The Burden of Cardiovascular Disease in North Dakota

2007

NORTH DAKOTA
DEPARTMENT of HEALTH

Heart Disease & Stroke
Prevention Program

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Preface

The North Dakota Heart Disease and Stroke Prevention Program is administered in the Division of Chronic Disease, Community Health Section, of the North Dakota Department of Health. It is funded by Cooperative Agreement number U50/CCU82134204 from the U.S. Centers for Disease Control and Prevention (CDC). The North Dakota program is directed toward capacity building.

Key activities of the program include:

- Coordinating and developing collaboration among public and private sector partners.
- Defining the cardiovascular disease (CVD) burden.
- Developing an inventory of policy and environmental strategies to assess heart-healthy policies and environments in various settings such as worksites and health care.
- Producing a comprehensive state plan for heart disease and stroke prevention by developing heart-healthy policies, changing physical and social environments, and eliminating disparities (e.g., those based on geography, gender, race or ethnicity, or income).
- Identifying culturally appropriate approaches to promote cardiovascular health (CVH) with racial, ethnic and other priority populations.
- Increasing awareness of the signs and symptoms of heart attack and stroke and the need to call 9-1-1.

The purposes of this report are to:

- Identify areas for the Heart Disease and Stroke Prevention Program to focus programmatic activities.
- Outline key strategies to be included in a comprehensive cardiovascular disease state plan.
- Increase cardiovascular disease awareness among key decision makers in North Dakota that will result in increased funding and urgency in addressing heart disease and stroke prevention.
- Provide data that will identify highest-risk populations and opportunities for intervention.

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- Kathleen R. Moum, MA
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- Karen K. Ehrens, LRD
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Key Findings

Unless otherwise stated, all data are from 2005.

- Cardiovascular disease (CVD) remained the leading cause of death in North Dakota. Of all deaths, 29 percent were attributed to heart disease, and 7 percent were attributed to stroke.
- There were more deaths from CVD than deaths from cancer, diabetes, suicide and Alzheimer's, combined.
- From 2000 to 2004, heart disease death rates were slightly higher in the U.S. than in North Dakota.
- Stroke death rates for both North Dakota and the U.S. were similar during the period 2000 to 2004.
- North Dakotans 65 and older are more likely to die from heart disease and stroke than any other age group. In fact, 95 percent of stroke deaths and 87 percent of heart disease deaths in 2005 were people 65 and older.
- American Indians living in North Dakota experience death due to cardiovascular disease at twice the rate of whites.
- The rate of diabetes among adult American Indians is two times greater than among whites.
- The smoking rate among adult American Indians is more than twice the rate of white adults.

- The 2006 cost of cardiovascular diseases in the U.S. was estimated to be $403.1 billion. Based on this figure, the estimated cost of CVD in North Dakota was $920 million. This figure includes both direct and indirect costs.
- In 2003, North Dakota Medicare (65 and older) payments for heart disease and stroke hospital discharges exceeded $61 million dollars.
- North Dakota residents with diagnosed diabetes experience cardiovascular disease at a higher rate than those who have not been diagnosed with diabetes, even when accounting for age.
- The major risk factors for CVD are primarily lifestyle related, such as smoking, physical inactivity, poor nutrition and unhealthy weight status (overweight or obese).
- Of North Dakota adults, 43 percent have three or more risk factors for cardiovascular disease.

- Twenty percent of North Dakota adults currently smoke. This rate has remained relatively stable, and about 50 percent of current adult smokers made at least one attempt to quit smoking in the previous year.

- Sixty-four percent of North Dakota adults are either overweight or obese.

- Nearly 80 percent of adults eat fewer than five fruits and vegetables daily.

- Fifty-two percent of North Dakota adults report they do not get adequate regular physical activity. Regular physical activity includes **either** moderate physical activity (activity that does not cause a person to sweat or breathe hard) for 30 or more minutes per day for five or more days per week, **or** vigorous activity (activity that causes a person to sweat and breathe hard) for 20 or more minutes per day on three or more days per week.

- Almost 25 percent of all adults report a history of high blood pressure, and 35 percent report high cholesterol. Both are key risk factors for future cardiovascular disease problems.

- Fifty-four percent of adults 65 and older report a history of high blood pressure, and 51 percent report high cholesterol.

- When physicians gave advice to control high blood pressure, patients changed their eating habits (80 percent), cut down on salt (89 percent), reduced alcohol use (92 percent), exercised (76 percent) and took medication (84 percent).

- Adults 65 and older are at a higher risk for heart attack or stroke, but they were less likely to recognize all the signs and symptoms of heart attack and stroke.

- More than 60 percent of the counties in North Dakota (34 out of 53) are designated medically underserved areas. Portions of 15 other counties are also designated as underserved. Two counties are designated with medically underserved populations and only two counties do not have either designation.

- All counties in North Dakota have at least one basic life support ground or advanced life support ground responder located within their boundaries.

- Many cardiovascular health risk behaviors are established in youth.

- The current smoking rate among youth in grades nine through 12 is 22 percent. This is a significant decrease from 41 percent in 1999.

- Students in grades nine through 12 are more likely to be physically inactive than students in grades seven and eight.

- Nearly 90 percent of high school students and more than 80 percent of students in grades seven and eight eat fewer than five fruits and vegetables daily.

- Eleven percent of high school students and 13 percent of students in grades seven and eight are overweight. These percentages have been increasing since 1999.

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Introduction

Cardiovascular disease (CVD) is the leading cause of death in North Dakota and the United States. In North Dakota, CVD alone accounts for more deaths than deaths from cancer, diabetes, suicide and Alzheimer's disease, combined.

The cost of cardiovascular diseases in the United States in 2006 was estimated to be **$403.1 billion**.[1] Based on this figure, the estimated cost (including both direct and indirect costs) in North Dakota in 2006 was **$920 million**. Direct costs include the cost of physicians and other professionals, hospital and nursing home services, the cost of medications, home health care, and other medical durables. Indirect costs include lost productivity that results from illness and death.

These are only economic costs; it is not possible to count the costs of CVD to North Dakotans in terms of human suffering and lives lost. People who lose their lives to these diseases leave behind family, friends and employers who struggle to carry on in the absence of loved ones and coworkers. Survivors of heart disease and stroke suffer pain and disability, along with the challenges of learning to live with a reality forever altered. Among adults 45 and older, nearly 20 percent have been told by a health professional that they have had a heart attack, 18.6 percent have angina or coronary heart disease, and 8.7 percent have experienced a stroke.

These diseases persist even though they are largely preventable. The major risk factors for cardiovascular disease are primarily lifestyle related, such as smoking, physical activity, nutrition and weight status (overweight or obese). In addition, the presence of high blood pressure, high cholesterol, and/or diabetes are key risk factors for future cardiovascular disease problems. The North Dakota Heart Disease and Stroke Prevention Program is working to reduce disease, disability and death related to heart disease, stroke and related risk factors through education, policy, systems and environmental changes and by facilitating healthy choices in day-to-day living at home, at work, in schools and within communities.

Before effective measures can be put in place to address the issues of cardiovascular disease, it is important to appreciate the magnitude of the diseases and their risk factors among the North Dakota population. This report presents statistics on cardiovascular disease prevalence, hospitalizations, mortality and risk factors among the citizens of North Dakota, including statistics specific to identified vulnerable populations.

Description and Definitions of Heart Disease and Stroke

Cardiovascular disease is defined as any abnormal condition characterized by dysfunction of the heart and blood vessels.

In this report, cardiovascular disease is separated into three diagnostic categories. Throughout this report, the term "stroke" will be used instead of cerebrovascular disease.

Diagnostic Category	Description	ICD-10 Codes
Heart Disease	Disease of the heart muscle or the blood vessels of the heart	I00-I09, I11, I13, I20-I51
Cerebrovascular Disease (Stroke)	Damage to the brain caused by interruption to its blood supply or leakage of blood outside of vessel walls	I60-I69
Other Cardiovascular Disease	Any other disease of the heart or blood vessels including atherosclerosis (hardening of the arteries), primary hypertension (high blood pressure), or hypertensive renal disease (kidney disease caused by high blood pressure)	I10, I12, I14-I19, I52-I59, I70-I78

North Dakota's Challenges

Several of the characteristics that define North Dakota's geography and population present challenges to reaching and helping to change environments, systems and choices for the state's residents.

<u>The land</u>
North Dakota encompasses a relatively large area, 68,975 square miles, with a sparse population, 642,200 residents. Thirty-six of the state's 53 counties are classified as "frontier" and have a population density of fewer than six people per square mile. This is where 21 percent of the population resides. The majority of our counties have a population base of fewer than 5,000 residents. Fifteen percent of the population resides in counties defined as "rural." The other 63 percent of the state's residents reside in the eight counties classified as "urban."

<u>The people</u>
Forty-three percent of North Dakota adults have three or more risk factors for cardiovascular disease. North Dakota adults with less than a high school education experience a higher prevalence rate for high blood pressure, high cholesterol, diabetes and overweight/obesity than any other education level.

Two population groups in North Dakota – the elderly and American Indians – are experiencing the burden of CVD more than others. North Dakotans 65 and older are more likely to die from heart disease and stroke than any other age group. Two-thirds of North Dakotans with a history of heart disease and two-thirds with a history of stroke are 65 and older. More than half of the state's residents 65 and older report a history of high blood pressure and high cholesterol. North Dakota residents 65 and older are also more likely to live in rural or frontier areas than are those younger than 65.

American Indians living in North Dakota experience death due to cardiovascular disease at twice the rate of whites, and stroke mortality is also higher for American Indians than for whites. Although American Indians and whites have similar prevalence rates of angina or coronary heart disease and stroke, American Indians in North Dakota are one and one-half times more likely to report a history of a heart attack. The rate of diabetes among adult American Indians is two times that of whites, and the smoking rate for adult American Indians is more than twice the rate of white adults.

Access to health care

Tertiary care hospitals are located in only four cities of the state, and nearly two-thirds of North Dakota counties are designated as "medically underserved" areas. There are two Indian Health Service (IHS) hospitals in the state. IHS currently provides health care to about 55 percent of American Indians in the United States, but only 55 percent of the funding needed to provide that health care has been allocated by the federal government.[2] According to the IHS, this funding gap limits health-care services and contributes to the lingering disparities of death and disease among American Indians.

Because of the great impact of heart disease and stroke on our elderly and American Indian populations and because of the limited health-care services available to those populations, it will take a focused effort to overcome these diseases in North Dakota. The Heart Disease and Stroke Prevention Program is committed to continuing its efforts to identify partners to engage, to eliminate barriers to quality health care, and to engage local champions to assist in developing culturally competent strategies and engaging their communities to find solutions to the problem.

Heart Disease and Stroke Prevention Program Is Ready To Meet the Challenges

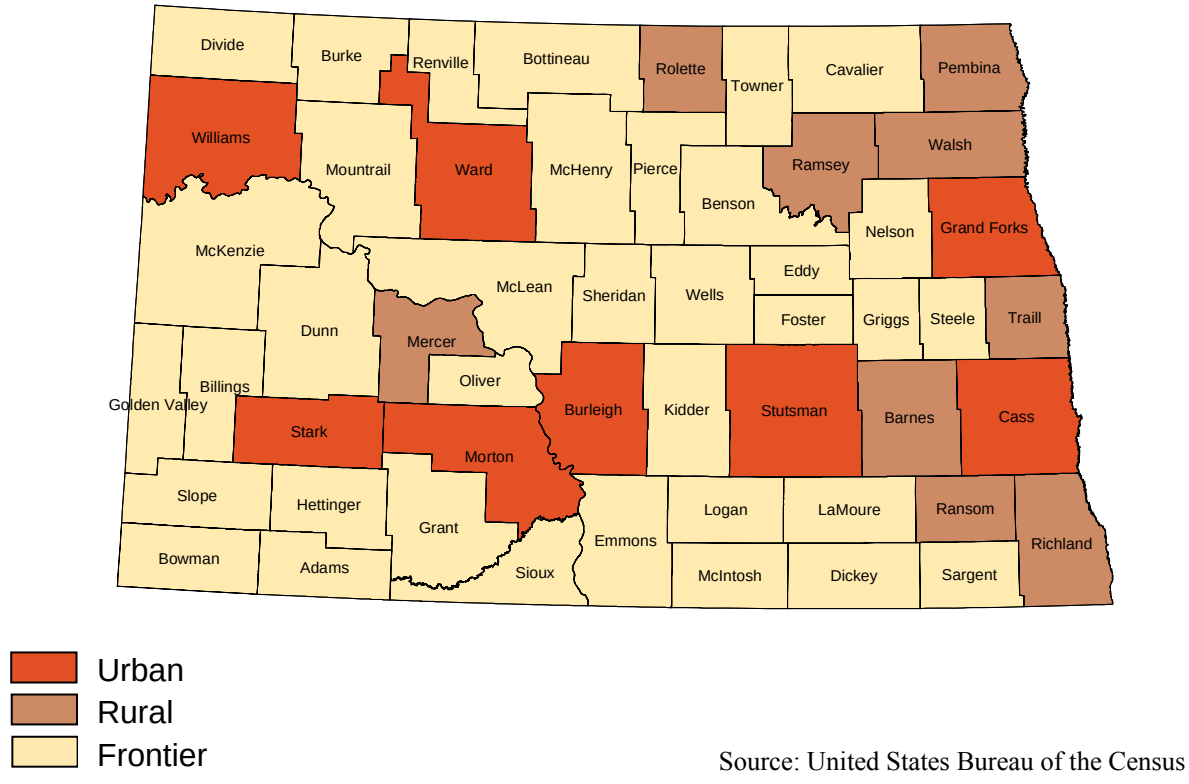
Throughout the remainder of this report, statistics and documentation about the burden of cardiovascular disease in North Dakota will be presented. Armed with this information, programs and policies can be targeted to the areas of greatest need, resulting in efficient distribution of resources and optimal impact. With the insight of, and assistance from, members of the North Dakota Heart Disease and Stroke Advisory Council and partners and practitioners throughout the state, a statewide plan to address heart disease and stroke in North Dakota will be built.

North Dakota Demographics

North Dakota is a predominantly frontier state with a population of 642,200 (2000 Census). Eight of the 53 counties in North Dakota are defined as "urban" (counties with a city of at least 15,000 population), nine counties are "rural" (no city with a 15,000 population but a density greater than or equal to six people per square mile) and the remaining 36 counties are defined as "frontier" (a population density fewer than six people per square mile). Sixty-three percent of the state's residents reside in the eight urban counties, 15 percent in the rural counties, and 21 percent in frontier counties. (See Appendix A.)

Figure. 1

North Dakota Counties



Source: United States Bureau of the Census

The median age for North Dakota residents is 36.2 years. Twenty-five percent of the population is younger than 18, while 15 percent are 65 and older. Females make up 50.1 percent of the population, while 49.9 percent are male. American Indians make up the largest racial minority in the state with 4.9 percent of the population, while 92.4 percent of the population is white.

Population Characteristics

The population of North Dakota is different from the United States population. The median household income is lower, a higher percentage of the population is 65 and older, and there is a longer life expectancy of more than two years. (See Appendix B for more facts.)

	North Dakota	United States
Median household income	$35,793	$42,228
People living below poverty level	11.9%	12.4%
Population 65 and older	14.7%	12.4%
People 65 and older with no high school degree	42.2%	34.5%
Uninsured adults	9.6%	14.6%
Life expectancy	77.6 yrs	75.4 yrs

The Elderly Population in North Dakota

North Dakota residents 65 and older are more likely to live in rural or frontier areas than are those younger than 65.[3] Although people 65 or older make up 15 percent of the state's population, 20 percent of the residents in rural and frontier counties are in this age group. Nearly half of the North Dakotans 65 and older live in rural or frontier counties, while only 35 percent of those younger than 65 live outside of the eight urban counties.

An Aging Population Will Challenge Our Health-Care Capacity

- The population of North Dakota is expected to grow only modestly over the next 15 years. The projected increase is 0.5 percent between 2000 and 2010, and only 1.4 percent between 2000 and 2020.[4]
- The most pronounced change in the state's population will be a dramatic increase in the elderly population. In 2000, 14.7 percent of the state's residents were 65 and older. By 2010, the proportion of elderly will jump to 17 percent and will move to 23 percent by 2020.[4]
- The number of North Dakotans 85 and older will increase by 28 percent from 2000 to 2010[5] and by 65 percent from 2000 to 2020.[4]
- Sixty-six percent of North Dakotans with a history of heart disease are 65 and older.[6]
- Sixty-eight percent of North Dakotans with a history of stroke are 65 and older.[6]

"The significant rise in seniors will require the need for more effective and efficient service delivery systems, elderly appropriate housing, a more integrated informal care system and a host of other needs.

Unfortunately, many of the rural areas are least prepared and equipped to meet these needs. That is why we need to plan ahead."

Richard Rathge
North Dakota State Data Center

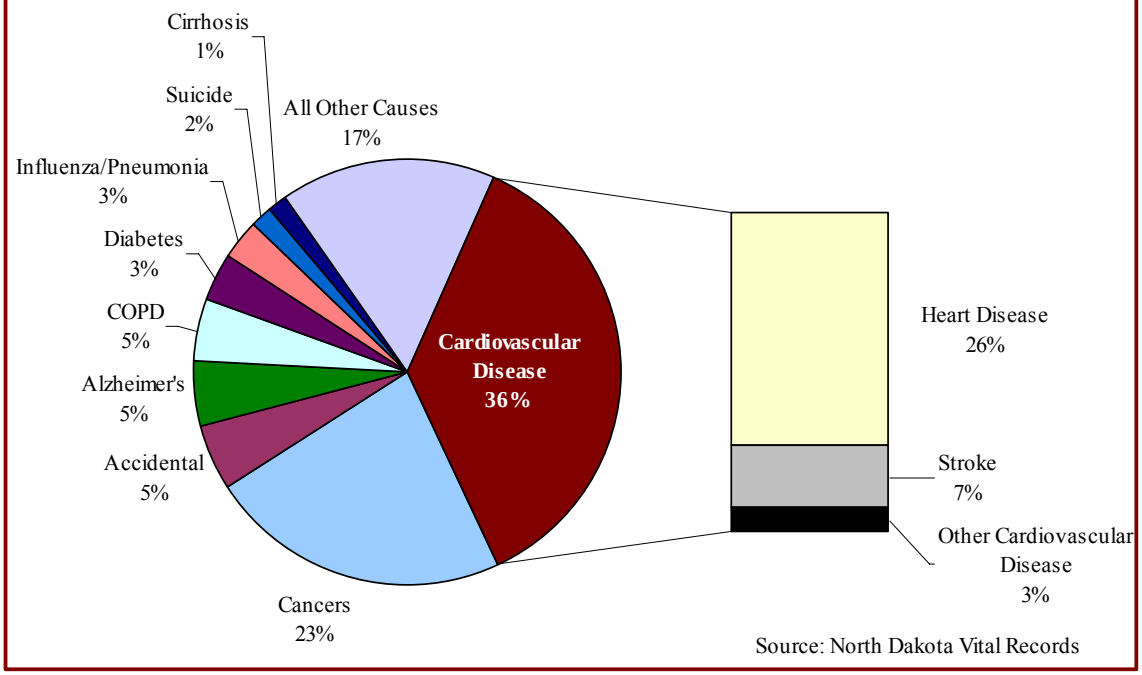
Mortality

Leading Causes of Death in North Dakota

Cardiovascular disease mortality is presented in three categories – diseases of the heart, stroke and other cardiovascular disease.

Heart disease was the leading cause of death in North Dakota in 2005. Stroke was the third leading cause of death in 2005. Together, cardiovascular disease accounted for 36 percent of all deaths in North Dakota in 2005.

Figure 2. 2005 North Dakota Leading Causes of Death



Source: North Dakota Vital Records

In 2005, 1,525 people in North Dakota died from heart disease, and 397 people died from stroke. An additional 154 people died due to some other form of cardiovascular disease.

Figure 3. Ten Leading Causes of Death
North Dakota 1999 - 2004

	Age Groups								
Rank	<1	1-14	15-24	25-34	35-44	45-54	55-64	65+	All Ages
1	Congenital Anomalies 99	Unintentional Injury 62	Unintentional Injury 244	Unintentional Injury 138	Unintentional Injury 180	Malignant Neoplasms 515	Malignant Neoplasms 1,080	**Heart Disease 8,585**	**Heart Disease 9,937**
2	Short Gestation 47	Malignant Neoplasms 18	Suicide 90	Suicide 80	**Heart Disease 163**	**Heart Disease 407**	**Heart Disease 727**	Malignant Neoplasms 6,165	Malignant Neoplasms 7,995
3	SIDS 46	Congenital Anomalies 15	Malignant Neoplasms 18	Malignant Neoplasms 39	Malignant Neoplasms 159	Unintentional Injury 174	Chronic Low. Respiratory Disease 123	**Stroke 2,720**	**Stroke 2,896**
4	Maternal Pregnancy Comp. 26	Suicide 7	**Heart Disease 14**	**Heart Disease 31**	Suicide 93	Liver Disease 81	Unintentional Injury 103	Chronic Low. Respiratory Disease 1,596	Chronic Low. Respiratory Disease 1,773
5	Placenta Cord Membranes 12	**Heart Disease 5**	Homicide 13	Homicide 17	Liver Disease 41	Suicide 79	**Stroke 94**	Alzheimer's Disease 1,519	Unintentional Injury 1,555
6	Respiratory Distress 10	*	Congenital Anomalies 6	Liver Disease 10	**Stroke 22**	Diabetes Mellitus 68	Diabetes Mellitus 94	Diabetes Mellitus 1,046	Alzheimer's Disease 1,531
7	Neonatal Hemorrhage 8	*	*	Diabetes Mellitus 7	Diabetes Mellitus 20	**Stroke 53**	Liver Disease 82	Influenza & Pneumonia 915	Diabetes Mellitus 1,236
8	Atelectasis 7	*	*	Influenza & Pneumonia 7	Homicide 16	Chronic Low. Respiratory Disease 37	Suicide 41	Unintentional Injury 648	Influenza & Pneumonia 984
9	Intrauterine Hypoxia 6	*	*	Congenital Anomalies 6	Congenital Anomalies 11	Influenza & Pneumonia 15	Influenza & Pneumonia 35	**Hypertension 347**	Suicide 465
10	Circulatory System Disease 6	*	*	HIV 5	Chronic Low. Respiratory Disease 9	Congenital Anomalies 13	Septicemia 21	Nephritis 344	Nephritis 370

* Not reportable, N < 5

Source: U.S. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control

Figure 3 addresses the top 10 leading causes of death in North Dakota by age category for the years 1999 through 2004.

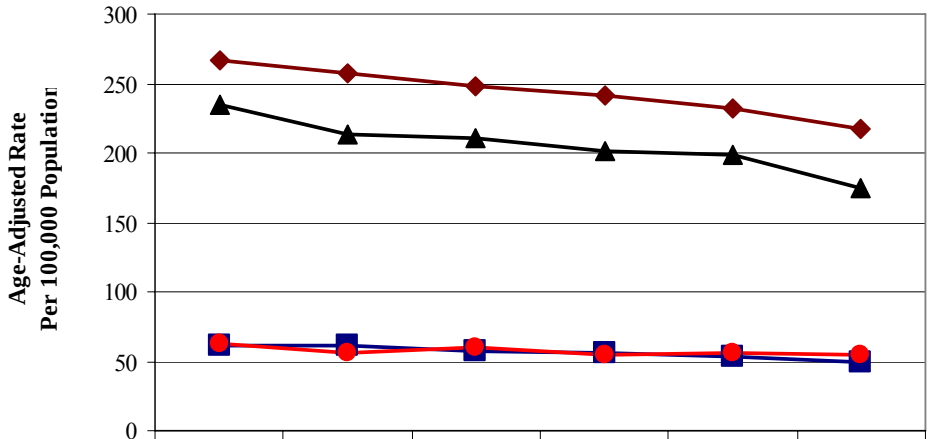
For people 65 and older, heart disease was the leading cause of death, while stroke was the third leading cause of death. In addition, hypertension was the ninth leading cause of death in this age group. Heart disease is in the top five for all age groups except infants younger than 1. Stroke is in the top seven for all age groups 35 and older.

Cardiovascular Disease Mortality

North Dakota and United States heart disease and stroke mortality rates have declined since 1999. These are age-adjusted rates per 100,000 population. Rates are age-adjusted to allow comparison between two populations with differing age group composition.

The U.S. heart disease mortality rate has been consistently higher than the rate for North Dakota, while the stroke mortality rates are relatively close.

Figure 4: Trends in Heart Disease and Stroke Mortality



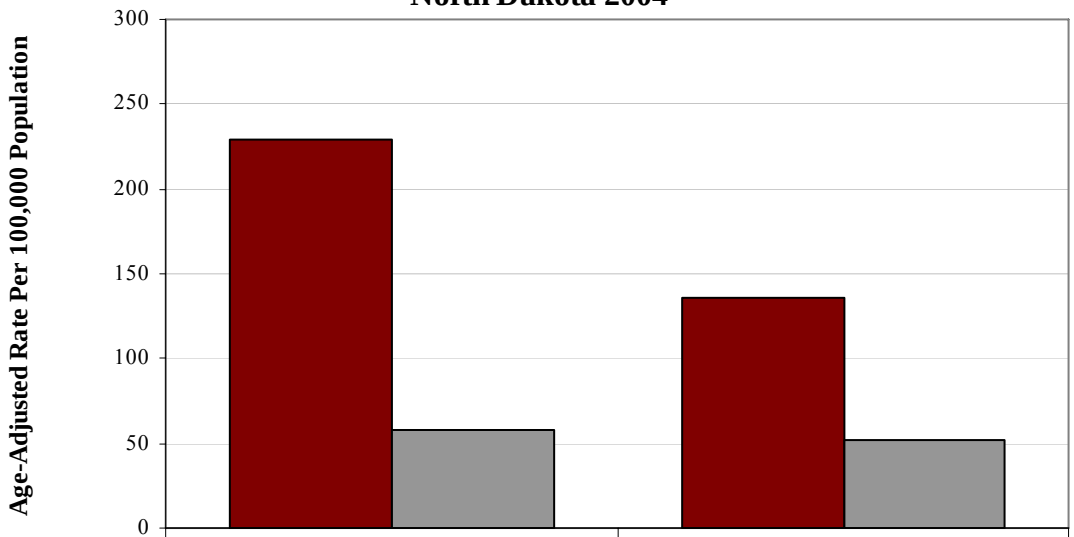
	1999	2000	2001	2002	2003	2004
U.S. Heart Disease	266.4	257.6	247.8	240.8	232.3	217.0
N.D. Heart Disease	234.2	212.7	210.1	200.7	198.6	175.0
U.S. Stroke	61.6	60.9	57.9	56.2	53.5	50.0
N.D. Stroke	63.0	55.5	60.0	54.2	55.5	54.3

Source: National Vital Statistics System, CDC Wonder

From 1999 to 2004, heart disease death rates decreased 18.5 percent for the nation, while in North Dakota the heart disease death rate declined 25.3 percent. During this same time period, stroke death rates decreased 18.8 percent for the nation, while in North Dakota the stroke death rate decreased 13.8 percent.

In Figure 5, North Dakota mortality rates for heart disease and stroke are presented by gender. The heart disease mortality rate for males is 69 percent higher than the rate for females, while the stroke mortality rate for males is 11 percent higher than the rate for females.

Figure 5. Cardiovascular Disease Mortality Rates by Gender
North Dakota 2004



	Male	Female
Heart Disease	229.2	135.5
Stroke	57.5	52.0

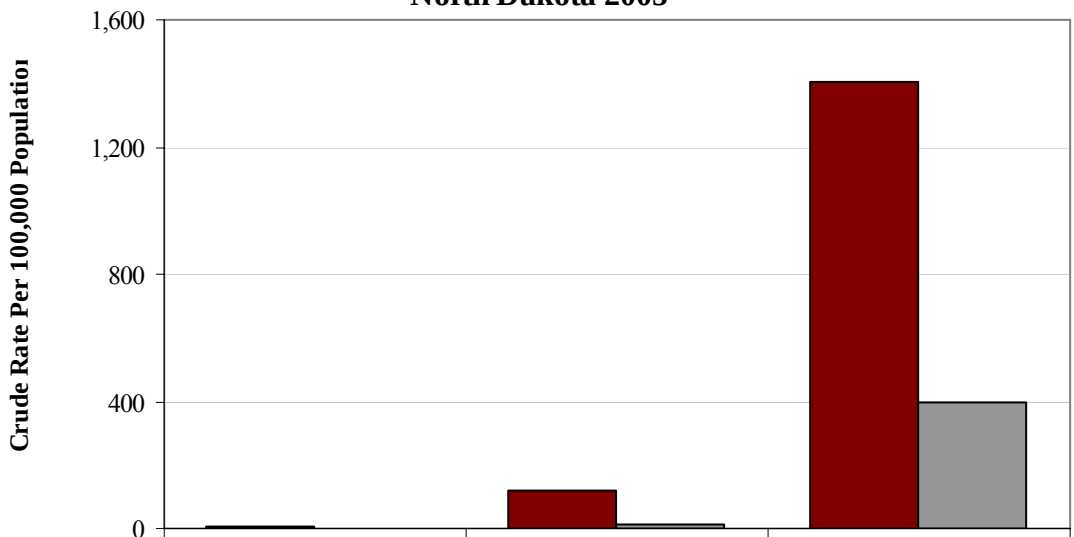
Source: North Dakota Vital Records

Mortality rates for heart disease and stroke increase dramatically with age. Of the 397 stroke deaths that occurred in 2005, 95 percent were among adults 65 and older. Of the 1,525 heart disease deaths that occurred in 2005, 87 percent were among adults 65 and older.

The rate of death from heart disease among people 65 and older is more than 12 times the rate for those 45 through 64 and 169 times the rate for those 0 through 44.

The rate of death from stroke among people 65 and older is more than 29 times the rate for those 45 through 64 and nearly 2,000 times the rate for those 0 through 44.

Figure 6. Cardiovascular Disease Mortality Rates by Age
North Dakota 2005

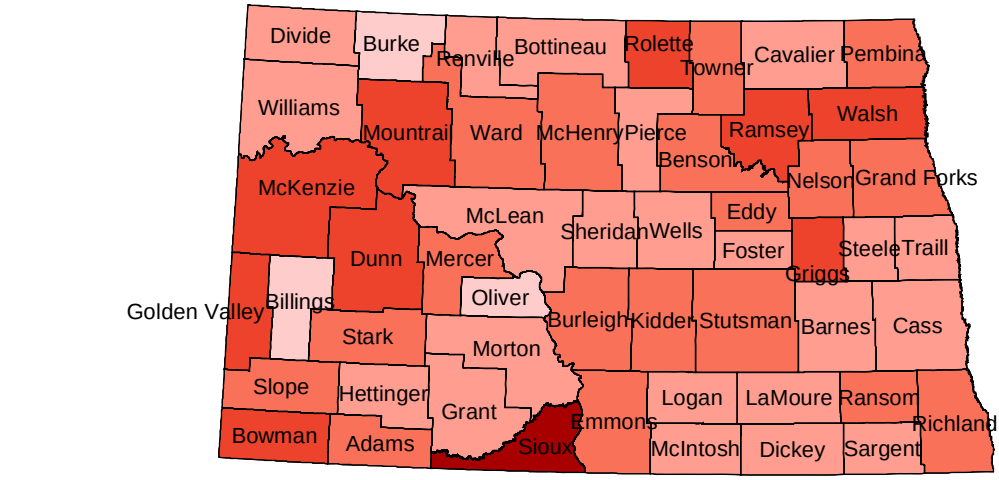


	0-44	45-64	65+
Heart Disease	8.3	116.7	1,406.7
Stroke	0.2	13.7	399.0

Source: North Dakota Vital Records

Figure 7 shows the heart disease mortality rate by county during the years 2000 through 2005. Sioux County had the highest rate, while three counties (Billings, Burke and Oliver) had the lowest rates.

Figure 7. Heart Disease Mortality Rate*
2000-2005



30-88
89-137
138-162
163-208
209-420

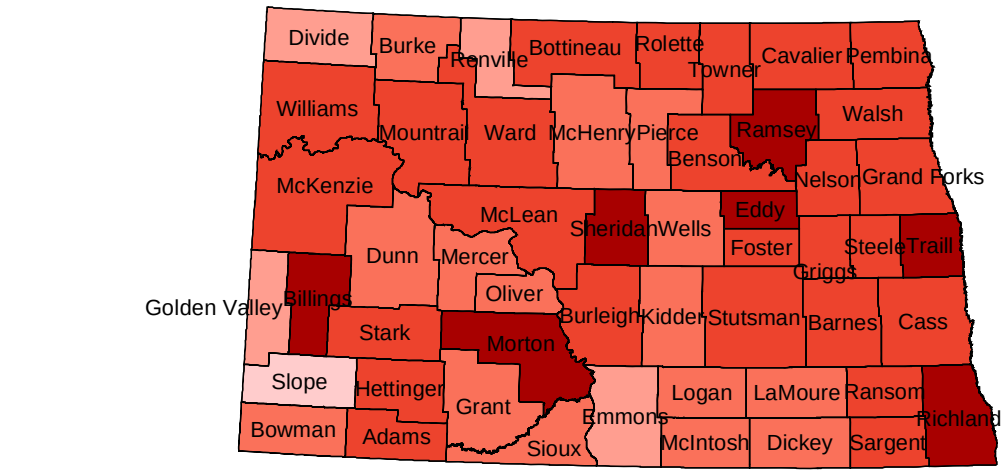
* Rate per 100,000 population age adjusted to the U.S. 2000 population standard.

Source: North Dakota Vital Records

Data used for this map can be found in Figure 9. These rates use multiple years of data in order to stabilize the annual rate fluctuations due to low population counts in some counties. All age groups are included in the calculation of these rates.

Figure 8 shows the stroke mortality rate by county during the years 2000 through 2005. Seven counties had the highest rates (Billings, Eddy, Morton, Ramsey, Richland, Sheridan and Traill), while Slope County had the lowest rate.

Figure 8. Stroke Mortality Rate*
2000-2005



* Rate per 100,000 population age adjusted to the U.S. 2000 population standard.

Source: North Dakota Vital Records

Data used for this map can be found in Figure 9. These rates use multiple years of data in order to stabilize the annual rate fluctuations due to low population counts in some counties. All age groups are included in the calculation of these rates.

Figure 9. Deaths by County

2000 – 2005 North Dakota Resident Deaths From Heart Disease and Stroke

	Number of Deaths		Age Adjusted Death Rate*	
County	Heart Disease	Stroke	Heart Disease	Stroke
Adams	64	20	149	32
Barnes	238	74	131	40
Benson	90	25	152	35
Billings	NR	NR	33	50
Bottineau	115	47	107	35
Bowman	97	16	169	31
Burke	37	10	87	27
Burleigh	839	251	142	42
Cass	1,138	343	132	40
Cavalier	97	29	126	36
Dickey	132	30	131	31
Divide	64	16	125	21
Dunn	74	9	167	22
Eddy	62	24	142	52
Emmons	119	12	152	15
Foster	80	25	132	37
Golden Valley	44	NR	171	17
Grand Forks	684	194	140	39
Grant	65	13	115	25
Griggs	91	20	185	40
Hettinger	57	18	111	36
Kidder	63	18	144	30
Lamoure	94	25	130	27
Logan	50	13	118	25
Mchenry	127	33	149	27
Mcintosh	127	35	135	29
Mckenzie	109	20	177	33
Mclean	178	51	125	33
Mercer	143	30	158	29
Morton	346	125	127	43
Mountrail	178	30	208	33
Nelson	121	39	154	38
Oliver	13	NR	76	23
Pembina	175	48	145	42
Pierce	111	26	126	26
Ramsey	292	96	178	49
Ransom	141	48	161	40
Renville	53	12	119	19
Richland	282	105	146	48
Rolette	163	34	177	37
Sargent	64	16	131	32
Sheridan	39	12	128	47
Sioux	45	NR	418	25
Slope	11	NR	161	0
Stark	366	100	148	37
Steele	35	9	133	33
Stutsman	373	119	143	37
Towner	70	29	138	39
Traill	157	69	129	45
Walsh	302	67	183	40
Ward	797	248	154	42
Wells	137	27	137	29
Williams	267	81	121	32

NR - To protect confidentiality, events that occur five or fewer times in a category will not be reported.

*** Rate per 100,000 population age adjusted to the U.S. 2000 population standard.**

Source: North Dakota Vital Records

Years of Potential Life Lost

The concept of years of potential life lost (YPLL) involves estimating the number of years a person would have lived had he or she not died prematurely. It represents the total number of years NOT lived by an individual who died before age 75. In 2005, 1,525 people in North Dakota died from heart disease, and 397 people died from stroke. The average years lost per death was 3.5 for heart disease and 1.6 for stroke. Of the people who died from heart disease, 23.5 percent were younger than 75, while 15.1 percent of those who died from stroke were younger than 75.

Figure 10. Years of Potential Life Lost (YPLL) Below Age 75
North Dakota 2005

Cause of Death	Total Deaths	Deaths Below Age 75	Total YPLL	Average YPLL Per Death
Heart Disease	1,525	359	5,305	3.5
Stroke	397	60	630	1.6

Source: North Dakota Vital Records

Summary and Discussion

Heart disease, stroke and other cardiovascular diseases accounted for 36 percent of all of the deaths in North Dakota in 2005. Heart disease alone accounted for one in four deaths. Heart disease was in the top five leading causes of death for all age groups except for infants. Stroke was in the top seven leading causes of death for all age groups older than 35.

Mortality rates for heart disease have decreased in the U.S. and North Dakota in recent years (1999–2004), while stroke death rates have remained level. Men have higher rates of cardiovascular disease mortality than women when the data is adjusted for age. Not surprisingly, people 65 and older have the highest cardiovascular mortality rate of any age group.

Of the people who died from heart disease, 23.5 percent were younger than 75, while 15.1 percent of those who died from stroke were younger than 75. This resulted in an average of 3.5 years of potential life lost to heart disease and 1.6 years lost to stroke for all of the deaths attributed to these causes.

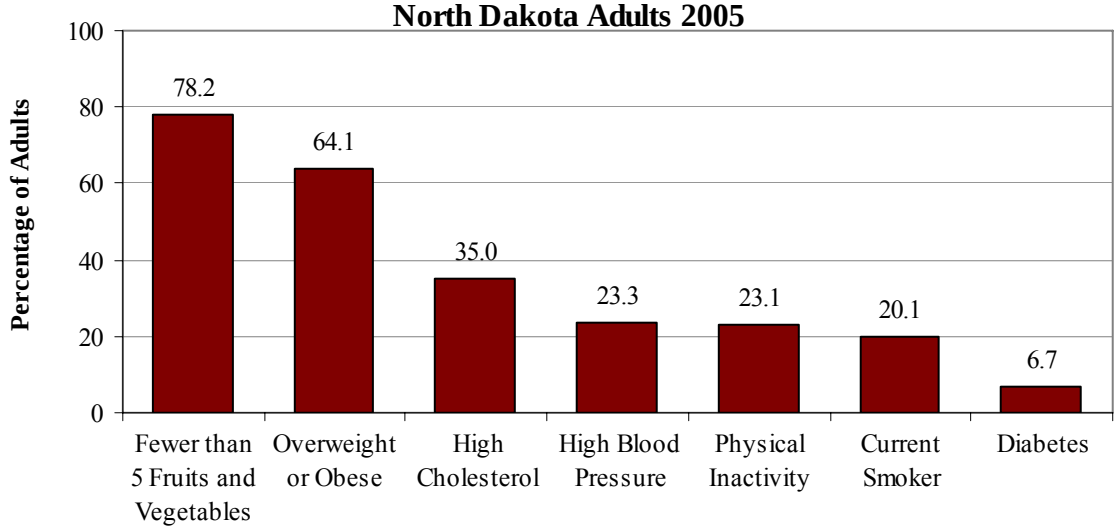
Cardiovascular Disease Risk Factors

Certain health behaviors and conditions, known as risk factors are associated with increased chances of developing cardiovascular disease. “Non-modifiable” risk factors are those that people are not able to change, such as age, gender and heredity/family history. The higher one’s age, the more likely he or she is to experience CVD. Men are more likely to have heart disease than women, although women are more likely to die as a result of heart disease than men. A family history of premature CVD is another risk factor that people are unable to change. As is noted in the Health Disparities section of this report, in annual risk factor surveys in North Dakota, American Indians are more likely to report diagnosis of CVD and many of its risk factors than are whites.

There are also “modifiable” risk factors – those factors that people can modify or control through lifestyle changes and/or medication. These preventable risk factors include poor dietary habits (illustrated by amount of fruits and vegetables consumed), physical inactivity, overweight and obesity, cigarette smoking, high blood pressure, high blood cholesterol, and diabetes. This section looks at those modifiable risk factors in North Dakota.

Unless otherwise noted, the data in this section comes from the Behavioral Risk Factor Surveillance System (BRFSS) survey.

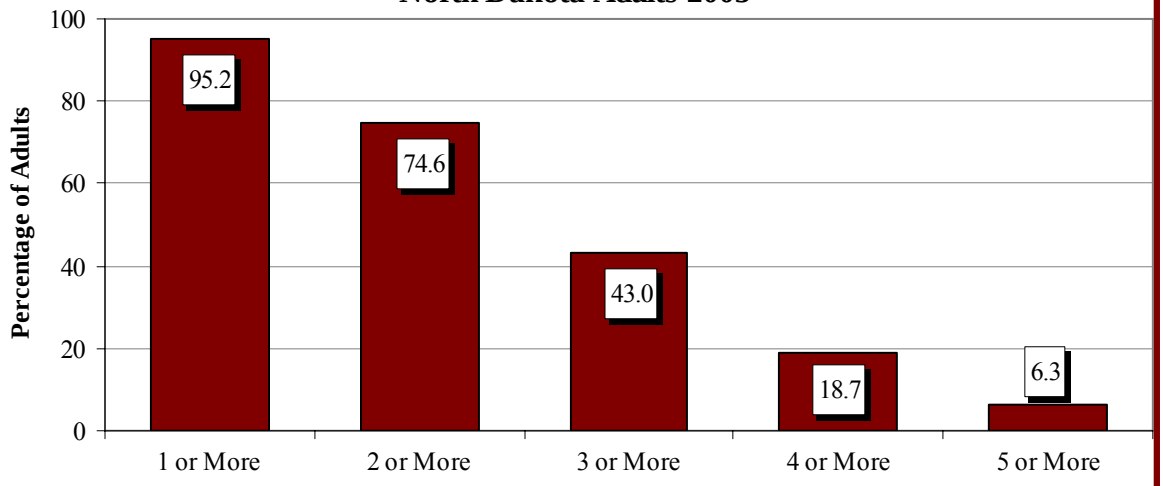
Figure 11. Risk Factors for Cardiovascular Disease
North Dakota Adults 2005



Source: Behavioral Risk Factor Surveillance System

Nearly all adults in North Dakota (95 percent) report at least one of the modifiable risk factors for CVD and thus are at risk for developing heart disease. Three-quarters of the population have two or more risk factors, and nearly half (43 percent) of North Dakota adults have three or more risk factors for cardiovascular disease.

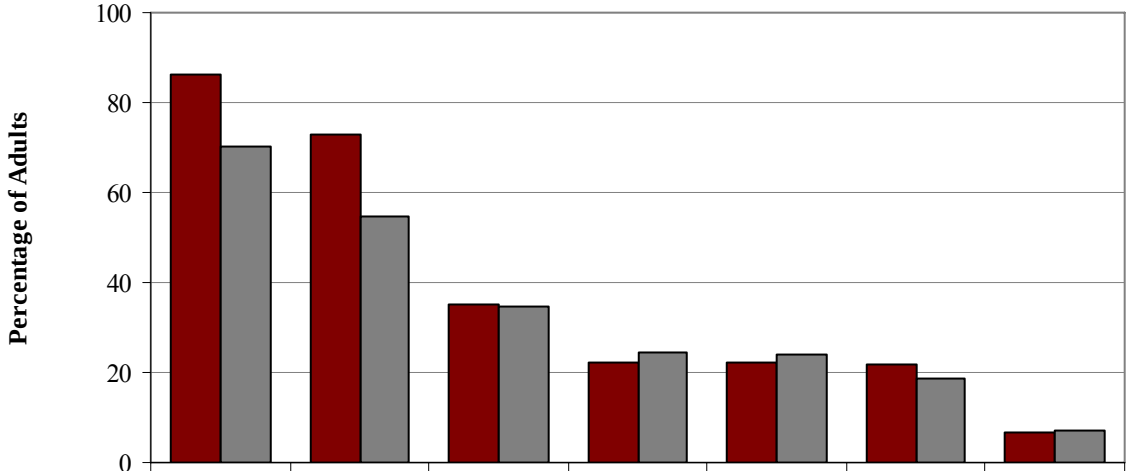
Figure 12. Number of Risk Factors for Cardiovascular Disease
North Dakota Adults 2005



Source: Behavioral Risk Factor Surveillance System

Women in North Dakota are more likely to eat the recommended amounts of fruits and vegetables and less likely to be overweight or obese. When it comes to the other risk factors, men and women are nearly equal in exhibiting risk factors.

Figure 13. Risk Factors for Cardiovascular Disease by Gender North Dakota Adults 2005

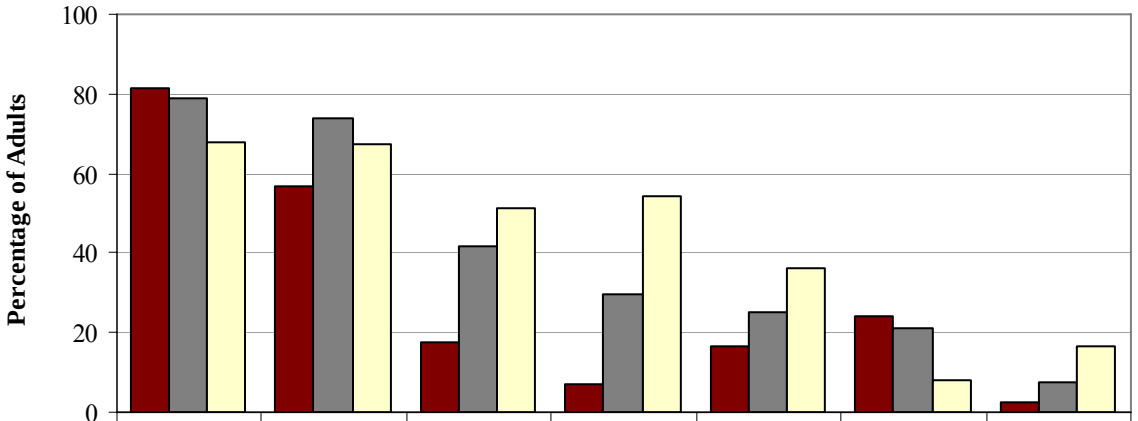


	Fewer than 5 Fruits and Vegetables	Overweight or Obese	High Cholesterol	High Blood Pressure	Physical Inactivity	Current Smoker	Diabetes
Male	86.2	73.1	35.2	22.1	22.1	21.6	6.5
Female	70.2	54.8	34.8	24.5	24.1	18.7	6.9

Source: Behavioral Risk Factor Surveillance System

As North Dakotans age, they are more likely to exhibit the risk factors of high cholesterol, high blood pressure, physical inactivity and diabetes. Younger adults are more likely to be physically active and to be smokers and less likely to be overweight or obese.

Figure 14. Risk Factors for Cardiovascular Disease by Age Group North Dakota Adults 2005

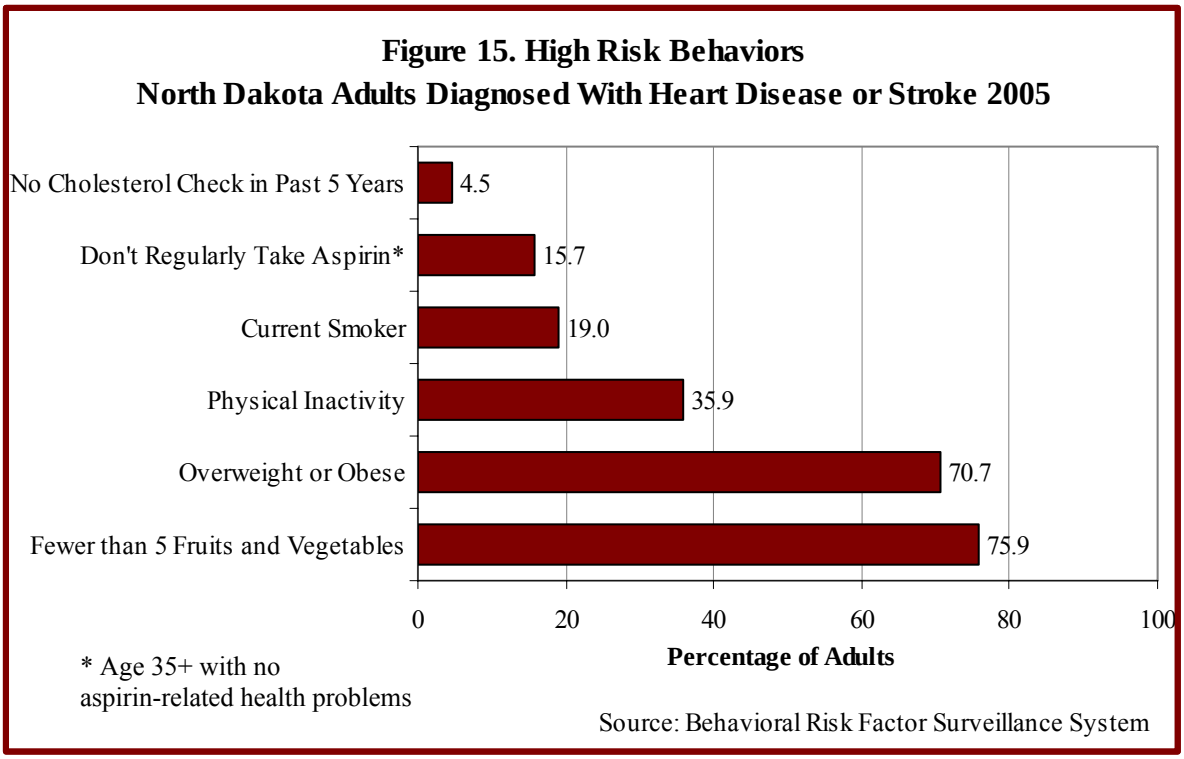


	Fewer than 5 Fruits and Vegetables	Overweight or Obese	High Cholesterol	High Blood Pressure	Physical Inactivity	Current Smoker	Diabetes
18-44	81.6	56.9	17.5	6.8	16.5	24.1	2.3
45-64	79.0	73.9	41.6	29.6	25.2	21.3	7.3
65+	67.8	67.1	51.2	54.2	36.2	7.8	16.4

Source: Behavioral Risk Factor Surveillance System

North Dakotans who have been diagnosed with CVD or stroke exhibit some of the same high risk behaviors when compared to the adult population. Rates of overweight/obesity in diagnosed people (71 percent) are higher than rates in the general population (64 percent); they also show higher rates of physical inactivity (36 percent) than those in the general population (23 percent). Rates of smoking are similar in both groups.

Figure 15. High Risk Behaviors
North Dakota Adults Diagnosed With Heart Disease or Stroke 2005



* Age 35+ with no aspirin-related health problems

Source: Behavioral Risk Factor Surveillance System

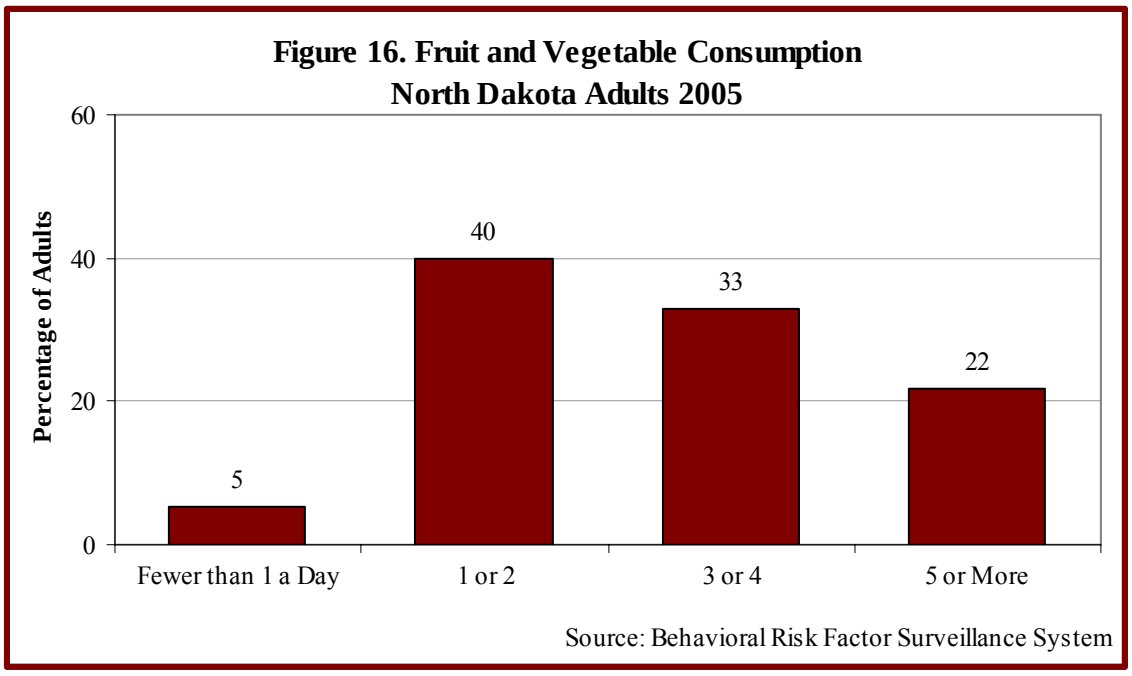
Eating Fruits and Vegetables

Why it is important

The amount of fruits and vegetables eaten is used as a measure of dietary habits. Compared with people who consume a diet with only small amounts of fruits and vegetables, those who eat more generous amounts as part of a healthful diet are likely to have reduced risk of chronic diseases, including stroke and other cardiovascular diseases. Also, because fruits and vegetables have low energy density (i.e., few calories relative to volume), eating them as part of a reduced calorie diet can be beneficial for weight management.[7]

How we are doing in North Dakota

Seventy-eight percent of North Dakota residents are not eating fruits and vegetables five or more times daily. The newest (2005) version of the Dietary Guidelines for Americans recommends that adults need from five to 13 cups of produce daily to get the maximum health benefits of fruits and vegetables.



How North Dakota compares with the rest of the U.S. and with national goals

North Dakotans' intake of fruits and vegetables is about the same as it is in the rest of the U. S.; as a national average, 77 percent of adults are not meeting the goal of eating fruits and vegetables five or more times a day.

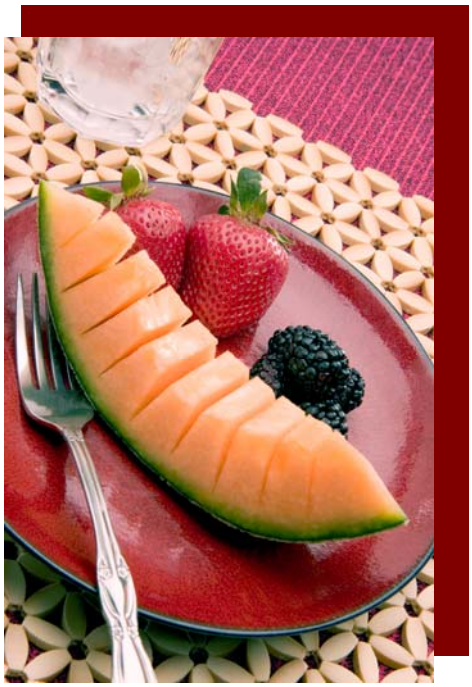
Healthy People 2010 goals for all Americans (HP2010) are to increase the proportion of people who consume at least two daily servings of fruit to 75 percent of the population and the proportion who consume at least three daily servings of vegetables to 50 percent.

Trends over time

The trend for fruit and vegetable consumption in North Dakota may be improving. In 2002, nearly 80 percent of adults were not eating fruits and vegetables five or more times daily.

Differences by age, gender or education level

- As North Dakotans grow older, they are more likely to eat fruits and vegetables in recommended amounts. In 2005, 79 percent of those 18 to 24 years old were eating fewer than five servings a day, while 68 percent of those 65 and older were eating fewer than five servings a day.
- Males (86 percent) are much more likely not to eat enough fruits and vegetables than females (70 percent).
- Those with at least some college education eat fruits and vegetables at recommended levels (23 percent to 25 percent) than those with a high school education or less (17 percent to 19 percent).



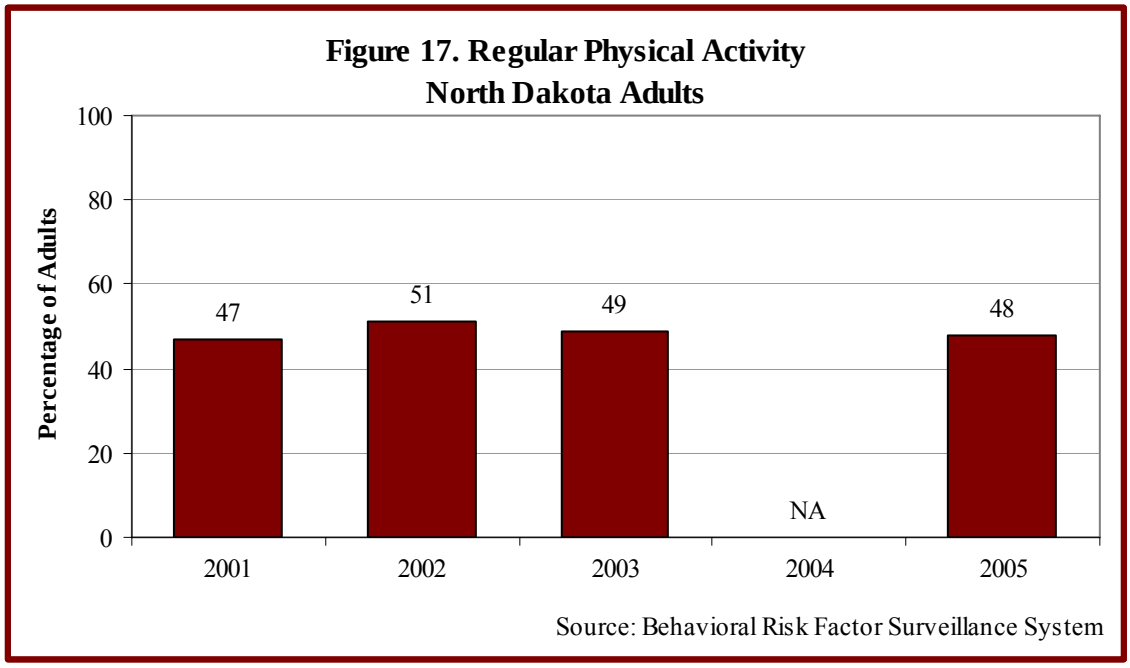
Physical Activity

Why it is important

Regular exercise can help control blood cholesterol, diabetes and obesity, as well as help to lower blood pressure in some people.[8] When people are not physically active, they are more likely to show increased risks for obesity, high blood cholesterol, high blood pressure and diabetes mellitus.

How we are doing in North Dakota

In North Dakota, about 48 percent of the population is getting regular physical activity. Regular physical activity includes **either** moderate physical activity (activity that does not cause a person to sweat or breathe hard) for 30 or more minutes per day for five or more days per week, **or** vigorous activity (activity that causes a person to sweat and breathe hard) for 20 or more minutes per day on three or more days per week.



How North Dakota compares with the rest of the U.S. and with national goals

The percentage of North Dakotans who are getting regular physical activity is near the national average of 49 percent.

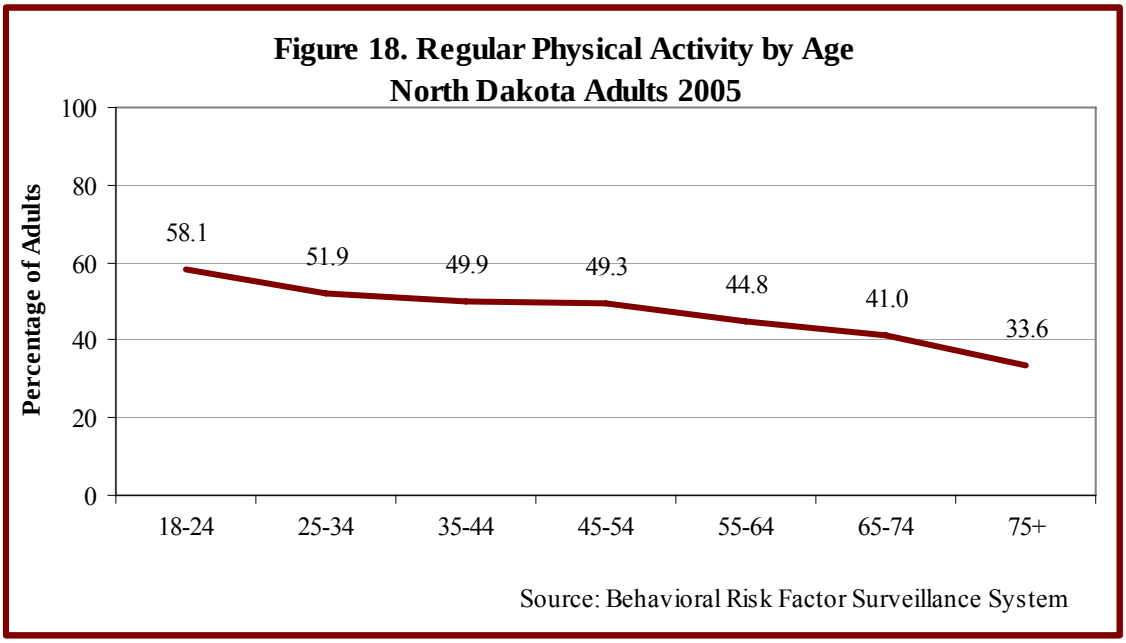
Related HP2010 goals are to increase the proportion of adults who engage regularly in moderate physical activity to 50 percent and to increase the proportion of adults who engage regularly in vigorous physical activity to 30 percent of the population.

Trends over time

The percentage of physically active people has remained fairly constant since 2001, with percentages ranging from 47 percent to 51 percent of the population reporting these levels of physical activity.

Differences by age, gender or education level

- As people in North Dakota age, they are less likely to be physically active on a regular basis. While 58 percent of adults 18 to 24 years old report getting regular physical activity, only 41 percent of those 65 to 74 years old and 34 percent of those 75 and older do.
- Roughly similar percentages of males and females engage in regular physical activity – 49 percent of men and 48 percent of women (BRFSS, 2005).
- North Dakota adults who have not completed high school are much less likely (only 35 percent) to engage in recommended levels of physical activity than those with at least a high school diploma (49 percent to 50 percent). This difference is related to age, as 21 percent of adults 65 and older have not completed high school, compared to 5 percent of adults younger than 65.



Overweight and Obesity

Why it is important

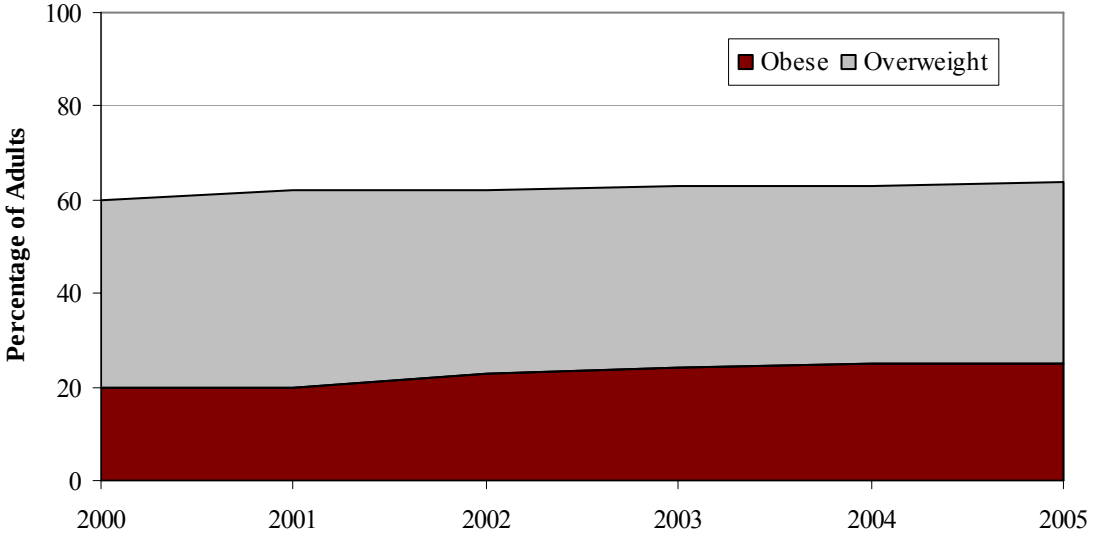
Adults who are overweight or obese are at increased risk for the occurrence of heart disease and stroke and the risk factors of heart disease and stroke. Adults who are overweight or obese are at increased risk of high blood pressure, high cholesterol, coronary heart disease, stroke, type 2 diabetes and other diseases such as osteoarthritis, sleep apnea, respiratory problems, and endometrial, breast, prostate and colon cancers.[9]

The good news is that by losing even as few as 10 pounds, you can lower your heart disease risk.

How we are doing in North Dakota

The percentage of North Dakota adults whose height and weight places them into the category of "obese" (body mass index [BMI] of 30 or above) is 25.4 percent. Thirty-nine percent are classified as "overweight" (BMI of 25-29.9). Together, 64 percent of North Dakotans are classified as "overweight or obese" (BMI ≥ 25); their body weight puts them at higher risk for heart disease or the risk factors of heart disease.

Figure 19. Self-Reported Prevalence of Overweight and Obesity North Dakota Adults



Source: Behavioral Risk Factor Surveillance System

How North Dakota compares with the rest of the U.S. and with national goals

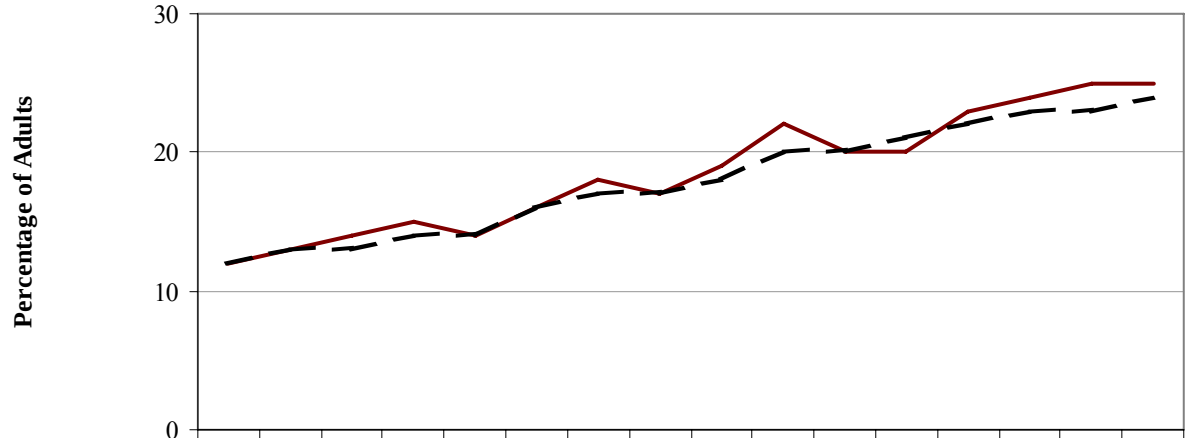
In 2005, the percentage of those ranked as obese in North Dakota (25.4 percent) was slightly higher than the U.S. average of 23.9 percent. However, overweight was a "bigger" problem in North Dakota, where 64 percent of North Dakotans report a BMI ≥ 25, which was greater than the national average of 60.5 percent.

The HP2010 goal for all Americans is to increase the percentage of adults who are at a healthy weight (BMI less than or equal to 25) to 60 percent and to reduce the percentage of adults who are obese to 15 percent. In North Dakota, we are far from meeting these goals, as only 46 percent of North Dakotans are in the healthy weight range and more than 25 percent are obese.

Trends over time

Since 1990, the percentage of adults classified as obese has doubled both in North Dakota (from 12 percent in 1990 to 25 percent in 2005) and the United States (from 12 percent in 1990 to 24 percent in 2005).

Figure 20. Obesity Trends Among North Dakota and U.S. Adults



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
North Dakota	12	13	14	15	14	16	18	17	19	22	20	20	23	24	25	25
United States	12	13	13	14	14	16	17	17	18	20	20	21	22	23	23	24

Source: Behavioral Risk Factor Surveillance

Differences by age, gender or education level

- North Dakota males (73 percent) are more likely to be overweight or obese (BMI >25) than are females (55 percent).
- The highest rates of obesity and overweight are found in those ages 45 to 64 (73 percent to 75 percent).
- While 62 percent of North Dakotans who have completed college are overweight or obese, 69 percent of those who have less than a high school education fall into this classification.

Tobacco Use

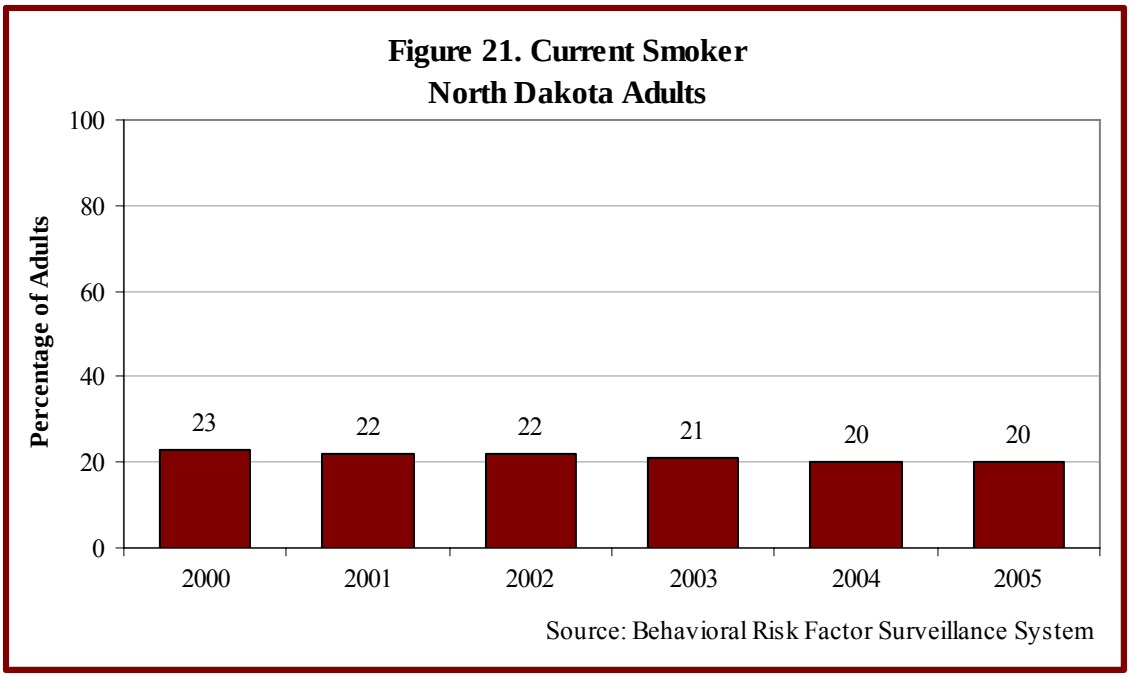
Why it is important
Smoking causes heart disease, lung cancer, emphysema and other chronic lung diseases, damages lung function, raises blood pressure and causes other diseases.[8]

How we are doing in North Dakota
Twenty percent of North Dakota adults currently smoke. About one-half (51.4 percent) of current adult smokers made at least one attempt to quit smoking in the previous year.

How North Dakota compares with the rest of the U.S. and with national goals
The rate of adult smoking in North Dakota is nearly the same as for the United States as a whole. In the U.S., 20.5 percent of adults report that they currently smoke.

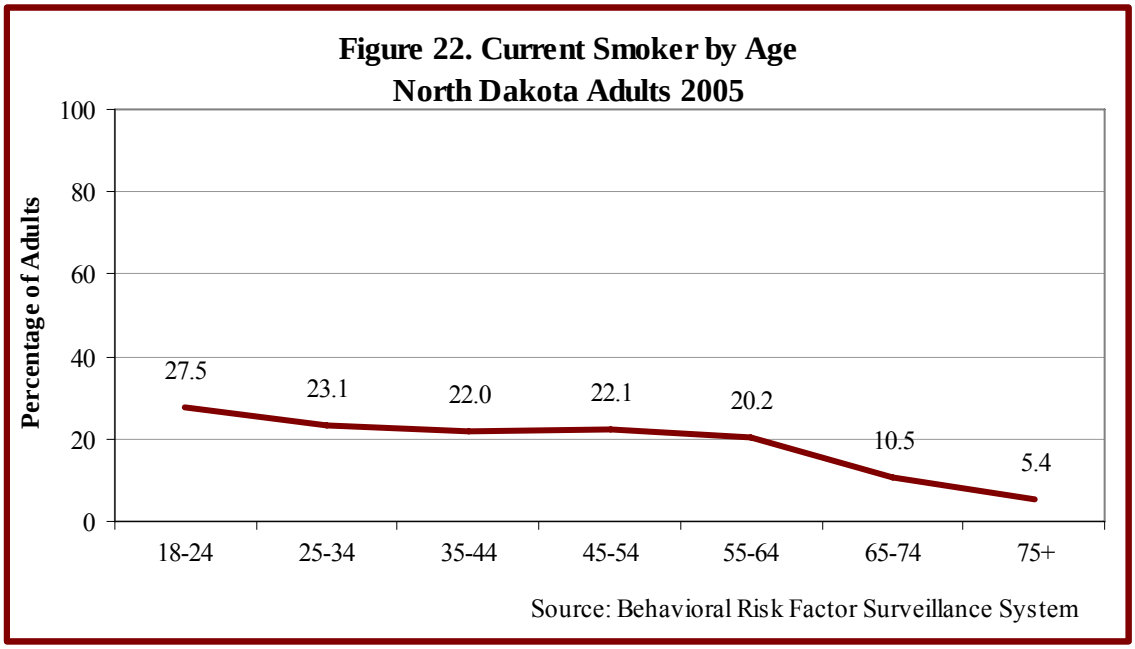
The HP2010 goal is to reduce cigarette smoking by adults to no more than 12 percent.

Trends over time
The rate of smokers has been declining slightly since 2000, when 23 percent of North Dakota adults reported that they currently smoked.



Differences by age, gender, or education

- In North Dakota, the younger the age, the more likely adults are to smoke. While 27.5 percent of 18- to 24-year-olds smoke, only 5.4 percent of those 75 and older currently smoke.
- Males are slightly more likely to smoke (21.6 percent) than women (18.7 percent).
- North Dakota adults who have not completed high school are much more likely (29 percent) to smoke than those who have completed college (10 percent).



High Cholesterol

Why it is important

The Framingham Heart Study established that high blood cholesterol is a risk factor for heart disease. The higher the cholesterol level, the greater the risk of heart disease.

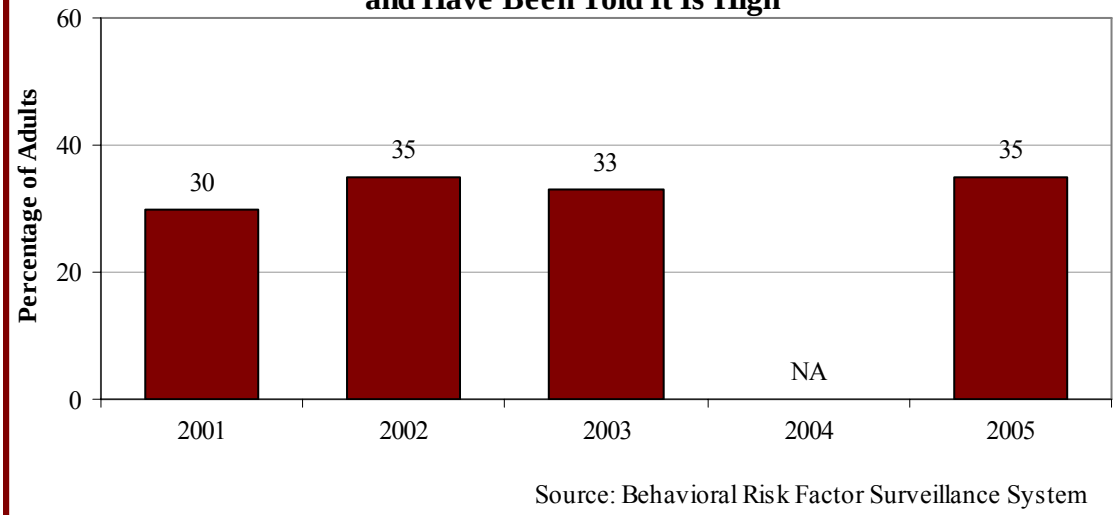
The good news is that a 10 percent reduction in serum cholesterol levels can result in a 30 percent reduction in the incidence of heart attacks and strokes.[10]

Studies among people with heart disease have shown that lowering high blood cholesterol can reduce the risk of dying of heart disease, having a nonfatal heart attack, and needing heart bypass surgery or angioplasty.

How we are doing in North Dakota

In the last statewide population study (2005 BRFSS), 35 percent of North Dakota adults who have ever had their blood cholesterol checked report that they have been told their blood cholesterol is high.

Figure 23. Self-Reported High Blood Cholesterol
North Dakota Adults Who Ever Had Their Cholesterol Checked and Have Been Told It Is High

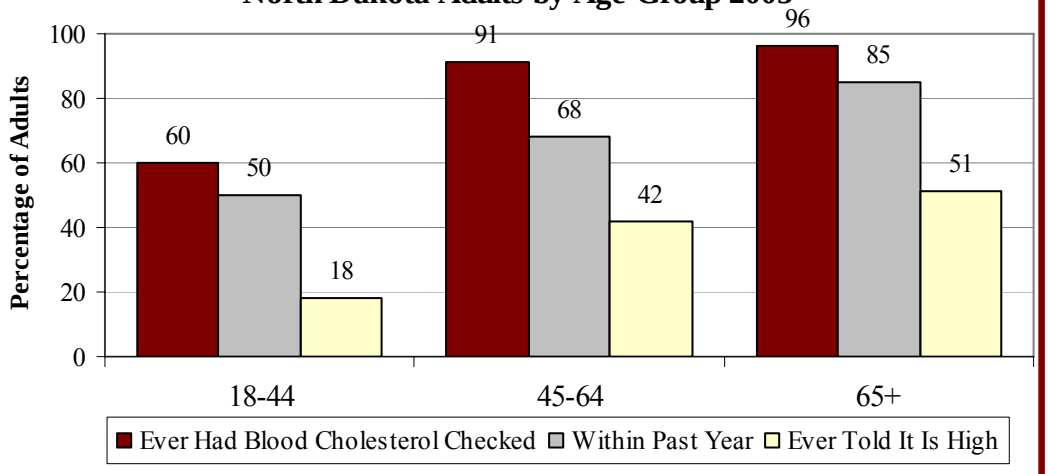


Source: Behavioral Risk Factor Surveillance System

Of adults reporting that they have had their cholesterol checked, 65.5 percent report that it has been checked in the past year. For 6.5 percent of people who have had their cholesterol checked, it has been more than five years since it was checked.

Those who are older are more likely to have ever had their blood cholesterol checked and checked in the last year. Eighty-five percent of those 65 and older report having their cholesterol checked in the past year, while only 50 percent of those 18 to 44 have done so in the last year.

Figure 24. Ever Had Cholesterol Checked – If Yes, Within the Past Year – and Ever Told Cholesterol Is High North Dakota Adults by Age Group 2005



Source: Behaviorial Risk Factor Surveillance System

How North Dakota compares with the rest of the U.S. and with national goals

The percentage of adults in North Dakota who report high cholesterol (35 percent) is nearly the same as for the United States as a whole (36.5 percent).

The HP2010 goal is to reduce the percentage of adults with high blood cholesterol to no more than 17 percent.

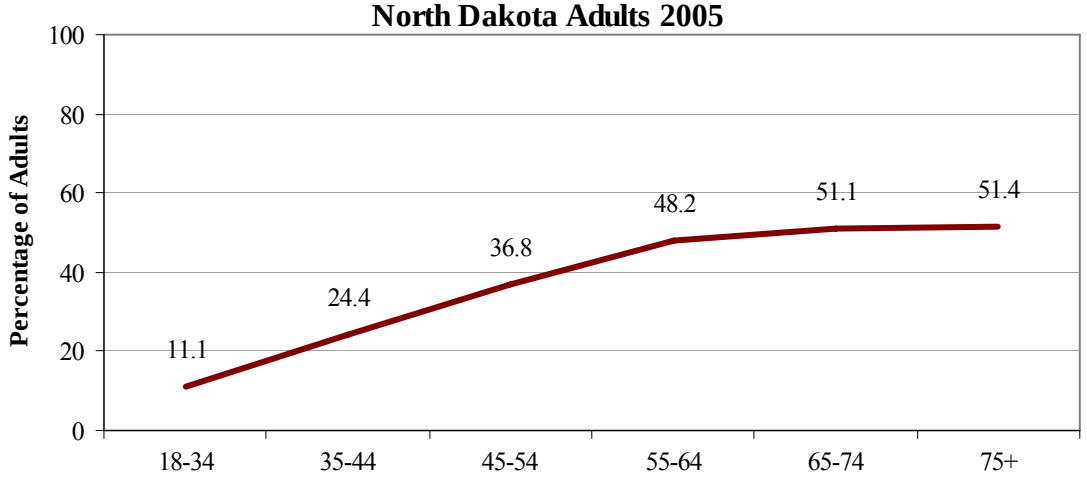
Trends over time

During the 1990s, the percentage of those who reported that they had been told their blood cholesterol was high remained at around 30 percent. There may be a trend toward a higher percentage of people in North Dakota with high blood cholesterol. In 2002 and 2005, 35 percent of people noted high blood cholesterol.

Differences by age, gender or education level

- Over half of adults 65 and older report a history of high cholesterol. This compares to 11 percent of the 18- to 34-year-old population.
- Of people who have had their blood cholesterol checked in the past year, males and females report the same rate, 35 percent, of high cholesterol.
- Those with less than a high school education are more likely to report having high cholesterol (30 percent) than those with at least some college education (26 percent). This difference is related to age, as 21 percent of adults 65 and older have not completed high school, compared to 5 percent of adults younger than 65.

Figure 25. High Cholesterol by Age
North Dakota Adults 2005



Source: Behavioral Risk Factor Surveillance System

High Blood Pressure

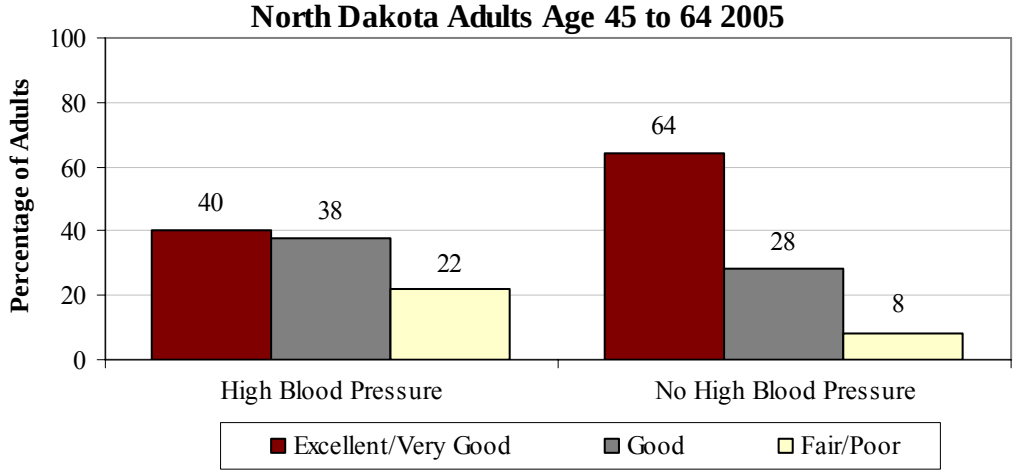
Why it is important

With high blood pressure, the heart has to work harder, resulting in an increased risk of a heart attack, stroke, heart failure, kidney and eye problems, and peripheral vascular disease.[11]

The good news is that improved nutritional choices and increased physical activity can help lower blood pressure, which also reduces heart disease risk.[12]

North Dakotans who do not have high blood pressure are more likely to report that they experience a better general health status. Only 40 percent of people with high blood pressure report an "excellent/very good" general health status, while 64 percent of those without high blood pressure rate their health status at this level.

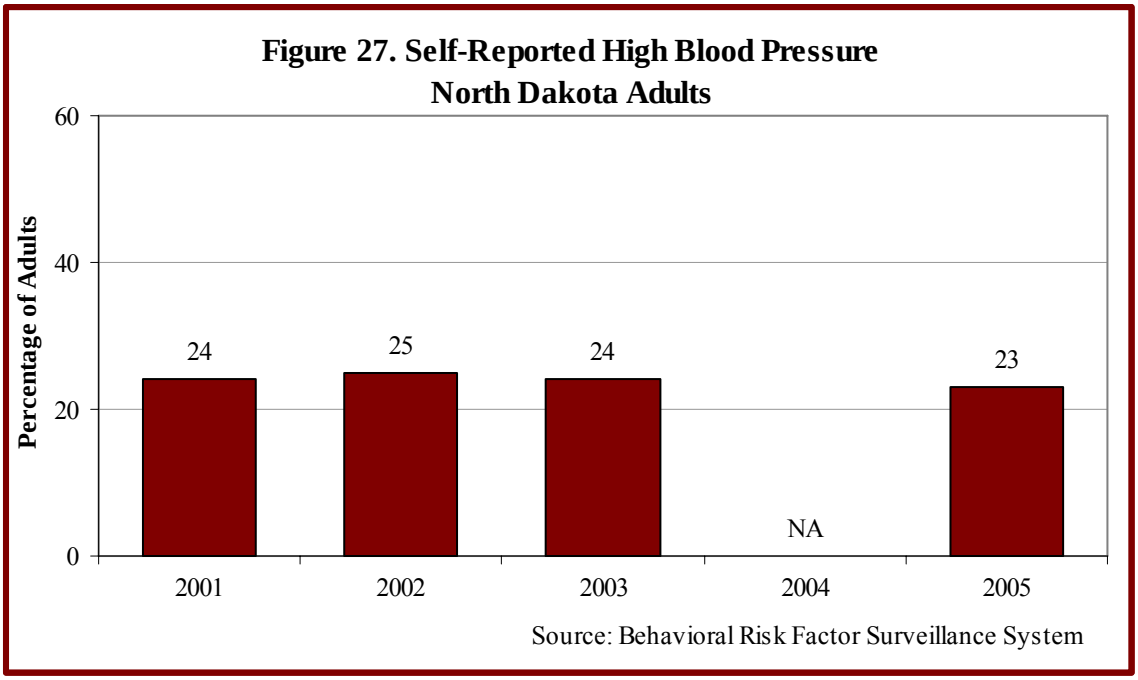
Figure 26. Self-Reported General Health Status by Lifetime Hypertension Status
North Dakota Adults Age 45 to 64 2005



Source: Behaviorial Risk Factor Surveillance System

How we are doing in North Dakota

Almost a quarter of **all** adults in North Dakota (23.3 percent) report a history of high blood pressure. More than half of adults age 65 and older (54 percent) report a history of high blood pressure.



How North Dakota compares with the rest of the U.S. and with national goals

A slightly lower proportion of North Dakotans (23 percent) report having high blood pressure than do all adults in the United States (25.5 percent).

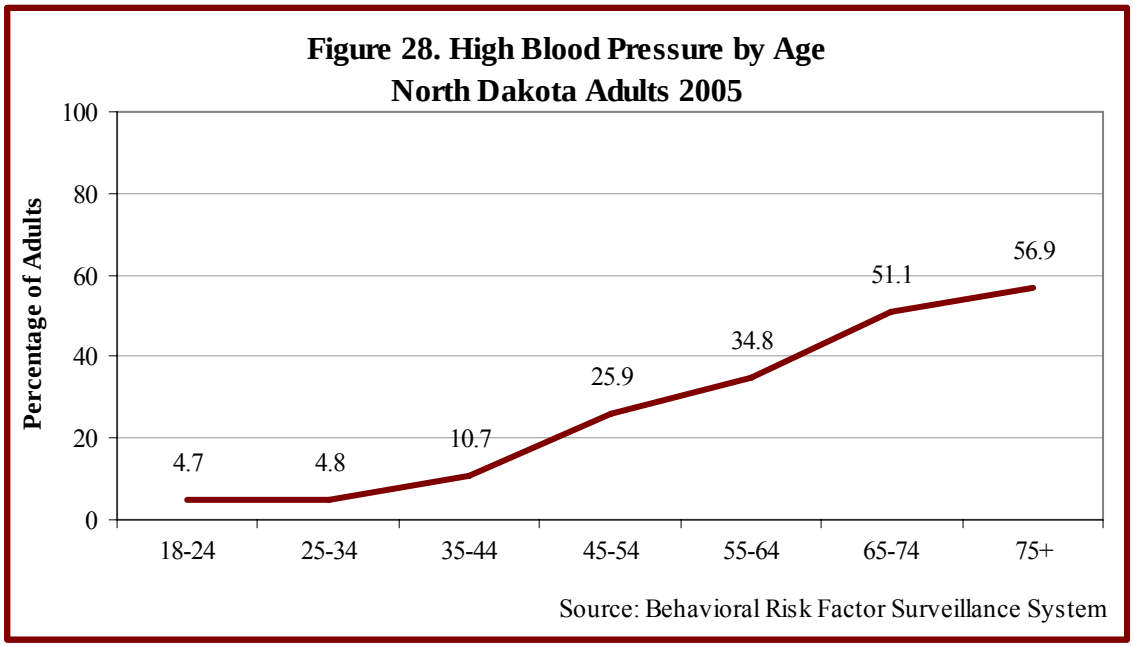
The HP2010 goal is to reduce the number of adults with high blood pressure to no more than 16 percent.

Trends over time

The percentage of adults who report that they have been told they have high blood pressure has remained stable over the past 10 years, hovering around 23 percent to 26 percent of the adult population surveyed.

Differences by age or gender or education level

The risk for high blood pressure increases as one ages. While less than 5 percent of North Dakotans ages 18 to 34 report high blood pressure, more than one-third (34.8 percent) of those 55 to 64 report it, as do 57 percent of those 75 and older.

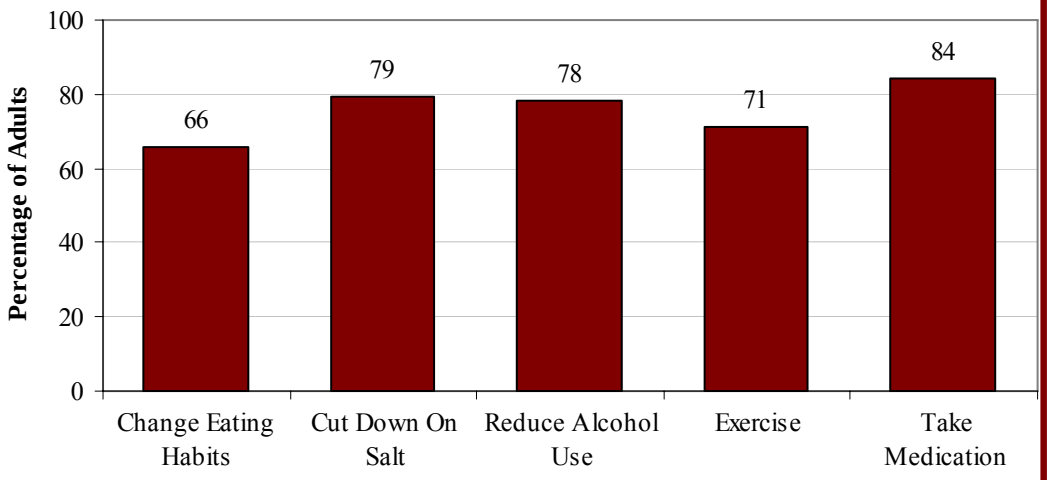


- On average in North Dakota, more women (25 percent) than men (22 percent) of all ages report high blood pressure.
- People with less than a high school education are twice as likely to report high blood pressure (38.9 percent) than do those with a college degree (19 percent). This difference is related to age, as 21 percent of adults 65 and older have not completed high school, compared to 5 percent of adults younger than 65.

What people are doing to control their high blood pressure

People who report having high blood pressure are taking action to control their blood pressure. North Dakotans report changing their eating habits (66 percent), cutting down on salt (79 percent), reducing alcohol use (78 percent), exercising (71 percent) and taking medication (84 percent).

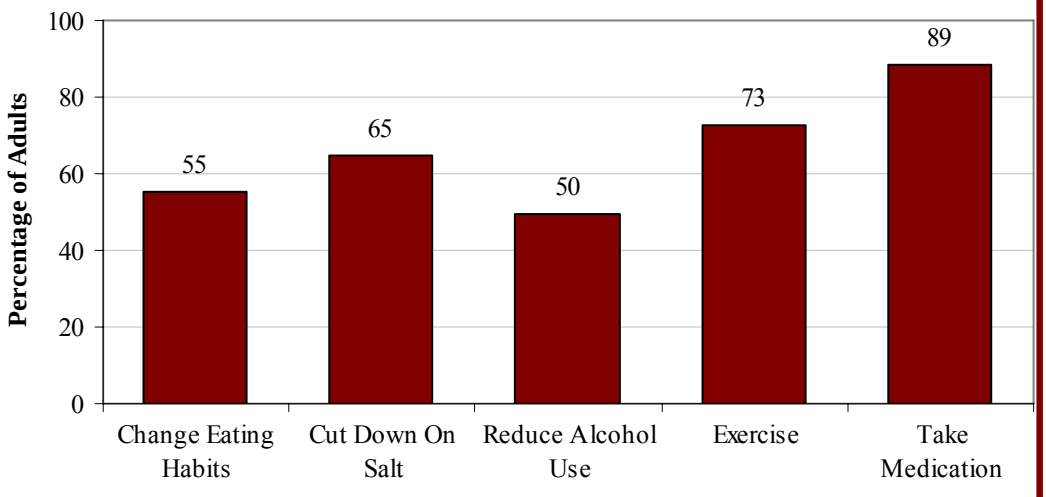
Figure 29. Actions To Control Blood Pressure
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

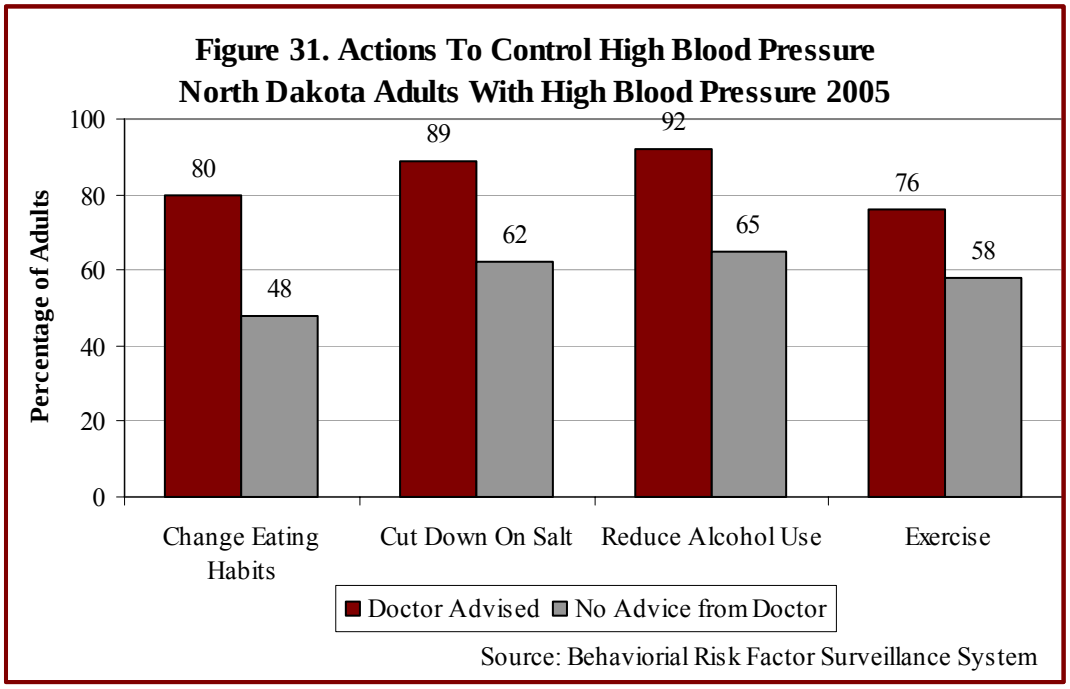
People who report having high blood pressure report that their physicians gave advice to change eating habits (55 percent), cut down on salt (65 percent), reduce alcohol use (50 percent), exercise (73 percent) and take medication (89 percent).

Figure 30. Doctor's Advice To Control Blood Pressure
North Dakota Adults 2005



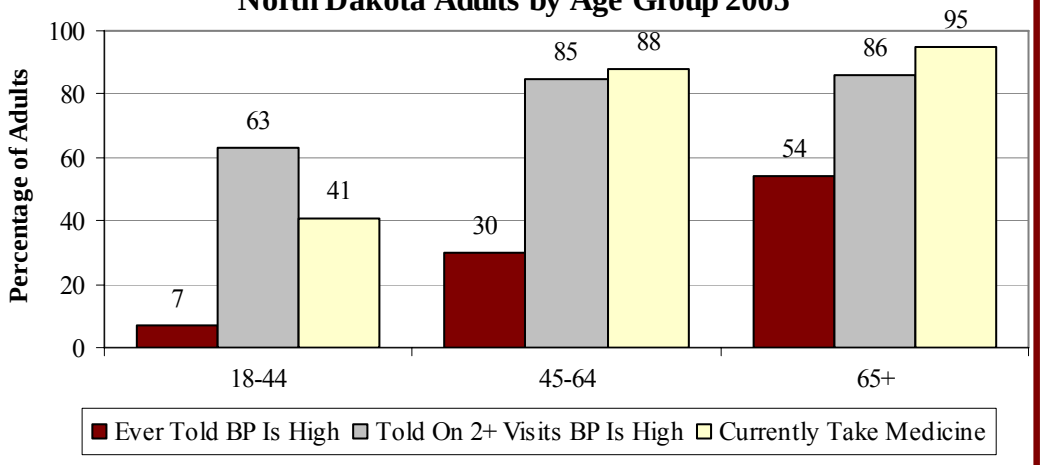
Source: Behaviorial Risk Factor Surveillance System

When physicians gave advice to control high blood pressure, North Dakotans changed their eating habits (80 percent), cut down on salt (89 percent), reduced alcohol use (92 percent), exercised (76 percent) and took medication (84 percent).



Older adults who have been told that their blood pressure is high on two or more occasions are taking medication to control blood pressure at higher rates than younger adults who have been given this advice.

Figure 32. Ever Told Blood Pressure Is High – If Yes, Told on Two or More Visits – and Currently Taking Medicine North Dakota Adults by Age Group 2005



Source: Behaviorial Risk Factor Surveillance System

Diabetes

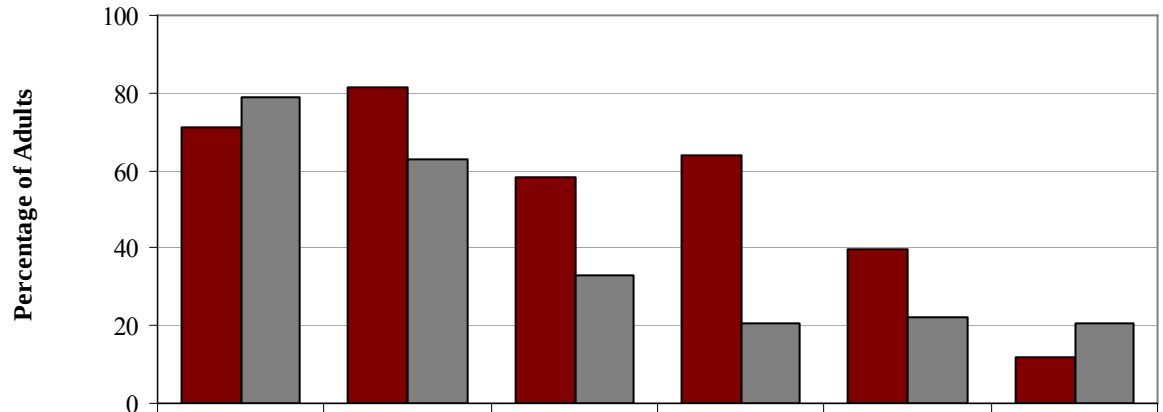
Why it is important

Diabetes seriously increases the risk of developing CVD. Even when blood sugar levels are under control, diabetes increases the risk of heart disease and stroke, but the risks are even greater if blood sugar is not well controlled. About three-quarters of people with diabetes die of some form of heart or blood vessel disease.[8]

When comparing adults with diagnosed diabetes to those without, those with diabetes are more likely to:

- Eat fewer than the recommended amounts of fruits and vegetables.
- Be overweight or obese.
- Have high cholesterol.
- Be physically inactive.
- Be more than three times more likely to have high blood pressure.

Figure 33. Risk Factors for Cardiovascular Disease by Diabetes Status North Dakota Adults 2005

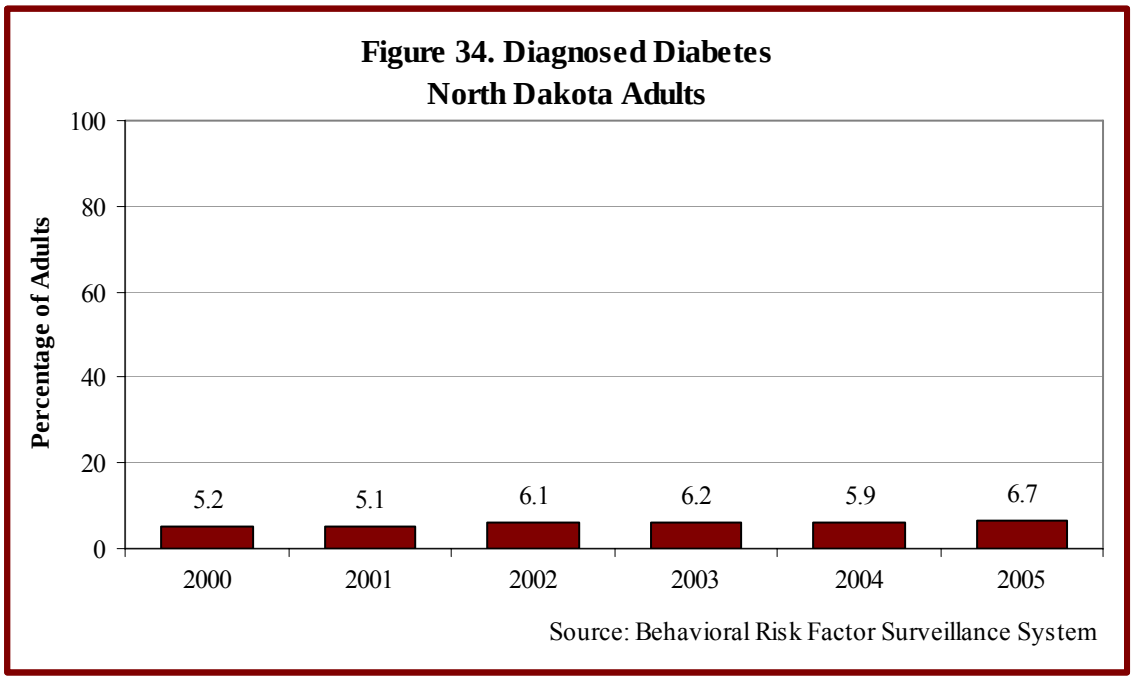


	Fewer than 5 Fruits and Vegetables	Overweight or Obese	High Cholesterol	High Blood Pressure	Physical Inactivity	Current Smoker
Diabetes	71	81	58	64	40	12
No Diabetes	79	63	33	20	22	21

Source: Behaviorial Risk Factor Surveillance System

How we are doing in North Dakota

In 2005, 6.7 percent of adults in North Dakota reported that they had been diagnosed with diabetes. In addition, it is estimated that an additional 3.35 percent have diabetes but have not been diagnosed. This means that one in 10 North Dakota adults have diabetes.



How North Dakota compares with the rest of the U.S. and with national goals

The rate of diagnosed diabetes (6.7 percent) in North Dakota is slightly lower than the national average of 7.3 percent of the adult population.

The HP2010 goal is to reduce the rate of diagnosed diabetes to 2.5 percent of the population.

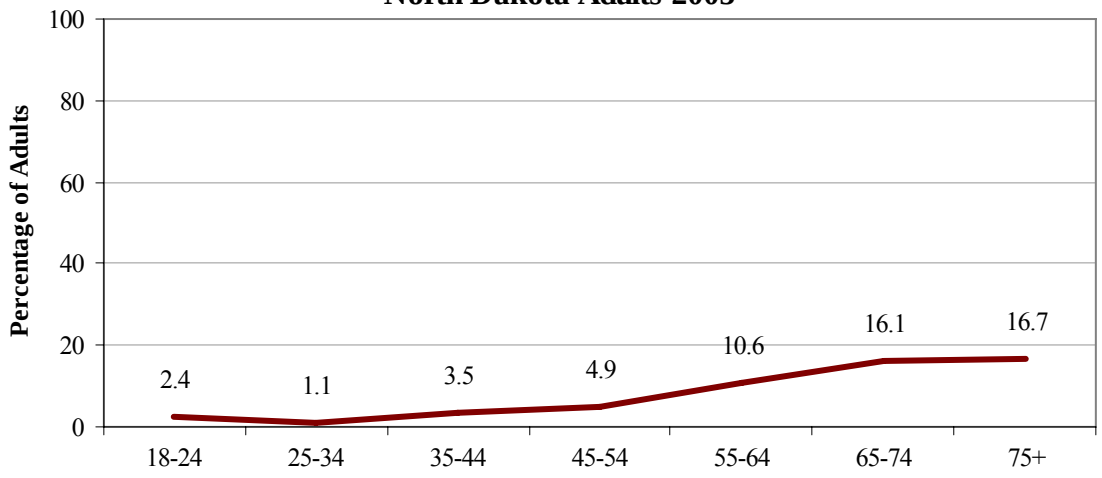
Trends over time

The percentage of people with diabetes in North Dakota has been increasing at an alarming rate; the rate has nearly doubled from 1997, when 3.5 percent of the adult population reported being diagnosed with diabetes, until 2005, when 6.7 percent reported this diagnosis.

Differences by age or gender

- The prevalence of diabetes increases with age. While fewer than three in 100 of those younger than 34 report the diagnosis, nearly 17 of 100 of those 75 and older report a diagnosis of diabetes.
- The rate of diabetes is nearly the same in men and women of all ages in North Dakota.
- Those with less than a high school education (13 percent) are more than twice as likely to report being diagnosed with diabetes as those with a college education (5 percent). This difference is related to age, as 21 percent of adults 65 and older have not completed high school, compared to 5 percent of adults younger than 65.

Figure 35. Diagnosed Diabetes by Age
North Dakota Adults 2005



Source: Behavioral Risk Factor Surveillance System

Summary and Discussion

As North Dakotans age, they are more likely to exhibit the risk factors of high cholesterol, high blood pressure, physical inactivity and diabetes. North Dakota's increasing proportion of elderly, age 65 and older, is an issue specific to our state. According to the North Dakota State Data Center, if current population trends continue, there will be a large jump in the proportion of seniors (ages 65 and over) from the current level of 15 percent to an estimated 23 percent by 2020.[13] Combining aging trends with the decline in the prime working-age population, it is predicted that by 2020 there will be more seniors in the state than those of prime working age. North Dakota will need to consider how to prevent CVD, as well as how to care for those with cardiovascular disease and other chronic diseases like diabetes.

Those North Dakotans with less than a high school education are more likely to be overweight or obese; to smoke; and to have high cholesterol, high blood pressure and diabetes; and are less likely to be physically active or eat recommended amounts of fruits and vegetables. These differences are related to age, as 21 percent of adults 65 and older have not completed high school, compared to 5 percent of adults younger than 65. Special consideration will need to be taken to reach this population and find ways to help them change behaviors to reduce their risk.

Cardiovascular Disease Risk Factors in North Dakota's Youth

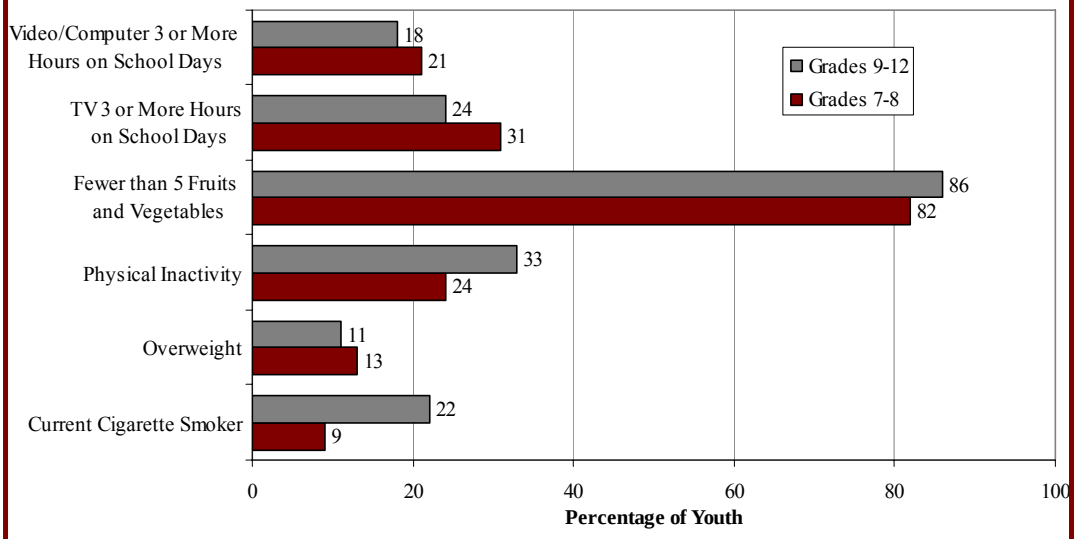
Cardiovascular disease is rarely seen in youth, but many youth exhibit behaviors that increase their risk of developing CVD later in life. Behavior patterns such as being physical inactive, not eating a well-balanced diet containing daily servings of fruits and vegetables, smoking and becoming overweight are developed during childhood and the adolescent years and have lifelong heart-health significance.

While CVD risk may be a future consequence of behavior patterns, children's everyday behavior also affects their ability to learn. Research shows a correlation between positive health behaviors and increased student achievement. Adequate nutrition increases the brain's ability to learn, and physical activity increases learning and academic achievement.

Differences in physical activity and dietary behaviors are noted between students attending school in rural areas (less than 1,000 students in a community) versus students attending school in urban areas (more than 1,000 students in a community).

Unless otherwise noted, the data in this section comes from the North Dakota Youth Risk Behavior Survey (YRBS).

Figure 36. Risk Factors for Cardiovascular Disease
North Dakota Youth 2005

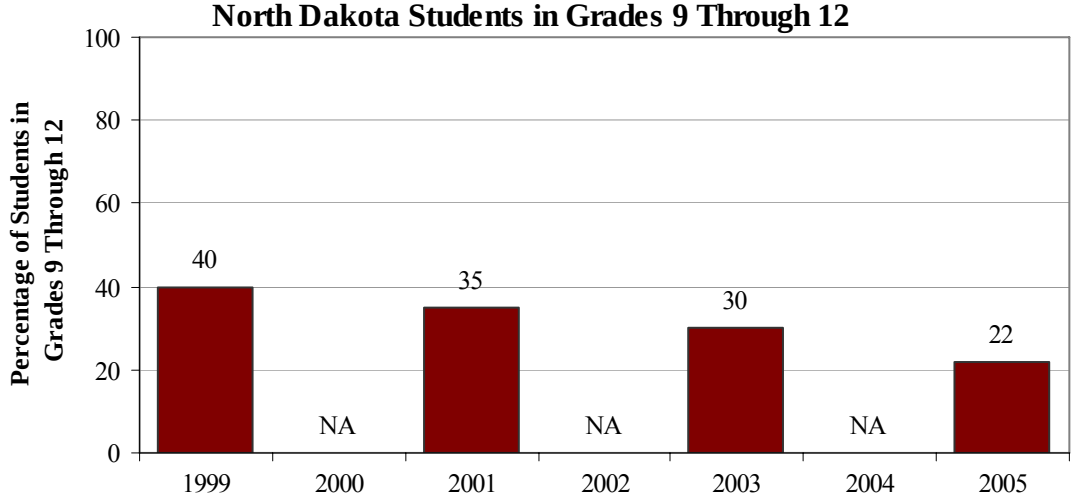


Source: Youth Risk Behavior Survey

Tobacco Use

Cigarette smoking is a major risk factor for CVD and stroke, so it is important to establish family and community norms that support non-tobacco use by adults and especially by youth. North Dakota has made notable progress in the area of preventing youth smoking. The percentage of North Dakota youth in grades nine through 12 who currently smoke cigarettes (defined as smoking on one or more of the past 30 days) significantly decreased from 40 percent in 1999 to 22 percent in 2005.

Figure 37. Prevalence of Self-Reported Current Cigarette Smoking North Dakota Students in Grades 9 Through 12



Source: Youth Risk Behavior Survey

About 19 percent of the North Dakota student population – 19,618 students – are protected by Gold Star School tobacco policies. These students attend schools with policies that meet such criteria as maintaining a tobacco-free campus, tobacco-free off-grounds school events, tobacco prevention education provided at grade levels K-12, and communicating tobacco policies to school visitors. Implementation of such comprehensive school tobacco policies helps to reduce the number of youth who may begin using tobacco and provides students with access to smoking cessation programs. Establishing policies protects the health and safety of all students, employees and the general public and changes the social norm, setting a non-tobacco use example by adults.

Physical Activity

The Dietary Guidelines for Americans recommend that children and adolescents engage in at least 60 minutes of physical activity on most, preferably all, days of the week. The National Standards for Physical Education recommend 150 minutes per week (an average of 30 minutes each school day) of physical education instruction for elementary students and 225 minutes per week (an average of 45 minutes each school day) for secondary students.

In North Dakota, only 37 percent of students in grades nine through 12 and only 31 percent in grades seven and eight attended daily physical education (PE) classes in 2005. There is a large gap between rural and urban school districts in this area. For seventh and eighth grade, 43 percent of students in urban districts report attending a daily PE class, while only 23 percent of those in rural districts report that this is taking place. For grades nine through 12, 43 percent of those in urban districts report daily PE, while only 33 percent of those in rural districts report this opportunity.[14]

Children and youth throughout the U.S. have more opportunities than ever before to be sedentary; 31 percent of North Dakota's seventh and eighth graders and 24 percent of ninth through 12th graders report that they watched three or more hours of TV during a school day. Also, 21 percent of seventh and eighth graders and 18 percent of ninth through 12th graders report that they spend three or more hours a day in front of a computer or video screen. In addition, 33 percent of youth in grades nine through 12 and 24 percent in grades seven and eight do not participate in sufficient physical activity. All these factors set youth up to become inactive adults.

> "Active youth are healthy youth who grow into healthy adults. Unfortunately, many North Dakota young people are not physically active enough, increasing their chances of becoming overweight or obese. We must all work together to create environments at home, in our schools and in our communities that encourage and promote physical activity and healthy lifestyles. Our children deserve nothing less."
>
> Terry Dwelle, M.D., M.P.H.T.M.,
> State Health Officer

Eating Fruits and Vegetables

Encouraging children to develop a habit of eating fruits and vegetables can potentially improve the health of all Americans. Adolescents who eat more fruits and vegetables are likely also to eat more of them as adults.[15]

The number of North Dakota high school students who ate five or more servings of fruits and vegetables each day during the seven days prior to the YRBS decreased from 18 percent in 2001 to 14 percent in 2005. North Dakota lags behind the nationwide average of 20 percent in this category.

In 2005, 18 percent of middle school students ate five or more servings of fruits and vegetables per day. This figure has decreased slightly since 2001, when 20 percent of middle school students reported eating this amount of fruits and vegetables.

There is a difference between students in rural and urban areas when it comes to fruit and vegetable intake. In urban areas, about 3 percent more students in both middle and high school report consuming adequate amounts of fruits and vegetables.[14]

Overweight and Obesity

Nationwide, the proportion of young people who are overweight has more than tripled since 1980. Rising levels of overweight are negatively effecting children's health and quality of life. The rise in childhood obesity is linked to a dramatic rise in the number of children suffering from type 2 diabetes. If current trends continue, adolescents with type 2 diabetes may experience heart disease symptoms beginning as young as age 30 to 40. Overweight adolescents have a 70 percent chance of becoming overweight or obese adults and therefore are at increased risk of developing heart disease as adults.

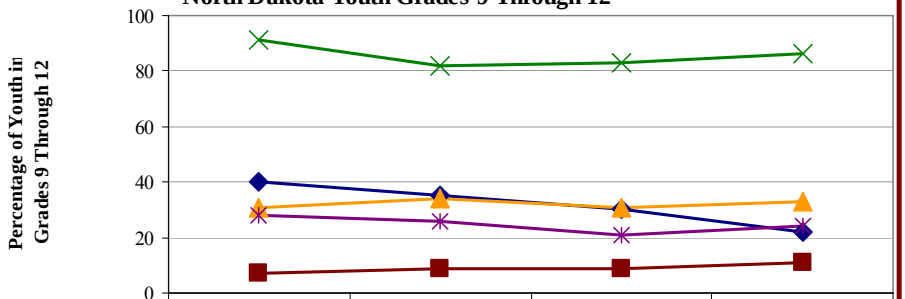
In 2005, 24 percent of North Dakota's high school students were overweight or at risk for becoming overweight. High school students who were overweight increased from 7 percent in 1999 to 11 percent in 2005. High school students who were at risk for overweight increased from 12 percent in 1999 to 13 percent in 2005.

In 2005, more than 28 percent of North Dakota's middle school students were overweight or at risk for becoming overweight. Middle school students who were overweight increased from 10 percent in 1999 to nearly 13 percent in 2005. Middle school students who were at risk for overweight increased slightly from 15 percent in 1999 to 15.5 percent in 2005.

Trends

Trends in CVD risk factors among youth indicate that physical inactivity, eating fewer than five fruits and vegetables and smoking are present in larger percentages in the high school age range than for students in grades seven and eight. This is in contrast to rates of overweight, which appear at higher rates in middle school grades than in high school.

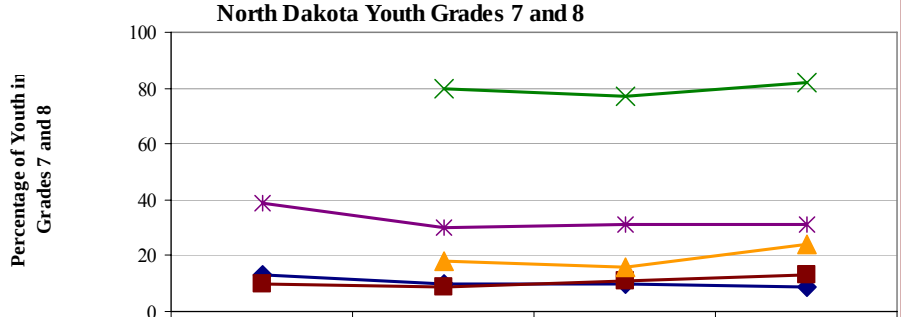
Figure 38. Trends in Cardiovascular Disease Risk Factors
North Dakota Youth Grades 9 Through 12



	1999	2001	2003	2005
Current Cigarette Smoker	40	35	30	22
Overweight	7	9	9	11
Physical Inactivity	31	34	31	33
Fewer than 5 Fruits and Vegetables	91	82	83	86
TV 3 or More Hours on School Days	28	26	21	24

Source: Youth Risk Behavior Survey

Figure 39. Trends in Cardiovascular Disease Risk Factors
North Dakota Youth Grades 7 and 8



	1999	2001	2003	2005
Current Cigarette Smoker	13	10	10	9
Overweight	10	9	11	13
Physical Inactivity	NA	18	16	24
Fewer than 5 Fruits and Vegetables		80	77	82
TV 3 or More Hours on School Days	39	30	31	31

Source: Youth Risk Behavior Survey

Knowledge of Signs and Symptoms of Heart Attack and Stroke

Heart Attack

Why it is important

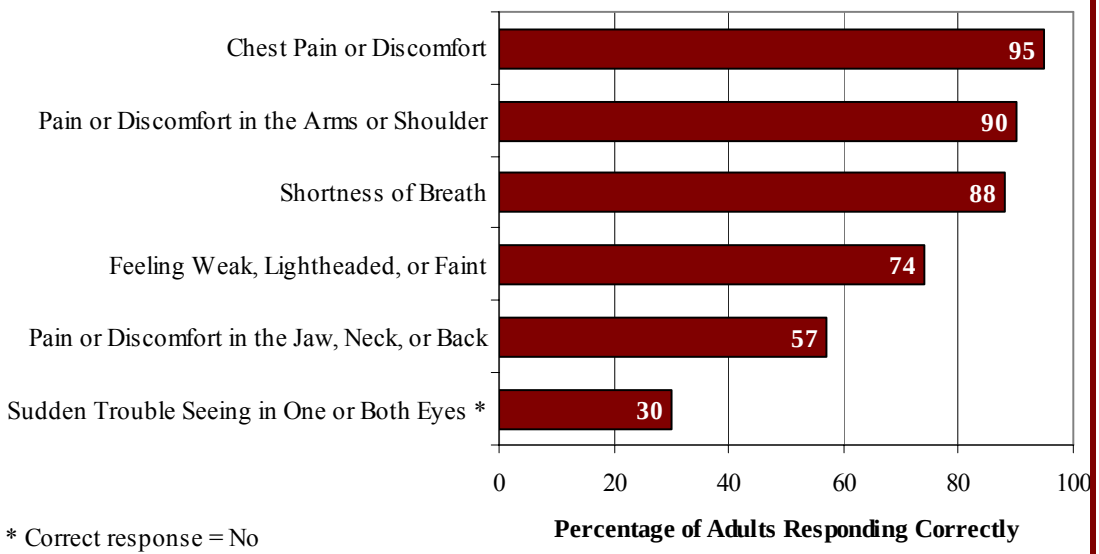
The promptness of treatment directly affects survival of a heart attack. Most heart attack deaths happen within the first two hours after the symptoms begin. More than 60 percent of people who die from a heart attack in the United States do so outside of the hospital. Recognizing and responding promptly to heart attack symptoms and receiving the appropriate artery opening treatment within one hour of symptom onset can prevent or limit heart damage.[16]

Unless otherwise noted, the data in this section comes from the Behavioral Risk Factor Surveillance System (BRFSS) survey.

How we are doing in North Dakota

More than 95 percent of North Dakota adults are aware of chest pain or discomfort as a warning sign of a heart attack. More than 88 percent recognize that "pain or discomfort in the arms or shoulder" and "shortness of breath" are signs. Seventy-four percent know that "feeling weak, lightheaded or faint" is a sign, while only 57 percent know that "pain or discomfort in the jaw, neck or back" is a sign of a heart attack. Although "sudden trouble seeing in one or both eyes" is not a symptom of a heart attack, only 30 percent know that it isn't.

Figure 40. Heart Attack Signs and Symptoms Awareness North Dakota Adults 2003

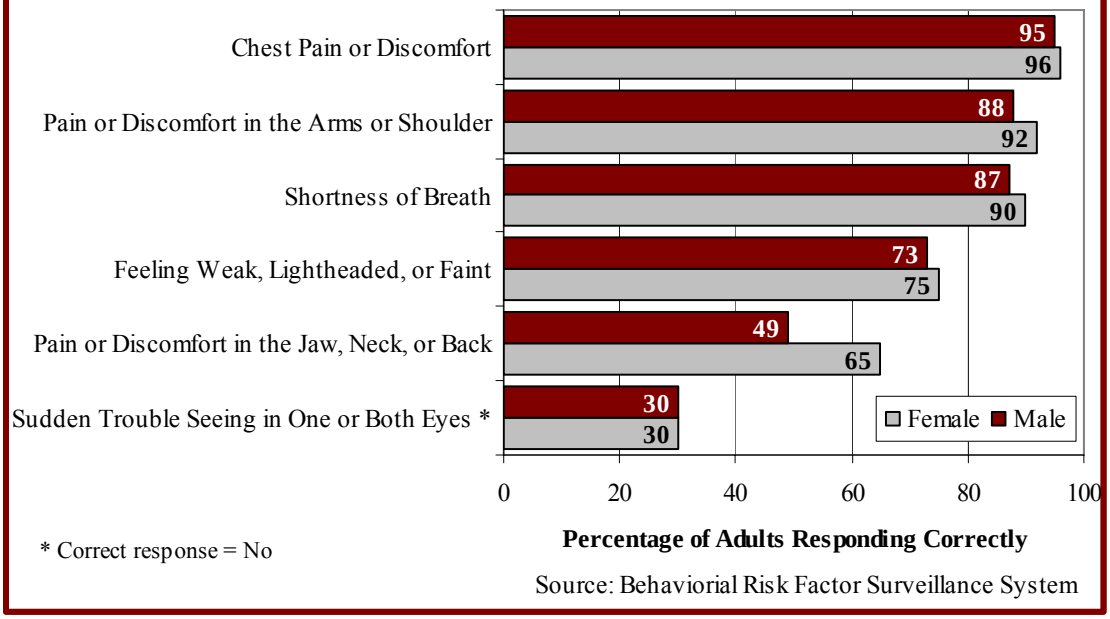


* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

Women were more likely than men to recognize "pain or discomfort in the jaw, neck, or back" and "shortness of breath" as symptoms of heart attack. Women and men are similarly likely to recognize other signs and symptoms of heart attack.

Figure 41. Heart Attack Signs and Symptoms Awareness North Dakota Adults 2003 by Gender

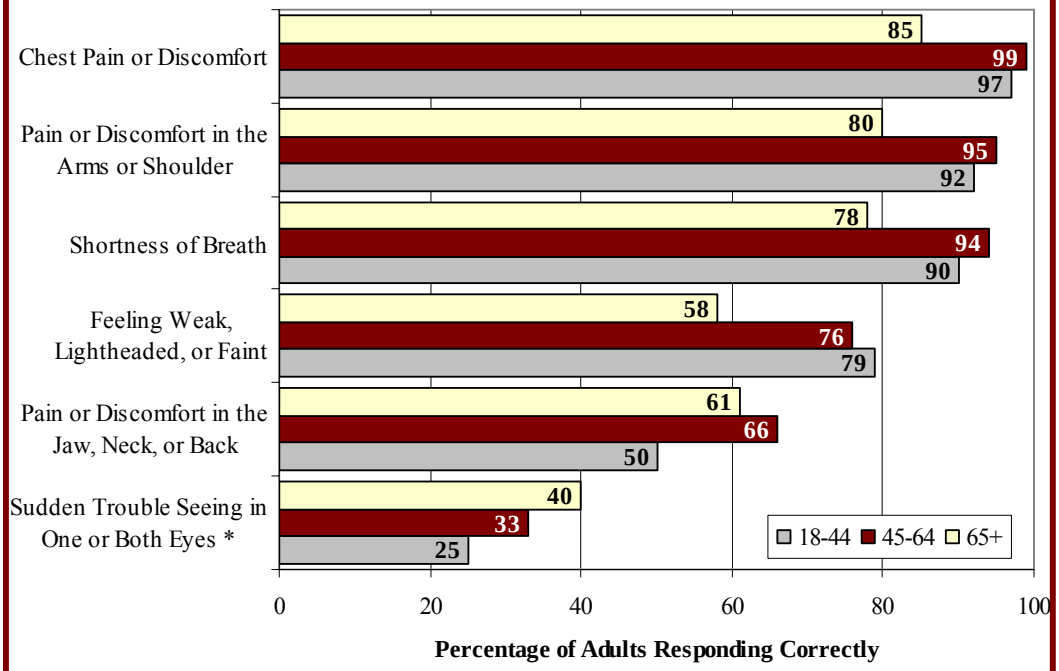


* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

More adults ages 45 to 64 are likely to recognize each noted sign and symptom of heart attack except "feeling weak, lightheaded or faint" than other age groups. Those 65 and older have the lowest percentage of persons recognizing all signs and symptoms of heart attack except for "pain or discomfort in the jaw, neck, or back" and have the highest percentage of those who correctly believe that "sudden trouble seeing in one or both eyes" is not a symptom of a heart attack.

Figure 42. Heart Attack Signs and Symptoms Awareness
North Dakota Adults 2003 by Age Group



* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

How North Dakota compares with national goals

The Healthy People 2010 goal for all Americans (HP2010) in this area is to increase the proportion of adults who are aware of the early warning symptoms and signs of a heart attack to 50 percent. North Dakotans surpass this goal for all five signs and symptoms. However, fewer than one in three adults are able to identify correctly that "sudden trouble seeing in one or both eyes" is not a sign or symptom of a heart attack.

Stroke

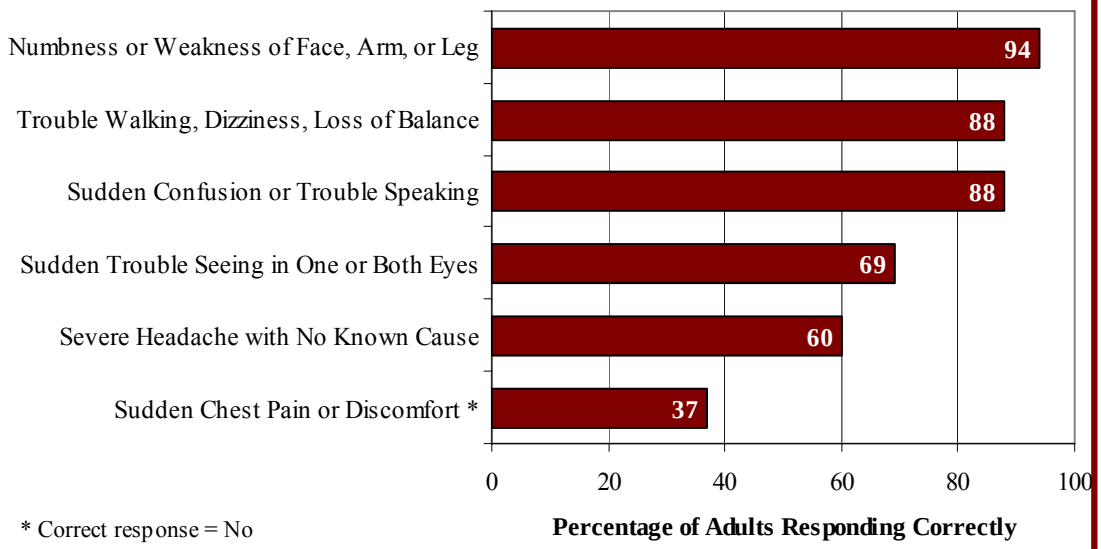
Why it is important

Substantial advances have been made in the diagnosis and treatment of ischemic stroke during the decade of the 1990s.[17] However, nearly half of all stroke deaths occur before patients are transported to hospitals.[18] Education efforts to increase public recognition of stroke warning signs can reduce delays in arriving at an emergency department.[19]

How we are doing in North Dakota

Nearly 94 percent of all North Dakota adults are aware of "numbness or weakness of face, arm or leg" as a warning sign of a stroke, and more than 88 percent recognize "trouble walking, dizziness, loss of balance and sudden confusion" or "trouble speaking" as warning signs. Although "sudden chest pain or discomfort" is not a symptom of a stroke, only 36 percent recognize that it isn't.

Figure 43. Stroke Signs and Symptoms Awareness
North Dakota Adults 2003

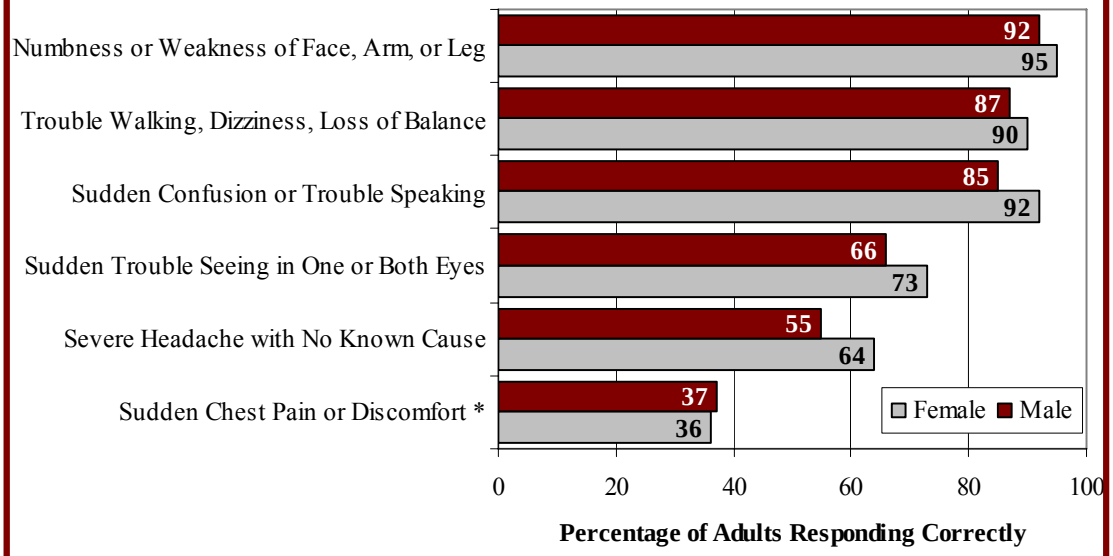


* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

Women are more likely than men to recognize all noted signs and symptoms of stroke.

Figure 44. Stroke Signs and Symptoms Awareness
North Dakota Adults 2003 by Gender

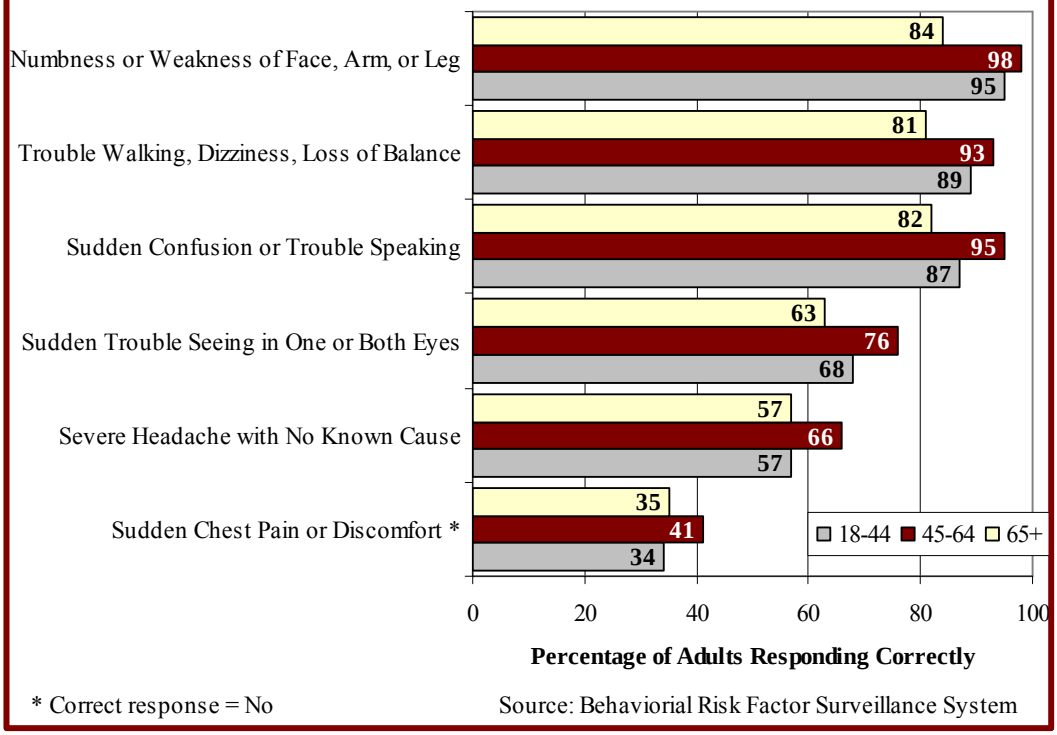


* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

More adults ages 45 to 64 are likely to recognize all noted signs and symptoms of stroke, as well as to correctly identify "sudden chest pain or discomfort" as not a symptom. Adults 65 and older are less likely to recognize signs and symptoms of stroke than those in any other age group.

Figure 45. Stroke Signs and Symptoms Awareness
North Dakota Adults 2003 by Age Group



* Correct response = No

Source: Behaviorial Risk Factor Surveillance System

How North Dakota compares with national goals

The HP2010 goal is to increase the proportion of adults who are aware of the early warning symptoms and signs of a stroke to 83 percent. North Dakotans surpass this goal for three of the signs and symptoms but fall short of the goal for two of them. In addition, only one in three adults are able to identify correctly that "sudden chest pain or discomfort" is not a sign or symptom of stroke.

Knowledge of Heart Attack and Stroke Signs and Symptoms By Education and Income Levels – North Dakota Adults

Percentage of Adults Responding Correctly – Heart Attack

	Chest pain or discomfort	Pain or discomfort in the arms or shoulder	Shortness of Breath	Feeling weak, lightheaded or faint	Pain or discomfort in the jaw, neck, or back	Sudden trouble seeing in one or both eyes*
Education Level						
Less Than HS	80	74	68	46	45	38
HS or GED	93	87	86	71	52	28
Some Post HS	97	92	91	77	58	27
College Grad	99	96	94	81	65	33
Income Level						
< $15,000	92	83	81	64	51	30
$15,000-$24,999	92	87	84	70	52	29
$25,000-$34,999	95	90	92	75	54	24
$35,000-$49,999	97	92	90	78	62	29
$50,000+	98	95	93	79	60	35

* Reflects the percentage of adults responding "No," which is the correct response.

Percentage of Adults Responding Correctly – Stroke

	Numbness or weakness of face, arm or leg, especially on one side	Sudden trouble walking, dizziness or loss of balance	Sudden confusion or trouble speaking	Sudden trouble seeing in one or both eyes	Severe headache with no known cause	Sudden chest pain or discomfort*
Education Level						
Less Than HS	76	75	69	47	43	28
HS or GED	92	87	86	63	56	27
Some Post HS	96	90	91	72	60	38
College Grad	97	92	93	80	69	47
Income Level						
< $15,000	86	87	81	67	53	29
$15,000-$24,999	90	86	83	65	55	27
$25,000-$34,999	92	88	88	68	58	35
$35,000-$49,999	96	90	91	71	62	38
$50,000+	98	92	94	74	66	46

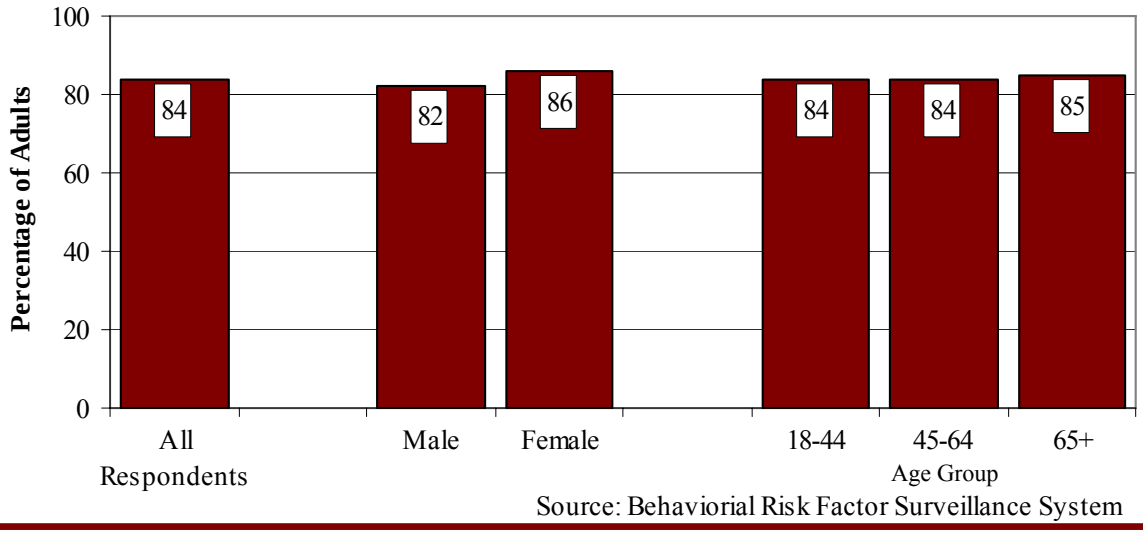
* Reflects the percentage of adults responding "No," which is the correct response.

Source: BRFSS 2003

Most adults in North Dakota are aware of the importance of calling 911 as the first thing they would do if they thought someone was having a heart attack or stroke. However, 10 percent responded they would take the person to the hospital, 1 percent said they would tell them to call their doctor and another 1 percent said they would call their spouse or a family member. An additional 4 percent said they would do something else.

Although in this chart females are slightly more likely than males to call 911 first, the difference is not statistically significant. Age groups do not differ significantly either.

Figure 46. Call 911 Awareness
North Dakota Adults 2003

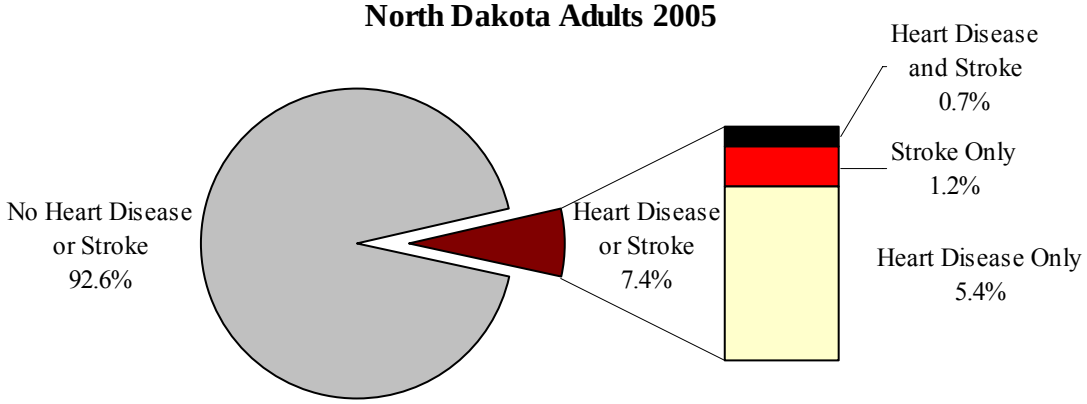


Source: Behaviorial Risk Factor Surveillance System

Self-Reported Cardiovascular Disease

The prevalence of cardiovascular disease is self-reported through the annual Behavioral Risk Factor Surveillance System (BRFSS). This is a random sample telephone survey of adults living in North Dakota. The random sample is representative of all non-institutionalized adults living in the state. This means that adults living in nursing homes or other institutions are not surveyed. Therefore, prevalence of chronic disease is underrepresented in BFSSS data, as severely ill people are more likely to be living in an institutional setting and will not be surveyed. It is not possible to determine the extent to which chronic diseases are underrepresented, but it should be noted that in North Dakota, 8.3 percent of people 65 and older live in group quarters.[20]

Figure 47. Diagnosed Heart Disease and Stroke
North Dakota Adults 2005



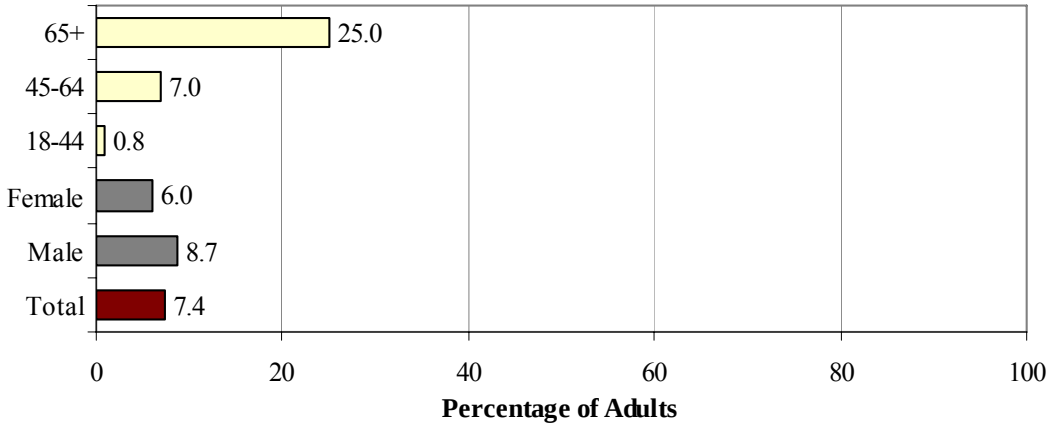
Source: Behaviorial Risk Factor Surveillance System

More than 7 percent of adults in 2005 indicated they previously had been diagnosed with a heart attack or myocardial infarction, angina or coronary heart disease, or a stroke. Figure 47 provides a breakdown by type of cardiovascular disease; heart disease includes heart attack, angina or coronary heart disease.

History of cardiovascular disease is measured by three questions on the BRFSS. Adults were asked if they had ever had a heart attack or myocardial infarction, angina or coronary heart disease, or a stroke. A positive response to any of these three questions is used to determine a history of any cardiovascular disease.

Among all non-institutionalized adults in North Dakota, more than 7 percent have a history of any cardiovascular disease. Nine percent of males and 6 percent of females have experienced cardiovascular disease in their lives. One in four adults 65 and older has a history of cardiovascular disease, while one in 14 adults ages 45 to 64 and one in 125 adults ages 18 to 44 have experienced cardiovascular disease.

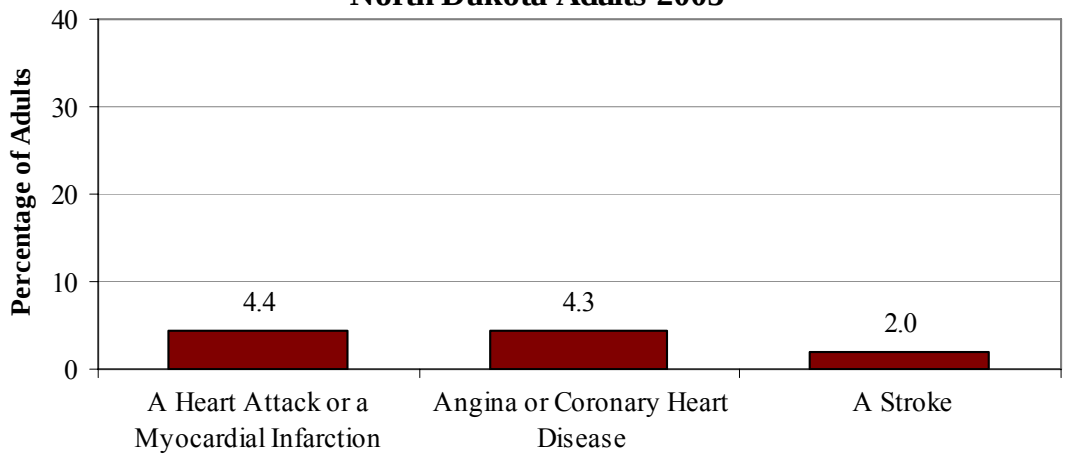
Figure 48. History of Any Cardiovascular Disease by Gender and Age Group
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

When looking at responses to the three questions that are used to measure history of cardiovascular disease, 4 percent have had a heart attack or myocardial infarction, 4 percent have had angina or coronary heart disease and 2 percent have had a stroke.

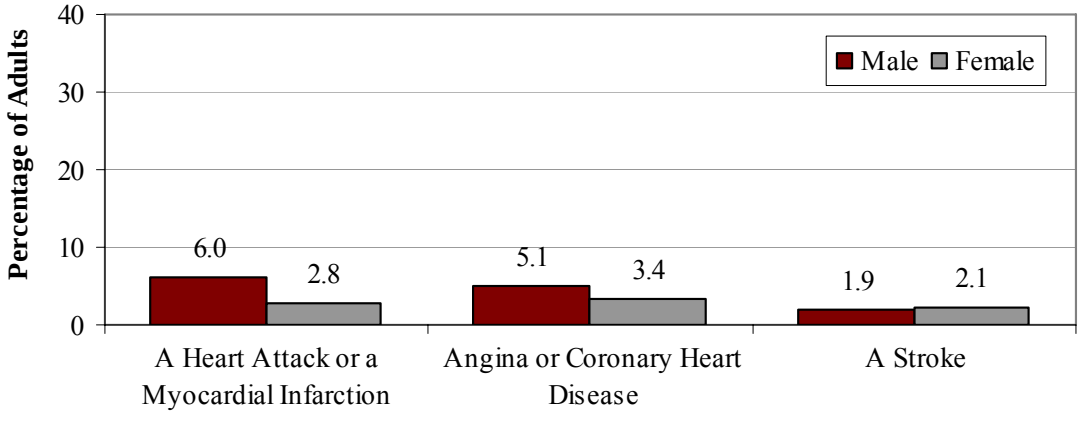
Figure 49. History of Heart Attack, Heart Disease or Stroke
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

Males have a higher prevalence of history of heart attack or coronary heart disease, while females have a slightly higher prevalence of stroke.

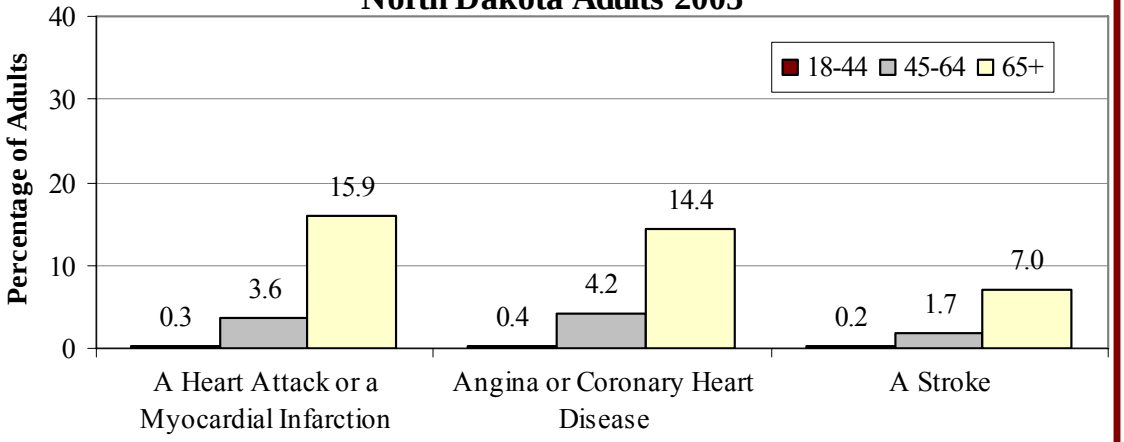
Figure 50. History of Heart Attack, Heart Disease or Stroke by Gender
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

People 65 and older have the highest rates of all forms of cardiovascular disease, while adults younger than 45 have the lowest prevalence rates.

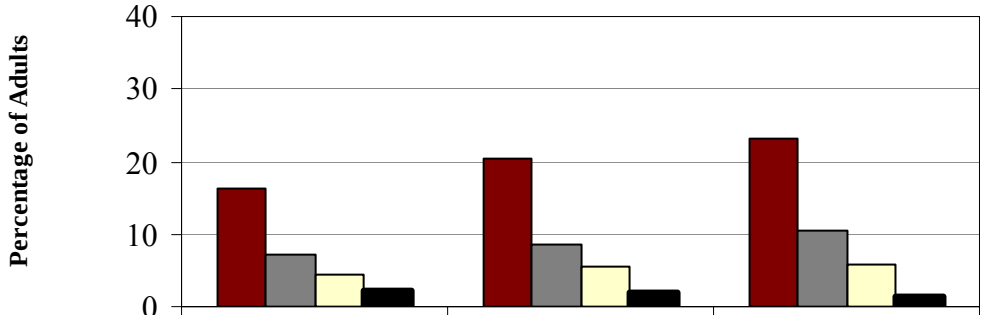
Figure 51. History of Heart Attack, Heart Disease or Stroke by Age Group North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

The prevalence of heart attack history among North Dakota adults has shown an increase among males and females 65 and older from 2001 to 2005. The prevalence among adults ages 45 to 64 has not changed significantly. One reason for the increase may be that adults suffering heart attacks are more likely to survive the event due to advances in treatment. Therefore, more older adults are living with a history of heart attack in their past.

Figure 52: Prevalence of Heart Attack
North Dakota Adults 2001-2005



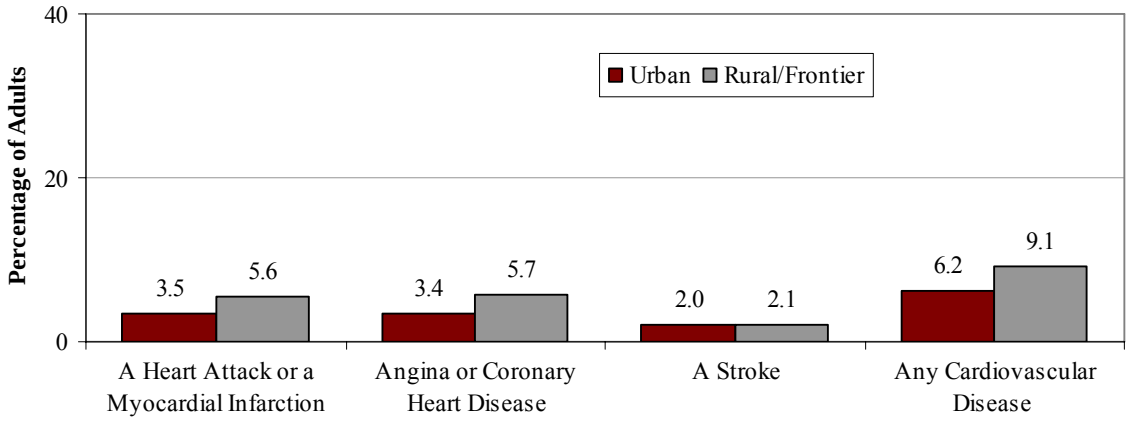
	2001	2003	2005
Male 65+	16.2	20.4	23.2
Female 65+	7.3	8.6	10.6
Male 45-64	4.5	5.6	5.9
Female 45-64	2.1	2.0	1.3

Source: Behaviorial Risk Factor Surveillance System

Urban, Rural and Frontier

The prevalence of cardiovascular disease is higher in rural and frontier areas than in urban areas of North Dakota. All of the differences in Figure 53 are statistically significant except for stroke. These differences are mostly due to age. The population living in the rural and frontier counties is older than the population living in urban areas.

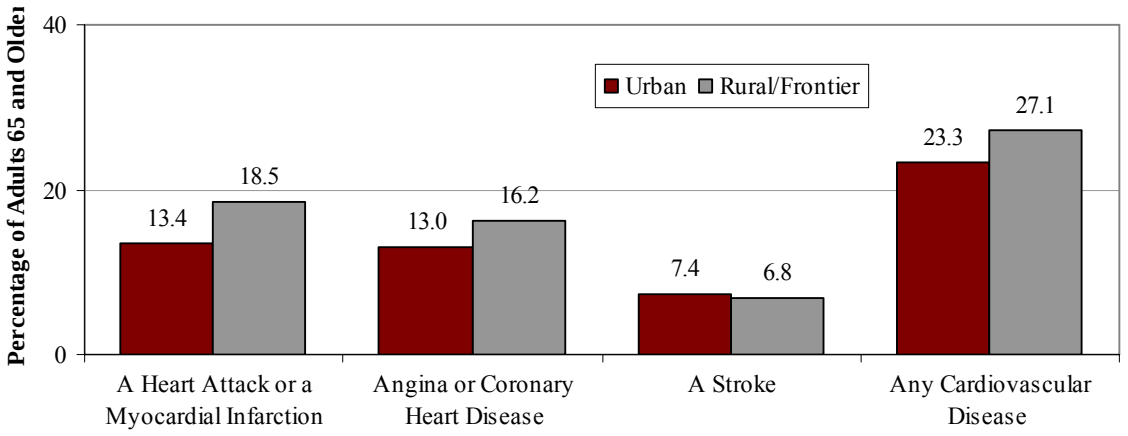
Figure 53. History of Heart Attack, Heart Disease or Stroke by Residence North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

When looking only at adults 65 and older (Figure 54), prevalence of heart attack or myocardial infarction, angina or coronary heart disease and any cardiovascular disease is higher in rural/frontier areas compared to urban areas, but these differences are not statistically significant.

Figure 54. History of Heart Attack, Heart Disease or Stroke by Residence North Dakota Adults 65 and Older 2005

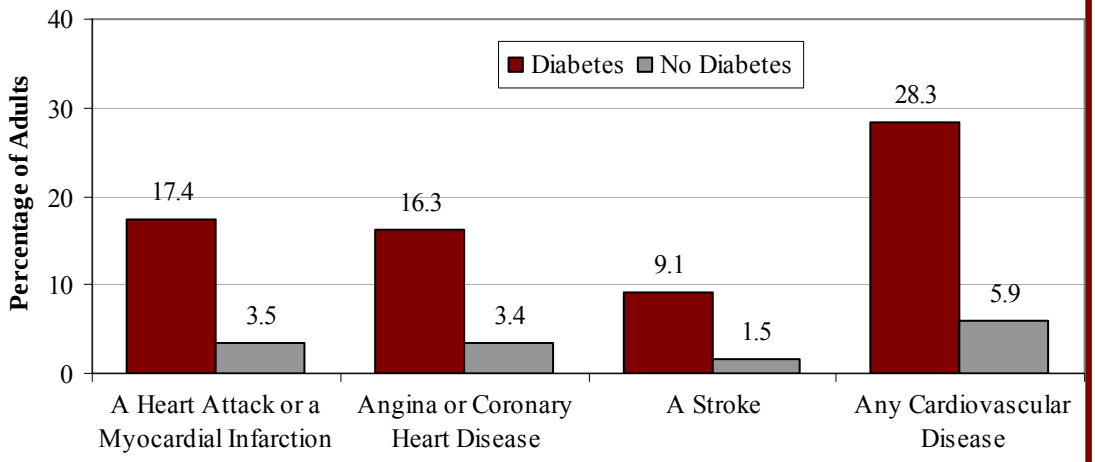


Source: Behaviorial Risk Factor Surveillance System

Diabetes

People with diabetes are disproportionately affected by cardiovascular disease. More than one in four adults with diabetes also has a history of some type of cardiovascular disease. Some of the high prevalence of cardiovascular disease among people with diabetes can be attributed to age.

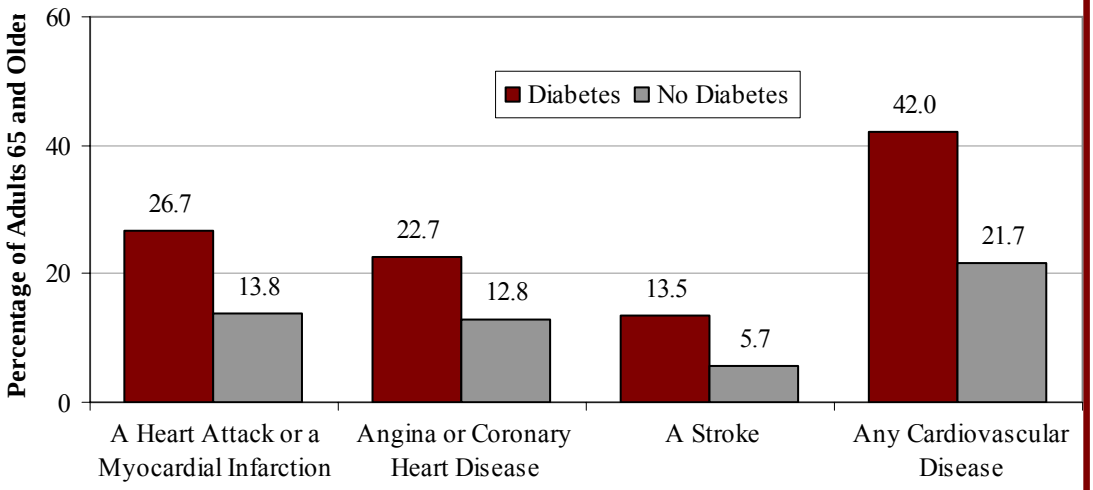
Figure 55. History of Cardiovascular Disease by Diabetes Status North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

Two out of five adults 65 and older with diabetes also have a history of cardiovascular disease, while only one out of five without diabetes is so afflicted. Essentially, having diabetes doubles an elderly person's likelihood of experiencing cardiovascular disease.

Figure 56. History of Cardiovascular Disease by Diabetes Status
North Dakota Adults 65 and Older 2005



Source: Behaviorial Risk Factor Surveillance System

Cardiac Rehabilitation

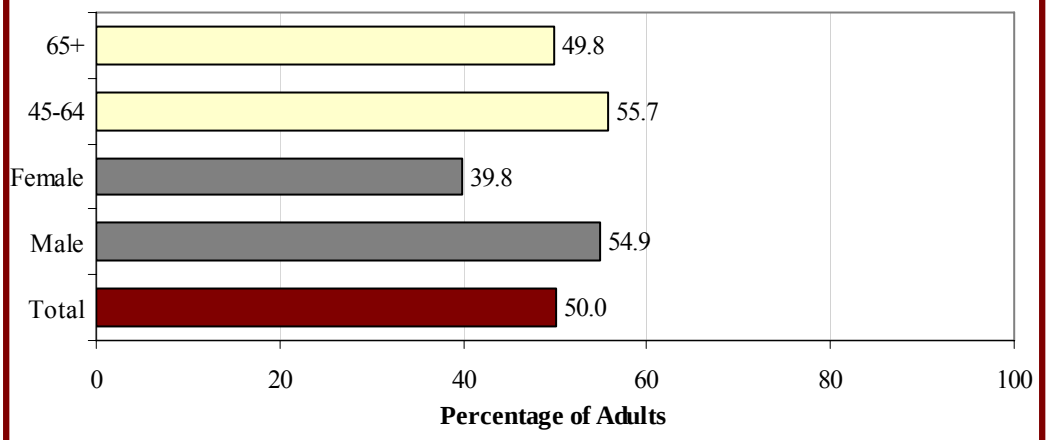
A major component of risk-reduction strategies for heart attack patients is cardiac rehabilitation consisting of nutritional counseling; management of lipid levels, hypertension, weight, and diabetes; smoking cessation; psychosocial interventions; and physical activity counseling and exercise training.[21]

According to the American Heart Association, cardiac rehabilitation is a medically supervised program to help heart patients recover quickly and improve their overall physical, mental and social functioning. The goal is to stabilize, slow or even reverse the progression of cardiovascular disease, thereby reducing the risk of heart disease, another cardiac event or death.[1]

The benefits of cardiac rehabilitation include greater exercise tolerance, fewer cardiac symptoms, lower blood fat levels, cessation of smoking, improved psychosocial well-being, and reduced risk for illness and death.[22]

Among North Dakota adults in 2005 who reported that they had previously had a heart attack, only one-half reported that they received rehabilitation services following their heart attacks. Males were more likely to receive rehabilitation than females, and adults 45 through 64 were more likely to receive rehabilitation than were those 65 and older.

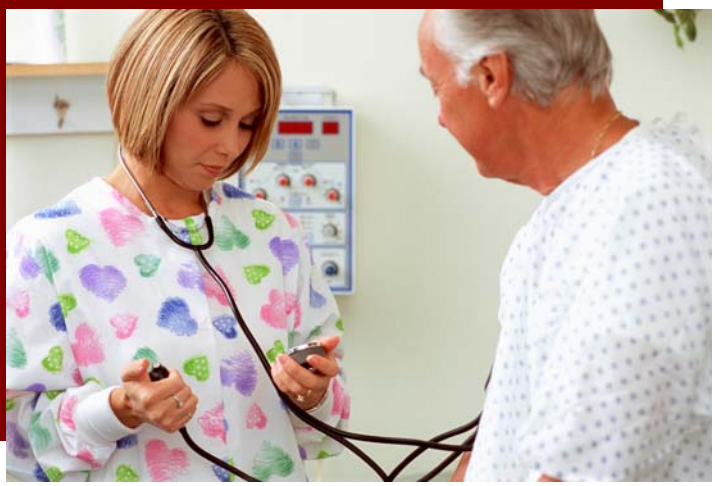
Figure 57. Rehabilitation After a Heart Attack by Gender and Age Group
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

Some people do not receive cardiac rehabilitation because of high-risk health conditions including unstable angina, serious arrhythmias, congestive heart failure, previous cardiac arrest during exercise, and extremely low activity level.[22]

Other factors contributing to a patient not receiving rehabilitation services include lack of referral from provider, distance to location of service, time commitment involved, out-of-pocket cost of services, lack of motivation from the patient, and lack of understanding of the benefits and importance of cardiac rehabilitation.

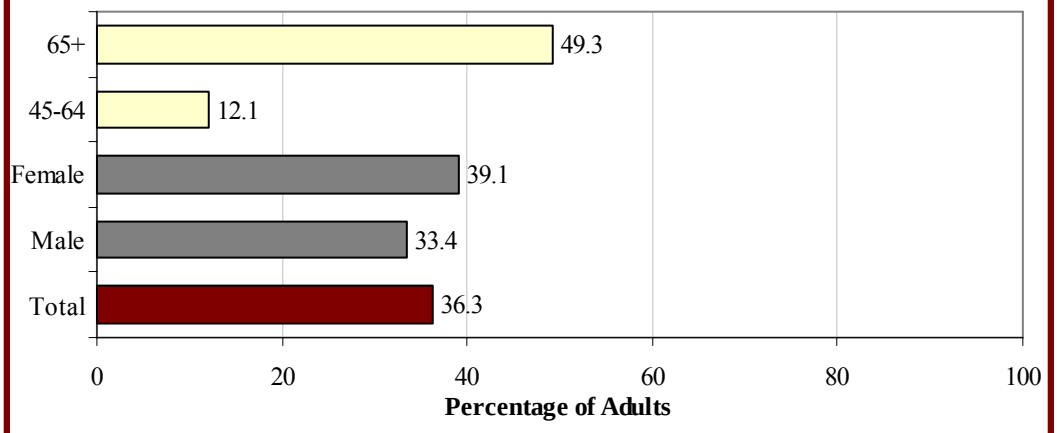


Stroke Rehabilitation

Stroke is a leading cause of serious, long-term disability. Many stroke survivors are left with mental and physical disabilities. Most gains in a person's ability to function in the first 30 days after a stroke are due to spontaneous recovery. Still, rehabilitation is important. People with the least impairment are likely to benefit the most. But even with slight improvement, rehabilitation can mean the difference between returning home and staying in an institution.

For a stroke survivor, the rehabilitation goal is to be as independent and productive as possible. That may mean improving physical abilities. Often, old skills have been lost and new ones are needed. It's also important to maintain and improve a person's physical condition when possible.[1]

Figure 58. Rehabilitation After a Stroke by Gender and Age Group
North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

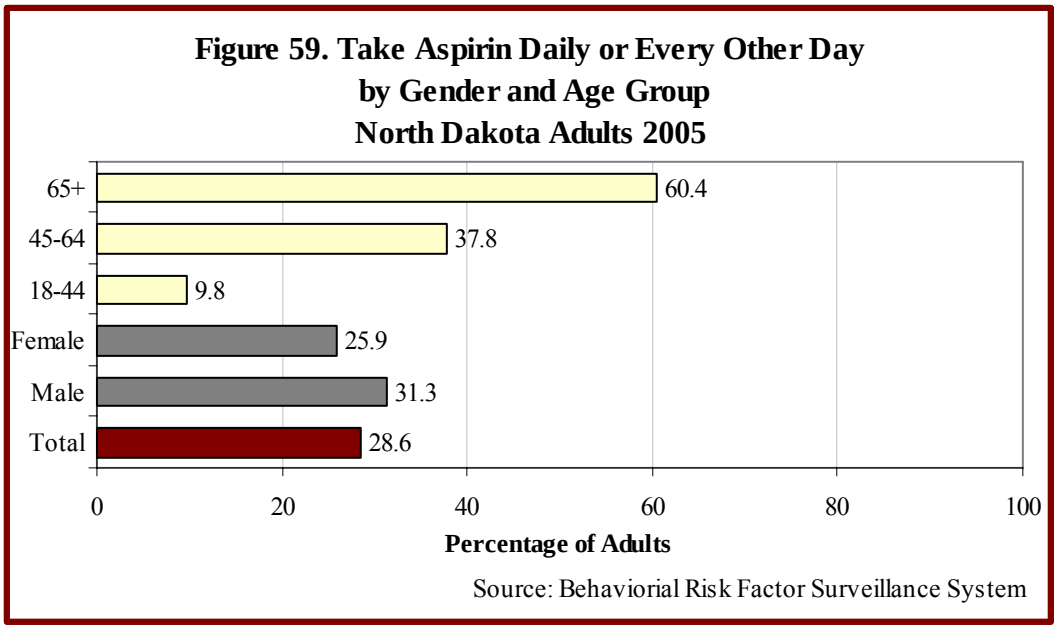
Among North Dakota adults in 2005 who reported that they had previously had a stroke, a little more than one-third reported that they received rehabilitation services following their stroke. Females were more likely to receive stroke rehabilitation than males, and adults 65 and older were much more likely to receive rehabilitation than were those 45 to 64.

Strokes affect people in different ways. Some people have a TIA (transient ischemic attack) where the symptoms are temporary and generally disappear in 24 hours and recover fully, while some people have a severe stroke resulting in a lot of disability. Different parts of the body can be affected: sometimes a little, sometimes a lot. Recovery depends on the type of stroke, how severe the stroke was, and the patient's age and overall health. Some patients may not need a rehabilitation program after a stroke.

Some other factors that may contribute to a patient not receiving stroke rehabilitation services include lack of referral from provider, distance to location of service, time commitment involved, out-of-pocket cost of services, lack of motivation from the patient, and lack of understanding of the benefits and importance of stroke rehabilitation.

Daily Aspirin Use

The American Heart Association recommends aspirin use for patients who've had a myocardial infarction (heart attack), unstable angina, ischemic stroke (caused by blood clot) or transient ischemic attacks (TIAs or "little strokes"), if not contraindicated. This recommendation is based on sound evidence from clinical trials showing that aspirin helps prevent the recurrence of events such as heart attack, hospitalization for recurrent angina, second strokes, etc. (secondary prevention). Studies show aspirin also helps prevent these events from occurring in people at high risk (primary prevention).[1]



More than 28 percent of adults in North Dakota report taking aspirin daily or every other day. Men are more likely than women to take aspirin regularly. Three out of five adults 65 and older and three out of eight adults 45 through 64 are regular aspirin users.

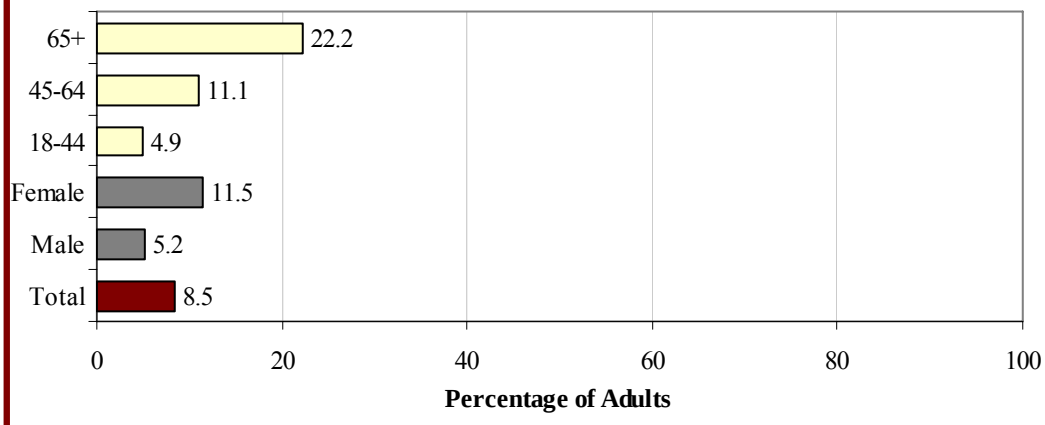
Factors That Prevent Aspirin Use

For many people, a daily dose of aspirin is not possible due to health problems. The decision to use aspirin to prevent a heart attack and stroke is safest when made in consultation with a health professional.

Aspirin can help prevent a heart attack or clot-related stroke by lowering the clotting action of the blood's platelets. But the same properties that make aspirin work in stopping blood from clotting may also cause unwanted side effects, such as stomach bleeding, bleeding in the brain, kidney failure and other kinds of strokes.

Some medical conditions – such as pregnancy, high blood pressure, bleeding disorders, asthma, stomach ulcers, and liver and kidney disease – could make aspirin a bad choice. Aspirin is also a drug that can mix badly with other medicines (prescription and over-the-counter), vitamins, herbals or dietary supplements. People who are already using a prescribed medicine to thin the blood should talk to a health professional before using aspirin, even occasionally. It's important to discuss the use of all medicines, vitamins and dietary supplements with your health professional before using aspirin daily.[23]

Figure 60. Do Not Take Aspirin Daily or Every Other Day Because of Health Problem by Gender and Age Group North Dakota Adults 2005



Source: Behaviorial Risk Factor Surveillance System

More than 8 percent of adults in North Dakota report that they do not take aspirin daily or every other day because of a health problem. One in five adults 65 and older and one in nine adults 45 through 64 do not take aspirin regularly due to health problems. Women are more than twice as likely as men to report that a health problem prevents them from regularly taking aspirin.

Hospitalizations

Medicare Recipients

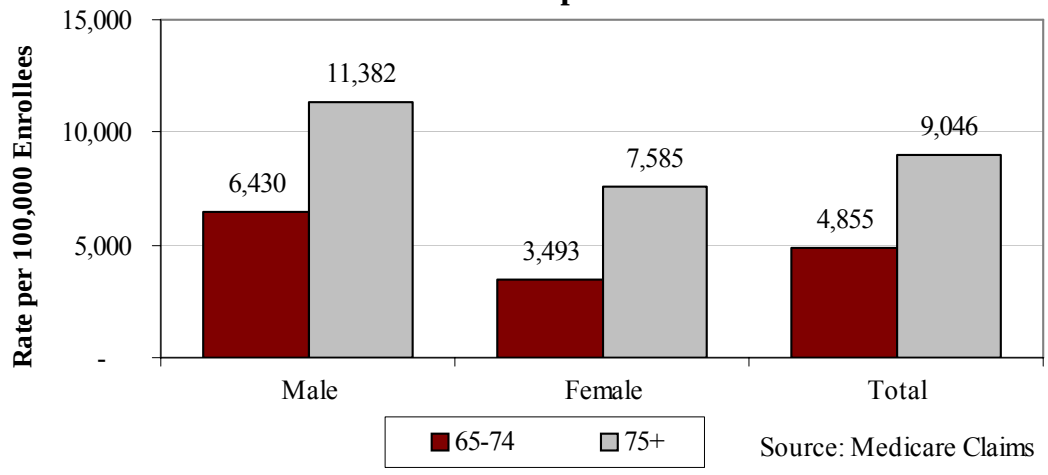
Medicare is the primary health insurance program for people 65 and older in the United States. In North Dakota in 2003, 91,690 people 65 and older were enrolled in Medicare. This is 97 percent of the state's 65-and-older population.

The average age of the North Dakota Medicare enrollees 65 and older is 76 years. Forty-two percent are male and 58 percent are female.

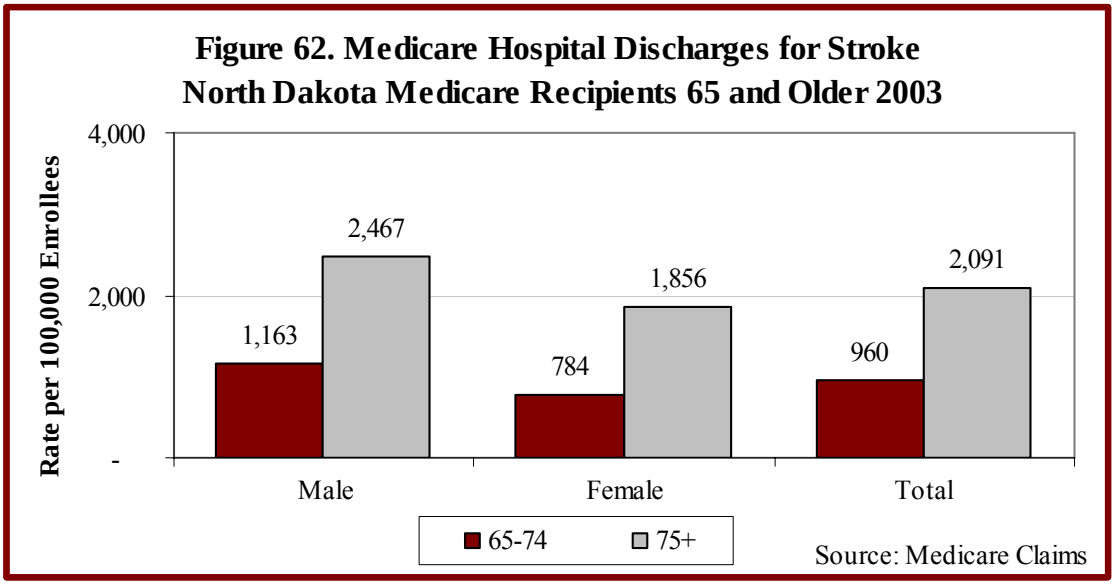
In 2003, 6,460 hospitalizations for heart disease and 1,422 hospitalizations for stroke were experienced by adults 65 and older in North Dakota enrolled in the Medicare program.

In the 65- to 74-year-old age group, this was a rate of 5,182 discharges per 100,000 enrollees where the primary diagnosis was heart disease. For the 75-and-older age group, the rate was 8,742 discharges per 100,000 enrollees. Women had lower rates of heart disease hospitalizations than men in both age categories.

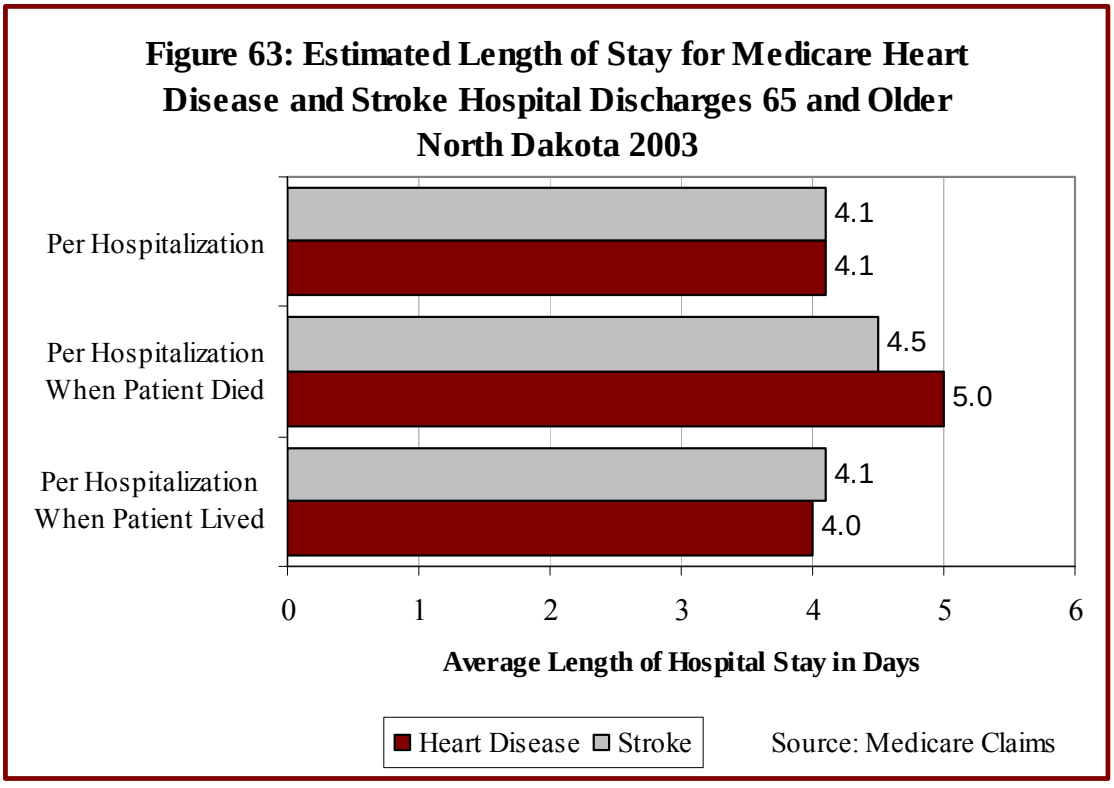
Figure 61. Medicare Hospital Discharges for Heart Disease
North Dakota Medicare Recipients 65 and Older 2003



Stroke hospital discharges show a similar pattern. In the 65 to 74 year old age group, there were 1,017 discharges per 100,000 enrollees where the primary diagnosis was stroke. For the 75 and older age group, the rate was 2,037 discharges per 100,000 enrollees. Women had lower rates of stroke hospitalizations than men in both age categories.

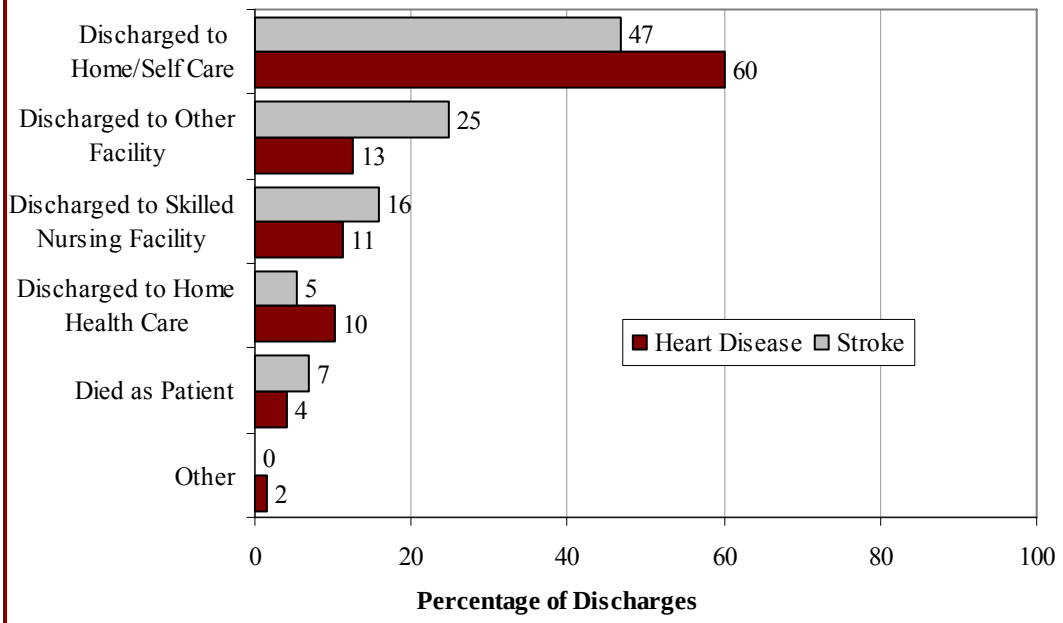


The length of stay for heart disease and stroke hospitalizations averaged 4.1 days. When the patient did not survive the event, the length of stay was slightly longer, 4.5 days for stroke and 5 days for heart disease.



Seven percent of the patients hospitalized with a stroke died as patients, while 4 percent of the patients hospitalized for heart disease died as patients. Sixty percent of heart disease patients were discharged to their home for self-care, compared to 47 percent of stroke patients. Stroke patients were twice as likely as heart disease patients to be discharged to another facility.

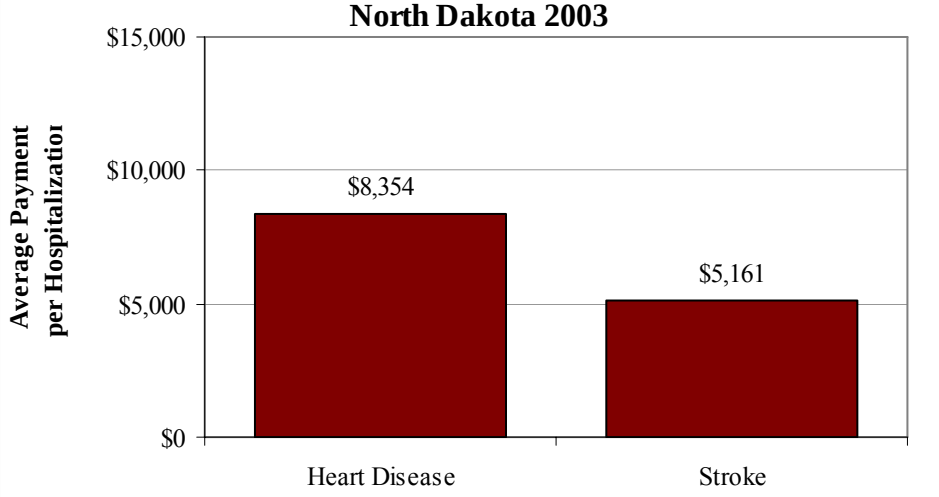
Figure 64: Discharge Outcome for Medicare Heart Disease and Stroke Hospital Discharges 65 and Older North Dakota 2003



Source: Medicare Claims

Medicare payments for a hospitalization for heart disease and stroke averages more than $8,000 for heart disease and more than $5,000 for stroke. These payments are for the hospitalization only and only include the amount paid for by Medicare. The actual total cost of a hospitalization is substantially higher. Hospital costs account for about 55 percent of the direct costs of heart disease and 42 percent of the direct costs of stroke. Other direct costs include nursing home, physicians/other professionals, drugs/other medical durables and home health care.[24]

Figure 65: Estimated Average Payment per Medicare Heart Disease and Stroke Hospital Discharge 65 and Older North Dakota 2003



Source: Medicare Claims

Medicare Hospital Discharges by County

Figure 66 shows the number of Medicare discharges by county in 2003 for enrollees 65 and older. A hospitalization rate is also displayed. Burleigh County had the highest number of discharges, followed by Cass, Grand Forks and Ward counties. The counties with the highest heart disease hospitalization rates were Adams County at 137 per 1,000 enrollees, and Rolette County at 132 per 1,000 enrollees. The counties with the highest stroke hospitalization rates were Bowman at 30 per 1,000 enrollees, and Foster at 28 per 1,000 enrollees.

Figure 66. Medicare Hospital Discharges by County
2003 North Dakota Resident Medicare Hospitalizations for Cardiovascular Disease (CVD), Enrollees 65 and Older

	Number of Hospital Discharges			Hospitalization Rate*		
County	Heart Disease	Stroke	Total	Heart Disease	Stroke	Total
Adams	77	11	88	137	20	157
Barnes	127	40	167	57	18	74
Benson	98	14	112	110	16	125
Billings	8	0	8	123	0	123
Bottineau	91	16	107	65	11	76
Bowman	61	21	82	88	30	118
Burke	36	15	51	66	27	93
Burleigh	562	153	715	64	17	81
Cass	554	128	682	46	11	56
Cavalier	95	14	109	91	13	104
Dickey	90	29	119	80	26	106
Divide	38	7	45	73	14	87
Dunn	39	5	44	79	10	89
Eddy	35	14	49	58	23	82
Emmons	79	11	90	78	11	89
Foster	60	22	82	77	28	105
Golden Valley	36	8	44	87	19	106
Grand Forks	499	87	586	81	14	95
Grant	49	7	56	79	11	91
Griggs	42	6	48	68	10	78
Hettinger	62	9	71	89	13	102
Kidder	44	10	54	77	18	95
Lamoure	75	17	92	68	15	83
Logan	50	6	56	91	11	102
Mchenry	110	16	126	84	12	96
Mcintosh	106	10	116	97	9	107
Mckenzie	59	12	71	80	16	97
Mclean	123	36	159	66	19	85
Mercer	84	25	109	68	20	88
Morton	263	68	331	70	18	88
Mountrail	91	23	114	81	21	102
Nelson	88	10	98	87	10	96
Oliver	15	4	19	76	20	96
Pembina	127	28	155	79	17	97
Pierce	68	14	82	70	14	85
Ramsey	209	48	257	98	23	121
Ransom	55	14	69	49	12	61
Renville	45	8	53	92	16	108
Richland	143	56	199	58	23	81
Rolette	169	18	187	132	14	146
Sargent	64	13	77	87	18	104
Sheridan	29	1	30	74	3	76
Sioux	12	3	15	55	14	69
Slope	7	1	8	83	12	95
Stark	282	56	338	78	16	94
Steele	11	1	12	27	2	30
Stutsman	323	49	372	87	13	100
Towner	39	7	46	67	12	78
Traill	86	24	110	56	16	72
Walsh	164	32	196	71	14	85
Ward	455	116	571	62	16	78
Wells	105	23	128	83	18	101
Williams	202	46	248	61	14	75
Unknown	19	10	29	144	76	220
Total	6,460	1,422	7,882	70	16	86

*** Rate per 1,000 Medicare enrollees 65 and older**

Source: Medicare Claims

Access to Care

Access to care for people who have cardiovascular disease or who are at risk of developing cardiovascular disease due to family history or other risk factors is important for several reasons.

- Treatment of risk factors such as high blood pressure and high cholesterol can prevent or at least delay the development of cardiovascular disease.
- Timely access to emergency care when a heart attack or stroke occurs reduces fatalities and severity of damage to the heart or brain.
- Rehabilitation from a heart attack or stroke is more successful if patients receive regular rehabilitation services and are treated by properly trained specialists.

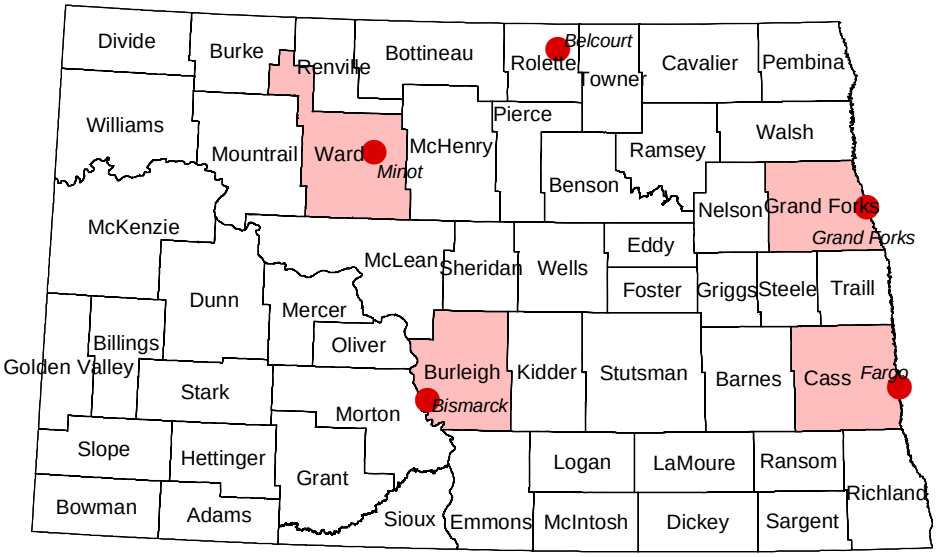
Access to care can be assessed by looking at a variety of measures:

- Health-care coverage, including health insurance or government plans such as Medicare
- Ability to afford the cost of seeing a doctor when needed
- Location of providers and distance needed to travel to receive care
- Location of emergency medical services
- Location of hospitals
- Medically underserved areas and populations

Location of Providers

In North Dakota, 34 cardiovascular disease specialists are located in the four counties with the highest population. The other 49 counties do not have a cardiovascular disease specialist. Cardiovascular surgeons are located in Bismarck, Fargo, Grand Forks, Minot and Belcourt. Although Belcourt has a physician who has a specialty in cardiovascular surgery, these surgeries are not conducted there. A patient in North Dakota will need to be transported to one of the four major population centers to receive cardiovascular surgery.

Figure 67. Cardiac Specialists and Surgeons



Counties where cardiovascular disease specialists are located

Locations of cardiovascular surgeons

Source: North Dakota Medical Association Directory, 2006-2007

Emergency Medical Services

North Dakota has a comprehensive network of emergency medical service providers. Services by county and city are listed in Appendix E.

The following table shows the number of providers by type of service.

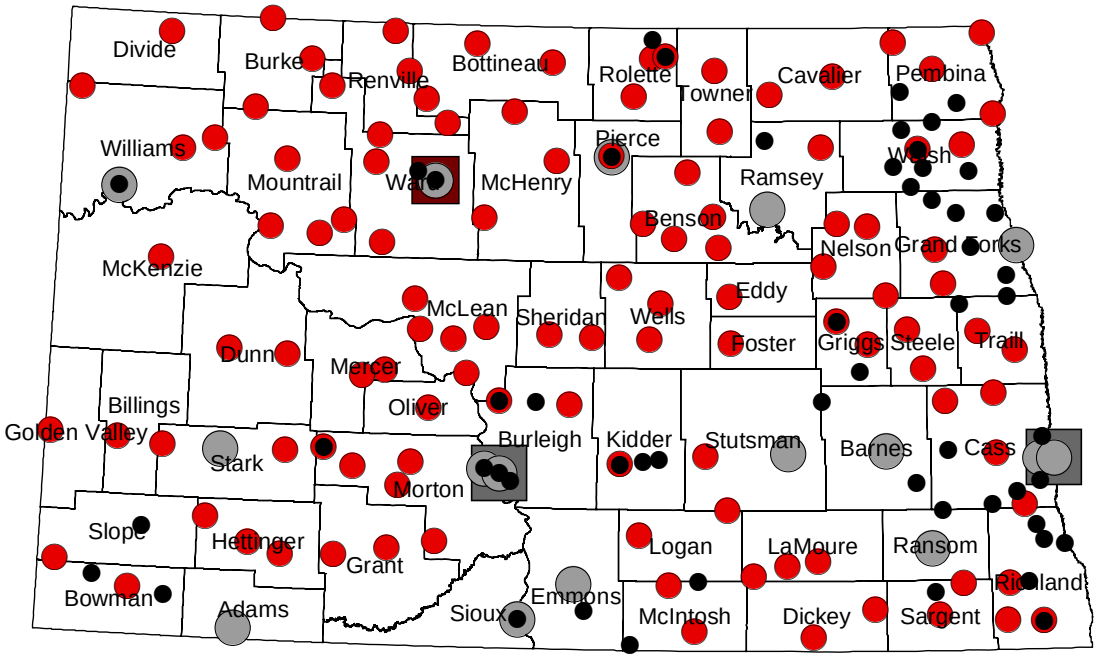
Type of Service	Number of Providers in North Dakota	Number of Providers in Border States that Serve North Dakota
Quick Response Units	56	1
Basic Life Support Ground	116	2
Advanced Life Support Ground	17	2
Critical Care Air	2	0
Advanced Life Support Air	1	1

All counties in North Dakota have at least one basic life support ground or advanced life support ground responder located within their boundaries. In North Dakota, it is legislated that the closest available emergency medical service is dispatched to the scene of medical emergencies regardless of city, county or district boundaries.

Basic life support (BLS) is a nationally recognized term to define an ambulance service that is staffed by emergency medical technicians (EMTs). An EMT's training consists of a 110-hour course. In North Dakota, that training is usually delivered locally by an ambulance service. A BLS service has a lesser equipment burden based on the training of the EMT. Typically BLS ambulance services are staffed by volunteers.

Advanced life support (ALS) is also a nationally recognized term to define an ambulance service that is staffed by paramedics. Paramedic training consists of at least a 1,000-hour course (one or two years). Many paramedic programs award associate in applied science (AAS) degrees. An ALS service can do many more treatment options for the emergent patient, including endotracheal intubation and surgical airways, needle decompression and chest tube insertion, manual defibrillation and external cardiac pacing, medication administration including thrombolytic and narcotic therapy, and IV therapy. Typically ALS services have career paid staff.

Figure 68. Ambulance Services and Quick Response Units



Advanced Life Support Air

Critical Care Air

Advanced Life Support Ground

Basic Life Support Ground

Quick Response Unit

Out-of-State Providers
Aberdeen, SD – ALS Air
Ada, MN – ALS Ground
Breckenridge, MN – ALS Ground
Wolverton, MN – QRU
Lemmon, SD – BLS Ground
McIntosh, SD – BLS Ground

Source: North Dakota Department of Health
Division of Emergency Medical Services

Medically Underserved Areas and Medically Underserved Populations

The U.S. Department of Health and Human Services, Health Resources Services Administration (HRSA) designates medically underserved areas (MUA) for the resident civilian population and medically underserved populations (MUP) for a specific population. MUAs and MUPs have shortages of primary medical-care providers and may be geographic (a county or service area) or demographic (low-income, Medicaid-eligible populations, cultural and/or linguistic access barriers to primary medical-care services). They are each assigned an Index of Medical Underservice (IMU) score, which is used to determine the eligibility of an area or population for MUA/MUP status. Geographic make-up of a designation can be a whole county, a census tract or a minor civil division (a census-recognized, subcounty area).

I. MUA Designation

Designation of an MUA involves application of the Index of Medical Underservice (IMU) to data on a service area to obtain a score for the area. The IMU scale is from 0 to 100, where 0 represents completely underserved and 100 represents best served or least underserved. Under the established criteria, each service area found to have an IMU of 62.0 or less qualifies for designation as a MUA.

The IMU involves four variables — ratio of primary medical-care physicians per 1,000 population, infant mortality rate, percentage of the population with incomes below the poverty level, and percentage of the population 65 and over. The value of each of these variables for the service area is converted to a weighted value, according to established criteria. The four values are summed to obtain the area's IMU score.

II. MUP Designation

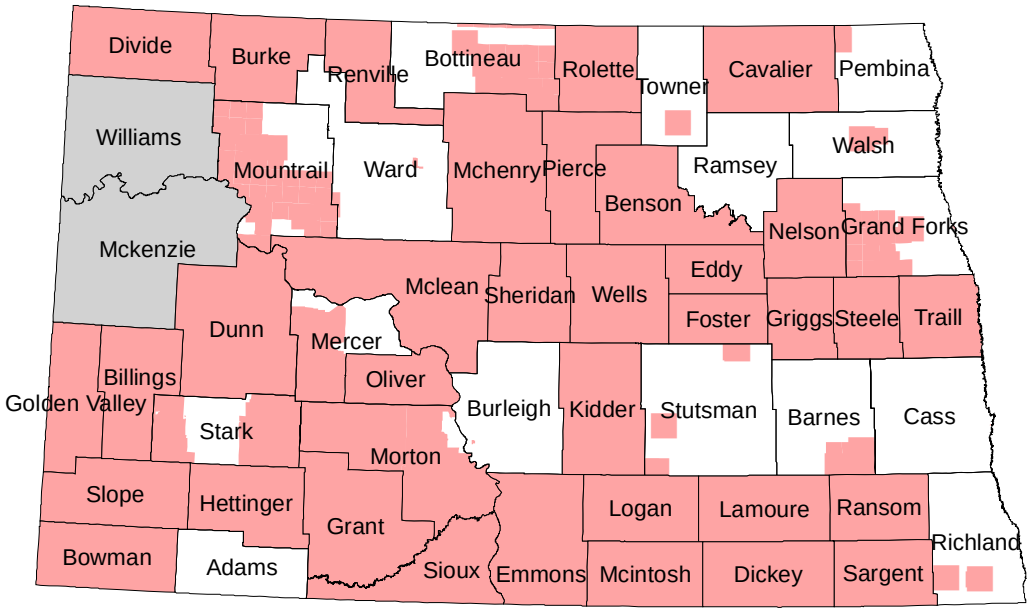
Designation of an MUP involves application of the Index of Medical Underservice (IMU) to data on an underserved population group within an area of residence to obtain a score for the population group. Population groups requested for MUP designation should be those with economic barriers (low-income or Medicaid-eligible populations), or cultural and/or linguistic access barriers to primary medical-care services.

More than 60 percent of the counties in North Dakota (34 out of 53) are designated medically underserved areas. Portions of 15 other counties are also designated as underserved. Two counties are designated with medically underserved populations, and only two counties do not have either designation.

The MUP designations in McKenzie and Williams counties are for the American Indian population in the Trenton Indian Service Area.

The American Indian and Alaska Native people have long experienced lower health status when compared with other Americans. Lower life expectancy and the disproportionate disease burden exist perhaps because of inadequate education, disproportionate poverty, discrimination in the delivery of health services, and cultural differences. IHS currently provides health care to about 55 percent of American Indians in the United States, but only 55 percent of the funding needed to provide for that health care has been allocated by the federal government. [2]

Figure 69. Medically Underserved Areas and Medically Underserved Populations



Designated Medically Underserved Area

Designated Medically Underserved Population

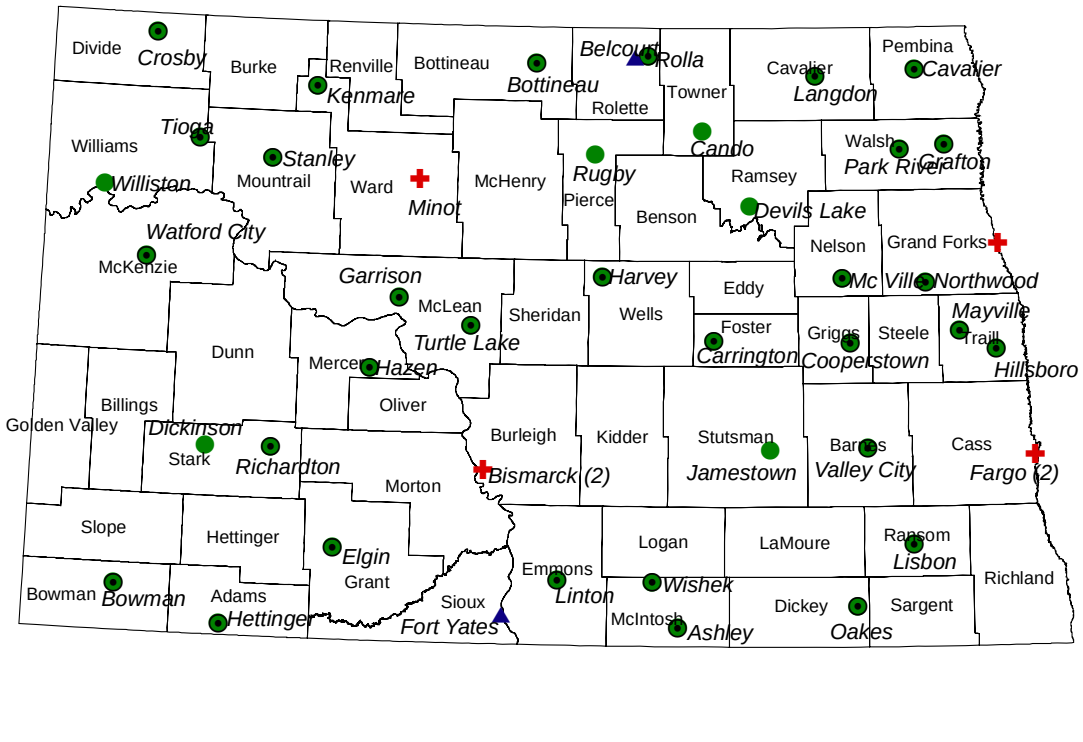
Source: U.S. Department of Health and Human Services, Health Resources Services Administration

Hospitals

North Dakota has 45 hospitals operating within its borders. Six are tertiary hospitals (major hospitals with a full complement of services) in the critical access hospital network and are located in the four largest cities in the state; Bismarck, Grand Forks, Fargo and Minot. Two are Indian Health Services hospitals – located in Belcourt on the Turtle Mountain Indian Reservation and in Fort Yates on the Sioux Indian Reservation. The remaining 37 are rural hospitals located throughout the state. Thirty-one of the rural hospitals are designated as critical access hospitals.

Critical access hospitals are rural limited service hospitals that are usually located in health professional shortage areas and/or medically underserved areas.

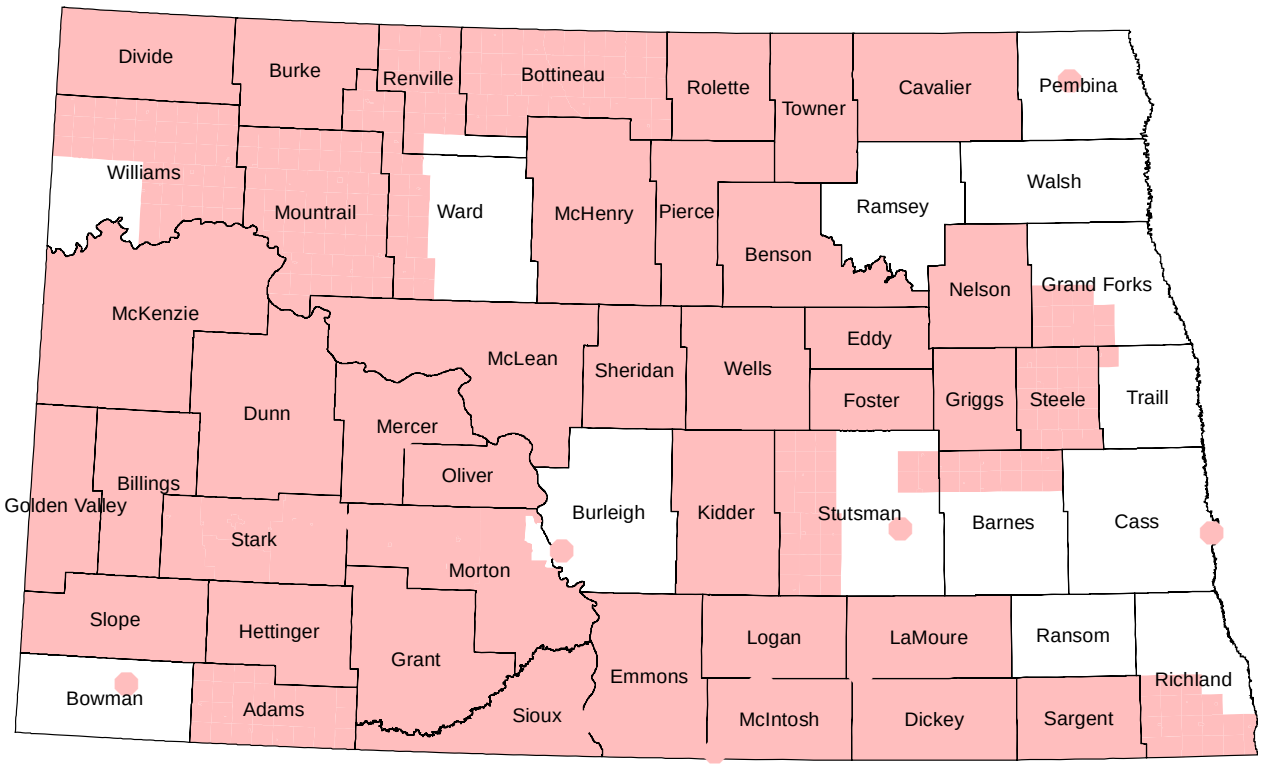
Figure 70. Hospitals



Source: Center for Rural Health, University of North Dakota School of Medicine and Health Sciences

Health professional shortage areas (HPSAs) have shortages of primary medical-care providers and may be geographic (a county or service area), demographic (low-income population) or institutional (comprehensive health center, federally qualified health center or other public facility). A large portion of North Dakota has been designated as a primary medical care provider HPSA. Thirty of the state's 53 counties are designated HPSAs for the entire county. In 20 other counties, a portion of the county or a certain population group or institution in that county has been designated as a HPSA. Only three counties in North Dakota have no HPSA designation.

Figure 71. Health Professional Shortage Areas



Designated Health Professional Shortage Area

Source: U.S. Department of Health and Human Services, Health Resources Services Administration

Health Disparities in Cardiovascular Disease

Health disparities include inequalities in health status, delivery of health services, and/or the utilization of health services due to a number of barriers.

The demographic changes that are anticipated over the next decade magnify the importance of addressing disparities in health status. Groups currently experiencing poorer health status are expected to grow as a proportion of the total U.S. population; therefore, the future health of America as a whole will be influenced substantially by our success in improving the health of these groups.[25]

Populations disproportionately affected by cardiovascular disease include people with co-morbid disease such as diabetes, people living in rural and frontier areas, people of minority racial or ethnic groups such as American Indians and Hispanics, and the elderly population.

Minority Health

"*The future health of the nation will be determined to a large extent by how effectively we work with communities to reduce and eliminate health disparities between non-minority and minority populations experiencing disproportionate burdens of disease, disability, and premature death.*"

~ Guiding Principle for Improving Minority Health
(CDC Office of Minority Health)

In North Dakota, according to the 2000 census (Appendix B), 92.4 percent of the population is white and 4.9 percent is American Indian/Alaska Native. The remaining 2.7 percent is some other race or is multiracial. Only 1.2 percent of the population in North Dakota is Hispanic, compared to 12.5 percent in the U.S.

The North Dakota State Data Center has published a bulletin with North Dakota population estimates by race for 2005.[26] It is estimated that the racial minority population in North Dakota grew 8.1 percent between 2000 and 2005. During the same period, the white-only population (which comprises the vast majority of the population in the state) declined 1.5 percent. The American Indian/Alaska Native-only population, North Dakota's largest racial minority, grew by 7.4 percent between 2000 and 2005. During this time, the Hispanic population grew from 1.2 percent to 1.6 percent.

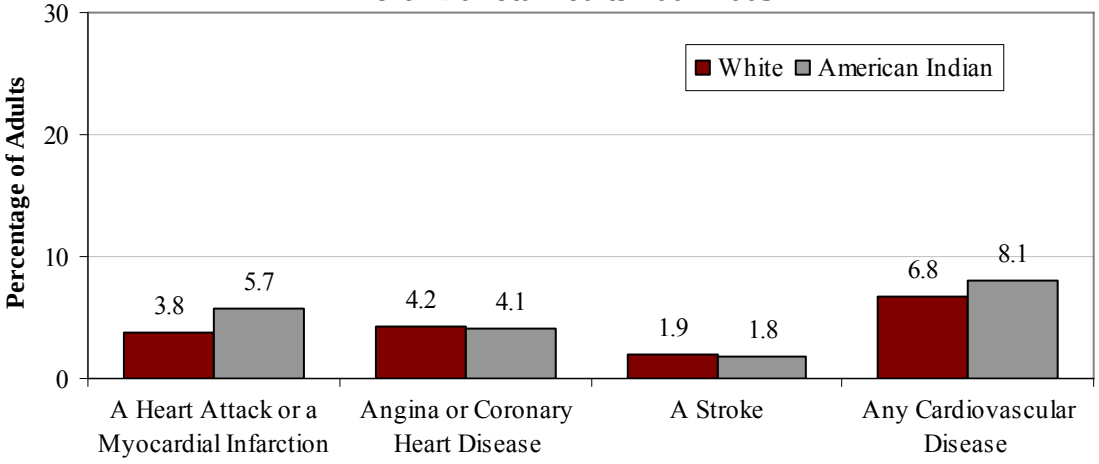
"The increasing diversity of our state's population, in part, is contributing to our state's recent population growth. This trend is likely to continue."

Richard Rathge,
Director of the North Dakota State Data Center

American Indian

American Indians have a higher prevalence of a history of heart attack or myocardial infarction than whites. The prevalence of angina or coronary heart disease and stroke is similar for the two races.

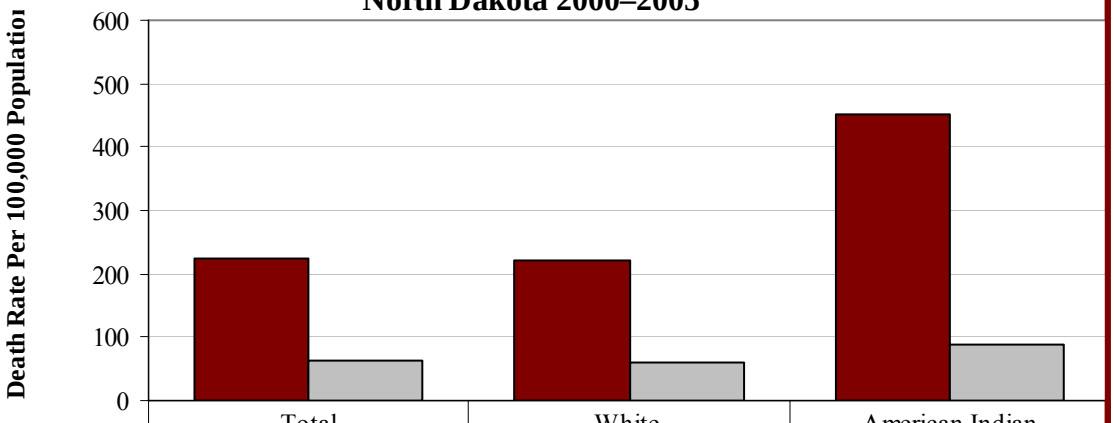
Figure 72. History of Heart Attack, Heart Disease or Stroke by Race North Dakota Adults 2001-2005



Source: Behaviorial Risk Factor Surveillance System

The heart disease mortality rate for American Indians is more than double the rate for whites in North Dakota. The stroke mortality rate for American Indians is 50 percent higher than the rate for whites.

Figure 73. Cardiovascular Disease Mortality Rates by Race
North Dakota 2000–2005



	Total	White	American Indian
Heart Disease	225.7	221.5	452.4
Stroke	62.8	59.3	88.9

Source: North Dakota Vital Records

American Indians lose many more years of potential life to heart disease and stroke than do whites. Two out of three American Indian deaths caused by heart disease occur to people younger than 75, compared to only three out of 10 white deaths. Seven out of 10 American Indian deaths caused by stroke occur to people younger than 75, compared to two out of 10 white deaths.

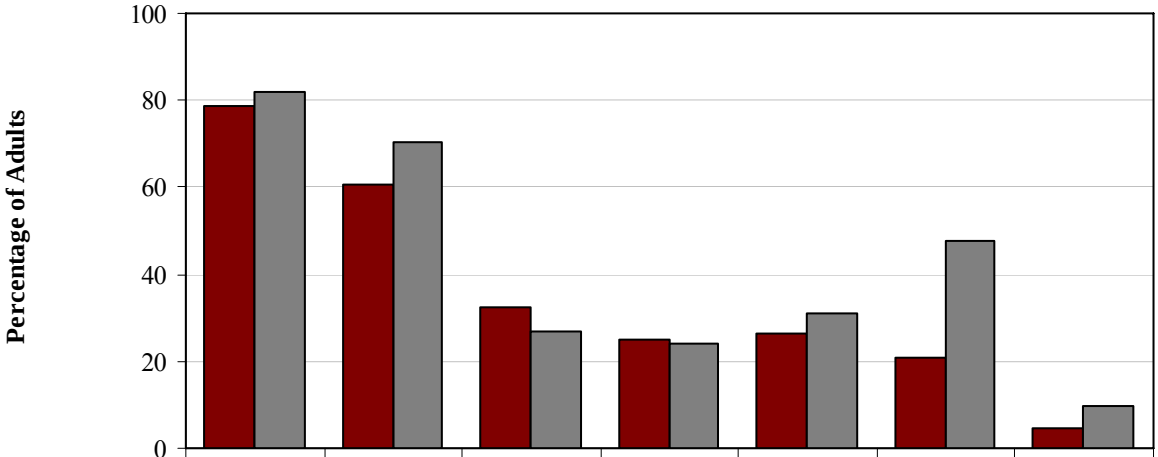
Figure 74. Years of Potential Life Lost Below Age 75 by Race
North Dakota 2000-2005

Cause of Death/Race	Total Deaths	Total YPLL	Average YPLL Per Death	Percentage of Deaths That Occurred Under 75 Years of Age
Heart Disease				
White	10,322	36,900	3.6	27
American Indian	330	4,042	12.2	67
Stroke				
White	3,001	6,605	2.2	18
American Indian	63	602	9.6	70

Source: North Dakota Vital Records

In addition to a higher prevalence of heart attacks, higher mortality rates due to cardiovascular disease and many more years of potential life lost, American Indians are disproportionately affected by the following risk factors: overweight or obesity, physical inactivity, smoking, and diabetes.

Figure 75. Risk Factors for Cardiovascular Disease by Race
North Dakota Adults 1996–2003



	Fewer than 5 Fruits and Vegetables	Overweight or Obese	High Cholesterol	High Blood Pressure	Physical Inactivity	Current Smoker	Diabetes
White	78.7	60.6	32.3	25.0	26.4	21.0	4.6
American Indian	81.9	70.2	26.9	23.9	31.0	47.8	9.6

Source: Behaviorial Risk Factor Surveillance System

Conclusions and Summary

Mortality rates from cardiovascular diseases (including heart disease and stroke) have declined in both the U.S. and North Dakota from 1999 to 2004. Despite these declines, cardiovascular diseases remain the leading cause of death in North Dakota.

Populations disproportionately affected by cardiovascular disease include people with co-morbid disease such as diabetes, people living in rural and frontier areas, people of minority racial or ethnic groups such as American Indians and Hispanics, and the elderly population (people 65 and older).

In addition to a higher prevalence of heart attacks, higher mortality rates due to cardiovascular disease and many more years of potential life lost, American Indians are disproportionately affected by the following risk factors: overweight or obesity, physical inactivity, smoking, and diabetes.

Behavioral risk factors for cardiovascular diseases are common in North Dakota. Slightly more than 40 percent of adults report three or more risk factors for cardiovascular diseases, while 20 percent report four or more risk factors. The majority of risk factors – traits and habits that increase a person's risk of disease – are primarily lifestyle related. High blood pressure and high cholesterol are both key risk factors for future cardiovascular disease problems and are impacted by modifiable risk factors such as physical inactivity, tobacco use, poor dietary habits, overweight or obesity, and diabetes.

Heart attacks or strokes are not rare events, especially among adults 65 and older. People in that age group also are less likely to recognize all the signs and symptoms of heart attack and stroke and are more likely to live in a rural or frontier area than those younger than 65.

In summary, the burden of cardiovascular disease is high in North Dakota, and many of the modifiable risk factors are increasing. American Indians are at a very high risk for heart disease and stroke, with rates of diabetes and smoking two times greater than whites. The senior population, ages 65 to 84, is relatively large and growing. This trend creates an age imbalance that poses concerns for our health-care system, especially when one considers that North Dakota already experiences health professional shortage areas in all but 10 counties. Reducing the burden of cardiovascular disease in North Dakota will require the cooperative efforts of communities, Indian tribes, public health organizations, clinicians, worksites and voluntary organizations, as well as state efforts to assist individuals to achieve healthier lifestyles through education, policy, system changes and environmental supports.

Appendices

Appendix A: North Dakota Counties

County	Population	Persons/ Sq. Mile
Urban		
Burleigh	69,416	42.5
Cass	123,138	69.7
Grand Forks	66,109	46.0
Morton	25,303	13.1
Stark	22,636	16.9
Stutsman	21,908	9.9
Ward	58,795	29.2
Williams	19,761	9.5
Rural		
Barnes	11,775	7.9
Mercer	8,644	8.3
Pembina	8,585	7.7
Ramsey	12,066	10.2
Ransom	5,890	6.8
Richland	17,998	12.5
Rolette	13,674	15.2
Traill	8,477	9.8
Walsh	12,389	9.7
Frontier		
Adams	2,593	2.6
Benson	6,964	5.0
Billings	888	0.8
Bottineau	7,149	4.3
Bowman	3,242	2.8
Burke	2,242	2.0
Cavalier	4,831	3.2
Dickey	5,757	5.1
Divide	2,283	1.8

County	Population	Persons/ Sq. Mile
Frontier		
Dunn	3,600	1.8
Eddy	2,757	4.4
Emmons	4,331	2.9
Foster	3,759	5.9
Golden Valley	1,924	1.9
Grant	2,841	1.7
Griggs	2,754	3.9
Hettinger	2,715	2.4
Kidder	2,753	2.0
LaMoure	4,701	4.1
Logan	2,308	2.3
McHenry	5,987	3.2
McIntosh	3,390	3.5
McKenzie	5,737	2.1
McLean	9,311	4.4
Mountrail	6,631	3.6
Nelson	3,715	3.8
Oliver	2,065	2.9
Pierce	4,675	4.6
Renville	2,610	3.0
Sargent	4,366	5.1
Sheridan	1,710	1.8
Sioux	4,044	3.7
Slope	767	0.6
Steele	2,258	3.2
Towner	2,876	2.8
Wells	5,102	4.0

Urban – counties with a city of at least 15,000 population
Rural – no city with 15,000 population but density greater than or equal to six people per square mile
Frontier – population density less than six people per square mile

Appendix B:
Census 2000 Demographic Profile Highlights: North Dakota

General Characteristics	N.D. Number	Percentage N.D.	Percentage U.S.
Total population	642,200		
Male	320,524	49.9	49.1
Female	321,676	50.1	50.9
Younger than 5	39,400	6.1	6.8
18 and older	481,351	75.0	74.3
65 and older	94,478	14.7	12.4

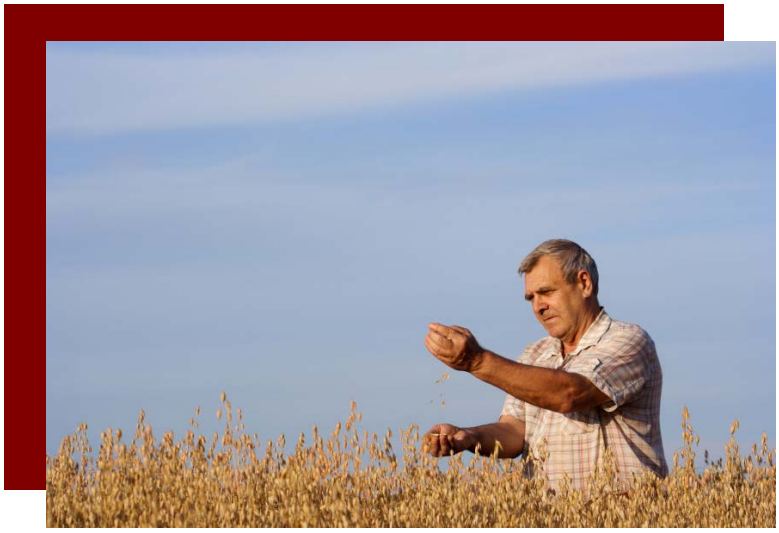
Race and Ethnicity	N.D. Number	Percentage N.D.	Percentage U.S.
One race	634,802	98.8	97.6
White	593,181	92.4	75.1
Black or African American	3,916	0.6	12.3
American Indian and Alaska Native	31,329	4.9	0.9
Asian	3,606	0.6	3.6
Native Hawaiian and Other Pacific Islander	230	0.0	0.1
Some other race	2,540	0.4	5.5
Two or more races	7,398	1.2	2.4
Hispanic or Latino (of any race)	7,786	1.2	12.5

Social Characteristics	N.D. Number	Percentage N.D.	Percentage U.S.
Population 25 and older	408,585		
High school graduate or higher	342,629	83.9	80.4
Bachelor's degree or higher	89,843	22.0	24.4
Disability status (population 5 and older)	97,817	16.7	19.3
Foreign born	12,114	1.9	11.1
Speak a language other than English at home (population 5 and older)	37,976	6.3	17.9

Economic Characteristics	N.D. Number	Percentage N.D.	Percentage U.S.
In labor force (population 16 and older)	338,982	67.5	63.9
Families below poverty level	13,890	8.3	9.2
Individuals below poverty level	73,457	11.9	12.4

Other Characteristics	N.D.	U.S.
Median age (years)	36.2	35.3
Average household size	2.41	2.59
Average family size	3.00	3.14
Mean travel time to work in minutes (workers 16 and older)	15.8	25.5
Median household income in 1999 (dollars)	34,604	41,994
Median family income in 1999 (dollars)	43,654	50,046
Per capita income in 1999 (dollars)	17,769	21,587

Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)



Appendix C:
Race Composition by County

	Total population	Race								Hispanic or Latino(of any race)
		One race							Two or more races	
		Total	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race		
North Dakota	642,200	634,802	593,181	3,916	31,329	3,606	230	2,540	7,398	7,786
COUNTY										
Adams	2,593	2,584	2,554	14	8	4	1	3	9	7
Barnes	11,775	11,708	11,529	53	90	22	0	14	67	64
Benson	6,964	6,907	3,541	7	3,346	1	1	11	57	55
Billings	888	880	877	0	1	0	1	1	8	3
Bottineau	7,149	7,092	6,950	16	104	13	1	8	57	35
Bowman	3,242	3,221	3,209	1	5	1	0	5	21	22
Burke	2,242	2,237	2,225	3	5	3	0	1	5	8
Burleigh	69,416	68,827	65,966	182	2,276	275	19	109	589	468
Cass	123,138	121,551	117,106	996	1,325	1,551	43	530	1,587	1,518
Cavalier	4,831	4,781	4,739	7	25	5	0	5	50	31
Dickey	5,757	5,716	5,629	6	20	29	0	32	41	78
Divide	2,283	2,279	2,260	0	3	12	0	4	4	14
Dunn	3,600	3,569	3,117	1	448	3	0	0	31	27
Eddy	2,757	2,737	2,657	2	65	4	2	7	20	17
Emmons	4,331	4,326	4,290	2	6	7	8	13	5	50
Foster	3,759	3,745	3,722	5	16	0	0	2	14	7
Golden Valley	1,924	1,903	1,881	0	14	2	0	6	21	20
Grand Forks	66,109	65,073	61,479	904	1,525	646	44	475	1,036	1,359
Grant	2,841	2,822	2,753	0	49	10	0	10	19	17
Griggs	2,754	2,749	2,735	0	6	4	0	4	5	11
Hettinger	2,715	2,705	2,686	4	10	2	2	1	10	6
Kidder	2,753	2,749	2,739	5	3	2	0	0	4	16
LaMoure	4,701	4,685	4,665	1	8	6	0	5	16	26
Logan	2,308	2,301	2,289	2	3	4	0	3	7	16
McHenry	5,987	5,945	5,911	5	24	2	0	3	42	24
McIntosh	3,390	3,371	3,352	0	5	10	1	3	19	28
McKenzie	5,737	5,669	4,438	4	1,215	3	1	8	68	58
McLean	9,311	9,201	8,615	2	554	11	1	18	110	81
Mercer	8,644	8,544	8,302	4	173	22	33	10	100	32
Morton	25,303	25,009	24,246	40	604	77	2	40	294	164
Mountrail	6,631	6,404	4,376	6	1,988	14	3	17	227	87
Nelson	3,715	3,693	3,662	3	13	11	0	4	22	6
Oliver	2,065	2,046	2,015	3	26	2	0	0	19	13
Pembina	8,585	8,461	8,198	13	123	18	0	109	124	264
Pierce	4,675	4,656	4,605	5	32	12	0	2	19	28
Ramsey	12,066	11,868	11,138	25	651	31	3	20	198	63
Ransom	5,890	5,835	5,768	11	19	15	0	22	55	48
Renville	2,610	2,589	2,551	6	17	12	0	3	21	19
Richland	17,998	17,864	17,428	62	299	44	6	25	134	123
Rolette	13,674	13,454	3,435	10	9,983	10	0	16	220	110
Sargent	4,366	4,337	4,289	2	20	2	0	24	29	32
Sheridan	1,710	1,707	1,697	2	7	0	0	1	3	6
Sioux	4,044	4,008	580	1	3,421	1	2	3	36	65
Slope	767	766	765	0	1	0	0	0	1	1
Stark	22,636	22,459	22,074	51	212	52	6	64	177	236
Steele	2,258	2,241	2,220	1	14	1	0	5	17	4
Stutsman	21,908	21,768	21,367	61	206	80	9	45	140	204
Towner	2,876	2,863	2,799	2	59	2	0	1	13	5
Traill	8,477	8,433	8,249	9	80	13	1	81	44	185
Walsh	12,389	12,256	11,752	41	126	24	2	311	133	700
Ward	58,795	57,794	54,327	1,305	1,215	483	36	428	1,001	1,125
Wells	5,102	5,089	5,057	7	12	12	0	1	13	15
Williams	19,761	19,325	18,367	24	869	36	2	27	436	185

Source: U.S. Census Bureau, 2000 Census

Appendix D:
American Indian Percentage of Population by County

	Percent of Population That is American Indian
North Dakota	4.9
COUNTY	
Adams	0.3
Barnes	0.8
Benson	48.0
Billings	0.1
Bottineau	1.5
Bowman	0.2
Burke	0.2
Burleigh	3.3
Cass	1.1
Cavalier	0.5
Dickey	0.3
Divide	0.1
Dunn	12.4
Eddy	2.4
Emmons	0.1
Foster	0.4
Golden Valley	0.7
Grand Forks	2.3
Grant	1.7
Griggs	0.2
Hettinger	0.4
Kidder	0.1
LaMoure	0.2
Logan	0.1
McHenry	0.4
McIntosh	0.1
McKenzie	21.2
McLean	5.9
Mercer	2.0
Morton	2.4
Mountrail	30.0
Nelson	0.3
Oliver	1.3
Pembina	1.4
Pierce	0.7
Ramsey	5.4
Ransom	0.3
Renville	0.7
Richland	1.7
Rolette	73.0
Sargent	0.5
Sheridan	0.4
Sioux	84.6
Slope	0.1
Stark	0.9
Steele	0.6
Stutsman	0.9
Towner	2.1
Traill	0.9
Walsh	1.0
Ward	2.1
Wells	0.2
Williams	4.4

Above the State percentage

Source: U.S. Census Bureau, 2000 Census

Appendix E:
North Dakota Ambulance Services by County and City

County	*Level*	*City*
Adams	Advanced Life Support Ground Ambulance	Hettinger
Barnes	Advanced Life Support Ground Ambulance	Valley City
	Quick Response Unit	Fingal
		Wimbledon
Benson	Basic Life Support Ground Ambulance	Esmond
		Fort Totten
		Leeds
		Maddock
		Minnewaukan
Billings	Basic Life Support Ground Ambulance	Medora
Bottineau	Basic Life Support Ground Ambulance	Bottineau
		Lansford
		Westhope
Bowman	Basic Life Support Ground Ambulance	Bowman
	Quick Response Unit	Rhame
		Scranton
Burke	Basic Life Support Ground Ambulance	Bowbells
		Portal
		Powers Lake
Burleigh	Advanced Life Support Ground Ambulance	Bismarck
	Basic Life Support Ground Ambulance	Wing
	Critical Care Air Ambulance	Bismarck
	Quick Response Unit	Bismarck
		Bismarck
		McKenzie
		Regan
Cass	Advanced Life Support Ground Ambulance	Fargo
		West Fargo
	Basic Life Support Ground Ambulance	Casselton
		Hunter
		Kindred
		Page
	Critical Care Air Ambulance	Fargo
	Quick Response Unit	Buffalo
		Davenport
		Harwood
		Horace
		Leonard

County	*Level*	*City*
Cavalier	Basic Life Support Ground Ambulance	Langdon Munich
Dickey	Basic Life Support Ground Ambulance	Ellendale Oakes
Divide	Basic Life Support Ground Ambulance	Crosby
Dunn	Basic Life Support Ground Ambulance	Halliday Killdeer
Eddy	Basic Life Support Ground Ambulance	New Rockford
Emmons	Advanced Life Support Ground Ambulance Quick Response Unit	Linton Strasburg
Foster	Basic Life Support Ground Ambulance	Carrington
Golden Valley	Basic Life Support Ground Ambulance	Beach
Grand Forks	Advanced Life Support Ground Ambulance Basic Life Support Ground Ambulance Quick Response Unit	Grand Forks Larimore Northwood Emerado Gilby Inkster Manvel Reynolds Thompson
Grant	Basic Life Support Ground Ambulance	Carson New Leipzig
Griggs	Basic Life Support Ground Ambulance Quick Response Unit	Binford Cooperstown Binford Hannaford
Hettinger	Basic Life Support Ground Ambulance	Mott New England Regent
Kidder	Basic Life Support Ground Ambulance Quick Response Unit	Steele Dawson Steele Tappen
LaMoure	Basic Life Support Ground Ambulance	Berlin Edgeley Kulm

County	*Level*	*City*
Logan	Basic Life Support Ground Ambulance	Gackle Napoleon
McHenry	Basic Life Support Ground Ambulance	Towner Upham Velva
McIntosh	Basic Life Support Ground Ambulance	Ashley Wishek
	Quick Response Unit	Lehr Zeeland
McKenzie	Basic Life Support Ground Ambulance	Watford City
McLean	Basic Life Support Ground Ambulance	Garrison Riverdale Turtle Lake Underwood Underwood – Coal Creek Underwood – Falkirk Mine Washburn Wilton
	Quick Response Unit	Wilton
Mercer	Basic Life Support Ground Ambulance	Beulah Beulah – Coteau Properties Beulah – Dakota Gasification Hazen
Morton	Advanced Life Support Ground Ambulance Basic Life Support Ground Ambulance	Mandan Almont Flasher Glen Ullin Hebron New Salem
	Quick Response Unit	Hebron Mandan – Huff Hills Ski Patrol
Mountrail	Basic Life Support Ground Ambulance	New Town Parshall Plaza Stanley
Nelson	Basic Life Support Ground Ambulance	Aneta Lakota Michigan Tolna

County	*Level*	*City*
Oliver	Basic Life Support Ground Ambulance	Center
Pembina	Basic Life Support Ground Ambulance	Cavalier Drayton Pembina Walhalla
	Quick Response Unit	Mountain St. Thomas
Pierce	Advanced Life Support Ground Ambulance	Rugby
	Basic Life Support Ground Ambulance	Rugby
	Quick Response Unit	Rugby
Ramsey	Advanced Life Support Ground Ambulance	Devils Lake
	Basic Life Support Ground Ambulance	Edmore
	Quick Response Unit	Starkweather
Ransom	Advanced Life Support Ground Ambulance	Lisbon
	Quick Response Unit	Enderlin
Renville	Basic Life Support Ground Ambulance	Glenburn Mohall Sherwood
Richland	Basic Life Support Ground Ambulance	Hankinson Lidgerwood Wyndmere
	Quick Response Unit	Abercrombie Barney Colfax Hankinson Walcott
Rolette	Basic Life Support Ground Ambulance	Belcourt Rolette Rolla
	Quick Response Unit	Rolla St. John
Sargent	Basic Life Support Ground Ambulance	Forman Milnor
	Quick Response Unit	Gwinner
Sheridan	Basic Life Support Ground Ambulance	Goodrich McClusky
Sioux	Advanced Life Support Ground Ambulance	Fort Yates
	Quick Response Unit	Fort Yates

County	*Level*	*City*
Slope	Basic Life Support Ground Ambulance	Marmarth
	Quick Response Unit	Amidon
Stark	Advanced Life Support Ground Ambulance	Dickinson
	Basic Life Support Ground Ambulance	Belfield
		Richardton
Steele	Basic Life Support Ground Ambulance	Finley
		Hope
Stutsman	Advanced Life Support Ground Ambulance	Jamestown
	Basic Life Support Ground Ambulance	Medina
Towner	Basic Life Support Ground Ambulance	Cando
		Rocklake
Traill	Basic Life Support Ground Ambulance	Hillsboro
		Mayville
	Quick Response Unit	Hatton
Walsh	Basic Life Support Ground Ambulance	Grafton
		Park River
	Quick Response Unit	Edinburg
		Fordville
		Hoople
		Lankin
		Minto
		Park River
		Pisek
Ward	Advanced Life Support Air Ambulance	Minot
	Advanced Life Support Ground Ambulance	Minot
		Minot AFB
	Basic Life Support Ground Ambulance	Berthold
		Carpio
		Kenmare
		Ryder
	Quick Response Unit	Burlington
		Minot
Wells	Basic Life Support Ground Ambulance	Chaseley
		Fessenden
		Harvey
Williams	Advanced Life Support Ground Ambulance	Williston
	Basic Life Support Ground Ambulance	Grenora
		Ray
		Tioga
	Quick Response Unit	Trenton

County	*Level*	*City*
Out-of-state	Advanced Life Support Air Ambulance	Aberdeen, SD
	Advanced Life Support Ground Ambulance	Ada, MN
		Breckenridge, MN
	Basic Life Support Ground Ambulance	Lemmon, SD
		McIntosh, SD
	Quick Response Unit	Wolverton, MN

Appendix F:
Data Sources

Data Sources
American Heart Association
Behavioral Risk Factor Surveillance System (BRFSS)
Blue Cross Blue Shield of North Dakota
Center for Rural Health – University of North Dakota School of Medicine
U.S. Centers for Disease Control and Prevention Cardiovascular Health Program
Medicaid – North Dakota Department of Human Services
Medicare – Center for Medicare and Medicaid Services
North Dakota Department of Health Cancer Prevention and Control Program
North Dakota Department of Health Diabetes Prevention and Control Program
North Dakota Department of Health Division of Emergency Medical Services
North Dakota Department of Health Division of Vital Records
North Dakota State Data Center
United States Census Bureau
Youth Risk Behavior Survey (YRBS)

The annual Behavioral Risk Factor Surveillance System (BRFSS) provides a valuable surveillance mechanism to assess trends in the prevalence of cardiovascular disease and many critical cardiovascular risk factors. Mortality statistics from the North Dakota Department of Health, Division of Vital Records describe the magnitude and impact of heart disease and stroke in North Dakota.

Appendix G:
Glossary

Age-adjusted rates

These are used mainly to compare rates of two or more specific communities or population groups. This report uses the U.S. 2000 population as the standard population so that rates can be compared for populations with different age compositions.

BRFSS

The Behavioral Risk Factor Surveillance System is a random-sample, statewide survey of adults.

Blood pressure screening

From the BRFSS, all respondents 18 and older who report that they have had their blood pressure checked within the past two years.

Body mass index (BMI)

BMI is weight (in kilograms) divided by the square of height (in meters), or weight (in pounds) divided by the square of height (in inches) times 704.5. BMI is the measurement of choice as an indicator of healthy weight, overweight and obesity.

Cardiovascular disease (CVD) (ICD-10 codes I00-I78)

CVD refers to a broad spectrum of heart and blood vessel diseases, including heart disease, stroke and peripheral vascular disease.

Cerebrovascular disease (ICD-10 codes I60-I69)

Cerebrovascular disease affects the blood vessels supplying blood to the brain and is also known as stroke. Stroke occurs when a blood vessel bringing oxygen and nutrients to the brain bursts or is clogged by a blood clot. Because of this rupture or blockage, part of the brain does not get the flow of blood it needs, and nerve cells in the affected area die.

Cholesterol screening

From the BRFSS, all respondents 18 and older who report that they have had a cholesterol check within the past five years.

Congestive heart failure (ICD-10 code I50)

Also known as heart failure, this is a disorder where the heart loses its ability to pump blood efficiently. The result is that the body doesn't get as much oxygen and nutrients as it needs, leading to problems like fatigue and shortness of breath. Heart failure is almost always a chronic, long-term condition that is managed with medications and lifestyle changes.

Coronary heart disease (ICD-10 codes I11, I20-I25)

Sometimes called ischemic heart disease, this refers to a reduction of blood flow due to thickening and hardening of the arteries that supply the heart muscle.

Critical access hospital (CAH)

This is a rural limited-service hospital that has been converted to a special designation as a critical access hospital under the Medicare Rural Hospital Flexibility Grant Program. The majority of CAHs are in health professional shortage areas and/or medically underserved areas.

Crude death rate

The crude death rate is the number of deaths for a specific condition in a given region, divided by the population of that region. Death rates in this publication multiply this proportion by 100,000. This is a common practice in reporting death rates.

Current smoker – adult

From the BRFSS, all respondents 18 and older who have ever smoked 100 cigarettes in their lifetimes and reported smoking every day or some days.

Current smoker – youth

From the YRBS, all respondents in middle school or high school who have smoked on one or more of the past 30 days.

Diabetes mellitus

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin production, insulin action, or both. From the BRFSS, all respondents 18 and older who report that they have been diagnosed with diabetes.

Frontier county

This is a county with population density less than or equal to six people per square mile.

Fruits and vegetables: 5-A-Day

From the BRFSS, all respondents 18 and older who report they are consuming five or more servings of fruits and vegetables per day.

Healthy People 2010 (HP2010)

Healthy People 2010 is the prevention agenda for the United States. It is a statement of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats.

Healthy weight

The BMI range for a healthy weight is >18.5 and <25. From the BRFSS, all respondents 18 and older who report that their BMI is >18.5 and <25.

High blood pressure

Blood pressure is the force of the blood pushing against the walls of arteries. Blood pressure is given as two numbers – systolic pressure (the first number, which measures the pressure while the heart is contracting) and diastolic pressure (the second number, which measures the pressure when the heart is resting between beats). From the BRFSS, all respondents 18 and older who report they have been told by a doctor, nurse or other health professional that they have high blood pressure.

High cholesterol

Cholesterol is the waxy substance that circulates in the bloodstream. When the level of cholesterol in the blood is too high, some of the cholesterol is deposited in the walls of the blood vessels. Over time, these deposits can build up until they narrow the blood vessels, causing atherosclerosis, which reduced the blood flow. From the BRFSS, all respondents 18 and older who report they have been told by a doctor, nurse or other health professional that they have high blood cholesterol.

ICD-9

International Classification of Diseases, 9th revision. The ICD is designed for classification of disease by a system of diagnostic codes.

ICD-10

International Classification of Diseases, 10th revision. The ICD is designed for classification of disease by a system of diagnostic codes.

Incidence

Incidence is an estimate of the number of new cases of a disease that develop in a population in a specified time period (usually one year). Incidence is a measure of disease that allows us to determine a person's probability of being diagnosed with a disease during a given period of time. Therefore, incidence is the number of newly diagnosed cases of a disease. An incidence rate is the number of new cases of a disease divided by the number of persons at risk for the disease. If, over the course of one year, five women are diagnosed with breast cancer, out of a total female study population of 200 (who do not have breast cancer at the beginning of the study period), then we would say the incidence of breast cancer in this population was 0.025 (or 2,500 per 100,000 women-years of study).

Ischemic heart disease (ICD-10 codes I20-I25)

This refers to a reduction of blood flow due to thickening and hardening of the arteries that supply the heart muscle.

Morbidity

Morbidity is a measure of illness in a population and is usually expressed as **prevalence** rate or **incidence** rate. Morbidity is another term for illness. A person can have several co-morbidities simultaneously. So, morbidities can range from Alzheimer's disease to cancer to traumatic brain injury. Morbidities are NOT deaths. Prevalence is a measure often used to determine the level of morbidity in a population.

Mortality

Mortality is a measure of death in a population from a given disease during a specified time period (usually one year) and is usually expressed as a rate per 100,000 population. Mortality is another term for death. A mortality rate is the number of deaths due to a disease divided by the total population. If there are 25 lung cancer deaths in one year in a population of 30,000, then the mortality rate for that population is 83 per 100,000.

Obesity

Obesity is defined as a BMI greater than or equal to 30. From the BRFSS, all respondents 18 and older who report that their BMI is >=30.0.

Overweight

Overweight is defined as a BMI greater than or equal to 25 and less than 30. From the BRFSS, all respondents 18 and older who report that their BMI is >=25.0 and <30.0.

Physical activity – adult

Physical activity is bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.

Physical inactivity: From the BRFSS, all respondents 18 and older who report no leisure-time physical activity during the past month.

Moderate physical activity: From the BRFSS, all respondents 18 and older who report moderate leisure-time physical activity >= 5 times per week for >= 30 minutes each time.

Vigorous physical activity: From the BRFSS, all respondents 18 and older who report vigorous leisure-time physical activity >= 3 times per week for >= 20 minutes each time.

Regular or recommended physical activity: From the BRFSS, all respondents 18 and older who report leisure-time physical activity to moderate or vigorous levels of intensity.

Physical activity – youth

Physical activity is bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.

Physical inactivity: From the YRBS, all respondents who report physical activity that did not meet moderate or vigorous levels of intensity and duration.

Moderate physical activity: From the YRBS, all respondents who report participating in physical activity that did not make them sweat or breathe hard for 30 minutes on five or more of the past seven days.

Vigorous physical activity: From the YRBS, all respondents who report participating in physical activity that made them sweat and breathe hard for 20 or more minutes on three or more of the past seven days.

Sufficient or recommended physical activity: From the YRBS, all respondents who report physical activity to moderate or vigorous levels of intensity and duration.

Premature death

Premature death occurs during the ages of 35 to 74.

Prevalence

Prevalence is an estimate of the total number of cases of a disease existing in a population at a specific point in time. It is often expressed as a percentage of the population. Prevalence is a measure of disease that allows us to determine a person's likelihood of having a disease. Therefore, the number of prevalent cases is the total number of cases of disease existing in a population. A prevalence rate is the total number of cases of a disease existing in a population divided by the total population. So, if a measurement of cancer is taken in a population of 40,000 people and 1,200 were recently diagnosed with cancer and 3,500 are living with cancer, then the prevalence of cancer is 0.118 (or 11,750 per 100,000 persons).

Rural county

A rural county is a county with no city with a population of 15,000, but with a density greater than six people per square mile.

Stroke

Stroke is another word for cerebrovascular disease. Stroke occurs when a blood vessel bringing oxygen and nutrients to the brain bursts or is clogged by a blood clot. Because of this rupture or blockage, part of the brain does not get the flow of blood it needs and nerve cells in the affected area die.

Tertiary hospital

A major hospital that usually has a full complement of services.

TIA or transient ischemic attack

A TIA is sometimes called a small or mini-stroke. TIAs are caused by a temporary disturbance of blood supply to an area of the brain resulting in sudden, brief (usually less than one hour) disruptions in certain brain functions.

Urban county

An urban county is a county with a city with a population of at least 15,000.

U.S. Centers for Disease Control and Prevention (CDC)

Located in Atlanta, Ga., the CDC is an agency of the U.S. Department of Health and Human Services. The CDC serves as the national focus for developing and applying disease prevention and control, environmental health, and health promotion and education activities designed to improve the health of people of the United States.

YRBS

The Youth Risk Behavior Survey is a survey of middle school and high school students conducted in the odd years. The priority health risk behaviors monitored include tobacco use, unhealthy dietary behaviors, physical inactivity, alcohol and other drug use, sexual behavior/STDs/HIV/AIDS/unintended pregnancies, and violence/injury.

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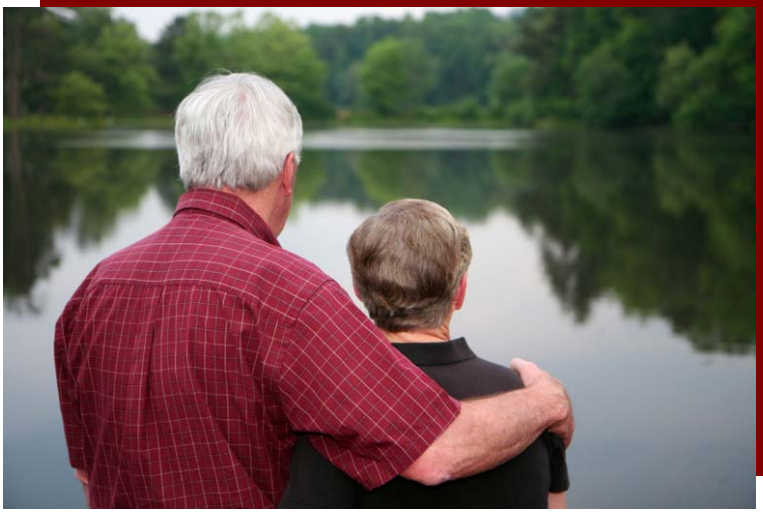

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