


IMPACT
of
Cardiovascular Disease
in Nebraska

December 2004

Nebraska Cardiovascular Health Program
Disease Prevention and Control

Nebraska Health and Human Services System

IMPACT OF CARDIOVASCULAR DISEASE IN NEBRASKA

Nebraska Health and Human Services System

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December 2004

Suggested Citation:
Nebraska Health and Human Services System. *Impact of Cardiovascular DIsease in Nebraska.* Lincoln, NE: Nebraska Health and Human Services System, Department of Health and Human Services, Office of Disease Prevention and Health Promotion; 2004.

ACKNOWLEDGMENTS

A special thanks is owed to Don Austin, MD, MPH, Professor, Oregon Health and Science University. Dr. Austin provided invaluable leadership and technical assistance on this project through the National Mentorship Program in Applied Chronic Disease Epidemiology which is supported by the Centers for Disease Control and Prevention (CDC), the Council of State and Territorial Epidemiologists (CSTE), and coordinated through Penn State University. Dr. Austin's experiences in public health epidemiology at the state, federal, and academic levels as well as his sensational ability to instruct, tremendously improved the quality of this report.

We would like to thank the following individuals/organizations for substantial support and contribution to the project:

- Victor Filos, Health Data Analyst, Nebraska Health and Human Services System, for completing the data analysis of the Nebraska Hospital Discharge Data presented within this report.
- Brett Foley, MS, Temporary Employee, Nebraska Health and Human Services System, for completing the analysis of the Medicaid related data presented within this report.
- Barb Fraser, MS, RD, for editing the report.
- Ted Fraser, MS, Data Analyst, CIMRO of Nebraska, for completing the quality of care analysis for Nebraska Medicare enrollees presented within this report.
- Jane McGinnis, MBA, Medicaid Managed Care Epidemiologist, Nebraska Health and Human Services System, for providing oversight and technical assistance with the Medicaid related data presented within this report.
- Norm Nelson, Health Data Analyst, Nebraska Health and Human Services System, for completing much of the data analysis and providing technical assistance on the mortality and BRFSS data presented within this report.

We would also like to thank the following individuals for assisting with the planning and reviewing of this report (NHHSS=Nebraska Health and Human Services System):

Rajaena Appleby, MS, Community Heart and Stroke Director, American Heart Association-Heartland Affiliate-Nebraska; Arturo Coto, MPH, Disease Surveillance Coordinator, Office of Epidemiology, NHHSS; Pierre Fayad, MD, Chair, Department of Neurological Sciences, University of Nebraska Medical Center; Wanda Koszewski, Ph.D., Assistant Professor, Nurtition and Health Science, University of Nebraska Lincoln; Carrie Kunc, Director Specialty Society, Nebraska Medical Association; Marilyn McGary, Administrator, Office of Minority Health, NHHSS; Jacquelyn D. Miller, DDS, Deputy Director, Health Services, NHHSS; Syed M. Mohiuddin, MD, Chief, Division of Cardiology, Creighton University Medical Center; Richard Raymond, MD, Chief Medical Officer, NHHSS; Bryan Rettig, MS, Lead Program Analyst, Data Management Section, NHHSS; Monica Seeland, RHIA, Director of Clinical Health Information, Nebraska Hospital Association; Kathy Ward, Administrator, Office of Women's Health, NHHSS; Bill Wiley, Public Information Officer, Communications and Legislative Services, NHHSS.

-Nebraska Cardiovascular Health Program

Financial support for this project and publication was provided through the Nebraska Cardiovascular Health Program of the Nebraska Health and Human Services System, using "Statewide Cardiovascular Health Programs" funding (U50/CCU721341-01) from the CDC.

NEBRASKA HEALTH AND HUMAN SERVICES SYSTEM
DEPARTMENT OF SERVICES • DEPARTMENT OF REGULATION AND LICENSURE
DEPARTMENT OF FINANCE AND SUPPORT

STATE OF NEBRASKA
MIKE JOHANNS, GOVERNOR

December 21, 2004

Dear Nebraskans,

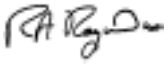
This report entitled “The Impact of Cardiovascular Disease in Nebraska” is the most comprehensive review and analysis done on this subject by the Nebraska Health and Human Services System. It represents a near two-year effort to identify the impact of cardiovascular disease in Nebraska and identify populations at greatest risk. Many of the findings are extremely significant, and it is imperative that in order to effectively prevent and control cardiovascular disease, Nebraskans work together to address this critical problem.

The lack of adequate physical activity and unhealthy eating habits are two of the primary reasons causing these unhealthy trends among Nebraskans, resulting in epidemic increases in overweight and obesity. Sadly, in 2001, Nebraska adults ranked next to last in recommended physical activity compared to the rest of the nation. Studies also show that both Nebraska youth and adults rank well below the national average in the consumption of the USDA’s recommended five or more servings of fruits and vegetables per day.

While it is critically important to focus on preventing cardiovascular disease, many people in Nebraska are already at high-risk for or have cardiovascular disease. Consequently, it is important that our residents experiencing cardiovascular episodes recognize their signs, act immediately by calling 9-1-1, and have health care systems in place to promptly and effectively treat their cardiovascular conditions.

Please utilize the information in this report to bring about change in your family, workplace, organization, church, or community. I ask for your continued support of the Cardiovascular Health Program and if you have any questions or suggestions, feel free to contact me or the program’s dedicated staff.

Yours very truly,



Richard Raymond, M.D.
Director of Regulation and Licensure and Chief Medical Officer
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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Cardiovascular disease (CVD), consisting of heart disease and stroke, is a serious and costly disease. Although a largely preventable and controllable disease, CVD claims thousands of lives each year (many of those among residents under 65 years of age), is a leading cause of disability, and results in enormous medical expenses.

To better understand the impact of CVD in Nebraska, a variety of state and national data sources were selected to look at multiple aspects of CVD and its associated risk factors. Within this report, a total of 14 Nebraska data sources were used to examine one or more aspects of CVD.

Highlights: CVD in Nebraska

- About 1 in every 10 Nebraska adults (or an estimated 100,000 to 143,000 adults) has been diagnosed (by a doctor, nurse, or health professional) with coronary heart disease, or have had a heart attack or stroke; placing them at extremely high risk for future heart attacks and strokes.
- CVD continues to be the leading cause of death among both genders and all racial and ethnic groups (except Asians) in Nebraska.
- In 2001, CVD killed 5,763 Nebraska residents (an average of 16 deaths per day) and claimed more lives than the next five leading causes of death combined.
- CVD is the leading cause of hospitalization in Nebraska, having accounted for at least 7,260 ER visits and 27,710 hospitalizations among Nebraska residents in Nebraska hospitals during 2001.
- The cost for cardiovascular care is enormous and appears to be increasing. From 1996 to 2001, the average charge per hospitalization due to CVD increased 44 percent while the average charge per ER visit increased 38 percent. Through 2001 State of Nebraska general funds, "taxpayer-supported" Medicaid paid approximately $45.7 million for medical visits, prescription drugs, and hospitalizations due to CVD among Nebraska enrollees. Furthermore, obesity among all Nebraska adults costs approximately $454 million per year in direct medical expenses (accounting for around 5.8% of all adult medical expenses each year).
- In 2000, (at least) 5,584 EMS transports occurred among people in Nebraska that were having a suspected cardiac event. The average EMS response time for a suspected cardiac event was approximately 10 minutes from dispatch to the scene (or individual in need) and nearly 30 minutes from the scene to the health care facility. In contrast, it takes just 4 minutes for the body to sustain brain damage without oxygen.
- People in Nebraska are not engaging in adequate amounts of physical activity and are engaging in unhealthy eating. In 2001, Nebraska adults ranked 50th lowest (out of 51) in recommended physical activity among all 50 U.S. states and the District of Columbia. In addition, both youth and adults rank well below the national average in the consumption of the USDA's recommendation of five or more servings of fruits and vegetables per day.
- Subsequently, people in Nebraska are increasingly overweight and obese. Between 1990 and 2002, obesity among Nebraska adults doubled, increasing from 11.6 percent to 23.2 percent. Furthermore, one-third of Nebraska youth in grades K-12 are either at risk for overweight or overweight.
- High blood pressure and cholesterol are important health concerns for people in Nebraska. Nearly 1 in every 4 (23%) Nebraska adults has been diagnosed with high blood pressure while more than 1 in every 4 (28%) has been diagnosed with high blood cholesterol (among those that have ever had a cholesterol screening). Surprisingly, among the 54 U.S. states and territories in 2001, Nebraska adults ranked second lowest in the percentage that have had a cholesterol screening during their lifetime, second only to Guam.

- About 1 in every 17 Nebraska adults (6%) has been diagnosed with diabetes, and diabetes mortality rates in Nebraska have increased in recent years.
- The prevalence of current cigarette smoking among Nebraska adults has remained virtually unchanged since 1989, at 23 percent in 2002. In contrast, about 1 in every 5 Nebraska high school students (24%) currently smoke cigarettes, a trend that is beginning to decline.
- When CVD risk factors are combined, the risk for heart attack and stroke dramatically increases. More than 8 in every 10 (83%) Nebraska adults has one or more CVD risk factors, nearly half has 2 or more CVD risk factors (46%), and nearly 1 in every 5 (18%) has 3 or more CVD risk factors (out of six possible risk factors).
- There are a variety of barriers that are impacting both primary and secondary prevention efforts for CVD in Nebraska. Primary prevention barriers include: excessive amounts of time spent using electronic devices (including televisions, video games, and computers); high-risk weight loss methods, and numerous unrealized opportunities within communities, worksites, and schools that could result in increases in physical activity and healthy eating. Secondary prevention barriers include: failure to properly recognize the signs and symptoms of a heart attack and stroke; limited aspirin use among people at high risk for CVD; lack of health care coverage among those 18-64 years of age; EMS and 9-1-1 coverage for persons in sparsely populated regions; and quality of care issues within the health care system.
- CVD is often perceived as a disease of the elderly. On the contrary, CVD is actually the second leading cause of premature death in Nebraska and is a major contributor to medical care and expenses among persons under 65. Developing CVD during ones' productive years of life can result in missed work days and less productivity and can (indirectly) be detrimental to Nebraska's economy.
- Medicaid enrollees (a predominately young population) are at extremely high risk for CVD related mortality and medical care in Nebraska. In 2001, 1 in every 4 CVD deaths in Nebraska occurred among people enrolled in the Nebraska Medicaid system at their time of death, making them 3.5 times more likely than non-Medicaid enrollees to die from CVD.
- Other populations in Nebraska at high-risk for CVD include African Americans, Native Americans, Hispanics, persons of low socioeconomic status, and persons living in rural communities.

What the future holds for CVD in Nebraska

- Of all children born today in America, nearly half (47%) are expected to die from CVD, while 22% are expected to die from cancer.
- National increases in obesity and diabetes are resulting in increases in hypertension, hyperlipidemia, and atherosclerotic vascular disease.
- The aging of Nebraska's population will result in more heart disease and stroke, likely increasing the economic impact.

Conclusion

Nebraska must brace itself for the future of CVD. To achieve success, and ultimately decrease the burden of CVD, Nebraska must support and offer more cost-effective treatments and place a stronger emphasis on primary prevention. Living with CVD has serious implications on quality of life and creates economic hardship. Individuals with CVD often require prescription medication and medical procedures that result in missed work, enormous out-of-pocket medical expenses, and disabilities that prevent active daily living. In addition, CVD is placing a large financial burden on employers, the insurance industry, the government, and the health care system. As a result, it is not only critical to effectively treat cardiovascular disease, but it is equally important to prevent CVD from progressing to the stages that require medical attention. Consequently, individuals, families, communities, schools, worksites, health care, media, faith-based organizations, and government must unite to address this problem.

REPORT HIGHLIGHTS

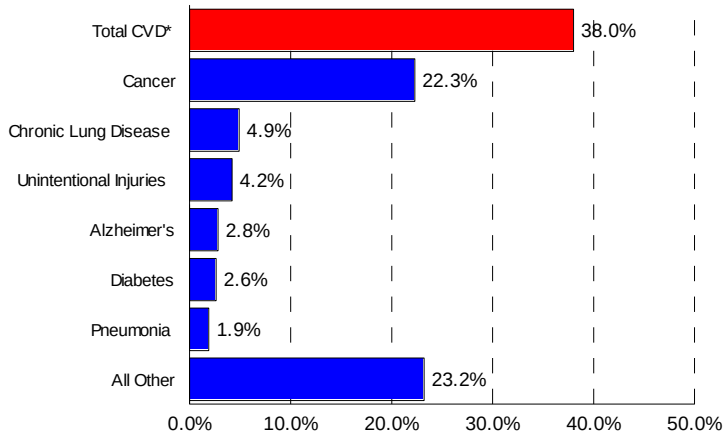
Living with CVD

- About 1 in every 10 Nebraska adults (or an estimated 100,000 to 143,000 adults) reported that they have been diagnosed (by a doctor, nurse, or health professional) with coronary heart disease or have had a heart attack or stroke during their lifetime[1]. Subsequently, these individuals are at extremely high risk for a recurrent heart attack or stroke.
- While experiencing a heart attack or stroke motivates some people to engage in healthier behaviors, this is not the case for many people in Nebraska. Among Nebraska adults reporting that they have been diagnosed with coronary heart disease or have had a heart attack or stroke, more than 1 in every 5 currently smokes cigarettes, more than 1 in every 3 is obese, more than 2 in every 5 do not engage in any leisure time physical activity, and 7 in every 10 do not consume the USDA's recommendation of five or more servings of fruits and vegetables per day (5-a-day)[1].

Mortality due to CVD[2]

- In Nebraska, CVD continues to be the leading cause of death among both genders and all racial and ethnic groups (except Asians).
- In 2001, CVD killed 5,763 Nebraska residents for an average of 16 deaths per day. Of all Nebraska deaths in 2001, 2 in every 5 (38%) resulted from CVD.
- CVD killed more Nebraska residents in 2001 than the next five leading causes of death combined (including cancer, chronic lung disease, unintentional injuries, Alzheimer's, and diabetes).

Leading Causes of Death in Nebraska, 2001



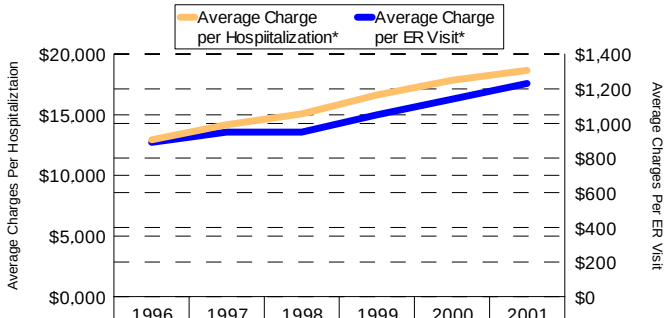
*Includes Heart Disease, Stroke, and other CVD related deaths (ICD-10 Codes I00-I99)
Source: Nebraska Vital Records

- CVD is often perceived as being a disease of the elderly. On the contrary, CVD is actually the second leading cause of premature death in Nebraska. Between 1999 and 2001, CVD killed more than 2,000 residents under the age of 65 and claimed about 60,000 years of productive life.
- While total CVD mortality rates are declining in Nebraska; stroke mortality rates have leveled off in recent years, heart failure mortality rates are increasing dramatically among older adults, and high blood pressure mortality rates are increasing among females.
- Even though CVD mortality rates are declining, some research has indicated that these declines are resulting from improvements in medical treatment rather than from less CVD[3,4]. In addition, due to the aging of Nebraska's population, the actual number of deaths per year is declining at a much slower pace than the rate of death. This indicates that the impact from CVD on the health care system in Nebraska is likely remaining stable or in some cases may be worsening.
- Unfortunately, many CVD deaths in Nebraska occur without hospital care. Between 1999 and 2001, nearly 2 in every 3 CVD deaths (65%) occurred outside of inpatient hospital care, likely resulting from sudden or near sudden death. There are a variety of effective interventions available to treat CVD; however, most have a limited window for administration. As a result, it is critically important that victims recognize their signs, act immediately by calling 9-1-1, and have quality emergency medical services available. It is also critical that health professionals properly diagnose and treat the condition.

Medical Care and Expenses due to CVD

- Cardiovascular disease is the leading cause of hospitalization in Nebraska. During 2001, at least 7,260 ER visits and 27,710 hospitalizations due to CVD occurred among Nebraska residents in Nebraska hospitals[5].
- About 1 in every 3 hospitalizations due to CVD during 2001 resulted in either death during hospitalization or discharge for follow-up care[5].
- In 2001, Nebraska hospitals charged payers more than $517 million for hospitalizations and more than $9 million for ER visits resulting from CVD[5].
- From 1996 to 2001, the average charge per hospitalization due to CVD increased 44 percent (from $12,920 to $18,650 per stay) while the average charge per ER visit increased 38 percent (from $890 to $1,230 per visit)[5].
- Of all payers, Medicaid had the most dramatic increase (from 1996-2001) in medical charges per hospitalization due to CVD, increasing 87 percent (from $12,800 to $23,900 per stay)[5].
- "Taxpayer-supported" Medicaid paid $114.6 million for medical visits, prescription drugs, and hospitalizations due to CVD among Nebraska enrollees in 2001; of which approximately $45.7 million was paid through State of Nebraska general funds[6].
- In 2001, at least 36,000 cardiovascular operations and procedures were performed on Nebraska residents in Nebraska hospitals (of which 43% were performed on residents under 65 years of age)[5].
- In 2000, at least 5,584 EMS transports occurred among people in Nebraska that were having a suspected cardiac event. The average EMS response time for a cardiac event was approximately 10 minutes from dispatch to the scene (or individual in need) and nearly 30 minutes from the scene to the health care facility. In contrast, it takes just 4 minutes for the body to sustain brain damage without oxygen[7].

Trends in the Estimated Charge per Hospitalization and ER Visits Due to CVD* in Nebraska, 1996-2001



	1996	1997	1998	1999	2000	2001
Average Charge per Hospiitalization*	$12,920	$14,180	$15,060	$16,620	$17,840	$18,650
Average Charge per ER Visit*	$890	$950	$950	$1,050	$1,140	$1,230

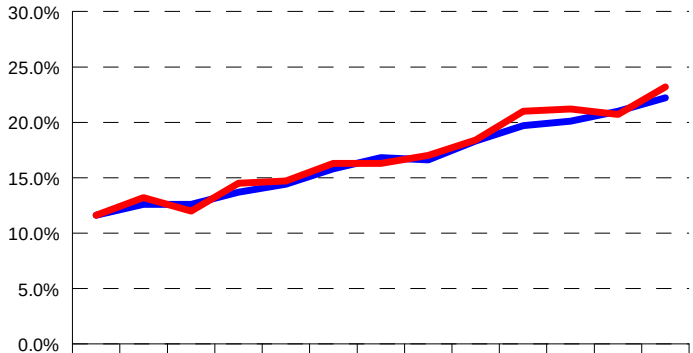
*Includes ICD-9-CM Codes 390-459
Note: hospitalization and ER visit costs are estimates because they are based on hospitalization data that range 82-87% complete and ER visit data that rranges from 75-80% complete for any one year between 1996 and 200
Source: Nebraska Hospital Discharge Data

Risk Factors for CVD

Overweight and Obesity

- Obesity among Nebraska adults doubled between 1990 and 2002, increasing from 11.6 percent to 23.2 percent[8].
- Obesity among Nebraska adults costs $454 million per year in direct medical expenses while accounting for around 5.8 percent of all adult medical expenses per year in Nebraska[9].
- During the 2002-2003 academic school year, 1 in every 3 Nebraska youth in grades K-12 was identified as either at risk for overweight or overweight[10].

Obesity* Trends among NE and U.S. Adults



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Nebraska	11.6%	13.2%	12.0%	14.5%	14.7%	16.3%	16.3%	17.0%	18.4%	21.0%	21.2%	20.7%	23.2%
Nation	11.6%	12.6%	12.6%	13.7%	14.4%	15.8%	16.8%	16.6%	18.3%	19.7%	20.1%	21.0%	22.2%

*BMI (weight in kilograms divided by height in meters squared) of 30 or greater
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

Lack of Physical Activity

- In 2001, just 1 in every 3 Nebraska adults (34%) engaged in a recommended level of physical activity[8]. This ranked Nebraska adults 50th lowest (out of 51) in recommended physical activity among all 50 U.S. states and the District of Columbia[11].
- Among Nebraska high school students in 2003, just 1 in every 5 (19%) engaged in a sufficient level of physical activity in all its forms (including moderate, vigorous, and strengthening exercise)[12].

Unhealthy Eating

- In 2002, less than 1 in every 5 Nebraska adults (18%) consumed five or more servings of fruits and vegetables per day (5-a-day) while just 1 percent consumed 9-a-day[8]. Nebraska adults ranked 4th lowest in 5-a-day consumption among 54 U.S. states and territories during 2002[11].
- In 2003, 1 in every 4 Nebraska high school students (24%) consumed 32 or more ounces of soda per day. In contrast, during the same year, less than 1 in every 5 students consumed 3 or more glasses of milk per day (18%) while just 1 in every 6 students consumed 5-a-day (16%)[12].

High Blood Pressure

- In 2001, nearly 1 in every 4 Nebraska adults (23%) indicated that they have been diagnosed with high blood pressure (by a doctor, nurse, or health professional) during their lifetime[8].

High Blood Cholesterol

- Among 54 U.S. states and territories in 2001, Nebraska adults ranked second lowest in the percentage that have had a cholesterol screening during their lifetime, second only to Guam[11].
- Among Nebraska adults that have ever had a cholesterol screening, more than 1 in every 4 (28%) indicated, during 2001, that they have been diagnosed with high blood cholesterol (by a doctor, nurse, or health professional) during their lifetime[8].

Diabetes

- The death rate from diabetes in Nebraska increased 50 percent between 1990 and 2000[13].
- In 2002, about 1 in every 17 Nebraska adults (6%) indicated that they have been diagnosed with diabetes (by a doctor, nurse, or health professional) during their lifetime[8].

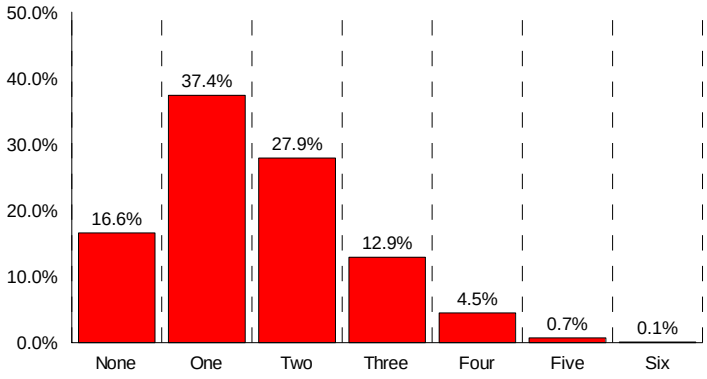
Cigarette Smoke

- Nearly 1 in every 4 Nebraska adults (23%) smoked cigarettes in 2002, a stable trend since 1989[8].
- In 2003, about 1 in every 5 Nebraska high school students (24%) smoked cigarettes[12]. However, this percentage is beginning to decline.
- About one-fourth of Nebraska adults allowed smoking in their home or family vehicle while 23 percent of employed Nebraska adults reported that smoking was allowed in one or more work areas (at their place of employment) in 2003[14].

Multiple Risk Factors for CVD

- When CVD risk factors are combined, the risk for heart attack and stroke dramatically increases. During 2001, more than 8 in every 10 (83%) Nebraska adults had one or more CVD risk factors, nearly half had 2 or more CVD risk factors (46%), and nearly 1 in every 5 (18%) had 3 or more CVD risk factors[8].

Number of Preventable Risk Factors for CVD*
Among Nebraska Adults, 2001



*From the following six CVD risk factors: obesity, no recommended physical activity, high blood pressure, high blood cholesterol, diabetes, and current cigarette smoking
Missing data=522 cases (14.1%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

Barriers to Cardiovascular Health

Barriers to the primary prevention of CVD

- Electronic entertainment is a major source of free time activity for people in Nebraska. During 2003, Nebraska adults indicated that they spend, on average, 2 hours and 42 minutes per day watching television (while sitting or lying down) and/or using the computer (outside of work)[14]. Nebraska high school students indicated, during 2003, that they spend, on average, more than 3 and 1/2 hours during an average school day watching television, using video game systems, and/or using the computer (excluding homework)[12].
- Among Nebraska high school students that were currently trying to lose weight in 2003, 1 in every 3 (34%) used a high-risk weight loss method to try to lose weight, such as fasting, diet pills, vomiting and/or laxative use[12].
- Most worksites in Nebraska provide little or no support for physical activity[1].
- Nebraska residents regularly frequent restaurants, fast food shops, and food stands without the selection of the lower-fat items they desire[1].
- Student at some Nebraska elementary schools are not being allowed to walk and bike to school as frequently as they desire[15].
- Perceived neighborhood safety from crime is a concern for many Nebraska adults, especially for those at lower socioeconomic status and those living in urban environments[1].
- While public schools in Nebraska (teaching grades 6-12) offer some supports for physical activity and healthy eating, opportunities exist to offer many more physical activity and healthy eating supports.

Barriers to the secondary prevention of CVD

- While the vast majority of Nebraska adults recognized 9-1-1 as the first emergency response option for a heart attack or stroke in 2001, just 1 in every 8 (13%) correctly identified all heart attack signs and symptoms, and just 1 in every 5 correctly identified all stroke signs and symptoms[1].
- Less than half of Nebraska adults (35 and older) with high blood pressure, high blood cholesterol, and diabetes took aspirin regularly in 2001 (among those with no aspirin-related health problems)[1].
- In 2002, approximately 145,000 Nebraska adults under 65 years of age (or about 1 in every 7) indicated that they have no health care coverage[8].
- EMS response times for suspected cardiac events average 40 minutes from dispatch to arrival at a health care facility, and are higher for residents in rural counties[7].
- In 2003, nearly half of Nebraska Medicaid Managed Care enrollees with high blood pressure did not have their blood pressure controlled while about 1 in every 6 diabetics did not receive a hemoglobin A1c (HbA1c) test[6].
- In 2002, more than 1 in every 5 (22%) Nebraska Medicare enrollees hospitalized for acute myocardial infarction failed to receive a beta-blocker within the 24 hours after hospital arrival[16].

High-Risk Populations

Medicaid Enrollees

- Medicaid enrollees (a predominately young population) accounted for 1 in every 4 CVD deaths in Nebraska during 2001, while making up just 11 percent of the states population[17].
- Medicaid enrollees in Nebraska were 3.5 times more likely than non-Medicaid enrollees to die from CVD in 2001[17].
- In 2001, Medicaid enrollees accounted for more than 140,000 medical encounters due to CVD (including inpatient, outpatient, ER, and physician office visits)[6].
- More than 33,000 Nebraska Medicaid enrollees (or about 17% of all enrollees) filled a CVD related drug prescription in 2001[6].
- In 2001, “taxpayer-supported” Medicaid paid $84.7 million for medical visits (including outpatient, ER, and physician office visits, $17.8 million for prescription drugs, and $12.2 million for hospitalizations due to CVD among Nebraska enrollees[6].

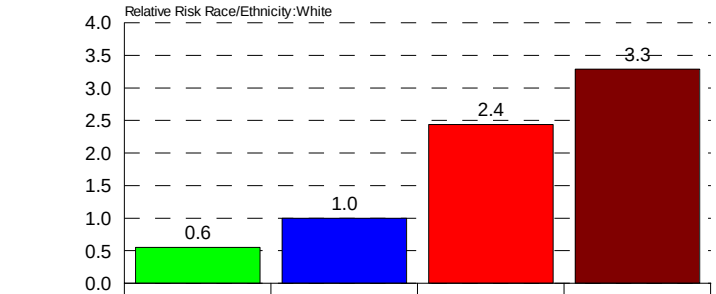
Both Genders

- Males in Nebraska are at greater risk for CVD mortality, hospitalization, and most risk factors (with the greatest disparities occurring among middle aged adults).
- Heart disease kills more females than males each year and is the leading cause of death among females in Nebraska. For every 1 breast cancer death nearly 9 heart disease deaths occur among females in Nebraska. However, about half of all adult females nationally perceive breast cancer as their most serious health threat (46%) compared to just 4 percent that perceive heart disease as their most serious health threat[18].

African Americans

- In Nebraska, African Americans are more likely than Whites to die from heart disease (relative risk 1.3) and stroke (relative risk 1.5), to be obese, to have diagnosed high blood pressure, to have diagnosed diabetes, to smoke cigarettes, and to have multiple risk factors for CVD; while they are less likely than Whites to consume 5-a-day, engage in physical activity, and have health care coverage.

Relative Risk^ for Premature CVD Mortality* by Race
Among Nebraska adults aged 45-64, 1999-2001



	Hispanic^^	White (reference)	African American	Native American
Age-Specific Mortality Rate**	86.7+	140.8	343.4++	463.2++

*ICD-10 Codes I00-I99
^Relative risk represents the race/ethnicity to white rate ratio
^^Hispanics can be of any race
Note: Insufficient data were available to calculate a mortality rate for Asians
Source: Nebraska Vital Records

**Age-Specific mortality rates per 100,000 population
+,++The race/ethnicity rate is significantly different from the white rate at the .01 or .001 level respectively

Native Americans

- Native Americans in Nebraska are more likely than Whites to die from heart disease (relative risk 1.8), to be obese, to have diagnosed diabetes, to smoke cigarettes, and to have multiple risk factors for CVD; while they are less likely than Whites to have health care coverage.

Hispanics

- Hispanic youth in Nebraska are much more likely than White youth to be overweight. Furthermore, Hispanics in Nebraska are less likely than Whites to consume 5-a-day, to have had a current blood cholesterol screening, to engage in physical activity, and to have health care coverage.

Middle Age Adults

- These individuals are in their most productive years of life. Unhealthy behaviors that result in missed work days and less productivity can (indirectly) be detrimental to Nebraska's economy. As mentioned previously, CVD is a major contributor to death and medical care among Nebraska residents under 65 years of age, and obesity is most common among Nebraska adults age 45-64.

Low Socioeconomic Status

- Compared to Nebraska adults with high education and income, those with low education and income are more likely to be obese, have diagnosed high blood pressure (among those 35-64), have diagnosed diabetes, smoke cigarettes, and have multiple risk factors for CVD; while being less likely to consume 5-a-day, engage in physical activity, have had a current cholesterol screening, correctly identify all heart attack and stroke signs and symptoms, and have health care coverage.

Rural Nebraska

- Nebraska residents in rural counties (outside of Douglas, Lancaster, and Sarpy) have less access to care, including less health care coverage, longer EMS response times, and lower quality 9-1-1 services. Furthermore, due to their larger older adult populations, residents of rural counties place a greater per-capita demand on the health care system.

Introduction

The purposes of this report are to identify areas for the Nebraska Cardiovascular Health (CVH) Program to focus programmatic activities, provide support for the development of a comprehensive state plan for heart disease and stroke, and to increase awareness among key decision makers in Nebraska of the need for increased attention and funding to address CVD. Therefore, this report contains Nebraska data on CVD mortality, medical care and expenses, drug prescriptions, risk factors, and barriers to the primary and secondary prevention of CVD. In addition, this report identifies gaps in the available CVD data that will help guide future data collection decisions.

In the fall of 2000, the CVH Program of the Nebraska Health and Human Services System received funding from the Centers for Disease Control and Prevention (CDC) for capacity building. The funding focuses on building alliances and consensus mechanisms that will result in heart disease and stroke prevention and control.

One requirement of the CDC funding is to identify priority populations (or populations on which the CVH program will dedicate significant time and effort). These populations may comprise any combination of the following: age, gender, race and ethnicity, geographical regions, socioeconomic status, or any other factor that causes one group to be at higher risk for CVD than another group.

This report will provide the foundation for the development of a comprehensive state plan for heart disease and stroke, which will coincide with the release of this report. Once the state plan is complete, a new state heart disease and stroke task force will be formed. This task force will consist of individuals from diverse backgrounds from both public and private sectors. The task force will help to evaluate the state plan and address the most important heart disease and stroke issues in Nebraska.

Background Information on Cardiovascular Disease

Cardiovascular disease includes all diseases of the heart and blood vessels, including coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. CVD is also commonly referred to as “diseases of the circulatory system.” Cardiovascular disease is a chronic disease, with a latency period that often extends over decades.

According to CDC figures, 64.4 million Americans (more than 1 in every 5 U.S. residents) currently have one or more forms of CVD[1]. According to the American Heart Association, both coronary heart disease and stroke are leading causes of serious, long-term disability in the United States.

Cardiovascular disease is the leading cause of both hospitalization and death in America. Currently, CVD is the leading cause of death in the United States among both genders and all racial and ethnic groups (except Asians), killing more than 925,000 Americans each year[2]. Furthermore, hospitalizations due to CVD are increasing nationally[3].

Through extensive research, almost all of the risk factors for CVD have been identified. Each of these risk factors can be categorized as preventable (those over which the individual has control)

or non-preventable (those over which the individual has no control) (Table 1). Fortunately, research has shown that most CVD risk factors are modifiable through simple lifestyle choices. While extensive efforts have been made in recent decades to improve these risk factors; many of these efforts have not been successful. This lack of successful behavior change can be attributed in part to societal barriers discouraging healthy behavior.

Some comparisons address the importance of CVD[4]:

- If CVD, in all its forms, were eliminated, American life expectancy would rise by nearly 7 years. In contrast, if all forms of cancer were eliminated, life expectancy would increase by 3 years.
- Of all children born today, nearly half (47%) are expected to die from CVD. In contrast, 22 percent are expected to die from cancer.

Table 1:
Risk Factors for CVD

Preventable Risk Factors

- Type-2 Diabetes
- High Blood Cholesterol
- High Blood Pressure
- Lack of Physical Activity
- Overweight and Obesity
- Unhealthy Eating
- Smoking

Non-Preventable Risk Factors

- Increasing Age
- Male Gender
- Race/Ethnicity
- Family History of Premature CVD

The economic burden that CVD and its associated risk factors place on society is enormous, and appears to be increasing at an unexpectedly rapid pace. The cost of CVD in the United States in 2004 is estimated to be $368.4 billion[1].

The Future Outlook of CVD

There are a variety of factors indicating that the burden of CVD is likely to increase in future years. In particular, over the past decade, the prevalence of both obesity and type-2 diabetes has increased at an alarmingly high rate. This increase in obesity and type-2 diabetes has contributed to an increase in hypertension, hyperlipidemia, and atherosclerotic vascular disease among U.S. residents[5]. In addition, today's younger generations are largely overweight and engaging in unhealthy behaviors that place them at increased risk for CVD.

Another factor indicating that the burden of CVD is likely to increase in future years is the aging of the population. In recent years, the older adult population has increased dramatically and is likely to continue to increase into future decades. According to the U.S. Census, it is estimated that by the year 2010, there will be 40 million Americans aged 65 and older. This aging of the population will result in more coronary artery disease, heart failure, and stroke[6].

Cardiovascular disease is a major health problem that drains the state's economy, overburdens the health care system, and sickens or kills thousands of Americans prematurely, yet it is largely preventable. For these reasons, it is important that CVD is a leading heath concern in Nebraska. CVD must receive adequate attention and funding if future successes are to be obtained. Prevention and control of CVD are possible through collaborative efforts of dedicated professionals, community support, education, and policy and environmental changes that support cardiovascular health.

Chapter 1: Morbidity

Introduction

Cardiovascular disease (CVD) includes all diseases of the heart and blood vessels, which includes coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. Estimates from 2001 indicate that 64.4 million Americans (more than one-fifth of the U.S. population) have one or more forms of CVD[1]. According to some research, incidence and prevalence rates for heart disease and stroke are not improving despite declining mortality rates for heart disease and stroke (see chapter 2 for further detail on mortality trends)[2,3]. These declining mortality trends are believed to be a result of better quality care that is subsequently resulting in less case fatality[2,3]. Furthermore, the recent increases in obesity and lack of physical activity (see chapter 4 for further detail on CVD risk factors) will likely contribute to more CVD in the coming years.

In this chapter, an overview of national and Nebraska prevalence data for total CVD as well as specific cardiovascular diseases (coronary heart disease and stroke) are presented. National data on CVD incidence are also presented.

Prevalence is defined as the number or proportion of cases or events or conditions in a given population[4]. In other words, prevalence of CVD is an estimate of how many people have CVD at a given point in time, such as today. In contrast, *incidence* is defined as a measure of the frequency with which an event, such as a new case of illness, occurs in a population over a period of time (among at risk individuals)[4].

Total Cardiovascular Disease Morbidity

National Overview

According to the CDC, greater than 1 in every 5 Americans (22.6%) currently has one or more forms of CVD[1]. This indicates that an estimated 64.4 million Americans currently have CVD[1]. Slightly more U.S. females than males are estimated to have CVD, 33.3 million and 31.1 million respectively[1].

While older adults (aged 65 years and older) are at greater risk for CVD mortality, the majority of Americans with CVD are under 65 years of age. In 2001, of the 64.4 million Americans with one or more forms of CVD, 39.1 million (or approximately 3 in every 5) are under 65 years of age[1]. This indicates that most Americans currently living with CVD are in their most productive (pre-retirement) years of life.

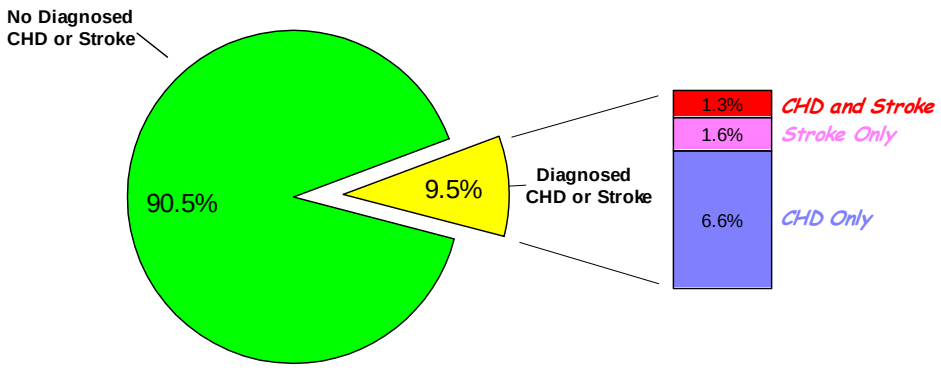
African Americans are more likely than both Whites and Mexican Americans to have CVD[1]. In 2001, 40.5 percent of African American males aged 20 years and older had CVD, making them 35 percent more likely than White males and 40 percent more likely than Mexican American males to have CVD[1]. Similar to males, 39.6 percent of African American females aged 20 years and older had CVD in 2001, making them 49 percent more likely than Mexican American females and 66 percent more likely than White females to have CVD[1].

Nebraskans with Diagnosed CVD[5]

In 2001, nearly 1 in every 10 (9.5%) Nebraska adults (aged 18 years and older) reported that they have had a diagnosed heart attack, a diagnosed stroke, or have been diagnosed with coronary heart disease (CHD) (meaning that they had been told by a doctor, nurse, or health professional that they have had a heart attack or myocardial infarction, a stroke, or that they suffer from angina or coronary heart disease). This indicates that an estimated 100,000 to 143,000 Nebraska adults have had a diagnosed heart attack, stroke, or been diagnosed with coronary heart disease. Given the long latency period of CVDs, that often provide no recognizable warning to their victims, many additional Nebraska adults are believed to have undiagnosed CVD (that they are unaware of).

Nebraska adults are more likely to report diagnosed CHD (including heart attack) than to report having had a diagnosed stroke. Among the 9.5 percent of adults reporting diagnosed CHD or stroke in 2001, the majority (almost 7 in every 10) reported having been diagnosed with CHD (including heart attack) but not stroke (Figure 1).

Figure 1: Percentage Breakdown of Diagnosed CHD and Stroke*
Among Nebraska Adults in 2001



*Adults (18+) that have been told by a doctor, nurse, or health professional that they have had a heart attack, myocardial infarction, or stroke or have angina or coronary heart disease.
Source: 2001 Nebraska CVD Survey

Large disparities in diagnosed CHD and stroke exist within certain Nebraska subpopulations (Table 1). Age has the strongest association with diagnosed CHD and stroke. In 2001, adults aged 65 years and older were 3.5 times more likely than adults aged 45-64 years and 6.4 times more likely than adults aged 25-44 years to report diagnosed CHD or stroke. Gender is also strongly associated with the prevalence of diagnosed CHD and stroke in Nebraska.

Even after being told by a doctor, nurse, or health professional that they have had a heart attack, stroke, or have coronary heart disease, many Nebraska adults continue to engage in unhealthy behaviors that place them at increased risk for further CVD (Figure 2). In 2001, among Nebraska adults with diagnosed coronary heart disease or stroke, greater than 1 in every 5 smokes cigarettes, 1 in every 3 adults aged 35 years and older (without any aspirin related health problems) does not take aspirin daily or every other day, greater than 1 in every 3 is obese, and greater than 2 in every 5 do not engage in any leisure time physical activity.

Table 1: Prevalence of Diagnosed CHD or Stroke* Among Nebraska Adults, 2001

	n**	Weighted Percentage	Relative Risk^
Overall	1,178	9.5%	-
Gender			
Female	781	7.3%	reference
Male	397	11.9%	1.63+
Age			
18-24	113	0.6%	0.02++
25-44	408	4.6%	0.16++
45-64	353	8.5%	0.29++
65+	294	29.4%	reference

*Adults (18+) that have been told by a doctor, nurse, or health professional that they have had a heart attack or myocardial infarction, a stroke, or that they have angina or coronary heart disease

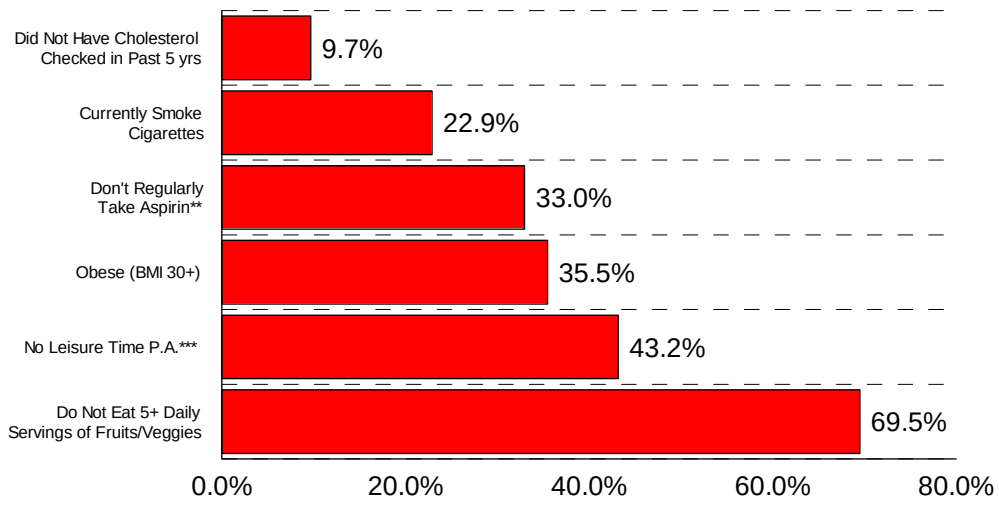
**Non-weighted sample size value

^^Relative Risk represents the percentage ratio for the specific category compared to the reference category within each subpopulation

+,++ Percentage is significantly different than the reference category at the .01 or .001 level respectively

Source: 2001 Nebraska CVD Survey

Figure 2: High Risk Behaviors Among Nebraska Adults with Diagnosed CHD or Stroke*, 2001



*Adults (18+) that have been told by a doctor, nurse, or health professional that they have had a heart attack, myocardial infarction, or stroke or have angina or coronary heart disease
**Among those aged 35 years and older with no aspirin related health problems, the percentage that do not currently take aspirin daily or every other day
***Did not engage in any leisure time physical activity during the 30 days preceding the survey
Source: 2001 Nebraska CVD Survey

Coronary Heart Disease Morbidity

National Overview

According to CDC figures, 13.2 million Americans currently have coronary heart disease (CHD)[1]. CHD includes heart attack, angina pectoris (chest pain), or both, but does not include all diseases of the heart. Thus, the prevalence of all heart disease is higher than that of CHD alone.

U.S. estimates from 2001 indicate that approximately the same number of males and females have CHD, an estimated 6.5 million and 6.7 million respectively[1]. This may be surprising to some women; who feel that heart disease is not a top health concern for them. According to a 1995 Gallup survey, 4 of every 5 U.S. women aged 45-75 did not know that heart disease is the leading cause of death among females nationally[6]. In fact, according to the National Center for Health Statistics, nearly 1 in every 2 U.S. women (46%) perceive breast cancer as their most serious health threat while only 4 percent perceive heart disease as their most serious health threat[7]. According to the American Heart Association, 1 in every 2.4 women dies of CVD (including heart disease and stroke) compared to 1 in every 29 dying of breast cancer[8].

Racial disparities in CHD prevalence are most prominent among females[1]. Among U.S. adults aged 20 and older in 2001, African American females were 32 percent more likely than Mexican American females and 66 percent more likely than White females to have CHD[1].

In addition to CHD prevalence, the incidence of CHD is also alarmingly high. Each year, an estimated 700,000 Americans will have a new coronary attack[9]. In addition, about 500,000 Americans will have a recurrent attack[9]. Among those who had a diagnosed myocardial infarction, 25 percent of men and 38 percent of women are expected to die within 1 year after their event[10].

Coronary heart disease results in serious long-term disabilities among many of its surviving victims. About 2 in every 3 heart attack patients never make a complete recovery[10]. In addition, CHD is the leading cause of premature, permanent disability in the U.S. labor force, accounting for 19 percent of disability allowances by the Social Security Administration[10].

Nebraskans with Diagnosed CHD[5]

Approximately 1 in every 13 Nebraska adults (18 and older) has been diagnosed with CHD (indicating that they have been told by a doctor, nurse, or health professional that they have had a heart attack or myocardial infarction or that they have angina or coronary heart disease). Given the long latency period of CHD, that often provides no recognizable warning to its victim, many additional Nebraska adults are believed to have undiagnosed CHD.

In 2001, 7.9 percent of Nebraska adults reported that they have diagnosed CHD (Table 2). This estimate indicates that between 81,000 and 121,000 Nebraska adults have diagnosed CHD. More specifically, 4.9 percent of Nebraska adults reported having had a diagnosed heart attack (or myocardial infarction), while 6.0 percent of Nebraska adults report having been diagnosed with angina or coronary heart disease.

Male adults in Nebraska are two times more likely than female adults in Nebraska to report diagnosed CHD, 10.6 percent to 5.4 percent respectively. This indicates that an estimated 65,900 male and 35,400 female Nebraska adults have diagnosed CHD. Part of this disparity could be explained by the fact that women who have heart attacks are 1.5 times more likely than men to die from them, and if they survive, are more likely to have a recurrent event[11].

Table 2: Diagnosed Coronary Heart Disease Prevalence* Among Nebraska Adults, 2001

Subpopulation	n**	Weighted Percentage	Estimated number of NE Adults with Diagnosed CHD (margin of error at 95% confidence)
Overall	1,178	7.9%	100,900 (+/- 19,600)
Gender			
Male	397	10.6%	65,900 (+/- 18,800)
Female	781	5.4%	35,400 (+/- 10,400)
Age			
25-44	408	4.6%	22,200 (+/- 9,800)
45-64	354	6.7%	25,600 (+/- 10,000)
65+	293	23.1%	53,700 (+/- 11,200)

*Adults (18+) that have been told by a doctor, nurse, or health professional that they have had a heart attack or myocardial infarction or that they have angina or coronary heart disease

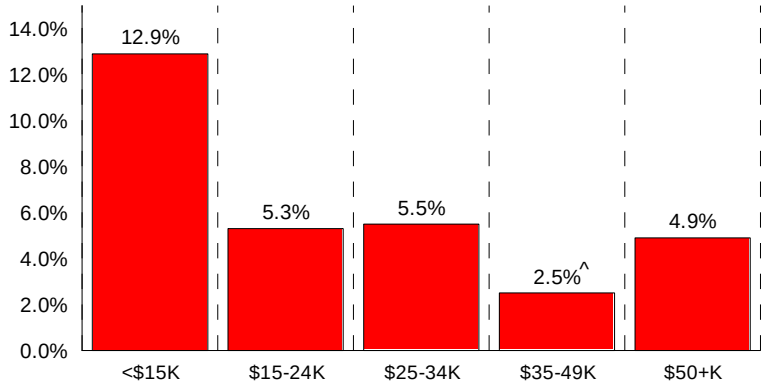
**Non-weighted sample size value

Source: 2001 Nebraska CVD Survey

Age is strongly associated with diagnosed CHD prevalence. In 2001, older Nebraska adults (65 and older) were 3.5 times more likely than middle age adults (45-64 years of age) and 5.0 times more likely than younger adults (25-44) to report having diagnosed CHD.

Among Nebraska adults aged 35-64 years, those with extremely low income appear more likely than adults with higher levels of income to have been diagnosed with CHD (Figure 3). In 2001, the percentage of Nebraska adults with diagnosed CHD, aged 35-64 years, with an annual household income of less than $15,000 is much higher than the percentage in other income categories; however is only significantly different from those earning $35,000 to $49,000 (possibly due to a small sample size per income category). Consequently, these differences warrant further investigation. Among Nebraska adults aged 65 years and older, neither income nor education was associated with diagnosed CHD.

Figure 3: Diagnosed CHD* among Nebraska Adults Aged 35-64 Years by Annual Household Income, 2001



*Adults that have been told by a doctor, nurse, or health professional that they have had a heart attack or myocardial infarction or have angina or coronary heart disease.
^Significantly lower than the <$15K category at the .05 level
n=474 valid cases and 119 missing cases (20.1%)
Source: 2001 Nebraska CVD Survey

Stroke Morbidity

National Overview

According to CDC figures, 4.8 million Americans have had a stroke and are still living[1]. It is estimated that stroke will cost the nation $53.6 billion in 2004 (including both direct and indirect costs)[1].

In 2001, an estimated 2.3 percent of U.S. males (or 2.1 million males) had survived a stroke compared to 1.7 percent of U.S. females (or 2.7 million females)[1]. The fact that a larger number of females than males have survived a stroke may be surprising to some women who tend to not view cardiovascular diseases (including stroke) as particularly threatening. According to the National Center for Health Statistics, nearly 1 in every 2 U.S. females (46%) perceives breast cancer as their most serious health threat[7]. In contrast, the AHA indicates that only 8 percent of American women consider heart disease and stroke to be their greatest health threats[12].

Racial disparities in stroke prevalence are most prominent among females[1]. In 2001, among U.S. adults aged 20 and older, African American females were 2.1 times more likely than White females and 2.5 times more likely than Mexican American females to have survived a stroke[1].

In addition to stroke prevalence, the incidence of stroke is also alarmingly high. National estimates indicate that 700,000 people experience a new or recurrent stroke each year[13]. Of those 700,000 people, 500,000 will experience a new stroke while 200,000 will experience a recurrent stroke[13]. On average, someone within the United States has a stroke every 45 seconds[1]. Each year, about 40,000 more females than males have a stroke (primarily due to a larger older adult female population and higher rates of stroke among older adults)[14].

Stroke is a leading cause of serious, long-term disability in the United States[1]. In 1999, it was estimated that more than 1.1 million American adults had functional limitations, difficulty with activities of daily living, etc. resulting from stroke[15]. In fact, three months after their stroke, 20 percent of stroke survivors still require institutional care[16].

Nebraskans with Diagnosed Stroke[5]

In 2001, approximately 3 percent (2.9%) of Nebraska adults (aged 18 years and older) reported having had a diagnosed stroke (or they were told by a doctor, nurse, or health professional that they had a stroke) (Table 3). This indicates that, in 2001, between 24,800 and 49,300 Nebraska adults had survived a stroke that was diagnosed by a medical professional. Unfortunately a large number of strokes are fatal. Stroke claims the life of approximately 1,100 Nebraska residents each year[17].

The prevalence of stroke may in fact be greater than the 3 percent identified within the 2001 Nebraska CVD survey. Transient ischemic attack (TIA) is a (mini) stroke that often lasts for only minutes with symptoms disappearing within an hour[18]. Victims of TIAs often do not seek medical attention due to the short-lived symptoms; however these individuals are at increased risk for future strokes[18]. Approximately 11 percent of those diagnosed with TIA in the emergency department will have a stroke within 90 days[19].

In 2001, male adults in Nebraska appeared slightly more likely than female adults in Nebraska to have had a diagnosed stroke (3.5% and 2.3% respectively); however this difference is not statistically significant.

Among Nebraska adults, age is strongly associated with self-reported diagnosed stroke. In 2001, Nebraska adults aged 65 years and older were 2.9 times more likely than adults aged 45-64 years and 19.4 times more likely than adults aged 25-44 years to report that they have had a diagnosed stroke.

Table 3: Diagnosed Stroke Prevalence* Among Nebraska Adults, 2001

Subpopulation	n**	Weighted Percentage	Estimated number of NE Adults with Diagnosed CHD (margin of error at 95% confidence)
Overall	1,186	2.9%	37,000 (+/- 12,300)
Gender			
Male	402	3.5%	21,800 (+/- 11,200)
Female	784	2.3%	15,100 (+/- 6,900)
Age			
25-44	410	0.5%	2,400 (+/- 3,300)
45-64	355	3.3%	12,600 (+/- 7,100)
65+	298	9.7%	22,500 (+/- 7,800)

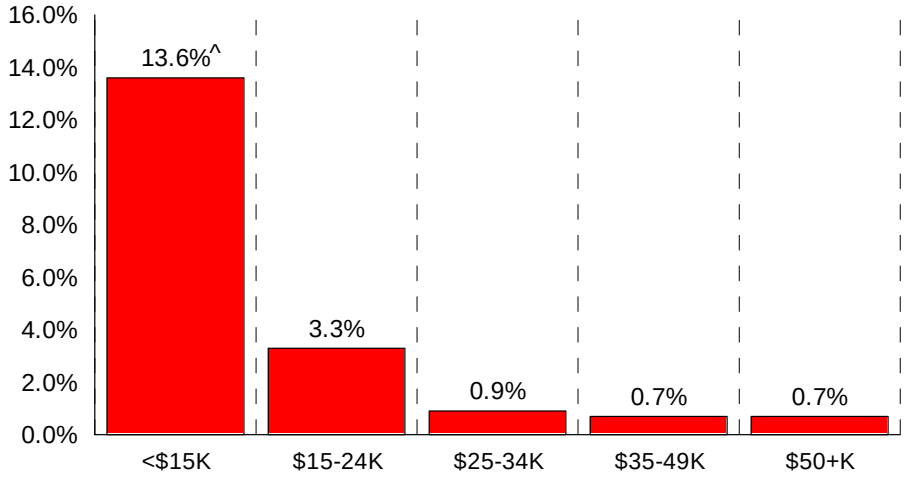
*Adults (18+) that have been told by a doctor, nurse, or health professional that they have had a stroke

**Non-weighted sample size value

Source: 2001 Nebraska CVD Survey

Among Nebraska adults aged 35-64 years, those with extremely low income are more likely to report having had a diagnosed stroke (Figure 4). In 2001, 13.6 percent of Nebraska adults aged 35-64 years (or about 1 in every 8) with an annual household income of less than $15,000 per year reported having had a diagnosed stroke. This percentage is significantly higher than all other income categories. Among Nebraska adults aged 65 years and older, neither income nor education was associated with diagnosed stroke.

Figure 4: Diagnosed Stroke* among Nebraska Adults Aged 35-64 Years by Annual Household Income, 2001



*Adults that have been told by a doctor, nurse, or health professional that they have had a stroke
^Significantly higher than all other age categories at the .05 level
n=476 valid cases and 117 missing cases (19.7%)
Source: 2001 Nebraska CVD Survey

Chapter 2: Mortality

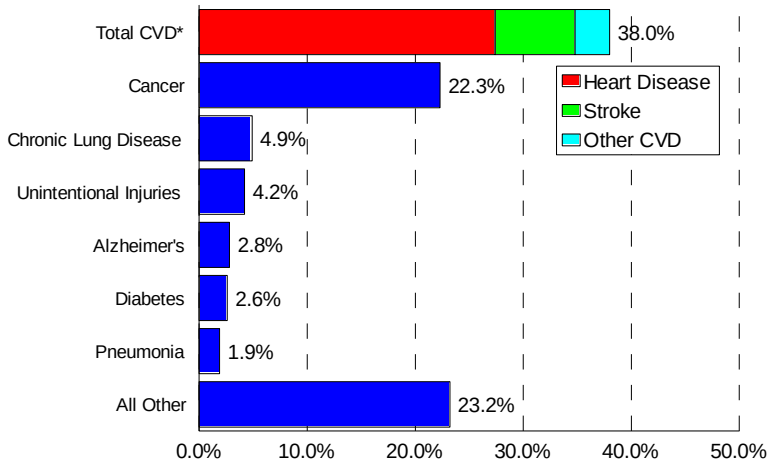
Introduction

Cardiovascular disease (CVD) mortality rates are declining nationally. However, the prevalence of many risk factors associated with CVD remain stable or are worsening[1,2]. Most striking is the recent increase in obesity among U.S. residents of all ages[3,4]. In addition, physical activity levels are low and type-2 diabetes is increasing[5,6]. These contradictory findings indicate that recent declines in CVD mortality likely resulted from improvements in case fatality, rather than declines in CVD incidence and prevalence[7,8]. As a result, the economic impact of CVD is likely worsening (from increases in treatment intervention) despite improvements in mortality.

Within this chapter, an overview of Nebraska mortality for total CVD as well as specific CVDs is presented. This chapter contains four sub-sections, including overall CVD, heart disease, stroke, and high blood pressure mortality. In addition, information on heart disease and stroke risk factors is presented. This chapter provides information supporting the elimination of disparities and economic improvement through identifying high-risk populations (in greatest need of intervention).

Cardiovascular disease (CVD) continues to be the leading cause of death in Nebraska among both genders and all racial and ethnic groups (excluding Asians). CVD was directly responsible for approximately 2 in every 5 Nebraska deaths in 2001 and was listed as the primary (or underlying) cause of death on 5,763 death certificates (Figure 1).

Figure 1: Leading Causes of Death in Nebraska, 2001



*Includes Heart Disease, Stroke, and other CVD related deaths (ICD-10 Codes I00-I99)
Source: Nebraska Vital Records

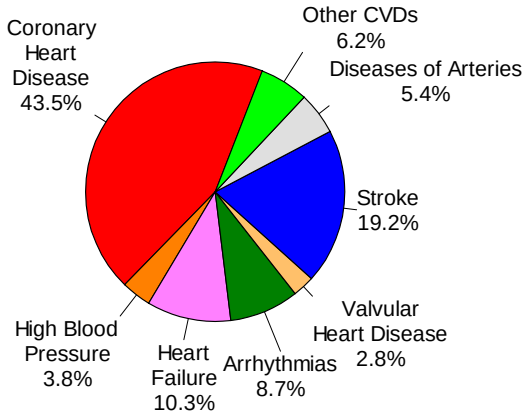
In addition to directly causing death, CVD contributes indirectly to a large number of deaths resulting from other conditions. In 2001, CVD was listed as a contributing factor in 3,516 deaths. This indicates CVD caused or contributed to 3 in every 5 Nebraska deaths (61.2%) in 2001. Of the 3,516 deaths in which CVD was a contributing factor, 1,065 (30.2%) were listed as a contributing factor to a death in which cancer was the primary cause. This indicates that CVD contributed to nearly 1 in every 3 cancer deaths (31.4%) in 2001.

Note: mortality data are classified through the use of the international classification of disease (ICD) codes. These codes, which are published by the World Health Organization (WHO), are updated every twenty years, and recently underwent the tenth revision (ICD-10) which was implemented in 1999. As a result, to compare data from 1979-1998 (ICD-9 data) to data from 1999-2001 (ICD-10), ICD-10 comparability ratios must be applied to data from years 1979-1998. Aside from total CVD mortality data, all data (unless noted), prior to 1999, presented in this chapter have been modified to allow for comparability with data from 1999 and beyond. *Please see Methodology Section for further detail*

More Nebraska residents in 2001 died from CVD than from the next five leading causes of death combined. In particular, Nebraska residents in 2001 were 1.6 times more likely to die of CVD than cancer (the second leading cause of death) and 7.5 times more likely to die of CVD than chronic lung disease (the third leading cause of death).

Collectively, many diseases combine to form CVD (Figure 2). Of those diseases, coronary heart disease (CHD) accounted for the largest percentage (43.5%) of all CVD deaths between 1999 and 2001. CHD was followed by stroke and heart failure.

Figure 2: Types of CVD* Death in Nebraska
Percentage Breakdown, 1999-2001



*Includes ICD-10 codes I00-I99; codes for specific cardiovascular diseases can be found in the methodology section of this report.
Source: Nebraska Vital Records

Differences by gender exist in the percentage who die from various types of CVD. In particular, nearly half (49.0%) of male CVD deaths resulted from CHD compared to 39.1 percent among females. In contrast, a larger percentage of females than males died from heart failure and stroke.

There is a tremendous amount of premature life lost to CVD in Nebraska. In 2001, the average age for a CVD death was 80.3 years old. Although CVD mortality occurs most often within older adult populations, CVD does claim a large number of deaths prematurely. One method for measuring premature mortality is through examining the years of life lost prior to age 75, also called years of productive life lost (or YPLL) (*see Methodology Section for further details on YPLL*). In 2001, Nebraska lost 20,365 years of productive life to CVD (second only to cancer). This indicates that, on average, each victim of CVD lost 3.4 years of productive life. Table 1 provides detail on YPLL among some of the leading causes of death in Nebraska.

Similar to the nation, Nebraska has established a set of health goals and objectives for the year 2010[9]. Of the cardiovascular diseases, objectives are established for coronary heart disease and stroke (Table 2). Based on 1999-2001 data, progress is needed if the objectives are to be achieved by 2010. From the time of this report, there are only five years to successfully achieve the objectives. Among racial and ethnic minority residents, large declines are necessary if the objectives are going to be reached. It should be noted that objectives for Asian Americans and Hispanic Americans are lower than those for other races. In addition, Asian residents have a small number of deaths per year, thus, their rates and objectives should be viewed with caution.

Within Nebraska there are a variety of sub-populations that suffer from disproportionately high rates of mortality from CVD. Aside from the older adult population, African Americans, Native Americans, and Medicaid enrollees appear to be among the sub-populations that are at greatest risk for CVD mortality. Throughout this chapter, detailed information on these sub-populations and others is presented.

There are a wide variety of risk factors that contribute to CVD. Each of these risk factors can be categorized as preventable (those over which the individual or society has some control) or non-preventable (those over which the individual has no control). The influence of preventable risk factors on CVD differs by disease. As a result, information on preventable risk factors within this chapter is presented for heart disease and stroke within their respective chapter sub-sections.

Table 1: Ranking Years of Productive Life Lost (below age 75) in Nebraska Among Leading Causes of Death, 1999-2001

Rank	Cause of Death	Total Deaths	Total YPLL	Average YPLL Per Death
1	Cancer	10,178	70,573	6.9
2	CVD	17,632	59,799	3.4
3	Unintentional Injuries	1,932	45,938	23.8
4	Suicide	557	18,073	32.4
5	Birth Defects	215	11,822	55.0
6	Homicide	169	7,453	44.1
7	Diabetes	1,182	7,067	6.0
8	Chronic Lung Disease	2,270	6,241	2.7
9	Pneumonia	1112	3,293	3.0
10	Alzheimer's Disease	1,115	654	0.6

Note: See methodology section for cause of death codes
Source: Nebraska Vital Records

Table 2: Progress Toward NE HP2010 CVD Mortality Objectives

Cause of Death	Race/Ethnicity	Years	NE Rate* 1999-2001	NE 2010 Objective	% Reduction Necessary to achieve HP2010 Goals
Coronary Heart Disease	Total	1999-2001	133.2	121.5	-8.8%
	White	1999-2001	133.2	121.5	-8.8%
	African American	1999-2001	146.1	121.5	-16.8%
	Native American	1999-2001	256.3	121.5	-52.6%
	Asian American	1999-2001	107.0	26.0	-75.7%
	Hispanic American	1999-2001	69.4	69.6	None
Stroke	Total	1999-2001	57.9	47.4	-18.1%
	White	1999-2001	56.9	47.4	-16.7%
	African American	1999-2001	84.5	47.4	-43.9%
	Native American	1999-2001	54.0	47.4	-12.2%
	Asian American	1999-2001	61.6	32.7	-46.9%
	Hispanic American	1999-2001	29.7	22.3	-24.9%

*Age-adjusted rate per 100,000 population
Codes: Coronary Heath Disease=ICD-10 codes I20-I25; Stroke=ICD-10 codes I60-I69
Data Sources:
1. Nebraska Health and Human Services System, Department of Services, Preventive and Community Health, Office of Public Health; Department of Finance and Support, Financial Services Division. Nebraska 2010 Health Goals and Objectives. May 2002.
2. Nebraska Vital Records

Total Cardiovascular Disease (CVD) Mortality

Definition: CVD includes all diseases of the heart and blood vessel, which include coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. CVD is also commonly referred to as "diseases of the circulatory system."

Codes used to define CVD: ICD-10 codes I00-I99; ICD-9 codes 390-459

Total CVD Mortality Highlights

National Highlights

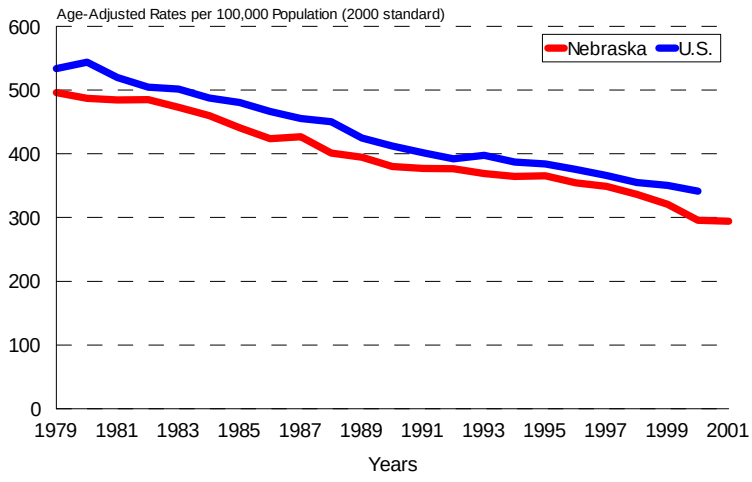
- The leading cause of death every year since 1900 (except 1918)[2].
- Killed 931,108 residents in 2000[2].
- Accounted for 1 in every 2.6 deaths in 2000[2].
- Kills nearly 2,600 Americans each day, for an average of 1 death every 34 seconds[2].

Nebraska Highlights

- CVD is the leading cause of death.
- Killed 5,763 Nebraska residents in 2001; accounting for nearly 2 in every 5 deaths (38.0%).
- Killed more residents in 2001 than the next five leading causes of death combined.
- Caused or contributed to 3 in every 5 (61.2%) deaths in 2001.
- The mortality rate (age-adjusted) for CVD declined 40.7 percent between 1979 and 2001.
- Older adults, males, African Americans, and Native American are at particularly high risk for CVD mortality.
- In 2001, residents enrolled in Medicaid at their time of death were 3.5 times more likely than residents not enrolled in Medicaid at their time of death to die from CVD (based on their age-adjusted mortality rate).

Overall CVD mortality in both Nebraska and the U.S. has been steadily declining since the late 1970s (Figure 3). Specifically, between 1979 and 2001, Nebraska's age-adjusted CVD mortality rate declined 40.7 percent. In addition, Nebraska residents are less likely than U.S. residents to die of CVD. In 2000, U.S. residents were 15 percent more likely than Nebraska residents to die from CVD[10]. Compared to 50 U.S. states and the District of Columbia, Nebraska's age-adjusted CVD mortality rate ranked 13th lowest in 2000 (interquartile rate range 296.3-373.1)[10].

Figure 3: CVD Mortality Trends*, 1979-2001

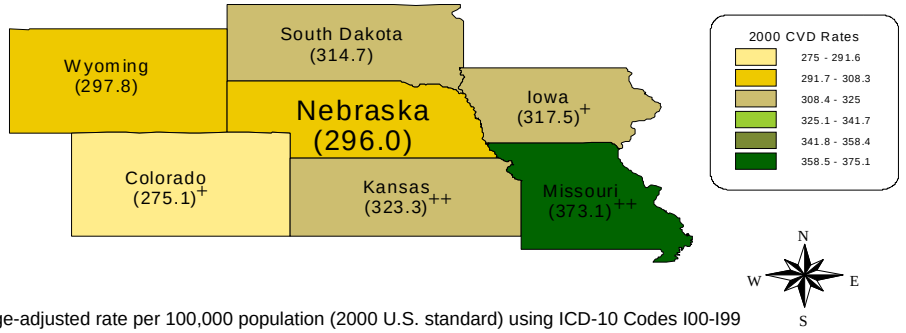


*Includes ICD-9 Codes 390-459 and ICD-10 Codes I00-I99
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://wonder.cdc.gov>

Similar to the mortality rate, the actual number of CVD deaths is also declining in Nebraska. Between 1979 and 2001, the number of actual CVD deaths declined from 7,568 to 5,763 respectively. This indicates that, between 1979 and 2001, CVD mortality declined by an average of 82 deaths per year, for a 23.9 percent overall decline. In contrast, the number of CVD deaths in the U.S. declined only 2.2 percent between 1979 and 2000[10]. Even though the rates for CVD mortality are declining dramatically, the less dramatic decline in the number of CVD deaths and high CVD prevalence (as presented in Chapter 1) indicate that the impact due to CVD on the health care system is likely not improving.

Nebraska compares well to its bordering states. In 2000, Colorado residents were less likely than Nebraska residents to die from CVD while residents of Kansas, Iowa and Missouri were more likely than Nebraska residents to die from CVD (based on age-adjusted mortality rates) (Map 1)[1,10]. While CVD mortality rates for Nebraska are lower than many bordering states, the large number of premature deaths and enormous medical expenses still warrant significant attention. As a result, it is important that Nebraska take advantage of the CVD prevention and control opportunities that it has been given, as well as continues to create and implement new and aggressive plans for addressing CVD in future years.

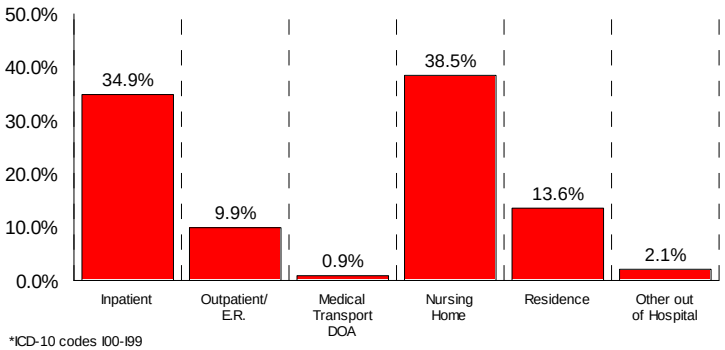
Map 1: Death Rates for Cardiovascular Disease* in 2000 for Nebraska and Bordering States



*Age-adjusted rate per 100,000 population (2000 U.S. standard) using ICD-10 Codes I00-I99
+,++ Rate is significantly different from the Nebraska rate at the .01 or .001 levels respectively
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://www.wonder.cdc.gov/>

Unfortunately, many CVD deaths in Nebraska occur without medical care (Figure 4). Between 1999 and 2001, nearly 2 in every 3 CVD deaths (65.0%) occurred outside of inpatient hospital care, likely resulting from sudden or near sudden death. There is a variety of effective life saving CVD interventions available, however, the limited window of administration for many of these interventions supports the need for victims to recognize their signs, have quality emergency medical services available, and that health professionals properly diagnose and treat the condition(s).

Figure 4: Location of CVD Death in Nebraska*, 1999-2001



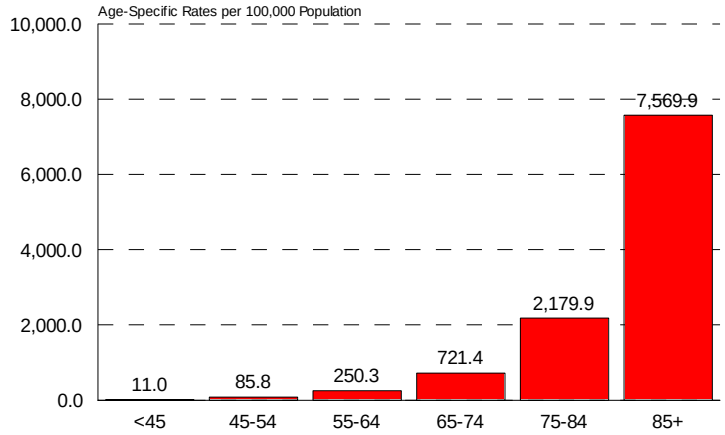
*ICD-10 codes I00-I99
Note: 16 deaths occurred in an unknow n location
Source: Nebraska Vital Records

Total CVD Mortality by Age

Age is undoubtedly the greatest predictor of cardiovascular disease (CVD) mortality. The vast majority of CVD deaths occur among older adults in Nebraska. Between 1999 and 2001, 3 in every 4 CVD deaths occurred among Nebraska residents aged 75 and older. Rates of death from CVD increase dramatically as age increases, even among the older adult population (aged 65 and older) (Figure 5). In particular, adults aged 85 and older were 3.5 times more likely to die of CVD than adults aged 75-84 and 10.5 times more likely to die of CVD than adults aged 65-74.

While risk for CVD death is highest among the older adult population, CVD does claim a large number of deaths among those under the age of 65. Between 1999 and 2001, 2,006 Nebraska residents died from CVD prior to reaching the age of 65. CVD claimed greater than 1 in every 10 deaths (11.7%) among Nebraska residents under the age of 45 and greater than 1 in every 4 deaths (27.8%) among those aged 45-64 years between 1999 and 2001. Among Nebraska residents aged 45-64 years, only cancer claimed more lives than CVD between 1999 and 2001.

Figure 5: Nebraska CVD Mortality Rates* by Age: 1999-2001



*Includes ICD-10 Codes I00-I99
Source: Nebraska Vital Records

The CVD death rate among Nebraska residents under 45 years of age remained stable between 1979 and 2001 (Table 3). In contrast, CVD death rates from 1979-1983 to 1999-2001 declined sharply among both middle aged and older adults; 54.7 percent and 28.2 percent declines respectively.

Table 3: Trends in CVD Mortality* by Age in Nebraska

	<45		45-64		65+	
years	Average # deaths/year	rate**	Average # deaths/year	rate**	Average # deaths/year	rate**
1979-1983	117	11.0	954	326.3	6,517	3,141.5
1984-1988	109	10.2	802	278.7	6,240	2,885.8
1989-1993	114	10.6	659	226.6	5,916	2,636.1
1994-1998	128	11.7	632	192.7	5,841	2,552.1
1999-2001	121	11.0	547	147.8	5,209	2,255.0
% change: 79-8" to 99-01	3.4%	0.4%	-42.6%	-54.7%^	-20.1%	-28.2%^

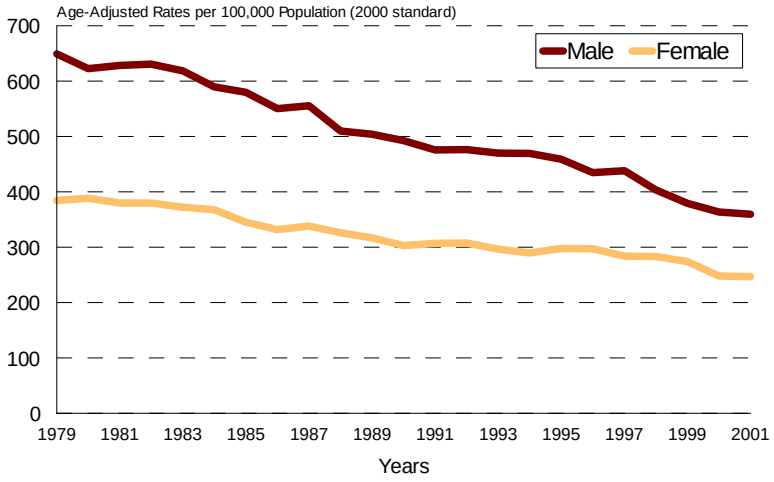
*Codes: ICD-9 390-459; ICD-10 I00-I99
**Age-specific rate per 100,000 population
^1999-2001 rate is significantly lower than the 1979-1983 race at the .001 level
Source: Nebraska Vital Records

Total CVD Mortality by Gender

Cardiovascular disease remains the leading cause of death among both genders in Nebraska. In 2001, the rate of CVD mortality among Nebraska males was 45 percent higher than the rate among Nebraska females, 359.5 to 247.2 deaths per 100,000 population respectively (age-adjusted) (Figure 6).

Trends in CVD mortality (based on age-adjusted rates) are declining faster among males than females. As a result, the gap in CVD mortality risk between males and females is declining (Figure 6). Between 1979 and 2001, the CVD mortality rate declined 44.6 percent among males compared to 35.7 percent among females. This has caused the male to female rate ratio to decline from 1.69 in 1979 to 1.45 in 2001.

Figure 6: Nebraska CVD Mortality Trends* by Gender, 1979-2001



*Includes ICD-9 Codes 390-459 and ICD-10 Codes I00-I99
Source: Nebraska Vital Records

In contrast to the mortality rate, more females than males die from CVD each year in Nebraska (due to a larger older adult female population). In 2001, 3,159 Nebraska females died from CVD compared to 2,604 Nebraska males. While the number of deaths per year is declining among both genders, females are declining at a slower pace than males in Nebraska (14.0 percent to 33.1 percent respectively between 1979 and 2001).

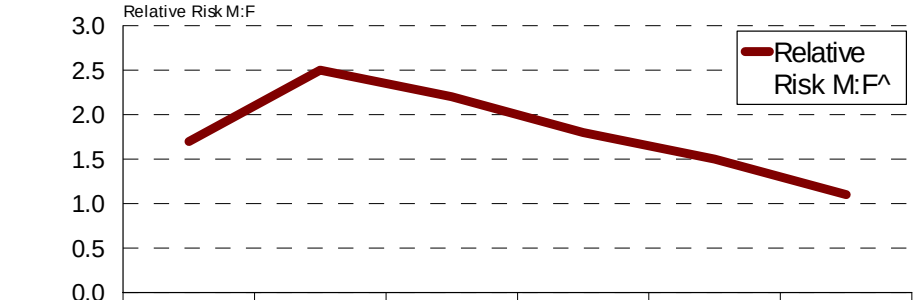
In 2000, males and females in Nebraska were less likely than males and females nationally to die from CVD. Compared to all other states and the District of Columbia, males and females in Nebraska each ranked 12th lowest in their rate of CVD mortality in 2000 (interquartile rate ranges of 365.8-448.3 and 251.2-312.9 respectively)[10].

On average, males die from CVD at a younger age than females. In 2001, males died from CVD at an average age of 76.3 years old while females died from CVD at an average age of 83.5 years old. In addition, as compared to females, males lost nearly twice as many years of productive life between 1999 and 2001 (39,413 years to 20,386 years respectively). This indicates that, on average, males lost substantially more years of productive life per CVD death than females between 1999 and 2001 (5.0 years to 2.1 years respectively).

Males are more likely than females to die of CVD in all age categories, however, disparities in death risk are most prominent within middle aged adults (45-64 years of age) (Figure 7). Among middle aged adults in Nebraska, males were 2.5 times more likely than females to die from CVD between 1999 and 2001 (based on their age-specific mortality rates). Furthermore, a larger number of actual CVD deaths occurred among middle aged males, compared to females (1,365 deaths and 641 deaths respectively).

Although a larger number of males than females are dying prematurely from CVD, trends in premature mortality are improving among both genders (Figure 8). Between 1979-1983 and 1999-2001, among middle aged adults in Nebraska, (age-specific) heart disease mortality rates declined more sharply for males than females, 58.1 percent and 46.5 percent declines respectively. While these declines are encouraging, recent increases in obesity, which are most prominent among middle age Nebraska adults, threatens to stabilize or reverse the improvements made in CVD mortality (see Chapter 4 for further detail on obesity trends).

Figure 7: Relative Risk for CVD Mortality* in Nebraska by Gender and Age, 1999-2001



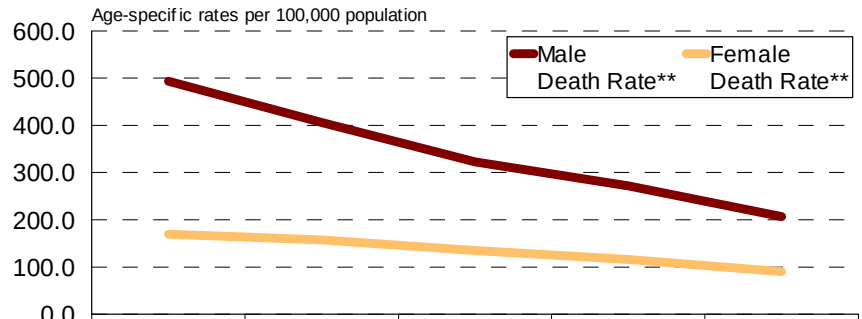
	<45	45-54	55-64	65-74	75-84	85+
Male Death Rate**	13.9	123.4	347.1	949.1	2,695.9	8,220.5
Female Death Rate**	8.1	48.7	158.3	529.1	1,833.2	7,314.3
*Relative Risk M:F^*	*1.7*+	*2.5*+	*2.2*+	*1.8*+	*1.5*+	*1.1*+

Age-Categories

*ICD-10 Codes I00-I99
^Relative risk representes the male to female rate ratio
Source: Nebraska Vital Records

**Age-Specific Death Rates per 100,000 Population
+The male rate is significantly higher than the female rate at the .001 level

Figure 8: Premature CVD Mortality Trends* by Gender
Among Nebraska Residents Aged 45-64, 1979-2001



	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Male Death Rate**	493.0	406.3	322.4	272.2	206.4^
Female Death Rate**	169.5	157.9	135.1	116.1	90.7^
*Relative Risk M:F****	*2.9*+	*2.6*+	*2.4*+	*2.3*+	*2.3*+

Years

*ICD-9 Codes 390-459; ICD-10 Codes I00-I99
**Age-Specific Death Rates per 100,000 Population
***Relative risk representes the male to female rate ratio
Source: Nebraska Vital Records

+The male rate is significantly higher than the female rate at the .001 level
^The 1999-2001 rate is signifantly lower than the 1979-1983 rate at the .001 level

Total CVD Mortality by Race/Ethnicity

The vast majority of CVD deaths in Nebraska occur among White residents (the result of a predominately White population). Between 1999 and 2001, 97 percent of CVD deaths in Nebraska occurred among White residents (Table 4).

Among all racial and ethnic groups in Nebraska, Native Americans suffer the greatest risk for CVD mortality followed by African Americans (Figure 9). Between 1999 and 2001, Native Americans died from CVD at an age-adjusted rate of 502.9 deaths per 100,000 population followed by African Americans at a rate of 395.3. In contrast, White Nebraskans died from CVD at an age-adjusted rate (2000 standard) of 305.2 deaths per 100,000 population. This indicates that Native Americans and African Americans are 1.66 and 1.33 times (or 66% and 33%) more likely than Whites to die from CVD respectively.

Table 4: CVD Mortality* by Race/Ethnicity, 1999-2001

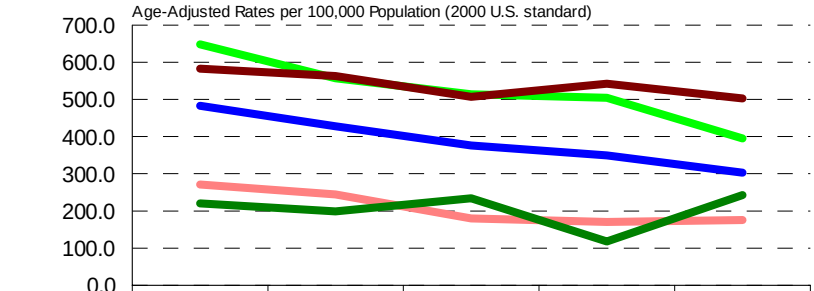
Racial or Ethnic Group	Total Number of CVD Deaths, 1999-2001	Average Number of CVD Deaths per Year, 1999-2001	Percentage of all CVD Deaths, 1999-2001
African American	444	148	2.5%
Asian	38	13	0.2%
Native American	92	31	0.5%
White	17,050	5,683	96.7%
Other Race	8	3	0.0%
Hispanic**	113	38	0.6%

*ICD-10 Codes I00-I99
**Hispanic can be of any race
Source: Nebraska Vital Records

Unlike Native Americans and African Americans in Nebraska, Hispanics (of any race) and Asians are less likely than Whites to die from CVD. Between 1999 and 2001, Hispanics died from CVD at an age-adjusted rate of 175.9 deaths per 100,000 population while Asians died at a rate of 242.3. This indicates that compared to the White population in Nebraska, Hispanics have a relative risk for CVD mortality of 0.58 while Asians have a relative risk for CVD mortality of 0.80.

Reasons for the racial and ethnic disparities in CVD mortality in Nebraska, while somewhat unclear, are believed to result from a wide variety of factors. These factors include (but are not limited to) differences in preventable risk factors for CVD, genetic predisposition, access to medical care, and quality of medical care. To better understand these disparities within Nebraska, more in-depth studies are needed.

Figure 9: Nebraska CVD Mortaltiy Trends* by Race, 1979-2001



	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Nat. American	582.9	563.1	507.0	542.3	502.9+
Afr. American	648.4	556.9	514.1	504.2	395.3+,^^
White	482.9	428.0	375.8	349.5	302.5^^
Asian	220.6	199.0	234.2	118.0	242.3
Hispanic**	271.1	244.6	180.0	170.2	175.9+,^

Year Categories

*ICD-9 Codes 390-459; ICD-10 Codes I00-I99, age-adjusted rates per 100,000 population (2000 U.S. standard)
**Hispanics can be of any race
+Between 1999-2001, the race/ethnicity rate is significantly different from the white rate at the .001 level
^,^^The 1999-2001 rate is signifantly lower than the 1979-1983 rate at the .05 or .001 level respectively
Source: Nebraska Vital Records

Cardiovascular disease mortality trends (based on age-adjusted rates) are declining among African Americans, Hispanics, and Whites in Nebraska while they remain statistically unchanged for Native Americans and Asians (Figure 9).

In Nebraska, racial and ethnic disparities in CVD mortality tend to be greater among females than males. Between 1999 and 2001, African American females were 41 percent more likely than White females to die from CVD, while Native American females were twice as likely (97% more likely) as White females to die from CVD (based on their age-adjusted mortality rates).

Due in large part to younger adult populations, the average age at the time of death is lower among all racial and ethnic groups when compared to Whites (Table 5). In addition, the average YPLL per death is also higher among all racial and ethnic groups, with the highest productive life lost per death occurring among Native Americans.

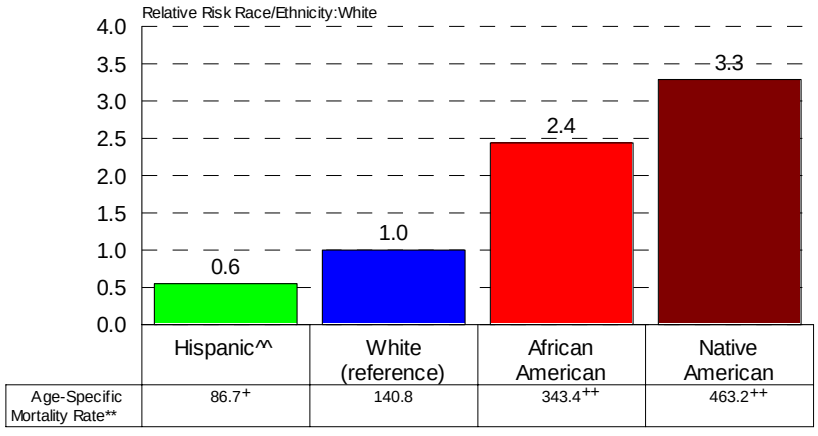
Table 5: CVD YPLL and Average Age at Death in Nebraska* by Race/Ethnicity, 1999-2001

Race/Ethnicity	Average age at the time of CVD death	Total YPLL for CVD	Average YPLL per CVD death	Percentage of CVD deaths that occurred under 65 years of age
African American	69.1	4,605	10.4	35.1%
Asian	72.2	259	6.8	21.1%
Native American	66.0	1,052	11.4	42.4%
White	80.7	53,771	3.2	10.6%
Hispanic**	70.4	1,060	9.4	31.9%

*ICD-10 Codes I00-I99
**Hispanic can be of any race
Source: Nebraska Vital Records

The most profound racial and ethnic disparities in CVD mortality occur among residents under the age of 65. Among middle aged adults (45-64 years of age) in Nebraska, Native Americans were 3.3 times more likely than Whites to die from CVD between 1999 and 2001. Figure 10 provides CVD mortality risk information for each race/ethnicity compared to the White population for middle aged adults between 1999 and 2001.

Figure 10: Relative Risk^ for Premature CVD Mortality* by Race
Among Nebraska adults aged 45-64, 1999-2001



*ICD-10 Codes I00-I99
^Relative risk represents the race/ethnicity to white rate ratio
^^Hispanics can be of any race
Note: Insufficient data were available to calculate a mortality rate for Asians
Source: Nebraska Vital Records

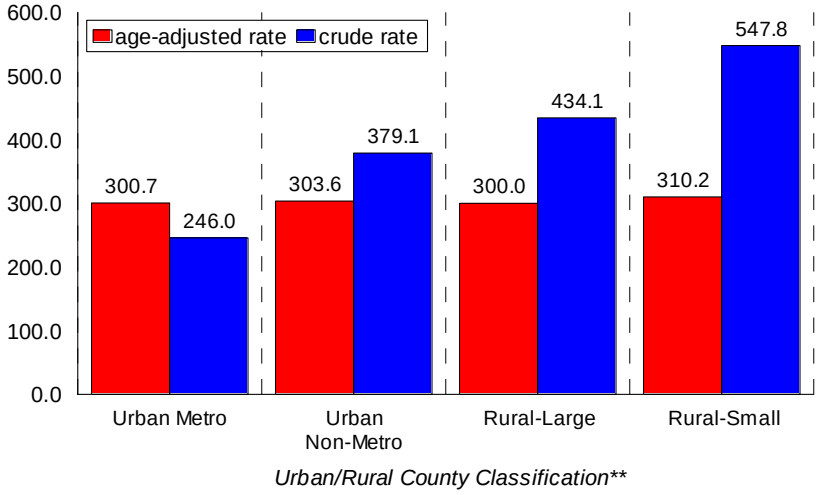
**Age-Specific mortality rates per 100,000 population
+,++The race/ethnicity rate is significantly different from the white rate at the .01 or .001 level respectively

Total CVD Mortality by Geographical Distribution

Between 1999 and 2001, risk for heart disease mortality (based on age-adjusted rates) did not differ (statistically) between residents of urban and rural counties in Nebraska. *For further detail on urban/rural categories, see the Methodology Section.*

In contrast to the differences observed through age-adjusted mortality rates, crude rates indicate that a larger proportion of Nebraska residents in rural counties, compared to urban counties, die from CVD (primarily due to larger older adult populations within rural counties) (Figure 11). While crude rates are not particularly useful for comparing risk among different populations (since they do not adjust for age differences between populations), they are useful for identifying the rate of actual death that occurs within a population. Knowing this information allows the health care system to be better prepared to deal with life-threatening CVD.

Figure 11: Nebraska CVD Mortality Rates* by Urban/Rural, 1999-2001



*ICD-10 codes I00-I99
**See Methodology Section for detail on urban/rural county classifications.
Source: Nebraska Vital Records

The average YPLL per CVD death is highest among residents of urban metropolitan counties in Nebraska and declines gradually as county of residence becomes more rural (Table 6). In addition, residents of urban metropolitan counties are, on average, younger at their time of CVD death than residents of other Nebraska counties (Table 6).

Table 6: CVD YPLL and Average Age at Deaths in Nebraska* by Urban/Rural County Classification, 1999-2001

Urban/Rural Category**	Number of CVD deaths	Total YPLL for CVD	Average YPLL per CVD death	Average age at the time of CVD death
Nebraska Total	17,632	59,799	3.4	80.3
Urban Metropolitan	6,172	27,933	4.5	77.9
Urban Non-Metropolitan	4,199	12,981	3.1	80.9
Rural-Large	4,000	10,772	2.7	81.6
Rural-Small	3,261	8,114	2.5	82.4

*ICD-10 Codes I00-I99
**See Methodology Section for detail on urban/rural county classifications
Source: Nebraska Vital Records

Total CVD Mortality by Medicaid Enrollment

Medicaid enrollees in Nebraska are more likely than non-Medicaid enrollees in Nebraska to die from CVD (Table 7). In 2001, 1,459 Nebraska residents died from CVD while enrolled in Medicaid. This indicates that Medicaid enrollees accounted for 1 in every 4 CVD deaths (25.3%) in 2001 while accounting for just 11 percent of Nebraska's population.

In 2001, Medicaid enrollees in Nebraska were 3.5 times more likely than non-Medicaid enrollees in Nebraska to die from CVD. Aside from differences in age, Medicaid enrollment status has a stronger association with CVD mortality than any other sub-population presented within this report.

Nebraska's Medicaid population consists of predominately women and children. As a result, approximately 7 in every 10 Medicaid deaths due to CVD (69.1%) occurred among females in 2001. However, male Medicaid enrollees are more likely than female Medicaid enrollees to die from CVD (based on their age-adjusted CVD mortality rates). In 2001, male Medicaid enrollees were 65 percent more likely than female Medicaid enrollees to die from CVD.

It is particularly concerning that some of the greatest disparities in CVD mortality, between Medicaid and non-Medicaid enrollees occur among adults during their most productive years of life. Medicaid enrollees aged 25-44 years and aged 45-64 years were far more likely than non-Medicaid enrollees (within the same age categories) to die from CVD in 2001 (5.74 and 6.10 times more likely respectively).

Table 7: CVD Mortality*: Medicaid vs Non-Medicaid, 2001

	Medicaid Enrollees**			Non-Medicaid Enrollees			Relative Risk^^
	# Deaths	Death Rate^	Population	# Deaths	Death Rate^	Population	Med:Non-Med
Overall	1,459	852.4	194,055	4,304	246.9	1,530,373	3.45+
Gender							
Female	1,008	725.7	112,087	2,151	195.9	761,677	3.70+
Male	451	1,195.6	81,968	2,153	315.5	768,696	3.79+
Race							
Asian	4	-	2,235	7	-	23,735	-
Native American	22	1,144.9	6,900	14	-	9,145	-
African American	70	807.3	26,535	88	313.7	44,361	2.57+
Hispanic	16	-	21,742	21	105.2	77,249	-
White	1,363	887.4	133,358	4,194	243.6	1,445,929	3.64+
Age							
<25	10	7.4	134,607	15	3.0	493,932	2.47
25-44	29	102.8	28,207	82	17.9	458,948	5.74+
45-64	98	762.9	12,845	454	125.1	362,770	6.10+
65+	1,322	7,186.4	18,396	3,753	1,747.8	214,724	4.11+

*ICD-10 Codes I00-I99

**Medicaid deaths consist of Nebraska residents enrolled in Medicaid at their time of death. Medicaid population data represents enrollment eligibility years for 2001 (or the # of enrollees if everyone enrolled was enrolled for an entire year).

^Age-adjusted rate per 100,000 pop (2000 U.S. standard population) (Note: rates for age categories are age-specific)

^^Relative Risk represents the Medicaid to non-Medicaid rate ratio

+Medicaid rate is significantly higher than the non-Medicaid rate at the .001 level

- Insufficient data to calculate statistic

Source: Nebraska Vital Records

Heart Disease

Definition: Heart disease is a form of cardiovascular disease; it includes all diseases of the heart, which includes acute rheumatic fever and chronic rheumatic heart disease, hypertensive heart disease, hypertensive heart and renal disease, coronary heart disease, congestive heart failure, as well as other forms of heart disease

Codes used to define heart disease: ICD-10 codes I00-I09, I11, I13, I20-I51, ICD-9 codes (390-398, 402, 404, 410-429), Comparability Ratio 0.9858

Heart Disease Highlights

National Highlights

- Heart disease killed 710,760 U.S. residents in 2000[2].
- Heart disease death rates are higher in the south-eastern United States[2].
- One coronary death occurs every minute in the U.S[2].
- Nearly 3 in every 4 heart disease deaths result from coronary heart disease[10].
- Coronary heart disease is the single largest killer of American males and females[2].
- Each year about 340,000 U.S. residents die from CHD in an emergency department or before reaching the hospital[2].

Nebraska Highlights

- Heart disease was responsible for 1 in every 3.7 deaths in 2001.
- Heart disease accounted for nearly 3 in every 4 total CVD deaths in 2001.
- Heart disease killed 4,151 Nebraska residents in 2001.
- The mortality rate (age-adjusted) for heart disease declined 39 percent between 1979 and 2001.
- 3 in every 4 heart disease deaths occur among Nebraska residents aged 75 and older.
- Males are 1.6 times more likely than females to die of heart disease (based on their age-adjusted mortality rate), however more females than males actually die from heart disease each year.
- African Americans and Native Americans are more likely than all other racial and ethnic groups to die of heart disease.
- Medicaid enrollees were 3.2 times more likely than non-Medicaid enrollees to die of heart disease (based on their age-adjusted rates) in 2001.

Overall Heart Disease Mortality

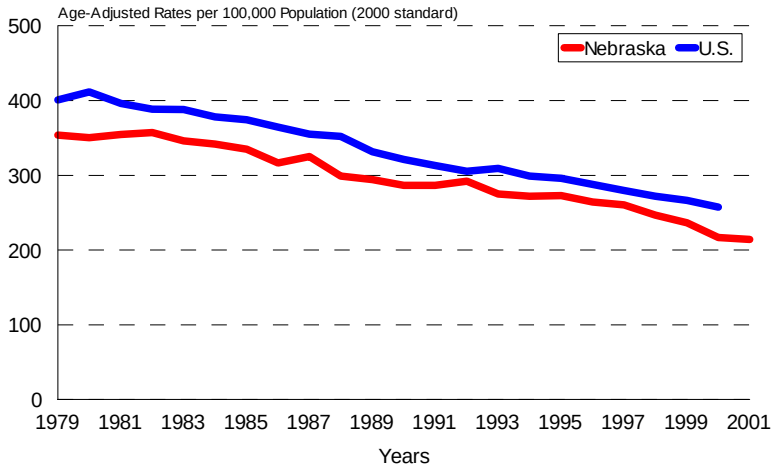
Independent of other forms of CVD, heart disease is the leading killer of Nebraska residents. In 2001, heart disease claimed the lives of 4,151 Nebraska residents, of which 532 were under the age of 65. Heart disease accounts for approximately 1 in every 5 deaths in Nebraska.

Heart disease mortality in both Nebraska and the U.S. has been steadily declining since the late 1970s (Figure 12). Between 1979 and 2001, Nebraska's age-adjusted heart disease mortality rate declined 39.4 percent.

Nebraska residents are less likely than U.S. residents to die from heart disease. In particular, the Nebraska to U.S. relative risk (or rate ratio) for heart disease mortality (based on age-adjusted mortality rates) is 0.84[10]. In 2000, Nebraska's heart disease mortality rate ranked 13th lowest among all 50 states and the District of Columbia (interquartile rate range 217.0-279.2)[10].

The actual numbers of deaths from heart disease in Nebraska is declining (although at a slower pace than the age-adjusted mortality rate).There were 5,403 heart disease deaths in 1979 compared to 4,151 heart disease deaths in 2001, indicating an average decline of 57 deaths per year (or a 23.2% overall decline). In contrast, the number of heart disease deaths in the U.S. declined only 2.9 percent between 1979 and 2000[10].

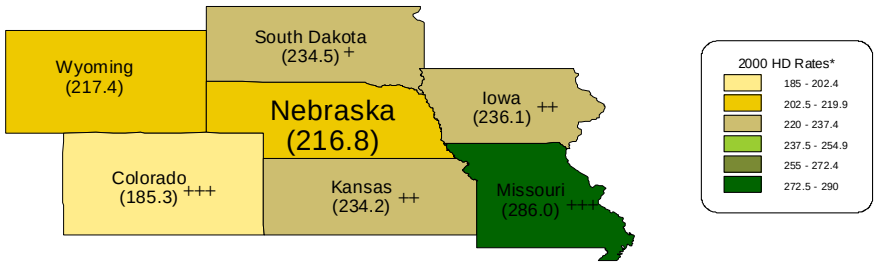
Figure 12: Heart Disease Mortality Trends*, 1979-2001



*Includes ICD-9 Codes 390-398, 402, 404, 410-429; ICD-10 Codes I00-I09, I11, I13, I20-I51; comparability ratio (.9981) applied to data from years 1979-1998
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://w onder.cdc.gov>

Rates for heart disease in Nebraska compare well to bordering states. In 2000, only Colorado had a lower (age-adjusted) heart disease mortality rate than Nebraska, while Iowa, Kansas, Missouri and South Dakota had higher (age-adjusted) heart disease mortality rates than Nebraska (Map 2)[1,10]. In particular, Missouri residents were 31 percent more likely than Nebraska residents to die from CVD in 2000[10]. While heart disease mortality rates in Nebraska are lower than many bordering states, heart disease still presents many challenges and opportunities within both public health and health care in Nebraska. To remain ahead of the curve, Nebraska must strive to create and implement new and aggressive plans to address heart disease in future years.

Map 2: Heart Disease Death Rates* for Nebraska and Bordering States, 2000

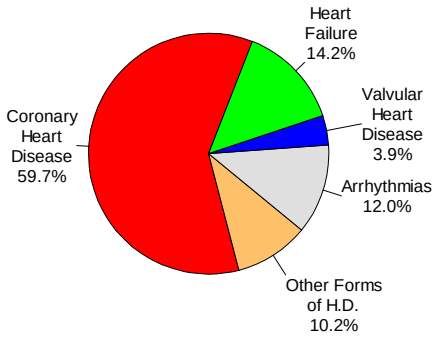


*Age-adjusted rate per 100,000 population (2000 U.S. standard) using ICD-10 Codes I00-I09, I11, I13, I20-I51
+,++,+++Rate is significantly different from the Nebraska rate at the .05, .01, or .001 level respectively
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://www.wonder.cdc.gov/>

There are a variety of different diseases of the heart that contribute to mortality in Nebraska (Figure 13). Between 1999 and 2001, coronary heart disease (CHD) accounted for approximately 3 in every 5 heart disease deaths. Other leading causes of heart disease death include heart failure (14.2%) and arrhythmias (12.0%).

Between 1999 and 2001, a higher percentage of male than female heart disease deaths resulted from CHD, 64.1 percent to 55.9 percent respectively. In contrast, a higher percentage of female than male heart disease deaths resulted from valvular heart disease and heart failure, 4.8 to 2.8 percent and 16.3 to 11.7 percent respectively.

Figure 13: Types of Heart Disease* Death in Nebraska
Percentage Breakdown, 1999-2001



*Includes ICD-10 codes I00-I09, I11, I13, I20-I51; codes for specific diseases can be found in the methodology section of this report.
Source: Nebraska Vital Records

Preventable Risk Factors for Heart Disease

There are a variety of preventable risk factors for heart disease morbidity and mortality. While many of these risk factors are highly correlated with one another, each is uniquely important to heart disease prevention and should be a primary focus for decreasing heart disease in Nebraska. *See chapter 4 for more information on preventable risk factors.*

High Blood Pressure - About half of people who have a first heart attack have blood pressures higher than 160/95 mm Hg[11]. Hypertension precedes the development of congestive heart failure (CHF) in 91 percent of cases[12]. High blood pressure is also associated with a 2-3 times greater risk for developing CHF[12].

High Blood Cholesterol - The risk of coronary heart disease (CHD) increases as blood cholesterol levels rise. Fortunately, as little as a 10 percent decline in total cholesterol levels may result in an estimated 30-percent reduction in the incidence of coronary heart disease[13].

Lack of Physical Activity - Physical activity is as important to the development of CHD as controlling high blood pressure, controlling high blood cholesterol, and not smoking[14]. Physically inactive people are almost twice as likely to develop CHD as people who engage in regular physical activity[15].

Unhealthy Eating - Healthy eating helps to prevent heart disease for a variety of reasons. In particular, fruit and vegetable consumption, particularly green leafy vegetables and vitamin C-rich fruits and vegetables, appear to have a protective effect against coronary heart disease[16]. People who consume eight or more servings of fruits and vegetables per day are at over 20 percent reduced risk of CHD compared to those who consumed less than three servings per day[16].

Smoking - Cigarette smoking dramatically increases an individual's risk for heart disease. However, the promising news is that if current smokers stop smoking, their risk of CHD declines 50 percent within 1 year[17]. In addition to actually smoking cigarettes, second-hand exposure to cigarette smoke also dramatically increases an individual's risk for heart disease. In fact, the risk of death from CHD increases by up to 30 percent among those exposed to environmental tobacco smoke at home or work[2].

Overweight and Obesity - Overweight and obese adults are more likely than adults at a healthy weight to develop heart disease. A gain of approximately 10 to 20 pounds may result in an increased risk of coronary heart disease (nonfatal myocardial infarction and death) of 1.25 times in women[18] and 1.6 times in men[19]. High levels of weight gain, 22 pounds in men and 44 pounds in women, may result in an increased coronary heart disease risk of 1.75 and 2.65, respectively[18,19].

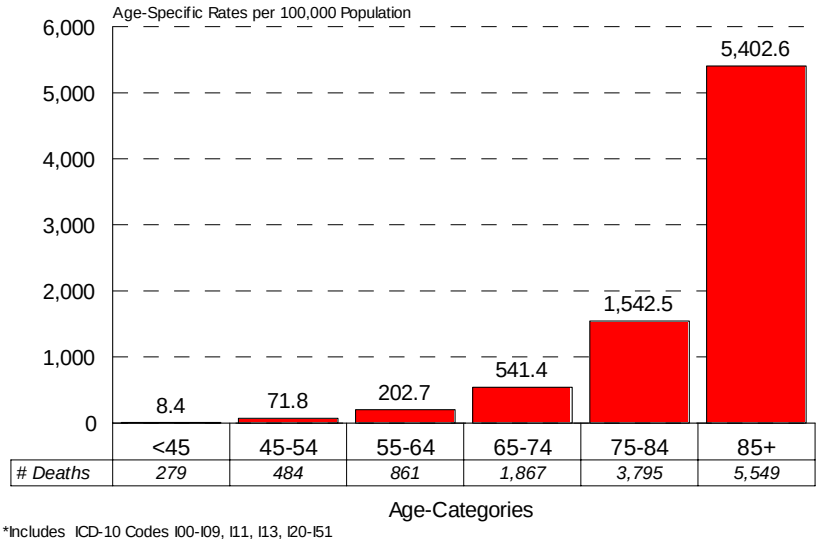
Diabetes - Diabetic patients compared to non-diabetics, have an almost twofold increase in dying or suffering severe outcomes from heart disease[20].

Stress - While not conclusive, some research is indicating a relationship between the risk of CVD and environmental and psychosocial factors (such as job strain, social isolation, and personality traits)[21]. Before implementing stress reduction programs, more research is needed on how stress contributes to heart disease[21].

Heart Disease Mortality by Age

Risk of death from heart disease increases dramatically as age increases, making age the greatest single predictor of heart disease mortality for Nebraska residents (Figure 14). Between 1999 and 2001, approximately 3 in every 4 heart disease deaths occurred among residents 75 and older.

Figure 14: Nebraska Heart Disease Mortality Rates* by Age, 1999-2001



*Includes ICD-10 Codes I00-I09, I11, I13, I20-I51
Source: Nebraska Vital Records

Although most heart disease deaths occur among older adults in Nebraska, heart disease does claim a large number of lives prematurely (before age 65). Between 1999 and 2001, heart disease prematurely killed, on average, 541 Nebraska residents per year. Heart disease is responsible for greater than 1 in every 6 premature Nebraska deaths.

The trend in heart disease mortality among residents under 45 has not changed in more than 20 years, while rates among middle and older adults have declined sharply (Table 8). In particular, the rate among middle aged adults (45-64 years of age) declined 56 percent between 1979-1983 and 1999-2001.

Table 8: Trends in Heart Disease Mortality* by Age in Nebraska

	<45		45-64		65+	
years	Average # deaths/year	rate**	Average # deaths/year	rate**	Average # deaths/year	rate**
1979-1983	95	8.9	805	275.3	4,680	2,255.9
1984-1988	84	7.8	685	238.0	4,659	2,154.6
1989-1993	87	8.1	555	190.9	4,458	1,986.1
1994-1998	98	9.0	526	160.2	4,322	1,888.1
1999-2001	93	8.5	448	121.1	3,737	1,617.9
% change: 79-83 to 99-01	-2.1%	-4.8%	-44.3%	-56.0%^	-20.1%	-28.3%^

*Codes: ICD-9 390-398, 402, 404, 410-429; ICD-10 I00-I09, I11, I13, I20-I51; comparability ratio (0.9981) applied to years 1979-1998

**Age-specific rate per 100,000 population

^1999-2001 rate is significantly lower than the 1979-1983 race at the .001 level

Source: Nebraska Vital Records

Heart Disease Mortality by Gender

Heart disease is the leading killer of both males and females in Nebraska. In 2001, heart disease accounted for more than 1 of every 4 deaths among males (26.9%) and females (27.7%).

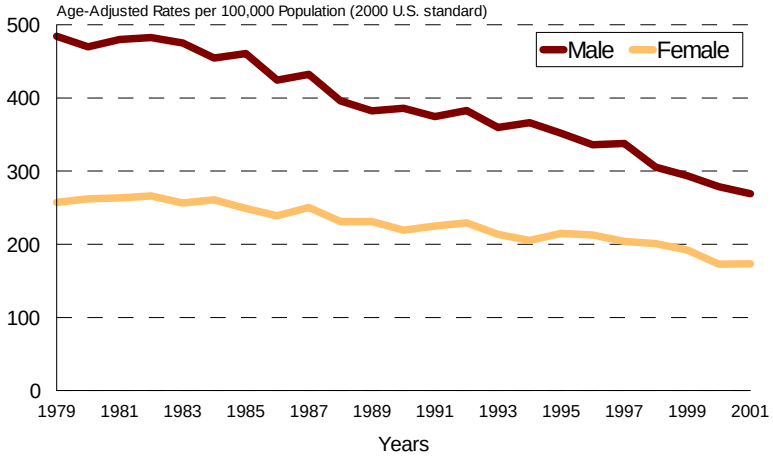
Heart disease death rates in Nebraska among both males and females compare well to other U.S. states. In 2000, Nebraska males ranked 12th lowest while Nebraska females ranked 13th lowest in their rate of heart disease mortality (age-adjusted) compared to all other states and the District of Columbia (interquartile rate ranges 279.0-347.3 and 173.5-230.1 respectively)[10].

Males are more likely than females to die from heart disease in Nebraska (Figure 15). In 2001, males were 1.55 times (or 55%) more likely than females to die from heart disease. While the gender disparity is still large, the fact that the relative risk has declined from 1.88 in 1979 to 1.55 in 2001 is encouraging.

In contrast to the mortality rate, more Nebraska females than males actually die from heart disease each year (due to a larger female older adult population). In 2001, heart disease killed 2,217 females compared to 1,934 males. While the number of heart disease deaths is declining among both males and females, they are declining at a much slower pace among females compared to males, 9.7 percent and 34.4 percent respectively between 1979 and 2001.

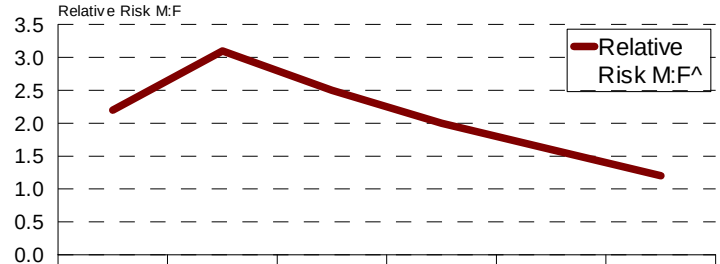
While heart disease claims a large number of lives prematurely among both males and females, males are more likely to die prematurely from heart disease (Figure 16). In addition, between 1999 and 2001, heart disease claimed more than twice as many years of productive life among males than females, 33,036 and 14,312 respectively.

Figure 15: Nebraska Heart Disease Mortality Trends* by Gender



*Includes ICD-9 Codes 390-398, 402, 404, 410-429; ICD-10 Codes I00-I09, I11, I13, I20-I51; comparability ratio (.9981) applied to data from years 1979-1998
Source: Nebraska Vital Records

Figure 16: Relative Risk for Heart Disease Mortality* in Nebraska by Gender and Age, 1999-2001



	<45	45-54	55-64	65-74	75-84	85+
Male Death Rate**	11.6	108.5	293.9	741.4	1,988.8	5,979.8
Female Death Rate**	5.2	35.4	116.1	372.3	1,242.8	5,175.9
*Relative Risk M:F^*	*2.2+*	*3.1+*	*2.5+*	*2.0+*	*1.6+*	*1.2+*

Age-Categories

*ICD-10 Codes I00-I09, I11,I13, I20-I51
^Relative risk represents the male to female rate ratio
Source: Nebraska Vital Records

**Age-Specific Death Rates per 100,000 Population
+The male rate is significantly higher than the female rate at the .001 level

Heart Disease Mortality by Race

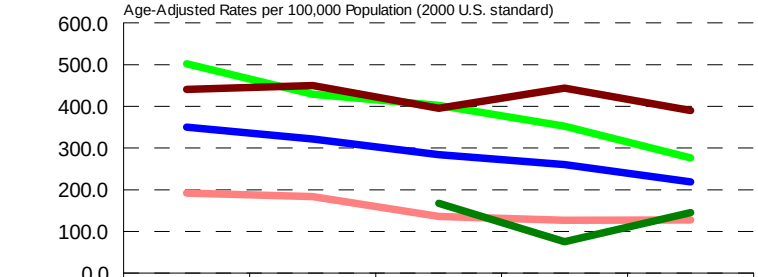
Large disparities in heart disease mortality exist between different racial and ethnic groups in Nebraska, making race an important non-preventable risk factor for heart disease. Between 1999 and 2001, Native Americans, followed by African Americans, were the most likely racial groups to die from heart disease (Figure 17). Compared to the White (majority) population in Nebraska, between 1999 and 2001, Native Americans and African Americans were 1.78 and 1.26 times more likely to die from heart disease respectively. In contrast, between 1999 and 2001, Asians and Hispanics were less likely than Whites to die from heart disease (relative risks of .67 and .58 respectively).

The high death rate and relatively stable trend from heart disease among Native Americans in Nebraska is concerning (Figure 17). Between 1991 and 1995, the rate of heart disease death (age-adjusted) among Native American men in Nebraska, aged 35 and older, ranked 34th highest out of 35 states[22] while Native American women in Nebraska, aged 35 and older, ranked 31st highest out of 32 states[23].

In Nebraska, the greatest disparities in heart disease death, between the White and minority populations, occurs among residents during their pre-retirement years (specifically between 45-64 years of age) (Figure 18).

The average years of productive life lost (YPLL) per heart disease death vary dramatically between different racial and ethnic groups. Between 1999 and 2001, average YPLL per heart disease death were as follows: 3.4 among Whites, 6.6 among Asians, 8.5 among Hispanics, 11.1 among African Americans, and 12.0 among Native Americans. Even though YPLL is strongly influenced by the average age of the population, such dramatic differences are concerning.

Figure 17: Trends in Nebraska Heart Disease Mortaltiy* by Race



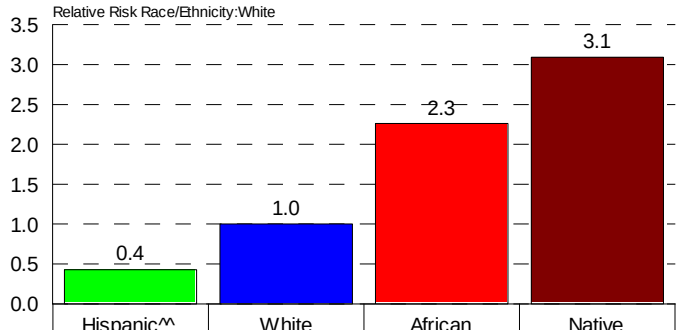
	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Nat. American	441.0	450.1	395.9	444.0	390.3+++
Afr. American	502.3	429.0	402.2	352.7	276.9++,^
White	350.4	321.5	284.0	260.1	218.9^
Asian	-	-	167.7	75.2	145.6+
Hispanic**	192.4	183.9	135.9	127.2	127.4+++

Year Categories

*Includes ICD-9 Codes 390-398, 402, 404, 410-429; ICD-10 Codes I00-I09, I11, I13, I20-I51; comparability ratio (.9981) applied to data from years 1979-1998
**Hispanics can be of any race
Source: Nebraska Vital Records

-Insufficient data to calculate rate
*-**-*** Between 1999-2001, the race/ethnicity rate is significantly different from the white rate at the .05, .01, or .001 levels respectively
^The 1999-2001 rate is signifantly lower than the 1979-1983 rate at the .001 level

Figure 18: Relative Risk^ for Premature Heart Disease Mortality*
Among Nebraska adults aged 45-64 by Race/Ethnicity, 1999-2001



	Hispanic^^	White (reference)	African American	Native American
Age-Specific Mortality Rate**	62.5+	116.1	262.7+	358.6+

*ICD-10 Codes I00-I09, I11, I13, I20-I51
^Relative risk represents the race/ethnicity to white rate ratio
^^Hispanics can be of any race
Note: Insufficient data were available to calculate a mortality rate for Asians
Source: Nebraska Vital Records

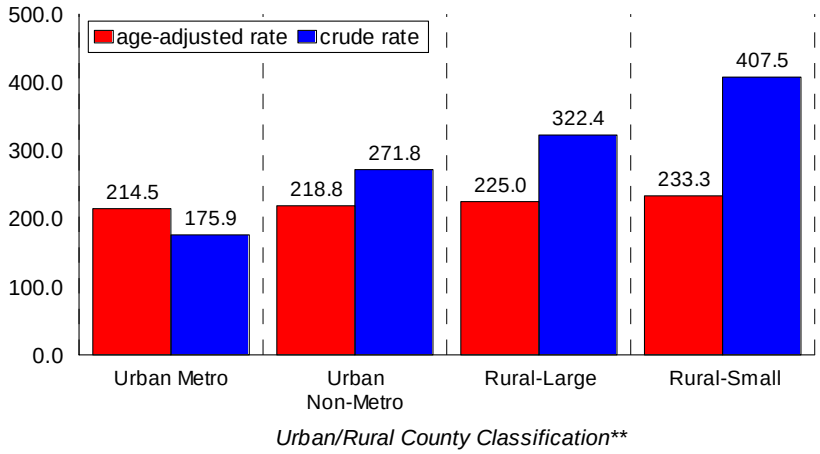
**Age-Specific mortality rates per 100,000 population
+The race/ethnicity rate is significantly different from the white rate at the .001 level

Heart Disease Mortality by Geographic Distribution

Residents of rural Nebraska counties are slightly more likely than residents of urban Nebraska counties to die from heart disease (based on their age-adjusted mortality rates) (Figure 19). Between 1999 and 2001, residents of rural-small counties in Nebraska were 9 percent more likely than residents of urban metropolitan counties in Nebraska to die from heart disease. *For further detail on urban/rural categories, see Methodology Section.*

In contrast to the differences observed through age-adjusted mortality rates, crude rates indicate that a much larger proportion of Nebraska residents in rural counties, compared to urban counties, die from heart disease (primarily due to larger older adult populations within rural counties) (Figure 19). While crude rates are not particularly useful for comparing risk among different populations (since they do not adjust for age differences between populations), they are useful for identifying the rate of actual death that occurs within a population. Knowing this information allows the health care system to be better prepared to deal with life-threatening heart disease.

Figure 19: Nebraska Heart Disease Mortality Rates* by Urban/Rural, 1999-2001



*ICD-10 codes I00-I09, I11, I13, I20-I51, rates per 100,000 population
**See Methodology Section for further detail on urban/rural county classifications.
Source: Nebraska Vital Records

The average YPLL per heart disease death is highest among residents of urban metropolitan counties in Nebraska and declines gradually as county of residence becomes more rural (Table 9). In addition, residents of urban metropolitan counties are, on average, younger at their time of heart disease death than residents of other Nebraska counties (Table 9).

Table 9: Heart Disease* YPLL and Average Age at Deaths in Nebraska by Urban/Rural County Classification, 1999-2001

Urban/Rural Category**	Number of HD deaths	Total YPLL for HD	Average YPLL per HD death	Average age at the time of HD death
Nebraska Total	12,835	47,348	3.7	79.8
Urban Metropolitan	4,414	21,796	4.9	77.3
Urban Non-Metropolitan	3,010	10,418	3.5	80.4
Rural-Large	2,985	8,467	2.8	81.5
Rural-Small	2,426	6,668	2.7	81.9

*ICD-10 Codes I00-I09, I11, I13, I20-I51
**See Methodology Section for further detail on urban/rural county classifications
Note: YPLL refers to years of productive life lost and measures death among persons under 75 years of age *(see methodology for further detail).*
Source: Nebraska Vital Records

Heart Disease Mortality by Medicaid Enrollment

Medicaid enrollees in Nebraska are more likely than non-Medicaid enrollees in Nebraska to die from heart disease (Table 10). In 2001, 1,003 Nebraska residents died from heart disease while enrolled in Medicaid. This indicates that Medicaid enrollees accounted for approximately 1 in every 4 heart disease deaths in 2001 while accounting for just 11 percent of Nebraska's population.

In 2001, Medicaid enrollees in Nebraska were 3.2 times more likely than non-Medicaid enrollees in Nebraska to die from heart disease. Aside from differences in age, Medicaid enrollment status has a stronger association with heart disease mortality than any other subpopulation presented within this report.

Nebraska's Medicaid population consists of predominately women and children. As a result, approximately 7 in every 10 Medicaid deaths due to heart disease (or 70%) occurred among females in 2001. However, male Medicaid enrollees in Nebraska were 67 percent more likely than female Medicaid enrollees in Nebraska to die from heart disease in 2001 (based on their age-adjusted mortality rates).

It is particularly concerning that some of the most striking disparities in heart disease mortality (between Medicaid and non-Medicaid enrollees) occurred among adults during their most productive years of life. Medicaid enrollees in Nebraska aged 25-44 years and aged 45-64 years were more likely than non-Medicaid enrollees in Nebraska (within the same age categories) to die from heart disease in 2001 (5.14 and 5.11 times more likely respectively).

Table 10: Heart Disease Mortality*: Medicaid vs Non-Medicaid

	Medicaid Enrollees**			Non-Medicaid Enrollees			Relative Risk^^
	# Deaths	Death Rate^	Population	# Deaths	Death Rate^	Population	Med:Non-Med
Overall	1,003	574.1	194,055	3,148	180.8	1,530,373	3.18++
Gender							
Female	701	483.0	112,087	1,516	137.3	761,677	3.52++
Male	302	805.5	81,968	1,632	237.5	768,696	3.39++
Race							
Asian	3	-	2,235	3	-	23,735	
Native American	17	-	6,900	12	-	9,145	
African American	45	527.4	26,535	64	226.7	44,361	2.33+
Hispanic	10	-	21,742	12	-	77,249	
White	938	596.8	133,358	3,068	178.5	1,445,929	3.34++
Age							
<25	9	-	134,607	11	2.2	493,932	
25-44	18	63.8	28,207	57	12.4	458,948	5.14++
45-64	67	521.6	12,845	370	102.0	362,770	5.11++
65+	909	4,941.3	18,396	2,710	1,262.1	214,724	3.92++

*ICD-10 Codes I00-I09, I11, I13, I20-I51

**Medicaid deaths consist of Nebraska residents enrolled in Medicaid at their time of death. Medicaid population data represents enrollment eligibility years for 2001 (or the # of enrollees if everyone enrolled was enrolled for an entire year).

^Age-adjusted rate per 100,000 pop (2000 U.S. standard population) (Note: rates for age categories are age-specific)

^^Relative Risk represents the Medicaid to non-Medicaid rate ratio

+,++Medicaid rate is significantly higher than the non-Medicaid rate at the .01 or .001 level respectively

- Insufficient data to calculate statistic

Source: Nebraska Vital Records

Coronary Heart Disease

Definition[24]: Coronary heart disease (or coronary artery disease) is a narrowing of the small blood vessels that supply blood and oxygen to the heart (coronary arteries). Coronary disease usually results from the build-up of fatty material and plaque (atherosclerosis). As the coronary arteries narrow, the flow of blood to the heart can slow or stop. The disease can cause chest pain (stable angina), shortness of breath, heart attack, or other symptoms.

Codes used to define CHD: ICD-10 codes I20-I25 and ICD-9 codes 390-398, 402, 404-429, Comparability Ratio 0.999

Coronary heart disease (CHD) is a type of heart disease that accounts for nearly 3 in every 5 heart disease deaths in Nebraska. In 2001, CHD killed 2,443 Nebraska residents for a death rate of 125.6 deaths per 100,000 population (age-adjusted). While the age-adjusted death rate for CHD declined 57.9 percent among Nebraska residents between 1979 and 2001, CHD (independent of all other heart diseases) is still the second leading cause of death in Nebraska (second only to cancer).

In 2001, CHD claimed approximately the same number of lives among males and females in Nebraska, 1,206 to 1,237 respectively. However, males were 1.71 times (or 71%) more likely than females to die from CHD based on their age-adjusted rate (Figure 20).

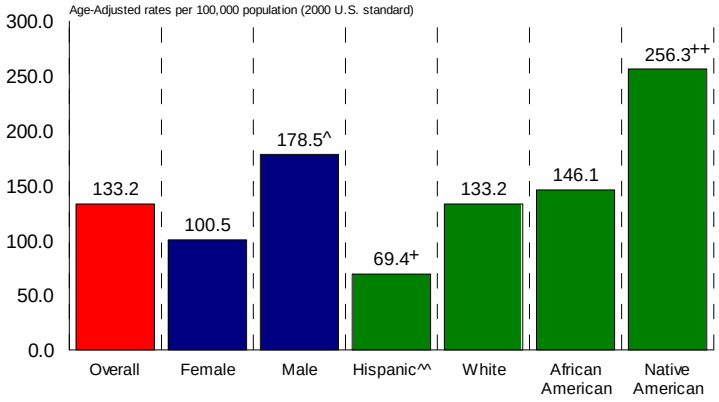
Although CHD is a leading killer in Nebraska, Nebraska residents are less likely than U.S. residents to die from CHD. In particular, U.S. females were 49 percent more likely than NE females while U.S. males were 33 percent more likely than NE males to die from CHD in 2000[10].

Native Americans are more likely than all other racial and ethnic groups to die from CHD in Nebraska (Figure 20). Between 1999 and 2001, Native Americans were nearly twice as likely as Whites (relative risk of 1.92) to die from CHD. In contrast, Hispanics were less likely than Whites to die from CHD in Nebraska between 1999 and 2001 (relative risk of 0.52).

CHD contributes to a large number of premature deaths in Nebraska. Between 1999 and 2001, 837 Nebraska residents aged 45-64 years died from CHD for an age-specific mortality rate of 75.3 deaths per 100,000 population. In contrast, stroke killed 199 Nebraska residents aged 45-64 years between 1999 and 2001, for an age-specific mortality rate of 17.9 deaths per 100,000 population.

According to the American Heart Association, sudden cardiac death is a result of cardiac arrest (when the heart stops abruptly). While most known heart diseases can lead to sudden cardiac death, the most common is CHD.

Figure 20: Nebraska CHD Mortality Rates*, 1999-2001



*ICD-10 Codes I20-I25
^The male rate is significantly higher than the female rate at the .001 level
+,++The race/ethnicity rate is significantly different from the white rate at the .01 or .001 level respectively
^^Hispanics can be of any race
Note: Insufficient data were available to calculate a mortality rate for Asians
Source: Nebraska Vital Records

Sudden Cardiac Death

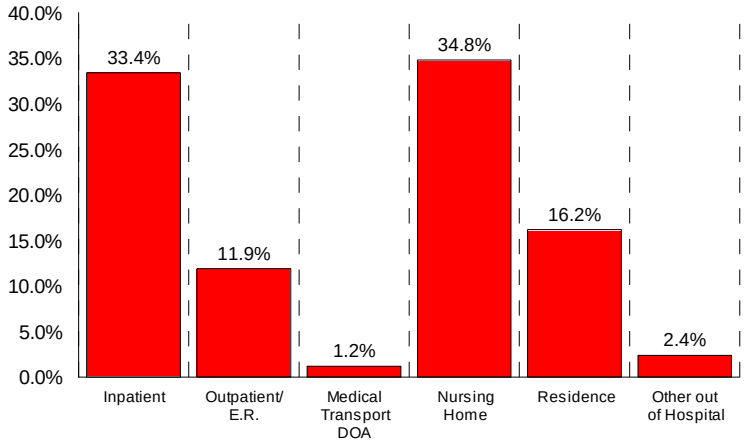
Definition[24]: Sudden cardiac deaths (SCD) result from sudden cardiac arrest, in which the heart stops beating abruptly or unexpectedly. Sudden cardiac death is often associated with coronary heart disease, while the most common underlying cause of sudden cardiac death is heart attack. Sudden cardiac death victims may or may not have diagnosed heart disease.

Methodology used to define SCD: deaths contain ICD-10 codes I00-I09, I11, I13, I20-I51, Q20-Q24 and death occurred in one of the following locations: outpatient, E.R., residence, nursing home, or other out of hospital death.

Each year in the United States, approximately 400,000 to 460,000 persons die of unexpected sudden cardiac death (SCD) in an emergency department (ER) or before reaching a hospital[25]. Heart attacks are a major cause of SCD and approximately 70 percent of SCDs are caused by coronary heart disease[25].

Among the 12,895 cardiac deaths (including all diseases of the heart and congenital malformations of the heart) that occurred in Nebraska between 1999 and 2001, 66.5 percent (or 8,576 deaths) resulted from SCD. Cardiac deaths occur in a wide variety of locations, led by nursing home (34.8%) and inpatient hospitalization (33.4%) (Figure 21).

Figure 21: Location of Cardiac Death in Nebraska*, 1999-2001



*ICD-10 codes I00-I09, I11, I13, I20-I51, Q20-Q24
Note: 13 deaths occurred in an unknown location.
Source: Nebraska Vital Records

Between 1999 and 2001, Nebraska residents died from SCD at an age-adjusted mortality rate of 146.8 deaths per 100,000 population. Males were 1.5 times more likely than females to die from SCD and Native Americans and African Americans were more likely than Whites to die from SCD, 43 percent and 26 percent more likely respectively.

Although SCD leads to a large number of preventable deaths in Nebraska each year, Nebraska ranks well when compared to the nation as a whole. In 1999, U.S. residents were 11 percent more likely than Nebraska residents to die from SCD[26].

Of the 8,875 SCDs that occurred between 1999 and 2001 in Nebraska, 1,121 (or 13.1%) occurred among residents under 65 years of age. As a result, efforts to reduce out-of-hospital (including nursing home, residence, or other out of hospital) deaths from SCD would likely decrease the overall incidence of premature death in Nebraska.

The high mortality rate from SCD indicates a statewide need to engage in efforts to increase public awareness of heart attack signs and symptoms and to reduce the delay time to treatment. In addition, these data also indicate a statewide need to support primary prevention efforts to reduce the number of sudden cardiac deaths from occurring.

Heart Failure

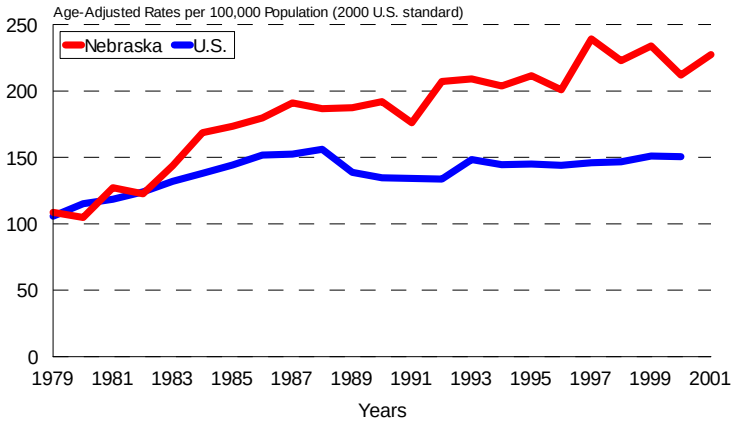
Definition[27]: Heart failure occurs when the heart loses its ability to pump enough blood through the body. Heart failure usually develops slowly, often over years, as the heart gradually loses its pumping ability and works less efficiently.

Codes used to define heart failure: ICD-10 codes I50 and ICD-9 codes 428, comparability ratio 1.0410

Between 2 and 3 million Americans have heart failure, and 400,000 new cases are diagnosed each year[27]. While the mortality rate from coronary heart disease is declining, the mortality rate from heart failure is increasing in both Nebraska and the nation (Figure 22).

Of the 1,819 heart failure deaths that occurred among Nebraska residents between 1999 and 2001, 94.8 percent (or 1,725 deaths) occurred among older adults (residents aged 65 and older). Among older adults in Nebraska, the heart failure mortality rate (age-adjusted) increased by 109 percent between 1979 and 2001 (Figure 22). Furthermore, from 1979 to 2001, the number of heart failure deaths among older adults in Nebraska increased from 211 to 586 respectively for a 177 percent increase.

Figure 22: Nebraska Trends in Heart Failure Mortality Rates* Among Older Adults (aged 65 and older), 1979-2001



*Includes ICD-10 code I50 and ICD-9 code 428, comparability ratio (1.0410) applied to years 1979-1998
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://wonder.cdc.gov>

When compared to the nation, heart failure mortality rates among older adults in Nebraska are increasing at a much steeper pace (Figure 22). In 2000, older adults in Nebraska were 41 percent more likely than older adults nationally to die from heart failure (based on their age-adjusted mortality rates)[10]. This is a sharp contrast to residents nationally being more likely than residents in Nebraska to die from both coronary heart disease and stroke[10].

In large part, the growing presence of heart failure as a health problem reflects the aging of the U.S. population[27]. Heart failure risk increases with age, and older adults are the fastest growing segment of the population[27]. There are a couple of possible explanations for the dramatic increases in heart failure mortality among older adults in Nebraska, however, further investigation is needed to better understand this trend. First, according to the Framingham Heart Study, increases in obesity are strongly associated with increases in heart failure[28]. Between 1990 and 2001, the percentage of obese older adults in Nebraska increased dramatically, from 11.6 percent to 20.7 percent[3]. Second, the sharp decline in coronary heart disease mortality among older adults in Nebraska may be resulting in more heart failure, since these individuals are subsequently at high risk for heart failure.

Heart failure is largely identifiable and preventable. As a result, access to care, quality of care, public awareness, and interventions to improve heart failure risk factors all present excellent opportunities for slowing Nebraska's death rate from heart failure and controlling unnecessary medical costs.

Stroke

Definition[29]: Stroke is a type of cardiovascular disease. It affects the arteries leading to and within the brain. A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bursts. When that happens, part of the brain cannot get the blood (and oxygen) it needs, so it starts to die.

Codes used to define stroke: ICD-10 codes I60-I69 and ICD-9 codes 430-434, 436-438, comparability ratio 1.0588

Stroke Highlights

National Highlights

- Accounted for approximately 1 of every 15 deaths in the United States in 2001, killing 163,538 U.S. residents[2].
- About half of all stroke deaths occur out of hospital[2].
- Independently from other CVDs, stroke ranks as the third leading cause of death[30].
- On average, someone dies from a stroke every 3 minutes[2].
- The number of actual deaths from stroke increased 8 percent between 1990 and 2001[30].

Nebraska Highlights

- Stroke killed 1,126 Nebraska residents in 2001.
- Independently from other CVDs, stroke ranks as the third leading cause of death.
- Actual deaths from stroke have remained virtually unchanged from 1989-1993 to 1999-2001.
- The age-adjusted stroke mortality rate declined 32.1 percent between 1979-1983 and 1989-1993, however declined just 10.1 percent between 1989-1993 and 1999-2001.
- Between 1999 and 2001, 1 in every 13 stroke deaths occurred among a Nebraska resident under 65 years of age.
- In 2001, 3 in every 5 stroke deaths in Nebraska occurred among females, however, males were 20 percent more likely than females to die from stroke (based on their age-adjusted mortality rate).
- Between 1999 and 2001, African Americans were 1.5 times more likely than Whites to die from stroke (based on their age-adjusted mortality rate).
- In 2001, Nebraska residents enrolled in Medicaid at their time of death were 4.4 times more likely than Nebraska residents not enrolled in Medicaid at their time of death to die from stroke (based on their age-adjusted mortality rate).

Overall Stroke Mortality

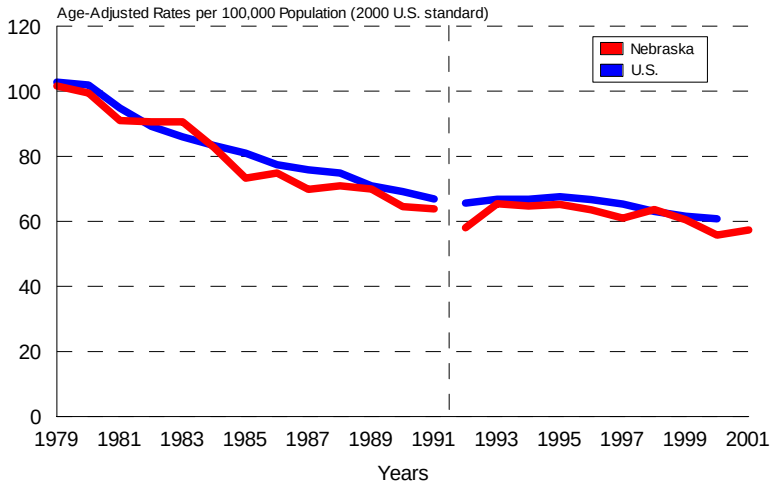
Independently from other forms of CVD, stroke ranks as the third leading killer of Nebraska residents. In 2001, stroke claimed the lives of 1,126 Nebraska residents, of which 107 were under the age of 65. Stroke accounted for approximately 1 in every 13.5 deaths in Nebraska in 2001.

Stroke mortality in both Nebraska and the U.S. declined dramatically from the late 1970s to the early 1990s, before trends began to level off and declines became more moderate (Figure 23). In Nebraska, the age-adjusted stroke mortality rate declined 32.1 percent between 1979-1983 and 1989-1993, however this rate declined just 10.1 percent between 1989-1993 and 1999-2001.

While stroke trends are declining, some research is indicating that the declines are likely resulting from declines in case fatality rather than changes in event rates[7]. These findings strongly support the need for public health efforts to prevent stroke .

Nebraska residents are less likely than U.S. residents to die from stroke. In particular, the relative risk (or rate ratio) for stroke mortality (based on the age-adjusted mortality rate) for Nebraska residents compared to U.S. residents is 0.92[1,10]. In 2000, Nebraska's stroke mortality rate ranked 12th lowest among the 50 U.S. states and District of Columbia (interquartile rate range 55.9-67.4)[10].

Figure 23: Stroke Mortality Trends*, 1979-2001



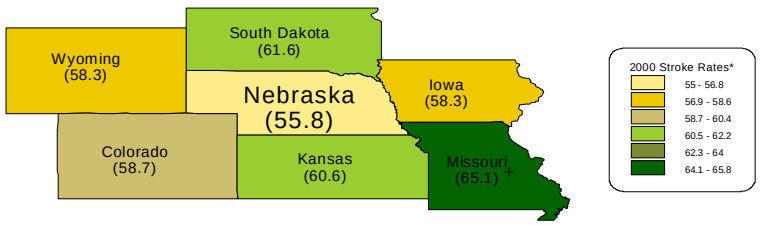
*Includes ICD-10 codes I60-I69 and ICD-9 codes 430-434, 436-438, comparability ratio (1.0588 applied to years 1979-1998)
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://wonder.cdc.gov>

Since the early 1990s, the average number of stroke deaths per year in Nebraska has remained virtually unchanged. The average number of stroke deaths per year declined 22.3 percent between 1979-1983 and 1989-1993, while the average number of stroke deaths per year declined just 1.8 percent between 1989-1993 and 1999-2001.

While the stroke mortality rate (age-adjusted) in Nebraska appears lower than all bordering states, it is only significantly lower than the rate in Missouri. In 2000, Nebraska residents were significantly less likely than residents of Missouri (relative risk of 0.86) to die from stroke (based on their age-adjusted mortality rates)[1,10].

While stroke mortality rates in Nebraska are lower than some bordering states, the stabilization of the stroke mortality trend (after dramatic declines during the 1980s) and recent increases in stroke risk factors warrant continued prevention and control efforts for stroke in Nebraska. It is important that Nebraska continues to create and implement new and aggressive plans to address stroke in future years.

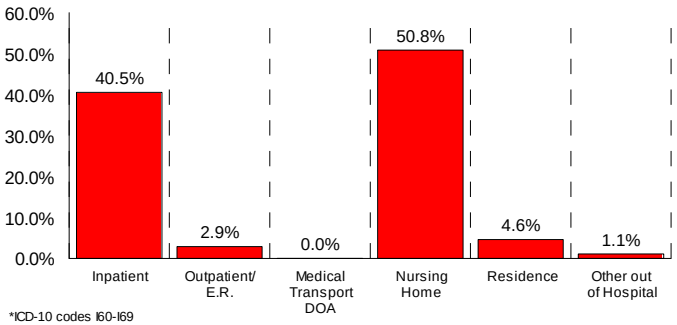
Map 3: Stroke Death Rates* for Nebraska and Bordering States, 2000



*Age-adjusted rate per 100,000 population (2000 U.S. standard) using ICD-10 Codes I00-I69
+Rate is significantly different from the Nebrasak rate at the .01 level
Sources: Nebraska Vital Records; CDC Wonder, Mortality Data, <http://www.wonder.cdc.gov/>

Unfortunately, many stroke deaths in Nebraska occur without medical care (Figure 24). Between 1999 and 2001, 3 in every 5 stroke deaths (59.4%) occurred outside of inpatient care, likely resulting from sudden or near sudden death. Thrombolytic drugs are very effective for saving the lives of stroke victims. However, given the limited window for thrombolytic administration, it is critically important that victims recognize stroke signs and have quality emergency medical services available immediately.

Figure 24: Location of Stroke Death in Nebraska*, 1999-2001



*ICD-10 codes I60-I69
Note: 3 deaths occurred in an unknow n location.
Source: Nebraska Vital Records

Preventable Risk Factors for Stroke

There are a variety of preventable risk factors for stroke morbidity and mortality. While many of these risk factors are highly correlated with one another, each is uniquely important to stroke prevention and should be a primary focus for decreasing stroke in Nebraska. *See chapter 4 for more information on preventable risk factors*

High Blood Pressure - High blood pressure is the most important risk factor for stroke[31]. It usually has no specific symptoms and no early warning signs[31]. About two-thirds of people who have a first stroke have blood pressures higher than 160/95 mm Hg[11].

High Blood Cholesterol[31] - A high level of total cholesterol in the blood (240 mg/dl or higher) is a major risk factor for heart disease, which increases risk for stroke. Recent studies show that high levels of LDL ("bad") cholesterol (>100 mg/dL) and triglycerides (blood fats, ≥ 150 mg/dL) increase the risk of stroke in people with previous coronary heart disease, ischemic stroke or transient ischemic attack (TIA). Low levels ((<40 mg/dL) of HDL ("good") cholesterol also may raise stroke risk.

Lack of Physical Activity[32] - Moderate to high levels of physical activity can reduce the risk of having a stroke (including total, ischemic, or hemorrhagic). Compared with low-active individuals, it is estimated that highly active individuals have a 25 to 64 percent lower risk of stroke incidence or mortality.

Unhealthy Eating - Consuming five servings per day of fruits and vegetables is related to a 30 percent lower risk of ischemic stroke in men and women[33]. Recent research studying stroke risk in Japanese men and women concluded that daily consumption of green-yellow vegetables and fruits is associated with a lower risk of total stroke, intracerebral hemorrhage, and cerebral infarction mortality (with similar benefits among both men and women)[34].

Smoking - The relative risk of stroke in heavy smokers (more than 40 cigarettes a day) is twice that of light smokers (less than 10 cigarettes per day)[35]. Former smokers develop stroke at the same rate as nonsmokers soon after stopping[35]. Stroke risk decreases significantly after two years and is at the level of nonsmokers by five years after cessation of cigarette smoking[35]. Cigarette smoking among women, when combined with some forms of birth control, can greatly increase stroke risk[31].

Obesity - Although limited, some research is indicating that obesity independently increases stroke risk. Obese men (BMI ≥ 30) are twice as likely as men at a healthy weight (BMI ≤23) to have a stroke[36]. Furthermore, abdominal obesity (compared to BMI) has been identified as an independent, potent risk factor for ischemic strokes in all race and ethnic groups[37].

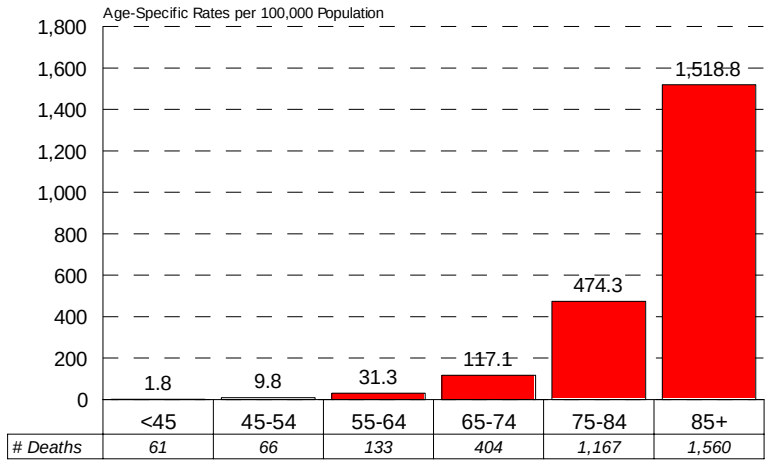
Diabetes - Although diabetes is treatable, simply having diabetes increases a person's risk of stroke[31]. Stroke risk is 2.5 times higher in people with diabetes[38]. Non-fatal strokes among diabetic patients compared to non-diabetic patients are more likely to result in disability from loss of motor function[39].

Excessive Alcohol Consumption - Some studies have shown that while drinking alcohol in moderation may reduce stroke risk, excessive drinking can dramatically increase risk[40]. Drinking an average of more than two drinks per day can increase your risk for stroke by as much as three times (as well as contribute to a wide variety of other health and risk problems)[40].

Stroke Mortality by Age

Risk of death from stroke increases dramatically as age increases, making age the greatest single predictor of stroke mortality for Nebraska residents (Figure 25). Between 1999 and 2001, approximately 4 in every 5 stroke deaths occurred among residents aged 75 and older.

Figure 25: Nebraska Stroke Mortality Rates* by Age, 1999-2001



*Includes ICD-10 Codes I60-I69
Source: Nebraska Vital Records

Although most stroke deaths occur among older adults in Nebraska, stroke claims a large number of lives prematurely (before age 65). Between 1999 and 2001, stroke prematurely killed 260 Nebraska residents (or an average of 87 Nebraska residents per year). This indicates that stroke is responsible for approximately 1 in every 35 premature Nebraska deaths.

The trend in stroke mortality among residents under 45 has not changed in more than 20 years (Table 11). In contrast, stroke mortality rates among middle and older Nebraska adults declined dramatically since the late 1970s. In particular, the rate among middle aged adults (aged 45-64 years) declined 50.3 percent between 1979-1983 and 1999-2001 while the number of actual stroke deaths declined 37.1 percent.

Table 11: Trends in Stroke Mortality* by Age in Nebraska

	<45		45-64		65+	
years	Average # deaths/year	rate**	Average # deaths/year	rate**	Average # deaths/year	rate**
1979-1983	17	1.6	105	36.1	1,357	654.0
1984-1988	20	1.8	84	29.1	1,138	526.2
1989-1993	21	2.0	71	24.5	1,055	470.2
1994-1998	23	2.1	79	24.1	1,099	480.0
1999-2001	20	1.9	66	17.9	1,044	451.8
% change: 79-83 to 99-01	18.5%	15.6%	-37.1%	-50.3%^	-23.1%	-30.9%^

*Codes: ICD-9 codes 430-434, 436-438; ICD-10 codes I60-I69; comparability ratio (1.0588) applied to years 1979-1998

**Age-specific rate per 100,000 population

^1999-2001 rate is significantly lower than the 1979-1983 race at the .001 level

Source: Nebraska Vital Records

Stroke Mortality by Gender

Independently from other forms of CVD, stroke is the third leading killer of both males and females in Nebraska. In 2001, stroke accounted for 1 of every 11.9 deaths among females (or 8.4% of all female deaths) and 1 of every 15.7 deaths among males (or 6.4% of all male deaths).

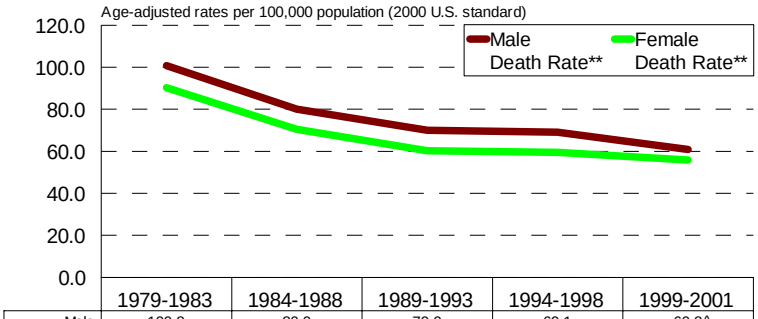
Although stroke death rates are high in Nebraska, males and females in Nebraska compare well to other U.S. states. In 2000, Nebraska males and females each ranked 15th lowest (interquartile rate ranges 55.2-70.8 and 54.3-65.5 respectively) in their rate of stroke mortality (age-adjusted) compared to all other U.S. states and the District of Columbia[10].

Males are more likely than females to die from stroke in Nebraska (Figure 26). Between 1999 and 2001, males were 9 percent more likely than females to die from stroke. Although males remain more likely than females to die from stroke (based on their age-adjusted rate) the gender disparity has declined slightly from that observed during most of the 1980s and 1990s.

In contrast to the mortality rate, more Nebraska females than males died from stroke between 1999 and 2001, 2,107 to 1,284 respectively. While the number of stroke deaths continues to decline among both males and females, current declines are more moderate than those observed 10 to 20 years ago. From 1979-1983 to 1989-1993, declines in the actual number of stroke deaths among males and females were 20.5 and 25.0 percent respectively, compared to declines of 1.3 and 2.7 percent respectively from 1989-1993 to 1999-2001.

Males, compared to females, are at greater risk for stroke mortality between the ages of 65-74 and 75-84 (Figure 27). Gender differences in stroke mortality within all other age categories are non-significant.

Figure 26: Nebraska Stroke Mortality Trends*, 1979-2001



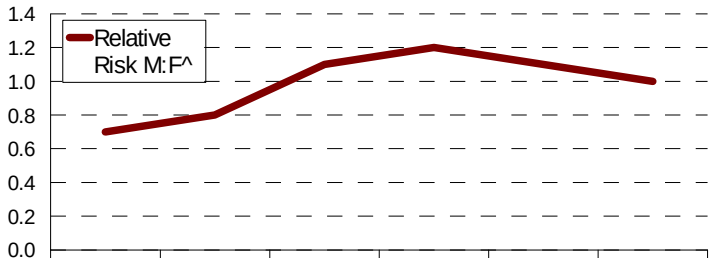
	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Male Death Rate**	100.8	80.0	70.0	69.1	60.8^
Female Death Rate**	90.3	70.4	60.2	59.5	55.9^
*Relative Risk M:F****	*1.1*+	*1.1*++	*1.2*++	*1.2*++	*1.1*

Years

*ICD-9 Codes 430-434, 436-438; ICD-10 Codes I60-I69; comparability ratio (1.0588) was applied to data from 1979-1998
**Age-Adjusted Death Rates per 100,000 Population
***Relative risk representes the male to female rate ratio
Source: Nebraska Vital Records

+,++The male rate is significantly higher than the female rate at the .01 or .001 level respectively
^The 1999-2001 rate is signifantly lower than the 1979-1983 rate at the .001 level

Figure 27: Relative Risk for Stroke* Mortality in Nebraska by Gender and Age between 1999 and 2001



	<45	45-54	55-64	65-74	75-84	85+
Male Death Rate**	1.5	8.9	32.4	131.1	511.9	1,546.7
Female Death Rate**	2.1	10.6	30.3	105.4	449.1	1,507.9
*Relative Risk M:F^*	*0.7*	*0.8*	*1.1*	*1.2*+	*1.1*+	*1.0*

Age-Categories

*ICD-10 Codes I60-I69
^Relative risk representes the male to female rate ratio
Source: Nebraska Vital Records

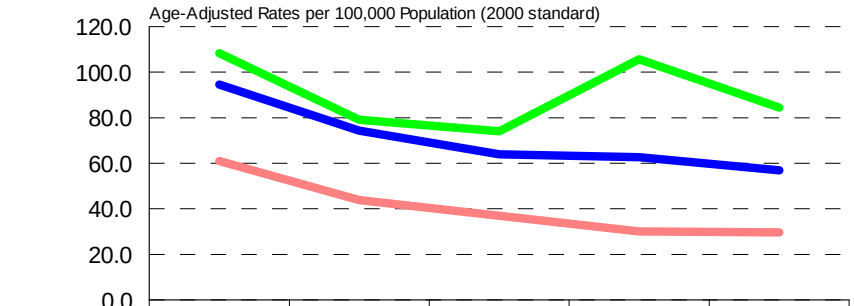
**Age-Specific Death Rates per 100,000 Population
+The male rate is significantly higher than the female rate at the .05 level

Stroke Mortality by Race

Large disparities in stroke mortality exist between different racial and ethnic groups in Nebraska, making race an important non-preventable risk factor for stroke. Among racial and ethnic groups in Nebraska with sufficient data to calculate stroke mortality rates, African Americans are the most likely to die from stroke (Figure 28). Between 1999 and 2001, African Americans were 1.5 times more likely than Whites to die from stroke while Hispanics were less likely than Whites (relative risk of 0.52) to die from stroke (based on their age-adjusted mortality rates).

Compared to other U.S. states, stroke mortality rates (age-adjusted) for Whites and Hispanics in Nebraska rank well while African Americans and Native Americans rank poorly. Between 1991 and 1998, among residents aged 35 years and older, Whites in Nebraska, ranked 19th lowest among all U.S. states and the District of Columbia while Hispanics in Nebraska tied for 9th lowest out of 39 states (with enough deaths for valid comparison)[41]. In contrast, between 1991 and 1998, among residents 35 and older, African Americans in Nebraska, ranked 29th highest out of 42 states while Native Americans in Nebraska ranked 29th highest out of 30 states[41].

Figure 28: Nebraska Stroke Mortaltiy Trends* by Race



	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Afr. American	108.4	79.1	74.0	105.7	84.5 +
White	94.6	74.3	64.0	62.7	56.9 ^
Nat. American*	-	-	-	79.6	-
Hispanic**	61.0	43.8	-	30.1	29.7 ++

Year Categories

*Includes ICD-9 codes I60-I69; ICD-10 codes 430-434, 436-438; comparability ratio (1.0588) was applied to data from years 1979-1998
Note: Insufficient data to calculate rates for Asians
-Insufficient data to calculate rate
Source: Nebraska Vital Records

**Hispanics can be of any race
+,++Between 1999-2001, the race/ethnicity rate is significantly different from the white rate at the .01 or .001 level respectively
^The 1999-2001 rate is signifantly lower than the 1979-1983 rate at the .001 level

The greatest racial disparities in stroke mortality occur during the pre-retirement, or most productive, years of life. Between 1999 and 2001, African Americans in Nebraska, aged 45-64 years, were 4.6 times more likely than Whites in Nebraska, aged 45-64 years, to die from stroke (based on their age-specific mortality rates).

The average age at the time of stroke death and years of productive life lost (YPLL) per stroke death vary dramatically between African Americans and Whites in Nebraska. Between 1999 and 2001, African Americans died from stroke, on average, at 68.7 years of age compared to Whites at 82.0 years of age. Furthermore, African Americans lost, on average, 10.0 years of productive life per stroke death compared to 2.2 years among Whites.

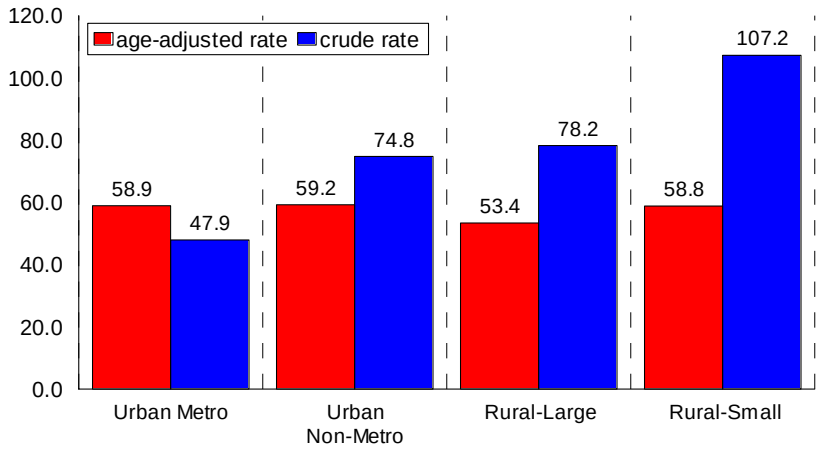
The disparity between African Americans and Whites in Nebraska presents the need for public health interventions specific to the needs within the African American population. Additional studies are needed in Nebraska to identify the causes of disparity in stroke mortality and to help identify successful intervention opportunities.

Stroke Mortality by Geographic Distribution

Between 1999 and 2001, risk for stroke mortality (based on age-adjusted rates) did not differ (statistically) between residents of urban and rural counties in Nebraska (Figure 29). *For further detail on urban/rural categories, see Methodology Section.*

In contrast to the differences observed through age-adjusted mortality rates, crude rates indicate that a larger proportion of Nebraska residents in rural counties, compared to urban counties, die from stroke (primarily due to larger older adult populations within rural counties) (Figure 29). While crude rates are not particularly useful for comparing risk among different populations (since they do not adjust for age differences between populations), they are useful for identifying the rate of actual death that occurs within a population. Knowing this information allows the health care system to be better prepared to deal with life threatening stroke.

Figure 29: Nebraska Stroke Mortality Rates* by Urban/Rural, 1999-2001



*ICD-10 codes I60-I69
**See Methodology Section for further detail on urban/rural county classifications.
Source:Nebraska Vital Records

The average YPLL per stroke death is highest among residents of urban metropolitan counties in Nebraska and declines gradually as county of residence becomes more rural (Table 12). In addition, residents of urban metropolitan counties are, on average, younger at their time of stroke death than residents of other Nebraska counties (Table 12).

Table 12: Stroke* YPLL and Average Age at Deaths in Nebraska by Urban/Rural County Classification, 1999-2001

Urban/Rural Category**	Number of Stroke deaths	Total YPLL for Stroke	Average YPLL per Stroke death	Average age at the time of Stroke death
Nebraska Total	3,391	8,382	2.5	81.6
Urban Metropolitan	1,203	4,204	3.5	79.4
Urban Non-Metropolitan	829	1,726	2.1	82.1
Rural-Large	721	1,340	1.9	82.7
Rural-Small	638	1,113	1.7	83.9

*ICD-10 Codes I60-I69

**See Methodology Section for further detail on urban/rural county classifications

Note: YPLL refers to years of productive life lost, and measures death among persons under 75 years of age *(see methodology for further detail).*

Source: Nebraska Vital Records

Stroke Mortality by Medicaid Enrollment

Medicaid enrollees in Nebraska are much more likely than non-Medicaid enrollees in Nebraska to die from stroke (Table 13). In 2001, 323 Nebraska residents died from stroke while enrolled in Medicaid. This indicates that Medicaid enrollees accounted for greater than 1 in every 4 stroke deaths (28.7%) in 2001 while accounting for just 11 percent of Nebraska's population.

In 2001, Medicaid enrollees in Nebraska were 4.4 times more likely than non-Medicaid enrollees in Nebraska to die from stroke. Aside from differences in age, Medicaid enrollment status has a stronger association with stroke mortality than any other subpopulation presented within this report.

Nebraska's Medicaid population is made up of predominately women and children. As a result, approximately 2 in every 3 Medicaid deaths due to stroke (67.5%) occurred among females in 2001. However, male Medicaid enrollees in Nebraska were 1.5 times more likely than female Medicaid enrollees in Nebraska to die from stroke in 2001 (based on their age-adjusted mortality rates).

It is particularly concerning that some of the most striking disparities in stroke mortality (between Medicaid and non-Medicaid enrollees in Nebraska) occur among adults during their most productive years of life. Medicaid enrollees in Nebraska aged 45-64 years were 9.4 times more likely than non-Medicaid enrollees in Nebraska to die from stroke in 2001.

Table 13: Stroke Mortality*: Medicaid vs Non-Medicaid

	Medicaid Enrollees**			Non-Medicaid Enrollees			Relative Risk^^
	# Deaths	Death Rate^	Population	# Deaths	Death Rate^	Population	Med:Non-Med
Overall	323	202.2	194,055	803	45.8	1,530,373	4.41+
Gender							
Female	218	181.8	112,087	452	41.6	761,677	4.37+
Male	105	275.1	81,968	351	52.7	768,696	5.22+
Race							
Asian	1	-	2,235	4	-	23,735	-
Native American	2	-	6,900	1	-	9,145	-
African American	20	233.2	26,535	18	-	44,361	-
Hispanic	16	-	21,742	21	-	77,249	-
White	300	210.1	133,358	780	45.0	1,445,929	4.67+
Age							
<25	0	-	134,607	1	-	493,932	-
25-44	9	-	28,207	17	3.7	458,948	-
45-64	20	155.7	12,845	60	16.5	362,770	9.41+
65+	294	1,598.2	18,396	725	337.6	214,724	4.73+

*ICD-10 Codes I60-I69

**Medicaid deaths consist of Nebraska residents enrolled in Medicaid at their time of death. Medicaid population data represents enrollment eligibility years for 2001 (or the # of enrollees if everyone enrolled was enrolled for an entire year).

^Age-adjusted rate per 100,000 pop (2000 U.S. standard population) (Note: rates for age categories are age-specific)

^^Relative Risk represents the Medicaid to non-Medicaid rate ratio

+Medicaid rate is significantly higher than the non-Medicaid rate at the .001 level

- Insufficient data to calculate statistic

Source: Nebraska Vital Records

High Blood Pressure

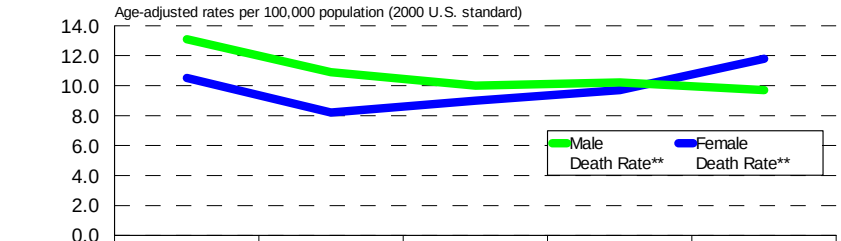
Definition[2]: Systolic pressure of 140 mm Hg or higher or diastolic pressure of 90 mm Hg or higher, or taking antihypertensive medicine

Codes used to define high blood pressure: ICD-10 codes I10-I15 and ICD-9 codes 401-404

Unlike the declines observed in many other forms of CVD, mortality from high blood pressure (HBP) is increasing. Nationally, between 1990 and 2000, the age-adjusted death rate from HBP increased 21.3 percent while the actual number of deaths increased 49.1 percent[2].

Nebraska's HBP mortality rate is increasing. Between 1984-1988 and 1999-2001 the Nebraska age-adjusted mortality rate from HBP increased 22 percent, from 9.3 to 11.3 deaths per 100,000 population respectively (Figure 30). Furthermore, the average actual number of deaths per year from HBP increased 44 percent from 1984-1988 to 1999-2001, 155 to 223 average deaths per year respectively.

Figure 30: Nebraska High Blood Pressure Mortality Trends*, 1979-2001



	1979-1983	1984-1988	1989-1993	1994-1998	1999-2001
Overall Death Rate**	11.6	9.3	9.6	10.2	11.3
Male Death Rate**	13.1	10.9	10.0	10.2	9.7
Female Death Rate**	10.5	8.2	9.0	9.7	11.8
*Relative Risk M:F^*	*1.3*[+]	*1.3*[++]	*1.1*	*1.1*	*0.8*

*ICD-9 Codes 401-404; ICD-10 Codes I10-I15; no comparability ratio was applied to data from 1979-1998
^Relative risk represents the male to female rate ratio
Source: Nebraska Vital Records

**Age-Adjusted Death Rates per 100,000 Population
[+,++]The male rate is significantly higher than the female at the .05 or .01 level respectively

Although Nebraska's age-adjusted mortality rate from HBP is increasing, Nebraska does compare well to the nation in HBP mortality. Between 1999 and 2000, U.S. residents were 1.5 more likely than Nebraska residents to die from HBP (based on their age-adjusted mortality rates)[1,10]. Furthermore, among all 50 U.S. states and the District of Columbia, Nebraska's age-adjusted mortality rate from HBP ranked 11th lowest (interquartile rate range 11.0 to 17.0) between 1999 and 2000[10].

Since the mid 1980s, HBP mortality rates in Nebraska increased among females but decreased among males. Between 1984-1988 and 1999-2001, the age-adjusted mortality rate from HBP increased 44 percent among females while remained statistically unchanged among males.

Dramatic differences in HBP mortality exist between African Americans and Whites in Nebraska. Between 1999 and 2001, African Americans were 3.6 times more likely than Whites to die from HBP (based on their age-adjusted mortality rates). These dramatic differences may be due in large part to the higher prevalence of HBP among Nebraska's African American residents (see Chapter 4 for further detail). Nationally, African Americans, compared to Whites, develop HBP earlier in life and their average blood pressures are much higher[42].

Chapter 3: Medical Care and Expenses

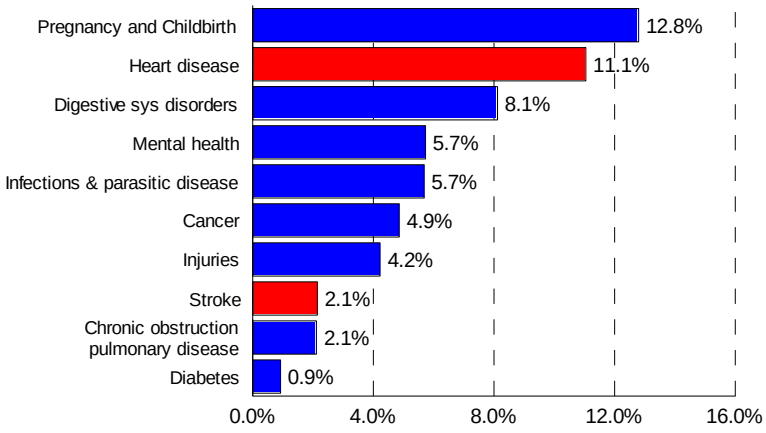
Introduction

Cardiovascular disease (CVD) mortality is declining in both Nebraska and the U.S[1,2]. Unfortunately, this is not paralleled by a similar decline in CVD morbidity[2]. The declines in CVD mortality are likely the result of a decrease in case fatality (less death among those with the disease), rather than improvements in CVD incidence and prevalence[3,4]. This indicates that the impact of CVD on the health care industry itself is likely remaining stable or in some cases may be worsening. While enormous (life saving) strides have been made in the treatment of CVD, the economic impact appears to be worsening[2]. Efforts to improve the economic impact of CVD must continue to find both cost-effective treatment and preventive support.

Cardiovascular disease continues to be the leading cause of (inpatient) hospitalization in both Nebraska and the nation[5,6]. However, when looking at the two major contributors to CVD, heart disease and stroke rank second and eighth respectively (Figure 1).

Nebraska medical care data for total CVD as well as specific cardiovascular diseases are presented within this chapter. These data include the number and rate of hospitalizations and medical visits, length of hospital stay, surgical procedures, hospital charges and payer, hospitalization outcomes (including death and follow-up care), medical prescriptions, and emergency medical services (EMS) response times.

Figure 1: Leading Causes of Hospitalization in Nebraska, 2001



Note: See methodology section of this report for cause specific ICD-9-CM codes
N=176,825 total hospitalizations in 2001
Note: 57.7% of all hospitalizations are for resons other than those listed above
Source: Nebraska Hospital Discharge Data

Medical care data throughout this chapter are presented in three sections; CVD and its two major subsections, heart disease and stroke. These data include Nebraska hospital discharge data (NHDD), Nebraska Medicaid claims data (NMCD), and Nebraska EMS response time data for cardiac events.

The NHDD includes inpatient (IP) and emergency department (ER) records for Nebraska residents treated in Nebraska acute care hospitals. The NHDD are not complete, meaning that records from some acute care hospitals in Nebraska are not available. Between 1996 and 2001, these data ranged from 82-87 percent complete for Nebraska residents treated in Nebraska hospitals. In addition, these data do not include hospitalizations where Nebraska residents receive care outside the State of Nebraska. As a result, these data represent only the minimum number of known hospitalizations. Unfortunately, the incompleteness of these data represents one of the gaps in Nebraska's health related data. Although these data have limitations, they do provide our best approximation of hospitalization in Nebraska.

The NMCD includes records on hospitalizations, outpatient, ER and physician office visits, and prescription medications for all Nebraska Medicaid enrollees. These data are complete and allow for some descriptive analysis (such as race and ethnicity) not available within the NHDD.

The Nebraska EMS response time data contain information on the time from dispatch to the arrival at the health care facility. The data presented within this chapter represent only response times for suspected cardiac events (including chest pain, myocardial infarction, and cardiac arrests). While these data do not represent stroke, it is our belief that response times for stroke may be slightly higher since stroke is a lower priority response than chest pain within many Nebraska communities.

Nationally, the number of (inpatient) hospitalizations for all conditions has been declining since the early 1980s[6]. These declines however, are attributed primarily to increases in ambulatory or outpatient (OP) surgery; made possible over the past 20 years by new surgical techniques and less invasive procedures[6]. Other treatment advances, including new drug therapies, have also contributed to fewer and shorter hospital stays[6]. Furthermore, cost-management controls and alternative forms of health care organization and payment have also contributed to shorter hospital stays[6]. This indicates that declines in inpatient care, while a step in the right direction, are not necessarily a refelection of less serious disease in Americans.

Many sub-populations within Nebraska have disproportionately high rates of CVD. Throughout this chapter, data are presented to highlight high-risk populations. Highlighting these populations is particularly important because they may be in greatest need of intervention that can improve their cardiovascular health, prevent further hospitalization, and lessen the economic impact. Some of the sub-populations receiving higher rates of medical care due to CVD include middle age and older adults, males, and Medicaid enrollees. Throughout this chapter, detailed information on these sub-populations and others is presented.

Similar to the nation, Nebraska has established a set of health goals and objectives for the year 2010[7]. The one objective established for medical care due to CVD is specific to hospitalization from congestive heart failure. Based on 2001 Nebraska hospital discharge data, substantial progress is needed if the objective is to be achieved by 2010. From the time of this report, there are only five years to successfully achieve this objective. Current hospitalization rates for congestive heart failure and the 2010 objectives for specific age categories are listed in Table 1.

Table 1: Progress Toward NE HP2010 Objectives for Congestive Heart Failure Hospitalization*

Age	NE Rate** 2001	NE 2010 Objective	% Reduction Necessary to achieve HP2010 Goals
Age 65-74 years	8.0	3.5	-56.3%
Age 75-84 years	16.6	8.4	-49.4%
Age 85 years and older	31.7	15.9	-49.8%

*Inpatient hospitalizaiton with congestive heart failure (ICD-9-CM code 428.0) listed as the primary discharge diagnosis

**Age-specific rate per 1,000 population

Sources: 1. Nebraska 2010 Health Goals and Objectives. May 2002.

2. Nebraska Hospital Discharge Data

Total Cardiovascular Disease (CVD) Hospitalization and Medical Care

Definition: CVD includes all diseases of the heart and blood vessel, which include coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. CVD is also commonly referred to as "diseases of the circulatory system."

Codes used to define CVD Hospitalization: ICD-9-CM codes 390-459

Total CVD Hospitalization Highlights

National Highlights

- CVD is the leading cause of hospitalization[8].
- 6.2 million hospitalizations due to CVD occurred in 2001, an increase of 27 percent since 1979[8].
- 71.1 million physician office visits due to CVD and 5.6 million outpatient department visits due to CVD occurred in 2001[9].
- In 2001, there were 4.2 million visits to the ER with a primary diagnosis of CVD[9].
- Direct health care costs resulting from CVD are estimated to be $226.7 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5]

- Ant least 7,260 ER visits and 27,710 hospitalizations due to CVD occurred among Nebraska residents in Nebraska acute care hospitals.
- CVD caused or contributed to an estimated 2 in every 5 (or 43% of all) hospitalizations, making it the leading cause of hospitalization in Nebraska.
- The 27,710 hospitalizations due to CVD in 2001 occurred among 21,790 Nebraska residents.
- Nebraska acute care hospitals charged payers an estimated $517 million for hospitalizations and $9 million for ER visits for health care services with CVD listed as the primary reason for care.
- Among all payers of hospitalization due to CVD, Medicare received the highest proportion of charges (61%) followed by commercial insurance (35%) and Medicaid (3%).
- An estimated 36,090 cardiovascular operations and procedures were performed on an estimated 16,260 Nebraska residents.
- About 1 in every 24 hospitalizations due to CVD (4.1%) resulted in death prior to discharge while an additional 2 in every 10 (20.2%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10]

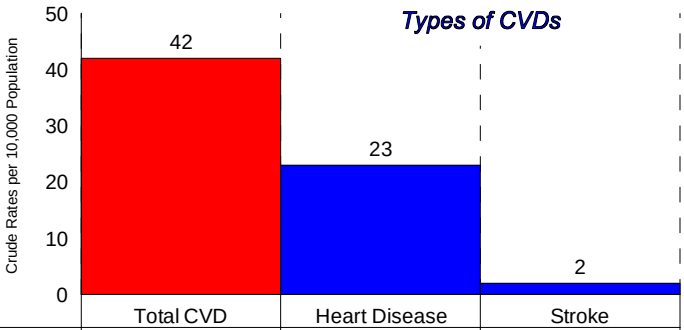
- 3,305 hospitalizations and 137,113 medical visits (including OP, ER, and physician office visits) due to CVD occurred among 23,863 of Nebraska's approximately 200,000 Medicaid enrollees.
- Among Nebraska Medicaid enrollees, about 1 in every 19 hospitalizations due to CVD (5.3%) resulted in death prior to discharge, while 1 in every 4 (20%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $96.8 million for medical care due to CVD and $17.8 million for CVD related drug prescriptions for a total of $114.6 million in 2001.
- In 2001, over 10 percent of Medicaid's costs for medical care and prescriptions were due to CVD
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $5.9 million (in 2001 dollars) for medical care and prescriptions for CVD.

Medical Care due to CVD among all Nebraska Residents[5]

Number and rates for ER visits due to CVD

Cardiovascular disease is a major contributor of emergency department (ER) visits among Nebraska residents. In 2001, an estimated 7,260 ER visits due to CVD occurred among Nebraska residents in Nebraska acute care hospitals. The crude (or actual) rate for CVD in 2001 was estimated at 42 ER visits per 10,000 population. Trend analysis in ER visits due to CVD (based on age-adjusted rates) is not possible due to dramatic changes, over time, in the completeness of the ER data.

Figure 2: Estimated Rates for Nebraska ER Visits Due to CVD*, 2001



	Total CVD	Heart Disease	Stroke
ER Visit Rate**	42	23	2
Number of ER Visits*	7,260	3,906	328

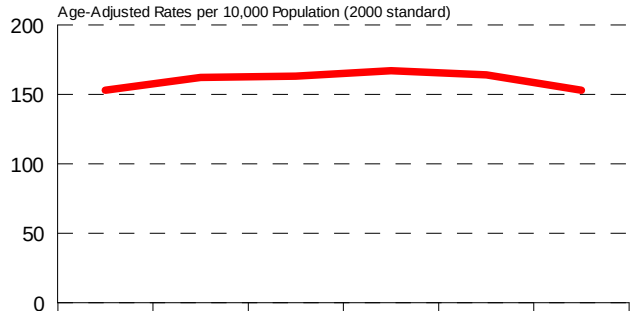
*Includes primary diagnosis codes only; specific ICD-9-CM codes are available in the Methodology Section of this report
**Crude rate per 10,000 population; the crude rate is the actual rate in the population, not adjusted to a standard age distribution
Note: these data are under-estimates because they are approximately 76% complete for 2001
Source: Nebraska Hospital Discharge Data

Number and rates for hospitalization due to CVD

Cardiovascular disease is the leading cause of hospitalization among Nebraska residents treated in Nebraska acute care hospitals. In 2001, CVD contributed directly to an estimated 27,710 hospitalizations among an estimated 21,790 Nebraska residents.

In addition to being a direct cause of hospitalization, CVD contributes indirectly to a large number of hospitalizations resulting from other conditions. In 2001, CVD was listed as a contributing factor in 48,120 hospitalizations. This indicates that CVD caused or contributed to an estimated 2 in every 5 hospitalizations (43%) in 2001.

Figure 3: Trends in Estimated Nebraska Hospitalization Due to CVD*, 1996-2001



	1996	1997	1998	1999	2000	2001
Hospitalization Rate**	153	162	163	167	164	153
Number of Hospitalizations*	26,630	28,180	28,690	29,560	29,590	27,710

*Includes ICD-9-CM Codes 390-459 listed as the primary diagnosis
**Age-adjusted rate per 10,000 popualtion (2000 U.S. standard population).
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Estimated hospitalization rates due to CVD (age-adjusted) increased slightly between 1996 and 1999 before declining between 1999 and 2001 (Figure 2). In 2001, the crude (or actual) hospitalization rate was estimated at 161 hospitalizations per 10,000 Nebraska residents.

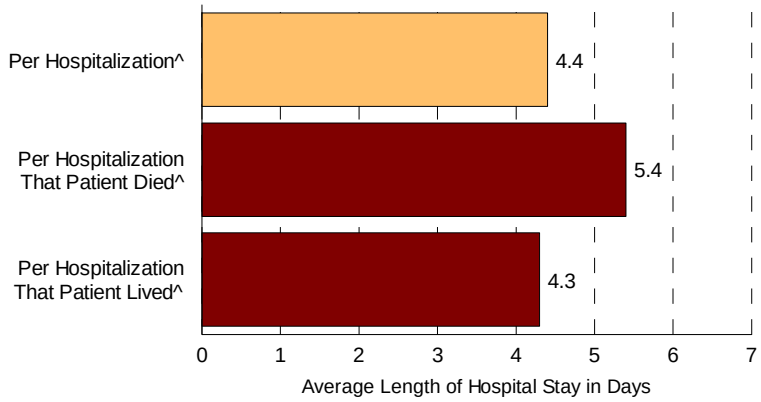
Length of hospitalization due to CVD

Cardiovascular disease contributes to a large number of days spent in Nebraska acute care hospitals. In 2001, Nebraska residents spent an estimated 121,660 days in the hospital from CVD, for an average stay of 4.4 days per hospitalization (Figure 4).

Among patients that are hospitalized for CVD, those that die during hospitalization average longer hospital stays than those that are discharged alive (Figure 4). In 2001, the average length of stay for CVD patients when they died during hospitalization was 5.4 days compared to 4.3 days when they were discharged alive.

The total number of days spent in the hospital due to CVD is declining. Between 1996 and 2001, the estimated length of stay per hospitalization declined from 4.8 to 4.4 days. While this decrease is encouraging, further studies are needed to explain its reasons.

Figure 4: Estimated Length of Stay for CVD Hospitalizations in Nebraska*, 2001

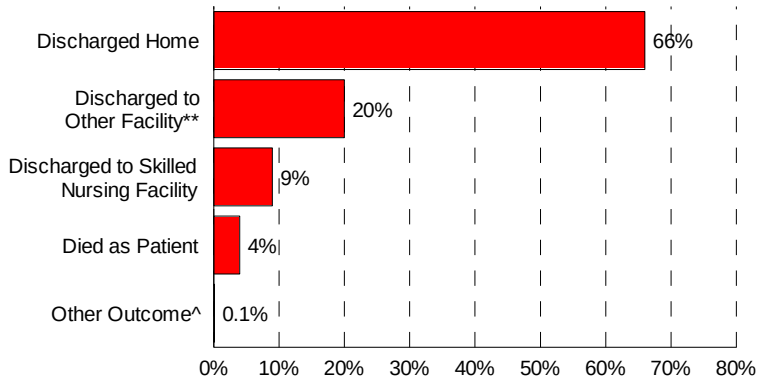


*Includes ICD-9-CM Codes 390-459,
^Hospitalization stay is based on the average stay per hospitalization (independent of the number of patients)
N=27,712 total hospitalizations due to CVD in 2001
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Hospitalization Outcome due to CVD

Many hospitalizations due to CVD result in a discharge outcome other than home or self-care (Figure 5). This indicates that additional costs (both direct and indirect) and reduced quality of life are likely to occur for many patients after they are discharged from acute care hospitals. In 2001, about 1 in every 24 hospitalizations due to CVD (4.1%) resulted in death prior to discharge. Furthermore, about 1 in every 11 hospitalizations due to CVD (9.2%) resulted in discharge to a skilled nursing home while 1 in every 5 (20.2%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Figure 5: Hospitalization Outcomes Due to CVD in Nebraska*, 2001



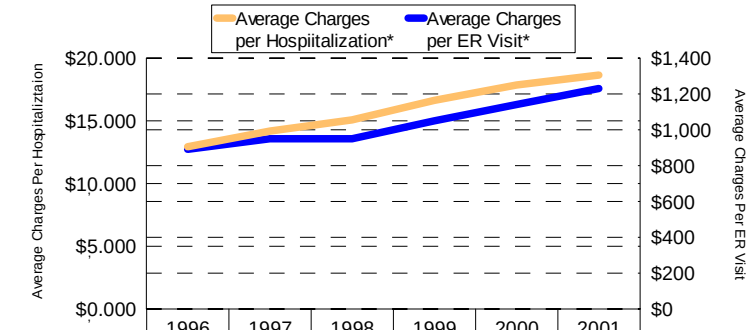
*Includes ICD-9-CM Codes 390-459
**Includes intermediate care, short-term care, or other type of facility for follow-up care
^Includes those that left against medical advice or had an unknown discharge
N=27,712 total hospitalizations due to CVD in 2001
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Hospitalization Charges due to CVD

While the Nebraska hospital discharge database captures hospital charges, it does not have information on the actual reimbursement that hospitals get paid for services rendered on their premises. Nonetheless, hospital charges were used as a proxy to reflect (at least one component of) the direct economic burden due to CVD within Nebraska.

Direct medical care expenses for CVD in Nebraska are extraordinary and appear to be increasing (Figure 6). In 2001, Nebraska acute care hospitals charged payers an estimated $517 million for hospitalizations due to CVD and an additional $9 million for ER visits, a dramatic increase from the $344 million and $4.9 million in charges in 1996 respectively. In 2001, the average estimated charge for a hospitalization due to CVD was $18,650, a 44 percent increase from the $12,920 per hospitalization in 1996.

Figure 6: Trends in Estimated Charges (in thousands) for Hospitalization and ER Visits Due to CVD* in Nebraska, 1996-2001



	1996	1997	1998	1999	2000	2001
Average Charges per Hospiitalization*	$12.920	$14.180	$15.060	$16.620	$17.840	$18.650
Average Charges per ER Visit*	$890	$950	$950	$1,050	$1,140	$1,230

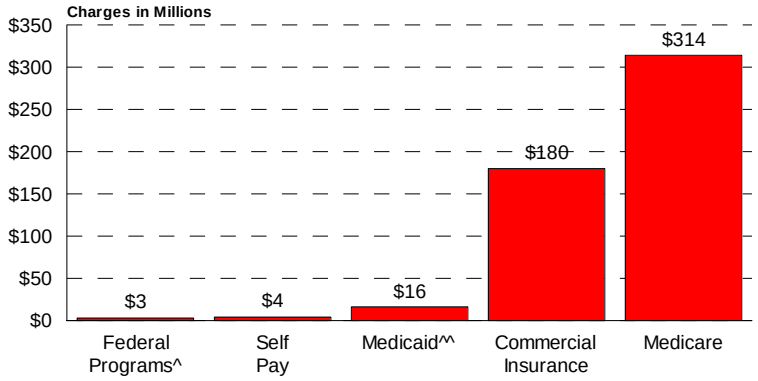
*Includes ICD-9-CM Codes 390-459
Note: hospitalization and ER visit costs are estimates because they are based on hospitalization data that ranges from 82-87% complete and ER visit data that rranges from 75-80% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Payer of Hospitalization Charges due to CVD

Medicare receives the largest proportion of all charges resulting from hospitalizations due to CVD (Figure 7). In 2001, Medicare was charged an estimated $314 million for hospitalizations due to CVD, accounting for approximately $3 of every $5 billed. Medicare was followed by commercial insurance, Medicaid, self-pay, and other federal programs respectively.

Trends in the average charge per hospitalization due to CVD are increasing among each of the payers, except federal programs independent of Medicare and Medicaid (Table 2). Medicaid and commercial insurance receive the highest charges per hospitalization.

Figure 7: Estimated Charges (in millions) for Hospitalization Due to CVD* by Payer, 2001



*Includes ICD-9-CM Codes 390-459, hospitalization charges are based on the average charge per hospitalization (independent of the number of patients) per payer
^Includes federal programs other than Medicare and Medicaid
^^Actual costs paid by Medicaid are available within this chapter, presented under the Medicaid hospitalization data
N=27,712 total hospitalizations due to CVD in 2001
Note: these costs are estimates because they ranges from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 2: Trends in Estimated Charges per Hospitalization due to CVD by Payer*, 1996-2001

	Year						
Payer	1996	1997	1998	1999	2000	2001	% Increase 1996-2001
Commercial Insurance	$14,800	$15,700	$16,600	$18,700	$20,300	$22,300	51%^
Self Pay	$11,700	$11,900	$13,500	$13,300	$15,900	$15,200	30%^
Medicaid	$12,800	$16,500	$15,600	$20,600	$23,900	$23,900	87%^
Medicare	$12,300	$13,600	$14,500	$15,700	$16,800	$16,900	37%^
Federal Programs	$20,100	$15,000	$15,800	$26,500	$24,700	$16,200	-

*ICD-9-CM Codes 390-459, hospitalization charges are based on the average charge per hospitalization (independent of the number of patients) per payer

^Increase significant at the 0.05 level

Note: these costs are estimates because they are based on data that range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Operations and Procedures for CVD

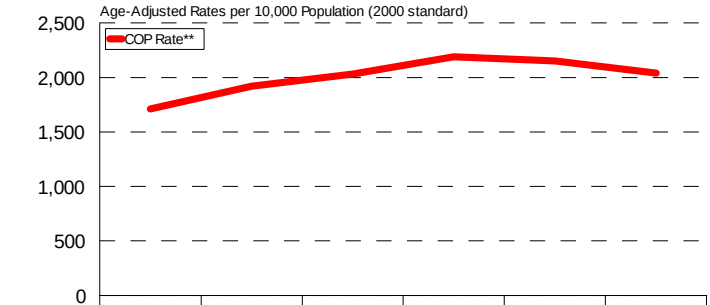
The role of medical intervention to treat CVD has increased significantly in recent years. In 2001, an estimated 6.2 million cardiovascular operations and procedures (COPs) were performed in the United States, a five fold increase since 1979[2].

It is estimated that in 2001, 36,090 COPs were performed on 16,260 Nebraska residents during 19,250 hospitalizations. This represents an average of 1.9 COPs per hospitalization and 2.2 COPs per patient.

Inpatient COPs in Nebraska appear to have increased since the mid-1990s (Figure 8). The estimated inpatient (age-adjusted) rate and number for COPs performed on Nebraska residents increased 28 percent and 31 percent respectively between 1996 and 1999 before leveling off and slightly declining.

There are a variety of different interventions available to treat CVD. In 2001, the most common inpatient COPs used to treat NE residents for CVD were diagnostic cardiac catheterization and angioplasty

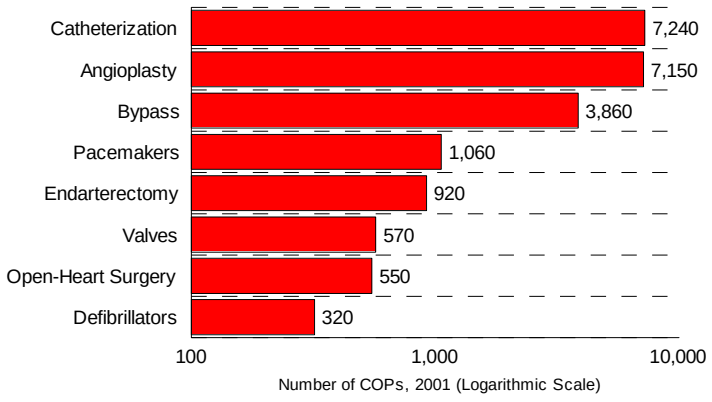
Figure 8: Estimated Trends in Inpatient Cardiovascular Operations and Procedures Performed on Nebraska residents*, 1996-2001



	1996	1997	1998	1999	2000	2001
COP Rate**	1,710	1,920	2,030	2,190	2,150	2,040
Number of COPs	28,500	32,380	34,470	37,410	37,700	36,090

*Includes ICD-9-CM Procedure Codes 35-39
**Age-adjusted rate per 10,000 population (2000 U.S. Standard population)
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001. Also, these data do not include procedures performed as outpatients or in ER or other nonhospitalized setting.
Source: Nebraska Hospital Discharge Data

Figure 9: Estimated Number of Inpatient Cardiovascular Operations and Procedures Performed on Nebraska Residents by Type*, 2001



*Includes ICD-9-CM Procedure Codes 35-39; codes for specific procedures can be found within the methodology sectior
N=36,090 total cardiovascular operations and procedures in 2001
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

respectively ; accounting for 2 in every 5 (40%) inpatient COPs performed (Figure 9).

Of the COPs performed between 1996 and 2001 on Nebraska residents in Nebraska acute care hospitals, the greatest increases occurred in the use of stenting (a type of angioplasty) and implantable defibrillators (Table 3). Between 1996 and 2001, the age-adjusted rate and number of stenting procedures increased 160 percent and 180 percent respectively while the age-adjusted rate and number of implantable defibrillator procedures increased 160 percent and 175 percent respectively.

Table 3: Estimated Numbers and Rates for Cardiovascular Operations and Procedures Performed on Nebraska Residents in Nebraska Acute Care Hospitals, 2001

CVD Related Procedure (ICD-9-CM Codes)	Estimated Number of Procedures (N)	Procedure Rate*	% Change in Procedure Rate from 1996-2001^	Estimated Number of Hospitalizations that had a Procedure (N)	Hospitalization Rate for the Procedure*	% Change in Hospitalization Rate for the Procedure from 1996-2001^	Avgerage number of Procedures per Hospitalization
All CVD Procedures (35-39)	36,090	203.8	19.3%	19,250	108.6	21.5%	1.87
Angioplasty (36.0)	7,150	40.6	82.8%	3,770	21.4	46.7%	1.90
PTCA (36.01, 36.02, 36.05)[a]	3,830	21.8	46.0%	3,750	21.3	48.3%	1.02
Stenting (36.06)	3,310	18.8	159.8%	3,272	18.6	163.6%	1.01
Cardiac Revascularization (Bypass) (36.1-36.3)	3,860	21.9	4.0%^^	2,252	12.4	1.7%^^	1.71
Diagnostic Cardiac Catheterizations (37.2)	7,240	41.2	6.9%	6,970	39.6	8.0%	1.04
Endarterectomy (38.12)	920	5.1	-13.1%	910	5.1	-11.8%^^	1.01
Implantable Defibrillators (37.94-37.99)	320	1.8	160.0%	300	1.7	147.8%	1.07
Open-Heart Surgery[b]	550	3.2	56.4%	470	2.7	54.9%	1.17
Pacemakers (37.8)[c]	1,060	5.6	30.3%	1,050	5.6	31.2%	1.01
Valves (35.1, 35.2, 35.99)[d]	570	3.2	19.6%	520	2.9	20.2%	1.10

*age-adjusted rate per 10,000 population (2000 U.S. standard population)

^rate in 1996 is significantly different from the rate in 2001 at the .05 level unless noted by ^^ indicating a non-significant difference

a. Does not include procedures in the outpatient or nonhospitalized setting, thus may excludes some cardiac catheterizations and PTCAs.

b. includes valves, bypass and 92,000 "other" open-heart procedures (codes 35 [less 35.1-35.2, 35.4, 35.96, 35.99]; 36 [less 36.0-36.1]; 37.1, 37.3-37.5)

c. There are aditional insertions, revisions, and replacements of pacemaker leads, including those associated with temporary (external) pacemakers.

d. Open-heart valvuloplasty without replacement; replacement of heart valve; other operations on heart valves

Note: these data are estimates because they are based on data that range from 82-87% complete for any one year between 1996 and 2001

Sources: All data are from the Nebraska Hospital Discharge Data; codes and definitions are from the: American Heart Association. Heart Disease and Stroke Statistics – 2004 Update. Dallas, Tex.: American Heart Association; 2003.

Populations at High Risk for Hospitalization due to CVD

Within Nebraska there are a variety of subpopulations at particularly high risk for CVD. To eliminate these disparities, it is important that these populations are targeted for primary and secondary intervention efforts that will help to prevent, to more effectively treat, and to reduce the overall costs of hospitalization due to CVD. The Nebraska hospital discharge data does not contain information on race, ethnicity, education, or income. Thus, it is possible that some populations, not identified within this subsection, may be at equal or greater risk for hospitalization.

Middle-age adults

While Nebraska residents aged 65 and older are at much higher risk for hospitalization due to CVD, a large number of hospitalizations occur among residents under 65 years of age. In 2001, an estimated 8,000 hospitalizations due to CVD occurred among an estimated 6,500 Nebraska residents under 65 years of age. The number of middle aged Nebraska residents hospitalized due to CVD appears to be increasing. Between 1996-1998 and 1999-2001 the number of Nebraska residents, aged 45-64 years, that were hospitalized due to CVD increased 8 percent. Furthermore, of the more than 36,000 COPs performed on Nebraska residents in 2001, 43 percent, or about 15,400 occurred among residents under 65 years of age.

Males

Nebraska males are at greater risk than females for hospitalization due to CVD (Table 3). In 2001, males were an estimated 1.5 times more likely than females to receive hospital care due to CVD in a Nebraska acute care hospital. Furthermore, slightly more males than females were hospitalized due to CVD in 2001, an estimated 11,390 and 10,400 respectively.

Nebraska males are also more likely than Nebraska females to receive a COP. In 2001, the estimated age-adjusted procedure rate for males was 1.8 times higher than the procedure rate for females, 151 and 267 procedures respectively per 10,000 population. Males received an estimated 6,480 more COPs than did females in 2001.

Table 4: Estimated Hospitalization due to CVD by Age and Gender*, 2001

	Male		Female		
Age	Number Hospitalizations	Hospitalization Rate**	Number Hospitalizations	Hospitalization Rate**	Relative Risk M:F
All Ages	14,520	188	13,190	125	1.5^
45-64	4,120	226	2,540	135	1.7^
65+	9,590	1,017	10,110	698	1.5^

*ICD-9-CM Codes 390-459, data represent the total number of hospitalizations (independent of the number of patients)

**age-adjusted rate per 10,000 population

^relative risk significant at the 0.05 level

Note: these data are estimates because they are based on data that range from 82-87% complete for any one year between 1996 and 2001

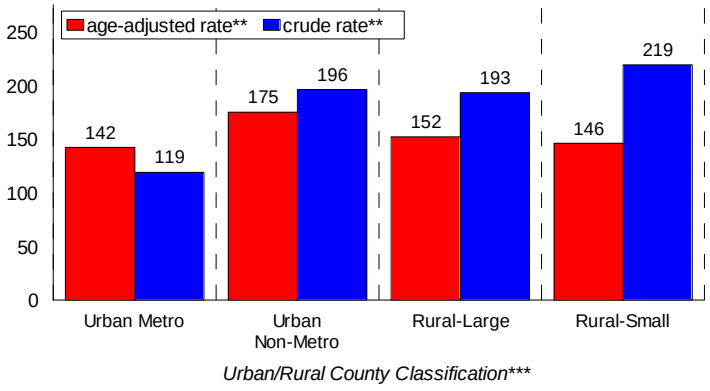
Source: Nebraska Hospital Discharge Data

Urban/Rural

In 2001, the rate of hospitalization due to CVD was an estimated 19 percent higher in urban non-metropolitan counties than all other counties ($p<.05$) (Figure 10). Also, residents of urban Nebraska counties are more likely than residents of rural Nebraska counties to receive a COP. In 2001, based on the estimated (age-adjusted) rate for COPs, Nebraska residents in urban-metropolitan counties were 38 percent more likely than residents in rural-small counties to receive a COP within a Nebraska acute care hospital (Figure 11).

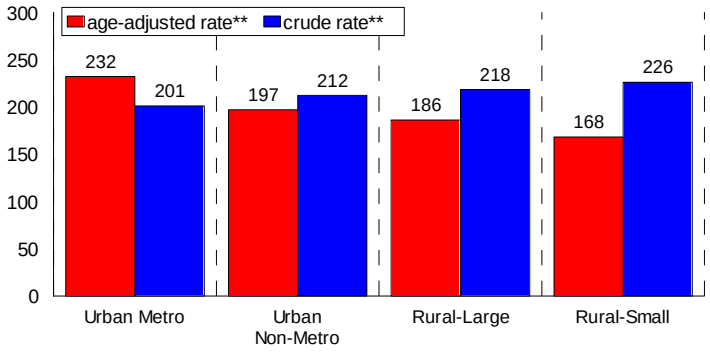
In contrast to the differences observed through age-adjusted hospitalization rates, crude rates indicate that a larger proportion of Nebraska residents in rural counties, compared to urban counties, receive inpatient hospital care and COPs for CVD (due to a larger percentage of older adults within rural counties) (Figures 10,11). While crude rates are not particularly useful for comparing risk among different populations, they are particularly useful for identifying the rate of actual hospitalization that occurs within a population. Knowing this information allows the health care system to be better prepared to deal with hospital care resulting from CVD.

Figure 10: Estimated Hospitalization Rates for CVD* by Urban/Rural, 2001



*Includes ICD-9-CM Codes 390-459
**Rates per 10,000 population
***See methodology for county classification criteria
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Figure 11: Estimated Cardiovascular Operation and Procedure Rates* for Nebraska Residents by Urban/Rural, 2001



*Includes ICD-9-CM Codes 35-39
**Rates per 10,000 population
***See methodology for county classification criteria
Note: these data are based on estimates that range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Medical Care due to CVD among Nebraska Medicaid Enrollees[10]

Nebraska Medicaid claims data (NMCD) contain information on inpatient (IP) hospitalizations, outpatient (OP), emergency department (ER) and physician office visits, and prescription drugs.

Number and Rates for Hospitalization and Medical Visits due to CVD

Cardiovascular disease is a major reason for medical care within the Nebraska Medicaid population (Table 5). In 2001, 23,863 Nebraska Medicaid enrollees (or approximately 12% of all enrollees) received medical care or consultation due to CVD. These individuals accounted for 140,418 medical encounters (indicating hospitalization, OP, ER, or physician office visits) in which CVD was listed as the primary reason for care. The crude (or actual) rate in 2001 for medical encounters due to CVD among Nebraska Medicaid enrollees was 7.2 encounters per 10 enrollees.

Even though Nebraska's Medicaid population is young (compared to Nebraska's population) CVD is still a major contributor to hospitalization among these individuals. In 2001, CVD contributed directly to 3,305 hospitalizations among 2,511 Nebraska Medicaid enrollees for a crude (or actual) rate of 170 hospitalizations due to CVD per 10,000 enrollees.

In addition to directly causing hospitalization among Nebraska Medicaid enrollees, CVD contributes indirectly to a large number of hospitalizations resulting from other conditions. In 2001, CVD was listed as a contributing factor in 7,012 hospitalizations. This indicates that, among Nebraska Medicaid enrollees in 2001, CVD caused or contributed to greater than 1 in every 4 hospitalizations (27%).

Table 5: Medical Care due to CVD among Nebraska Medicaid Enrollees*, 2001

	Hospitalizations**		Total Medical Encounters***	
Statistics	CVD was the primary cause of hospitalization+	CVD caused or contributed to hospitalization++	CVD was the primary cause of the encounter+	CVD caused or contributed to the encounter++
Number of hospitalizations/encounters	3,305	10,317	140,418	199,778
% of all hospitalizations/encounters	8.7%	27.3%	4.0%	5.7%
Number of enrollees	2,511	7,042	23,863	28,885
% of all enrollees that were hospitalized/had a medical encounter	9.7%	27.1%	11.0%	13.3%
Crude rate^	170	532	7236	10295
Age-adjusted rate^^	349	1,076	12873	17988

*ICD-9-CM Codes 390-459

**Includes IP hospitalizations; due to the selection of specific billing codes during analysis, these data may be underrepresented

***Includes hospitalizations, OP, ER, and physician office visits

+A CVD code was listed as the first discharge diagnosis

++A CVD code was listed among any of the diagnosis codes (primary or secondary)

^Crude rate per 10,000 population

^^Age-adjusted rate per 10,000 population (2000 U.S. standard)

Source: Nebraska Medicaid Claims Data

Nebraska Medicaid enrollees appear at much higher risk than all Nebraska residents for hospitalization due to CVD. In 2001, the hospitalization rate for Nebraska Medicaid enrollees was estimated at 349 hospitalizations per 10,000 enrollees compared to an estimated rate of 153 hospitalizations per 10,000 Nebraska residents (age-adjusted)[58].

Length of Hospitalization due to CVD

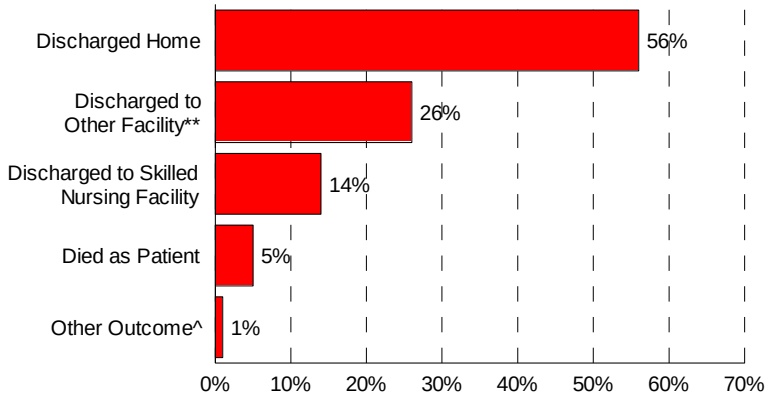
Cardiovascular disease contributes to a large number of days spent in the hospital among Nebraska Medicaid enrollees. In 2001, Nebraska Medicaid enrollees spent about 16,700 days in the hospital (as an IP) due to CVD, for an average of 5.1 days per hospitalization.

Nebraska Medicaid enrollees appear to have longer hospital stays due to CVD than do all Nebraska residents. In 2001, Nebraska Medicaid enrollees averaged 5.1 days per hospitalization due to CVD while all Nebraska residents averaged 4.4 days[58].

Outcomes of Hospitalizations due to CVD

Additional costs (both direct and indirect) and reduced quality of life are likely to occur within many Nebraska Medicaid enrollees after they are discharged from acute care hospitals due to CVD (Figure 12). In 2001, approximately 5 percent of all hospitalizations due to CVD resulted in death during hospitalization. In addition, 2 in every 5 enrollees were discharged after hospitalization to a skilled nursing home or other facility for follow-up care.

Figure 12: Outcomes of Hospitalizations due to CVD Among Nebraska Medicaid Enrollees*, 2001



*Includes ICD-9-CM Codes 390-459
**Includes intermediate care, short-term care, or other type of facility for follow-up care
^Includes those that left against medical advice or had an unknown discharge
N=3,305 total hospitalizations due to CVD in 2001
Source: Nebraska Medicaid Claims Data

Nebraska Medicaid enrollees appear more likely than Nebraska residents to be discharged for additional care beyond their CVD hospitalization. In 2001, 38 percent of Medicaid enrollees, compared to an estimated 29 percent of Nebraska residents, were discharged for follow-up care (to a skilled nursing, intermediate, short-term, or other facility for follow-up care). This difference is believed to be significant even though the NHDD are not complete.

Frequency of Prescriptions for CVD Drugs

Among Nebraska Medicaid enrollees, CVD-related drugs (those drugs used to treat CVD or a related risk factor) are a major component of all Medicaid drug prescriptions. In 2001, 1 in every 10 drug prescriptions filled by Nebraska Medicaid enrollees was for a CVD-related drug. Cardiovascular disease-related drug prescriptions were filled by 33,664 Nebraska Medicaid enrollees (or approximately 17% of all enrollees) in 2001.

Costs of Medical Care and Prescriptions for CVD

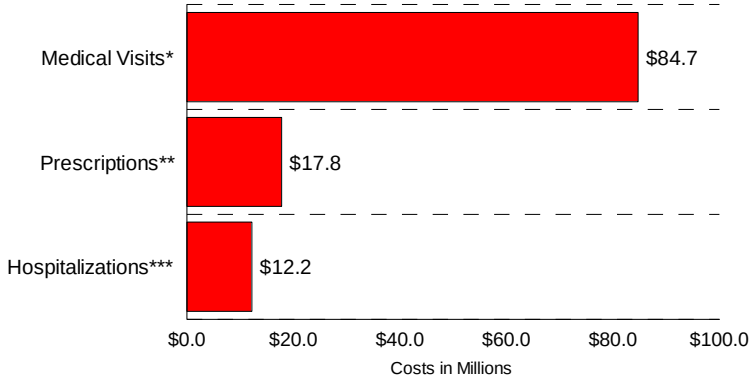
Unlike the NHDD, the NMCD capture the paid costs of hospitalization and care. As a result, the actual economic burden of CVD within the Nebraska Medicaid population is attainable. The following data represent what Medicaid actually paid for medical care and prescriptions for CVD in Nebraska.

For Nebraska Medicaid enrollees, Medicaid paid $96.8 million for medical care due to CVD and $17.8 million for CVD-related drug prescriptions for a total of $114.6 million in 2001 (Figure 13). Cardiovascular disease accounted for more than 10 percent of all medical care and prescription costs by Nebraska Medicaid enrollees in 2001. During calendar year 2001, the State of Nebraska paid 39.9 percent of the costs from Medicaid claims, while the remainder (60.1%) was paid by the federal government. This indicates that Nebraska paid (through tax-payer supported general funds) approximately $45.7 million for medical care and prescriptions due to CVD in 2001.

Adding new enrollees to Medicaid is costly for Nebraska (if those added were similar to the current enrollees). It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year, Medicaid will pay $5.9 million (in 2001 dollars) for medical care and prescriptions for CVD.

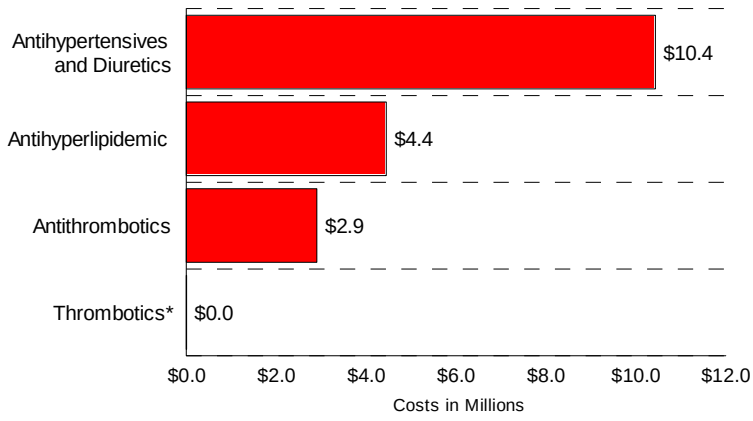
Medical visit costs (including OP, ER, and physician office visits) due to CVD are substantially higher than hospitalization costs due to CVD among Nebraska Medicaid enrollees (Figure 13). In 2001, hospitalizations due to CVD among Nebraska Medicaid enrollees accounted for $12.2 million while medical visits accounted for $84.7 million. On average, each hospitalization due to CVD cost nearly $3,700 while each medical visit cost approximately $620. Hospitalizations among Nebraska Medicaid enrollees that result in death from CVD prior to discharge incur greater expense than hospitalizations where enrollees are discharged alive.

Figure 13: Costs of Medical Care and Prescriptions for CVD Among Nebraska Medicaid Enrollees, 2001



*Cost incured during an OP, ER, or Physician Office Visit with ICD-9-CM codes 390-459 listed as the primary diagnosis
**Cost for CVD related drug prescriptions (that were filled) from the following drug classes: antithrombotics, Thrombotics, Antihypertensives and Diuretics, Not Specified Cardiac, and Antihyperlipidemic
***Cost incured during an IP hospitalization with ICD-9-CM codes 390-459 listed as the primary diagnosis
Source: Nebraska Medicaid Claims Data

Figure 14: Costs for CVD Related Drug Prescriptions (in millions) Among Nebraska Medicaid Enrollees by Drug Class*, 2001



*Costs for thrombotic drug prescriptions was $1,256 in 2001
N=33,664 Nebraska Medicaid enrollees received a drug prescription for CVD in 2001
Source: Nebraska Medicaid Claims Data

Cardiovascular-related drug prescriptions for Nebraska Medicaid enrollees are costly (Figure 14). In 2001, Medicaid paid approximately $17.8 million for CVD-related drug prescriptions among Nebraska Medicaid enrollees. Of the CVD-related drugs prescribed in 2001, antihypertensive and diuretic drugs (primarily used to treat high blood pressure) accounted for 59 percent of all CVD-related drug prescription costs for Nebraska Medicaid enrollees.

Medicaid coverage is important for low income residents in Nebraska. However, the medical care and prescription costs for Medicaid coverage place enormous strain on both the Nebraska and U.S. economy. Through the addition of preventive supports for CVD and its associated risk factors, it is possible that Medicaid could serve more residents without increasing costs.

Medicaid Populations at Highest Risk for Medical Care and Prescriptions due to CVD

While Nebraska Medicaid enrollees collectively are at greater risk than other Nebraska residents to receive hospitalizations due to CVD, there are disparities in medical care among Medicaid enrollees. Differences within these populations represent those beyond socioeconomic status (since enrollees in Medicaid are somewhat homogeneous with respect to income and education). It is important that these populations are targeted for primary and secondary intervention efforts that will help to prevent CVD, to treat CVD more effectively, and to reduce the overall costs of medical care due to CVD within the Nebraska Medicaid system.

Gender

Male Medicaid enrollees are at higher risk than female Medicaid enrollees to receive medical care due to CVD. In 2001, males were 16 percent more likely than females enrolled in Medicaid to have a medical encounter due to CVD (Table 6). However, because there are more females enrolled in Medicaid in Nebraska, females accounted for more than twice as many medical encounters than did males in 2001, 97,728 to 43,140 respectively (Table 6).

Table 6: Medical Care due to CVD Among Nebraska Medicaid Enrollees by Gender and Age*, 2001

	Male		Female		
	Number	Rate+	Number	Rate+	Relative Risk M:F++
Hospitalizations**					
All Ages	1,183	419	2,122	313	1.34^
45-64	474	962	568	718	1.34^
65+	530	1,167	1,396	1,008	1.16^
Medical Encounters***					
All Ages	43,140	14,207	97,278	12,238	1.16^
45-64	13,440	27,267	19,279	24,354	1.12^
65+	22,903	50,408	67,630	48,822	1.03^

*ICD-9-CM Codes 390-459
**Includes IP hospitalizations, may be underrepresented due to the selection of specific billing codes during analysis
***Includes hospitalizations, OP, ER, and physician office visits
+Age-adjusted rate per 10,000 population (2000 U.S. standard population)
++Relative risk represents the male to female rate ratio
^Male to female relative risk significant at the 0.05 level
Source: Nebraska Medicaid Claims Data

Residents under 65 years of Age

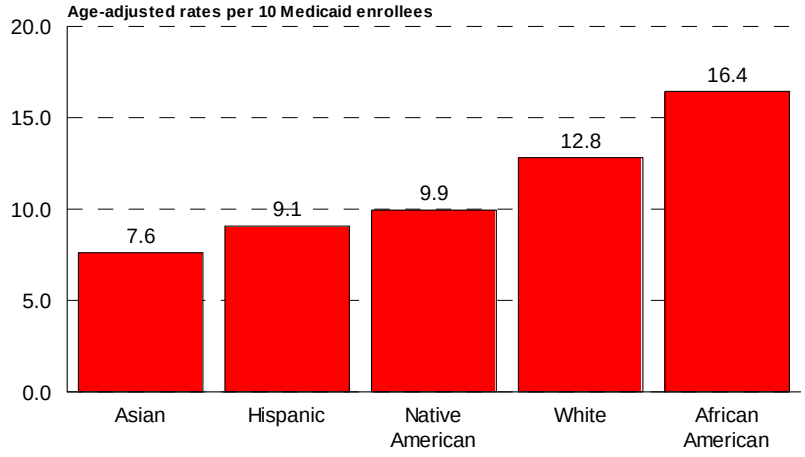
Compared to all Nebraska residents, Nebraska Medicaid enrollees appear to be at much higher risk for premature CVD. In 2001, Nebraska Medicaid enrollees aged 45-64 were hospitalized due to CVD at a rate of 811 hospitalizations per 10,000 enrollees (age-adjusted). In contrast, all Nebraska residents aged 45-64 were hospitalized due to CVD at an estimated rate of 179 hospitalizations per 10,000 residents (age-adjusted).

In 2001, 49,885 medical encounters due to CVD occurred among Nebraska Medicaid enrollees under 65, of which 1,379 were for (inpatient) hospitalization. Furthermore, 17,094 Nebraska Medicaid enrollees under 65 filled a CVD-related drug prescription in 2001.

Race/Ethnicity

African Americans enrolled in Nebraska's Medicaid system are more likely than all other racial and ethnic populations to receive medical care due to CVD (Figure 15). Compared to other races/ethnicities, African American Medicaid enrollees in Nebraska have the highest medical encounter rate for CVD, two times higher than the rate for Asians when controlling for differences in age.

Figure 15: Medical Encounter^ Rates for CVD* Among Nebraska Medicaid Enrollees by Race/Ethnicity, 2001

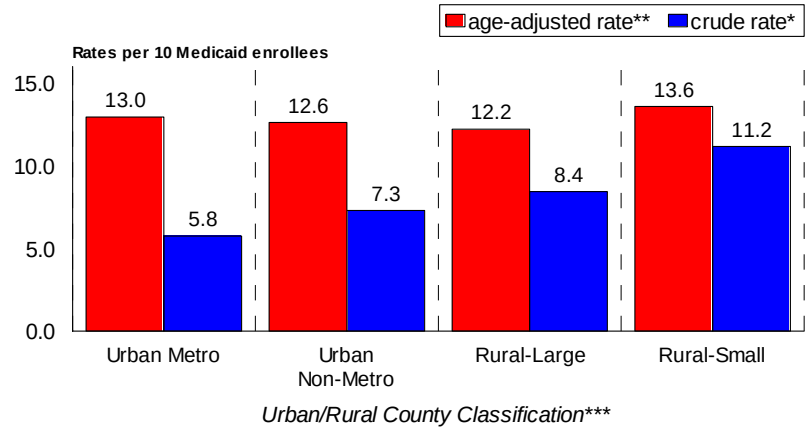


*Includes ICD-9-CM Codes 390-459, age-adjusted rates per 10 Medicaid enrollees (2000 U.S. standard population)
^Medical encounters include hospitalizations and OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Urban/Rural

When controlling for age (through age-adjustment), the medical encounter rates for CVD among Nebraska Medicaid enrollees do not differ by urban vs. rural residence (Figure 16). However, (based on crude rates) a larger proportion of Medicaid enrollees in rural counties, compared to urban counties, receive medical care due to CVD (primarily due to a larger older adult population in rural counties) (Figure 16). While crude rates should not be used to compare risk between different populations, they do provide information on the actual rate of care, thus allowing the health care system to be better prepared to deal with CVD.

Figure 16: Medical Encounter^ Rates for CVD* Among Nebraska Medicaid Enrollees by Urban/Rural, 2001



*Includes ICD-9-CM Codes 390-459, rates per 10 Medicaid enrollees
**age-adjusted rates per 10 Medicaid enrollees (2000 U.S. standard population)
***See methodology for further detail on urban/rural classifications
^Medical encounters include hospitalizations and OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Heart Disease Hospitalization and Medical Care

Definition: Heart disease is a form of cardiovascular disease; it includes all diseases of the heart, which includes acute rheumatic fever and chronic rheumatic heart disease, hypertensive heart disease, hypertensive heart and renal disease, coronary heart disease, congestive heart failure, as well as other forms of heart disease

Codes used to define heart disease: ICD-9-CM codes 390-398, 402, 404, 410-429

Heart Disease Hospitalization Highlights

National Highlights

- Between 1979 and 2001, the number of Americans that were hospitalized in short-stay hospitals with (a primary diagnosis of) coronary heart disease increased 27 percent[8].
- Nearly 2.1 million hospitalizations due to coronary heart disease occurred in 2001[2].
- The number of medical operations and procedures performed to treat heart disease has increased dramatically over the past 20 to 30 years[2].
- Direct health care costs resulting from all heart diseases are expected to top $130 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5] *See pages 66-68 for detailed tables and figures.*

- At least 3,910 ER visits and 19,540 hospitalizations due to heart disease occurred among Nebraska residents in Nebraska acute care hospitals.
- Heart disease was the second leading cause of hospitalization, second only to pregnancy and childbirth.
- The 19,540 hospitalizations due to heart disease occurred among 15,330 Nebraska residents, indicating that many Nebraska residents were hospitalized multiple times for heart disease.
- Coronary heart disease accounted for an estimated 9,860 hospitalizations (about half of all heart disease hospitalizations) while heart failure accounted for an estimated 4,030 hospitalizations.
- The estimated trend in heart disease hospitalization rates (age-adjusted), between 1996 and 2001, appears somewhat curvilinear, increasing slightly from 1996-1999 before declining slightly from 1999-2001.
- In 2001, Nebraska acute care hospitals charged payers an estimated $398 million for hospitalizations and $6.2 million for ER visits for health care services with heart disease listed as the primary reason for care.
- Among all payers of hospitalization due to heart disease in 2001, Medicare received the highest proportion of charges (66%) followed by commercial insurance (31%) and Medicaid (2%).
- The average charges per hospitalization due to heart disease steadily increased between 1996-2001, increasing from $14,300 and $20,360 per hospitalization for a 42 percent overall increase.
- About 1 in every 27 hospitalizations due to heart disease (3.8%) resulted in death prior to discharge while an additional 1 in every 5 (19.9%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10] *See pages 69-71 for detailed tables and figures.*

- 2,208 hospitalizations and 63,973 medical visits (including OP, ER, and physician office visits) due to heart disease occurred among 11,818 of Nebraska's approximately 200,000 Medicaid enrollees
- The age-adjusted rate (per 10,000 population) for hospitalization due to heart disease appears much higher among Medicaid enrollees (234) compared to all Nebraska residents (estimated at 108).
- Among Nebraska Medicaid enrollees, about 1 in every 17 hospitalizations due to heart disease (5.8%) resulted in death prior to discharge, while an additional 1 in every 4 (22.9%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $41.1 million for medical care due to heart disease along with millions of additional dollars for heart disease-related drug prescriptions
- In 2001, heart disease accounted for 4.5 percent of all medical encounter costs (including hospitalization, OP, ER, and physician office visits) among Medicaid enrollees.
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $2.1 million (in 2001 dollars) for heart disease care (plus the cost of prescription medication).

Stroke Hospitalization and Medical Care

Definition[38]: Stroke is a type of cardiovascular disease. It affects the arteries leading to and within the brain. A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bursts. When that happens, part of the brain cannot get the blood (and oxygen) it needs, so it starts to die.

Codes used to define stroke: ICD-9-CM codes 430-434, 436-438

Stroke Hospitalization Highlights

National Highlights

- Between 1979 and 2001, the number of Americans that were hospitalized in short-stay hospitals with (a primary diagnosis of) stroke increase 27 percent[8].
- 931 thousand hospitalizations due to stroke occurred in 2001[2].
- In recent years, a number of new and effective treatment mechanisms for stroke, such as using tPA to dissolve blood clots that are causing a stroke, have become much more commonly used[11].
- Direct health care costs resulting from stroke are expected to be around $33 billion in 2004[2].

Nebraska Hospitalization Highlights, 2001[5] *See pages 66-68 for detailed tables and figures.*

- At least 330 ER visits and 3,790 hospitalizations due to stroke occurred among Nebraska residents in Nebraska acute care hospitals.
- Stroke was the eighth leading cause of hospitalization, accounting for 2.1 percent of all hospitalizations.
- The 3,790 hospitalizations due to stroke occurred among 3,320 Nebraska residents, indicating that around 470 Nebraska residents were hospitalized multiple times for stroke.
- Estimated rates for hospitalization due to stroke remained virtually unchanged between 1996-2001.
- In 2001, Nebraska acute care hospitals charged payers an estimated $54.4 million for hospitalizations and $543 thousand for ER visits for health care services with stroke listed as the primary reason for care.
- Among all payers of hospitalization due to stroke in 2001, Medicare received the highest proportion of charges (75%) followed by commercial insurance (22%) and Medicaid (2%).
- The average charge per hospitalization due to stroke increased dramatically between 1996-2001, increasing from $8,940 to $14,330 per hospitalization for a 60 percent overall increase.
- About 1 in every 13 hospitalizations due to stroke (7.5%) resulted in death prior to discharge while an additional 1 in every 4 (26.7%) resulted in discharge to an intermediate, short-term, or other type of facility for follow-up care.

Nebraska Medicaid Highlights, 2001[10] *See pages 69-71 for detailed tables and figures.*

- 465 hospitalizations and 24,889 medical visits (including OP, ER, and physician office visits) due to stroke occurred among 11,160 of Nebraska's approximately 200,000 Medicaid enrollees
- The age-adjusted rate (per 10,000 population) for hospitalization due to stroke appears much higher among Medicaid enrollees (49/10,000) compared to all Nebraska residents (estimated at 21/10,000).
- Among Nebraska Medicaid enrollees, about 1 in every 15 hospitalizations due to stroke (6.5%) resulted in death prior to discharge, while close to 1 in every 3 (31.2%) resulted in discharge to an intermediate care, short-term care, or other type of facility for follow-up care.
- Medicaid paid $33.7 million for medical care due to stroke along with millions of additional dollars for stroke-related drug prescriptions.
- In 2001, stroke accounted for 3.7 percent of all medical encounter costs (including hospitalization, OP, ER, and physician office visits) among Medicaid enrollees.
- It is estimated that for every 10,000 new people added to the Nebraska Medicaid system for an entire year (assuming those added were similar to the current enrollees), Medicaid will pay $1.7 million (in 2001 dollars) for stroke care (plus the cost of prescription medication).

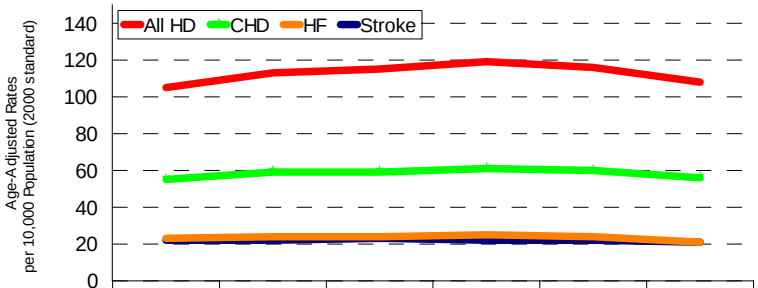
Medical Care due to Heart Disease and Stroke among all Nebraska Residents[5]

Table 7: Estimated Minimum Number of Hospitalizations, Hospitalization Rates, Length of Hospital Stay, and Hospitalization Outcomes for All Heart Disease, Coronary Heart Disease, and Stroke, Among Nebraska Residents, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]
Number of Hospitalizations	19,540	9,860	3,790
Hospitalization Rate (age-adjusted)*	108	56	21
Number of Residents that received (one or more) hospitalizations	15,330	8,020	3,320
Average Length of Stay per Hospitalization (in days)			
For all hospitalizations	4.1	3.8	5.4
For hospitalizations that patient died	5.5	5.0	4.7
For hospitalizations that patient was discharged alive	4.1	3.7	5.5
Hospitalization Outcome (%)			
Discharged home	69.0%	70.7%	47.6%
Discharged to other facility**	7.2%	4.5%	26.7%
Discharged to skilled nursing facility	19.9%	21.3%	18.1%
Died as patient	3.8%	3.3%	7.5%
Other outcome	0.2%	0.2%	0.1%

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
*Age-adjusted rate per 10,000 population (2000 U.S. standard population)
**Includes intermediate care, short-term care, or other type of facility for follow-up care
Note: these data are estimated because they range from 82-87% complete for any one year between 1996-2001
Source: Nebraska Hospital Discharge Data

Figure 17: Trends in Estimated Hospitalizations by All Heart Disease (HD), Coronary Heart Disease (CHD), Heart Failure (HF), and Stroke Among Nebraska Residents, 1996-2001



	1996	1997	1998	1999	2000	2001
All HD	105	113	115	119	116	108
CHD	55	59	59	61	60	56
HF	23	24	24	25	24	21
Stroke	22	22	23	22	22	21

*Primary discharge diagnosis using ICD-9-CM Codes: All HD 390-398, 402, 404, 410-429; CHD 410-414, 429.2; HF 428
Note: these data are estimates because they range from 75-80% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 8: Estimated Charges* (in millions) for Hospitalizations due to All Heart Disease, Coronary Heart Disease, and Stroke, Among Nebraska Residents, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]
Total Hospitalization Charges (in millions)	$397.9	$246.1	$54.4
Average Charge Per Hospitalization	$20,400	$25,000	$14,300
Per Hospitalization that patient died	$30,400	$36,000	$17,000
Per Hospitalization that patient was discharged alive	$20,000	$24,600	$14,100
Total Charges per Payer (in millions)			
Commercial Insurance	$145.3	$102.5	$15.3
Medicaid	$11.1	$6.2	$2.5
Medicare	$235.8	$133.3	$36.0
Other Federal Programs**	$2.6	$1.8	$0.23
Self Pay	$3.2	$2.4	$0.29

*Reflects that dollars charged for medical care and services, not the actual amount paid

**Includes federal programs other than Medicare and Medicaid

a. Includes charges for ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization

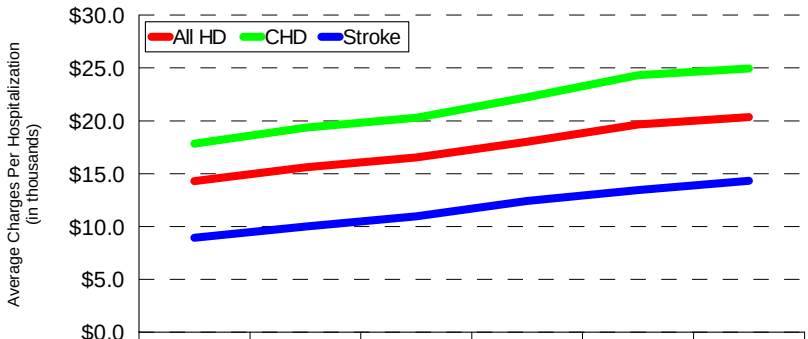
b. Includes charges for ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization

c. Includes charges for ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization

Note: these charges are estimated because they range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Figure 18: Trends in Estimated Charges (in thousands) for Hospitalizations due to All Heart Disease (HD), Coronary Heart Disease (CHD), and Heart Failure (HF), Among Nebraska Residents, 1996-2001



	1996	1997	1998	1999	2000	2001
All HD	$14.3	$15.6	$16.5	$18.0	$19.7	$20.4
CHD	$17.9	$19.4	$20.3	$22.2	$24.3	$25.0
Stroke	$8.9	$10.0	$11.0	$12.4	$13.5	$14.3

*Primary discharge diagnosis using ICD-9-CM Codes: All HD 390-398, 402, 404, 410-429; CHD 410-414, 429.2; HF 428
Note: these data are estimates because they range from 82-87% complete for any one year between 1996 and 2001
Source: Nebraska Hospital Discharge Data

Table 9: Estimated Minimum Number of Hospitalizations and Hospitalization Rate for All Heart Disease, Coronary Heart Disease, Heart Failure, and Stroke, Among Nebraska Residents by Age, Gender, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Heart Failure[c]		Stroke[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	19,540	108	9,860	56	4030	21	3,790	21
Age								
≤ 24	90	1	5	0.1	10	0.2	30	0.4
25-44	760	16	340	7	60	1	90	2
45-64	5,000	132	3,280	89	520	14	630	17
65+	13,690	578	6,230	266	3430	141	3,040	127
Gender								
Female	8,990	85	3,790	37	2205	19	1,910	18
Male	10,550	135	6,070	78	1830	25	1,890	25
Urban/Rural^								
Urban Metro	6,950	97	3,520	49	1260	18	1,410	20
Urban Non-Metro	5,280	127	2,680	66	1100	25	940	22
Rural-Large	4,170	107	2,080	55	930	22	940	21
Rural-Small	3,120	106	1,570	56	740	22	600	20

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization

b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization

c. Includes ICD-9 code 428 listed as the primary cause of hospitalization

d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization

*Estimated minimum number of hospitalizations for Nebraska residents treated in acute care hospitals in Nebraska

**Age-adjusted rate per 10,000 population

^Urban/Rural classifications can be found within the Methodology section of this report

Note: these data are estimated because they range from 82-87% complete for any one year between 1996-2001

Source: Nebraska Hospital Discharge Data

Medical Care due to Heart Disease, Stroke, and High Blood Pressure among Nebraska Medicaid Enrollees[10]

Table 10: Hospitalization and Total Medical Encounter Numbers, Rates, Length of Hospital Stay, and Hospitalization Outcomes for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]	High Blood Pressure[d]
(Inpatient) Hospitalizations				
Number of Hospitalizations	2,208	947	465	166
Hospitalization Rate (age-adjusted)*	234	110	49	19
Number of Medicaid Enrollees that received (one or more) hospitalizations	1,658	740	399	154
Average Length of Stay per Hospitalization (in days)				
For all hospitalizations	4.6	4.2	6.7	5.8
For hospitalizations that patient died	4.8	3.5	7.9	6.0
For hospitalizations that patient was discharged alive	4.6	4.2	6.2	5.8
Hospitalization Outcome (%)				
Discharged home	59.1%	63.0%	38.7%	68.1%
Discharged to other facility**	22.9%	23.0%	31.2%	17.5%
Discharged to skilled nursing facility	11.2%	6.8%	22.8%	12.7%
Died as patient	5.8%	5.9%	6.5%	1.8%
Other outcome	1.1%	1.3%	0.9%	0.0%
Total Medical Encounters***				
Number of Medical Encounters	66,187	17,698	24,889	33,282
Medical Encounter Rate (age-adjusted)*	11,818	4,478	3,629	11,160
Number of Medicaid Enrollees that received (one or more) Medical Encounters	5,766	1,736	2,225	3,225

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
d. Includes ICD-9 codes 401-404 listed as the primary cause of hospitalization
*Age-adjusted rate per 10,000 population (2000 U.S. standard population)
**Includes intermediate care, short-term care, or other type of facility for follow-up care
***Includes hospitalizations, OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Table 11: Costs* for Hospitalizations and Total Medical Encounters due to All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees, 2001

	All Heart Disease[a]	Coronary Heart Disease[b]	Stroke[c]	High Blood Pressure[d]
(Inpatient) Hospitalizations				
Total Hospitalization Costs (in millions)	$7.9	$4.5	$2.4	$0.42
Average Cost Per Hospitalization	$3,599	$4,699	$5,255	$2,544
Total Medical Encounters **				
Total Medical Encounter Costs (in millions)	$41.1	$14.6	$33.7	$16.2
Average Cost Per Medical Encounter	$622	$824	$1,355	$486

*Reflects that actual dollars paid by Medicaid
a. Includes costs for ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes costs for ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes costs for ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
d. Includes costs for ICD-9 codes 401-404 listed as the primary cause of hospitalization
**Includes hospitalizations, OP, ER, and physician office visits
Source: Nebraska Medicaid Claims Data

Table 12: Number of Hospitalizations and Hospitalization Rate for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees by Age, Gender, Race/Ethnicity, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Stroke[c]		High Blood Pressure[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	2,208	234	947	110	465	49	166	19
Age								
≤ 24	24	2 +	2	0.1 +	8	0.6 +	6	0.4 +
25-44	154	55 +	71	25 +	35	12 +	38	14 +
45-64	723	563 +	373	290 +	145	113 +	54	42 +
65+	1,037	711 +	501	272 +	277	151 +	68	37 +
Gender								
Female	1,421	210	565	94	316	46	103	16
Male	787	282	382	143	149	54	63	24
Race/Ethnicity								
Asian	14	133 ++	11	111 ++	4	32 ++	3	25 ++
African American	161	203	63	83	43	55 ++	31	36 ++
Hispanic^	89	253	38	113 ++	21	57 ++	7	15 ++
Native American	61	318	23	125 ++	18	96 ++	7	32 ++
White	1,849	237	794	114	373	47	117	16
Urban/Rural^^								
Urban Metro	739	199	319	92	163	41	71	19
Urban Non-Metro	606	266	269	130	122	49	32	13
Rural-Large	444	248	187	120	92	62	37	23
Rural-Small	419	284	172	126	88	68	26	20

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause of hospitalization
b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause of hospitalization
c. Includes ICD-9 code 428 listed as the primary cause of hospitalization
d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause of hospitalization
*Number of hospitalizations for Nebraska Medicaid Enrollees
**Age-adjusted rate per 10,000 Nebraska Medicaid Enrollees
+Age-specific rate per 10,000 Nebraska Medicaid Enrollees
++Rates based on fewer than 50 cases should be viewed with caution
^Hispanic can be of any race
^^Urban/Rural classifications can be found within the Methodology section of this report
Source: Nebraska Medicaid Claims Data

Table 13: Number of Medical Encounters[#] and Medical Encounter Rate for All Heart Disease, Coronary Heart Disease, Stroke, and High Blood Pressure Among Nebraska Medicaid Enrollees by Age, Gender, Race/Ethnicity, and Urban/Rural, 2001

	All Heart Disease[a]		Coronary Heart Disease[b]		Stroke[c]		High Blood Pressure[d]	
	N*	Rate**	N*	Rate**	N*	Rate**	N*	Rate**
Overall	66,187	5766	17,698	1736	24,889	2,225	33,282	3225
Age								
≤ 24	2,111	157 +	114	9 +	465	35 +	728	54.1 +
25-44	4,077	1445 +	930	330 +	1,531	543 +	4,065	1441 +
45-64	14,694	11439 +	5,065	3943 +	5,011	3,901 +	8,563	6666 +
65+	45,305	24628 +	11,589	6300 +	17,882	9,721 +	19,926	10832 +
Gender								
Female	45,535	5304	11,251	1479	16,686	2,044	24,399	3301
Male	20,652	6685	6,447	2240	8,203	2,651	8,883	3053
Race/Ethnicity								
Asian	325	2609	123	1191	234	1,417	400	2861
African American	4,828	5666	1,133	1459	2,892	3,391	5,147	5937
Hispanic^	1,665	4085	493	1360	406	1,070	1,021	2262
Native American	762	3770	200	1051	437	2,303	545	2649
White	57,954	5985	15,486	1813	20,622	2,159	25,696	2920
Urban/Rural^^								
Urban Metro	21,103	5196	6,223	1660	10,046	2,439	14,050	3626
Urban Non-Metro	17,735	5980	4,009	1523	5,951	2,053	7,915	2950
Rural-Large	13,139	5773	3,805	1955	4,433	2,038	5,506	2742
Rural-Small	13,757	6985	3,560	2082	4,272	2,204	5,572	3092

[#]Includes hospitalizations, OP, ER, and physician office visits

a. Includes ICD-9 codes 390-398, 402, 404, 410-429 listed as the primary cause

b. Includes ICD-9 codes410-414, 429.2 listed as the primary cause

c. Includes ICD-9 code 428 listed as the primary cause

d. Includes ICD-9 codes 430-434, 436-438 listed as the primary cause

*Number of hospitalizations for Nebraska Medicaid Enrollees

**Age-adjusted rate per 10,000 Nebraska Medicaid Enrollees

[+]Age-specific rate per 10,000 Nebraska Medicaid Enrollees

^Hispanic can be of any race

^^Urban/Rural classifications can be found within the Methodology section of this report

Source: Nebraska Medicaid Claims Data

Emergency Medical Services Response Times due to CVD among Nebraska Residents

Number of EMS Transports due to Cardiac Events, 2000[12]

Cardiovascular disease is a major contributor of emergency medical services (EMS) in Nebraska. In 2000, (at least) 5,584 EMS transports occurred among people in Nebraska for suspected cardiac events (including chest pain, myocardial infarction, and cardiac arrest).

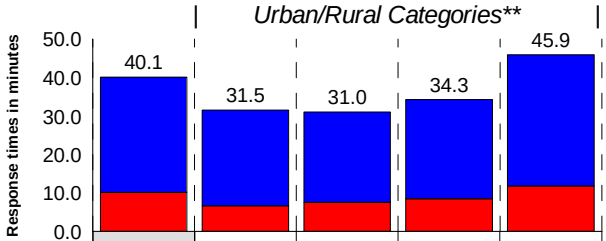
Of the 5,584 (reported) EMS transports for cardiac events that occurred during 2000, slightly more than half occurred among males. Males accounted for 2,993 EMS transports for cardiac events in 2000 (or 53.6% of the total) while females accounted for 2,591 (or 46.4% of the total).

Average Response Times for Cardiac Events, 2000[12]

In 2000, the average EMS response time for a suspected cardiac event in Nebraska was: 10:10 from dispatch to the scene (or individual in need) and 29:55 from the scene to the health care facility (Figure 17). This indicates that the average Nebraska resident in need of EMS for a suspected cardiac event can expect arrival at a health care facility approximately 40 minutes after the EMS unit is dispatched.

It only takes 4 minutes for the body to sustain brain damage without oxygen. Thus, it is most critical that dispatch to scene times are kept as short as possible. The current dispatch to scene time of 10:10 for cardiac events in Nebraska indicates that many residents likely receive permanent damage or death that could be prevented if faster medical care were available.

Figure 17: EMS Response Times (in minutes) for Cardiac Events* from Dispatch to Arrival at the Health Care Facility Among Nebraska Residents by Urban/Rural, 2000



	Overall Nebraska	Urban Metro	Urban Non-Metro	Rural-Large	Rural-Small
Number of Transports^	5,584	2,107	1,520	1,053	904
Scene to Hospital (minutes)	29.9	24.8	23.4	25.8	34.0
Dispatch to Scene (minutes)	10.2	6.7	7.6	8.5	11.9

*Includes the average response times (for the times reported) for suspected cardiac events including chest pain, myocardial infactrion, and cardiac arrest
**See methodology for further detail on urban/rural classifications
^This is the minumum number of known transports for suspected cardiac events (some may go unreported)
Source: Nebraska EMS Data

Due, in part, to the low population density within many regions of Nebraska, EMS response times for cardiac events differ by place of residence. Nebraska residents of rural-small counties receive longer dispatch to scene (11:52) and scene to health care facility (33:59) times than residents of urban metro (6:39,24:50), non-urban metro (7:35,23:26), and rural-large counties (8:30,25:46). In 2000, EMS dispatch to scene times for cardiac events were, on average, at least 3 minutes and 22 seconds longer in rural-small counties compared to the other three urban/rural regions.

In addition to varying EMS response times across Nebraska, the quality of 9-1-1 telephone coverage differs dramatically by place of residence. This indicates that residents within rural-small Nebraska counties are not only at greater risk from longer transport times, but also may experience complications that delay EMS dispatch.

Chapter 4: Risk Factors for CVD

Introduction

There are a variety of risk factors that contribute to CVD morbidity and mortality. Through extensive research, many of these risk factors for CVD have been identified and are well documented and understood. Each of these risk factors can be categorized as preventable (those over which the individual has control) or non-preventable (those over which the individual has no control) (Table 1). Fortunately, research has identified almost all of the risk factors for CVD and has shown that most are modifiable through simple lifestyle choices. While extensive efforts have been made in recent decades to improve these risk factors, many of these efforts have not been successful. This lack of successful behavior change can be attributed in part to societal barriers discouraging healthy behavior.

This chapter will focus on the preventable risk factors for CVD, including overweight and obesity, unhealthy eating, physical inactivity, high blood pressure, high blood cholesterol, diabetes, and cigarette smoking. When risk factors are combined, risk for CVD can increase. As a result, this chapter will also focus on multiple risk factors for CVD.

Table 1:
Risk Factors for CVD

Preventable Risk Factors

- Type-2 Diabetes
- High Blood Cholesterol
- High Blood Pressure
- Lack of Physical Activity
- Overweight and Obesity
- Unhealthy Eating
- Smoking

Non-Preventable Risk Factors

- Increasing Age
- Male Gender
- Race/Ethnicity
- Family History of Premature CVD

Table 2: Progress Toward the Nebraska HP2010 Objectives for CVD Risk Factors

NE HP2010 Objectives	Year	Nebraska Prevalence	NE 2010 Objective	% Change Necessary to achieve HP2010 Goals
Adult Objectives (18 years and older)				
Obesity	2002	23.2%	15.0%	-35.3%
No Leisure Time PA*	2002	22.0%	15.0%	-31.8%
Sufficient Moderate PA*	2001	24.2%	30.0%	24.0%
Sufficient Vigorous PA*	2001	16.3%	30.0%	84.0%
Diagnosed High Blood Pressure	2001	22.6%	16.0%	-29.2%
Current Cholesterol Screening	2001	65.4%	80.0%	22.3%
Diagnosed Hgh Blood Cholesterol	2001	27.8%	17.0%	-38.8%
Diagnosed Diabetes	2002	5.8%	2.5%	-56.9%
Current Cigarette Smoking	2002	22.7%	12.0%	-47.1%
Youth Objectives (students in grades 9-12 unless noted)				
Overweight Among K-12 Students	2002/2003	16.2%	-**	-
Sufficient Moderate PA*	2003	26.7%	35.0%	31.1%
Sufficient Vigorous PA*	2003	64.7%	85.0%	31.4%
Current Cigarette Smoking	2003	24.1%	15.0%	-37.8%

Note: Definitions and sources for each indicator can be found under the appropriate heading within this chapter
*PA=physical activity
**An objective is established for 9-12 grade students based on self-reported heights and weights, however the data presented within this table (from another source) are better quality and do not allow for valid comparison to the objective

Overweight and Obesity

Introduction

According to the Centers for Disease Control and Prevention (CDC) there is an obesity epidemic occurring among both youth and adults in America[1]. Behavioral Risk Factor Surveillance System data indicate that the percentage of obese U.S. adults nearly doubled between 1990 and 2002, increasing from 11.6 percent to 22.2 percent[2]. Similarly, between 1976-1980 and 1999-2000, the percentage of overweight U.S. children (ages 6-11) more than doubled (increasing 135%) while the percentage of overweight adolescents (ages 12-19) more than tripled (increasing 210%)[3].

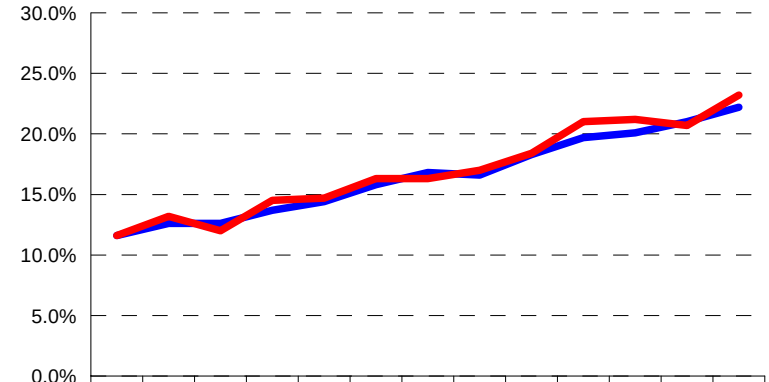
The physical and emotional impacts of overweight and obesity are extraordinary. Obese individuals are 50 to 100 percent more likely to die prematurely from any cause than individuals at a healthy body weight[4]. In addition, overweight and obesity substantially increase the risk for (among other diseases) coronary heart disease, type 2 diabetes, some forms of cancer, and certain musculoskeletal disorders such as osteoarthritis[4]. Overweight and obese individuals also may suffer from social stigmatization, discrimination, and poor body image[4].

Overweight and Obesity among Nebraska Adults[5]

Indicator Definitions for Body Mass Index (BMI) (weight in kilos divided by height in meters squared)
Underweight: BMI <18.5
Healthy Weight: BMI ≥18.5 but <25.0
Overweight: BMI ≥25.0 but <30.0
Obese: BMI ≥30.0

Nebraska HP2010 Objective:
15 percent obese (#19-2)

Figure 1: Obesity* Trends among NE and U.S. Adults



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Nebraska	11.6%	13.2%	12.0%	14.5%	14.7%	16.3%	16.3%	17.0%	18.4%	21.0%	21.2%	20.7%	23.2%
Nation	11.6%	12.6%	12.6%	13.7%	14.4%	15.8%	16.8%	16.6%	18.3%	19.7%	20.1%	21.0%	22.2%

*BMI (weight in kilograms divided by height in meters squared) of 30 or greater
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

2002 Highlights

- Nearly 1 in every 4 Nebraska adults (aged 18 years and older) is obese (23.2%) while 2 in every 5, or an estimated 758,000 to 795,000 Nebraska adults, is either overweight or obese (60.2%).
- Approximately 1 in every 15 Nebraska adults (7.4%) suffers from either class-two obesity (BMI value of ≥ 35 and < 40) or class-three obesity (BMI value of ≥40). This level of obesity places individuals at extreme risk for obesity related health problems.

Obesity Trends

- Obesity among Nebraska adults doubled between 1990 and 2002, increasing from 11.6 percent to 23.2 percent (Figure 1).

Compared to the Nation in 2002[2]

- Nebraska ranks tied for 34th lowest in obesity (with Missouri) among 54 U.S. states and territories (interquartile range 19.5% to 23.8%).
- Compared to bordering states, Nebraska adults are more likely than adults in Colorado (16.5%), South Dakota (21.2%), and Wyoming (19.5%) to be obese (p<.001, .05, and .001 respectively).

Medical Expenses from Obesity[6]

- Obesity in Nebraska is costly and accounts for a significant prorportion of all medical expenses among Nebraska adults each year (Table 3).
- On an annual basis, obesity accounts for 5.8 percent of all medical expenses among Nebraska adults, or $454 million per year.
- Annual obesity-related medical expenses are $94 million for Nebraska Medicare enrollees and $114 million for Nebraska adult Medicaid enrollees.

Table 3: Estimated Annual Cost (in millions) for Obesity and Percentage of all Medical Expenses Due to Obesity, for Nebraska Adults (18 and older)

Total Adult Population		Medicare Population		Adult Medicaid Population	
%*	Cost**	%*	Cost**	%*	Cost**
5.8%	$454	7.0%	$94	10.3%	$114

*Percentage of all medical expenses resulting from obesity
**Estimated annual cost in millions for direct medical expenses
Source: Finkelstein, EA, Fiebelkorn, IC, Wang, G. *State-level estimates of annual medical expenditures attributable to obesity*. Obesity Research 2004;12(1):18-24.

Descriptive Analysis of Obesity, 2002

Age

- The relationship between age and obesity among Nebraska adults is curvilinear, indicating that middle age adults (in particular those aged 45-64 years, 28.7%) are the most likely to be obese.

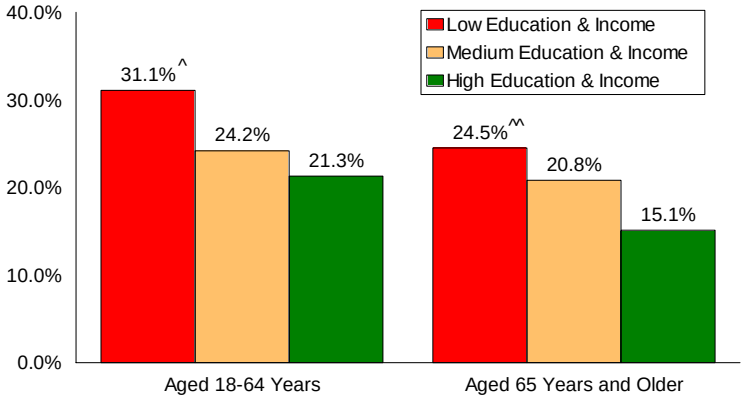
Gender

- Male adults in Nebraska are 28 percent more likely than female adults in Nebraska to be obese, 26.0 percent and 20.4 percent respectively (p<.001).
- Approximately 7 in every 10 male adults (69.7%) are either overweight or obese compared to half of all female adults (50.8%) (p<.001), indicating that male adults are 37 percent more likely than female adults to be overweight or obese.
- Obesity has increased dramatically among both male and female adults in Nebraska, however obesity among males is increasing at a much steeper pace. Between 1990 and 2002, the percentage of obese male adults in Nebraska increased 143 percent (from 10.7% to 26.0% respectively) while the percentage of obese female adults increased 63 percent (from 12.5% to 20.4% respectively).

Education & Income

- As level of education and income increase, obesity decreases among Nebraska adults (among both younger and older adults) (Figure 2).
- Among Nebraska adults aged 18-64 years, those with low education and income are 29 percent and 46 percent more likely than those with medium and high education and income respectively to be obese (Figure 2).
- Among Nebraska adults aged 65 years and older, those with low education and income are 63 percent more likely than those with high education and income to be obese (Figure 2).

Figure 2: Obesity* Among Nebraska Adults by Education & Income, 2002**



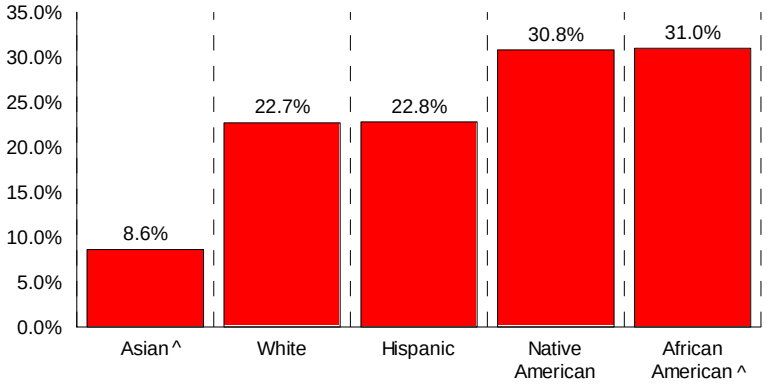
*BMI (weight in kilograms divided by height in meters squared) of 30 or greater
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc=>$35K income and education beyond high school

^Significantly higher than med. & low ed/inc at the .05 level
^^Significantly higher than low ed/inc at the .05 level
Listwise n=3,575 valid cases, 808 missing cases (18.4%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

Race/Ethnicity Highlights from 2001 & 2002 (combined)

- African Americans and Native Americans are the most likely racial and ethnic groups in Nebraska to be obese, 31.0 percent and 30.8 percent respectively (Figure 3). In contrast, less than 1 in every 10 Asians (8.6%) are obese, making them less likely than all other racial and ethnic groups to be obese.
- Racial and ethnic disparities in obesity are most prominent among females. Compared to White females, Hispanic females are 1.2 times more likely to be obese, African American females are 1.8 times more likely to be obese, and Native American females are more than twice as likely (relative risk 2.1) to be obese (all p<.05 respectively). In contrast, Asian females are 56 percent less likely than White females to be obese (p<.05).

Figure 3: Obesity* Among Nebraska Adults by Race/Ethnicity, 2001-2002



*BMI (weight in kilograms divided by height in meters squared) of 30 or greater
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .05 level
Missing data=1,370 cases (8.4%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

Urban/Rural

- Nebraska adults aged 25-44 years living outside of Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 30 percent more likely than adults living within Nebraska's three urban-metropolitan counties to be obese, 24.8 percent and 19.1 percent respectively (p<.01). Differences within other age-categories were non-significant.

At Risk for Overweight and Overweight among Nebraska Youth (in grades K-12), 2002/2003 Academic School Year[7]

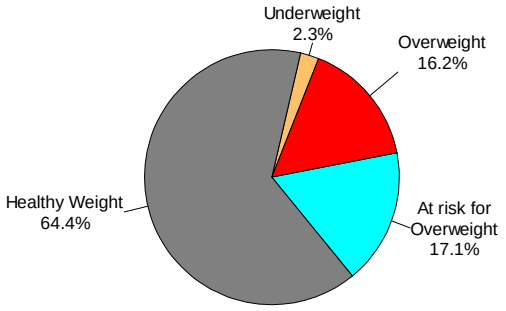
Indicator Definitions (based on gender and age specific values from the 2000 CDC Growth Charts)
Underweight: <5th Percentile
Healthy Weight: ≥5th Percentile but <85th Percentile
Overweight: BMI ≥85th Percentile but <95th Percentile
Obese: BMI ≥95th Percentile

Nebraska HP2010 Objective: None Established (using objectively measured data)

2002/2003 Highlights

- In Nebraska, 1 in every 6 students (16.2%) in grades K-12 is overweight while an additional 1 in every 6 (17.1%) is at risk for overweight (Figure 4). This indicates that 1 in every 3 (33.3%), or approximately 106,000 Nebraska students, is either at risk for overweight or overweight.

Figure 4: BMI Classifications* for Nebraska Students in Grades K-12, 2002/2003



*Represent age (mid-point value) and gender specific BMI values from the 2000 CDC growth charts: Underweight: <5th percentile; Healthy Weight: ≥ 5th but < 85th percentile; At risk for Overweight: ≥ 85th but < 95th percentile; Overweight ≥ 95th percentile

Descriptive Analysis of Overweight, 2002/2003

Grade Differences

- Students in late elementary and early middle school grades (4-6) are the most likely to be overweight.
- Students in grades 3-8 are more likely than students in both younger (K-2) and older (9-12) grades to be overweight, 17.4 percent, 13.5 percent ($p < .001$), and 16.2 percent ($p < .01$) respectively.

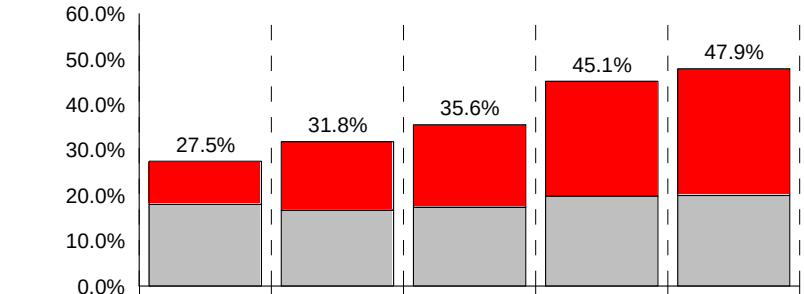
Gender Differences

- Male students are 24 percent more likely than female students to be overweight, 17.8 percent and 14.4 percent respectively ($p < .001$).
- As grade level increases, the overweight disparity between males and females increases. While male and female students are equally likely to be overweight in grades K-3, male students are 33 percent more likely than female students to be overweight in grades 9-12.

Racial/Ethnic Differences

- Native American students (27.9%) and Hispanic students (25.3%) are more likely than students of any other race/ethnicity to be overweight (Figure 5). Native American students are 1.8 times more likely than White students while Hispanic students are 1.7 times more likely than White students to be overweight ($p < .001$). Furthermore, close to half of Native American and Hispanic students are either at risk for overweight or overweight, 47.9 percent and 45.1 percent respectively.
- African American students are 20.5 percent more likely than White students to be overweight, 18.2 percent and 15.1 percent respectively ($p < .01$) (Figure 5). However, gender differences indicate that African American females are 47 percent more likely than White females to be overweight ($p < .001$) while African American and White males are equally likely to be overweight.
- Asian students (9.5%) are less likely than students of any other race/ethnicity to be overweight. In particular, Asian students are 37 percent less likely than White students to be overweight, 9.5 percent and 15.1 percent respectively ($p < .01$).

Figure 5: At Risk for Overweight or Overweight*
Nebraska Students in Grades K-12 by Race, 2002/2003



	Asian	White	African American	Hispanic	Native American
Overweight	9.5%	15.1%	18.2%	25.3%	27.9%
At Risk	18.0%	16.8%	17.3%	19.8%	20.0%
Overweight RR Race:White**	0.63^	reference	1.21^	1.68^	1.85^

*Represent age (mid-point value) and gender specific BMI values from the 2000 CDC growth charts: At risk for Overweight: ≥ 85th but < 95th percentile; Overweight ≥ 95th percentile

***Relative risk represents the race to white percentage ratio for overweight
^Percentage overweight is significantly different from white ($p < .05$)

Geographic Differences

- Students in the western region of the state have the lowest percentage of overweight students, and are significantly less likely than students in the northeastern (16.7%), south central (18.0%), and southeastern (16.9%) regions of the state to be overweight.
- In contrast, students in the south central region of the state have the highest percentage of overweight students, and are significantly more likely than students in the eastern (15.1%), north central (14.9%), northeastern (16.7%), and western (14.0%) regions of the state to be overweight.

Unhealthy Eating

Fruit and Vegetable Consumption

Introduction

The United States Department of Agriculture (USDA) recommends that Americans consume at least five servings of fruits and vegetables per day, while some research studies support the consumption of up to nine servings of fruits and vegetables per day[8]. According to the Division of Nutrition and Physical Activity at the CDC, a diet rich with fruits and vegetables and low in fats, particularly saturated fats, may help to reduce the risk of cardiovascular disease, high blood pressure, and diabetes[9]. Additional information on the association between fruit and vegetable consumption and cardiovascular disease risk can be found in the heart disease and stroke risk factors sections of Chapter 2.

Indicator Definition

5-a-day represents the percentages (of adults and youth) that consume 5 or more daily servings of fruits and vegetables.

Nebraska HP2010 Objectives: None Established (for adult or youth)

Fruit and Vegetable Consumption among Nebraska Adults[5]

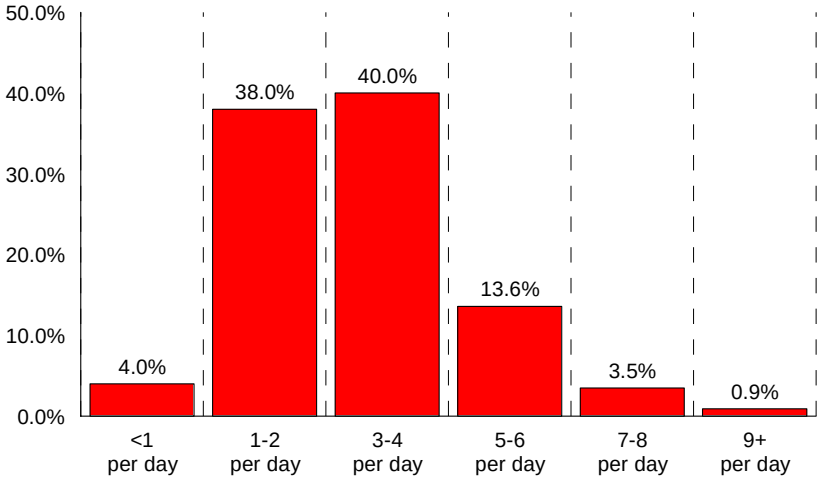
2002 Highlights

- Nebraska adults consume, on average, 3.5 servings of fruits and vegetables per day.
- Less than 1 in every 5 Nebraska adults (18.0%) consumes 5-a-day, while just 1 percent consumes 9-a-day (Figure 6).
- It is estimated that between 990,000 and one million Nebraska adults do not consume 5-a-day.

5-a-day Trends

- Between 1990 and 2002, 5-a-day consumption among Nebraska adults has remained virtually unchanged.

Figure 6: Daily Servings of Fruits and Vegetables Among Nebraska Adults, 2002



n=4,380 valid cases, 3 missing cases (0.1%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

Compared to the Nation in 2002[2]

- Nebraska ranks 4th lowest in 5-a-day consumption among 54 U.S. states and territories (interquartile range 20.6% to 27.5%).
- Compared to bordering states, Nebraska adults are less likely than adults in Colorado (23.9%), Iowa (19.8%), South Dakota (20.7%), and Wyoming (22.1%) to consume 5-a-day (p<.001, .05, .01 and .001 respectively).

Descriptive Analysis of fruit and vegetable consumption, 2002

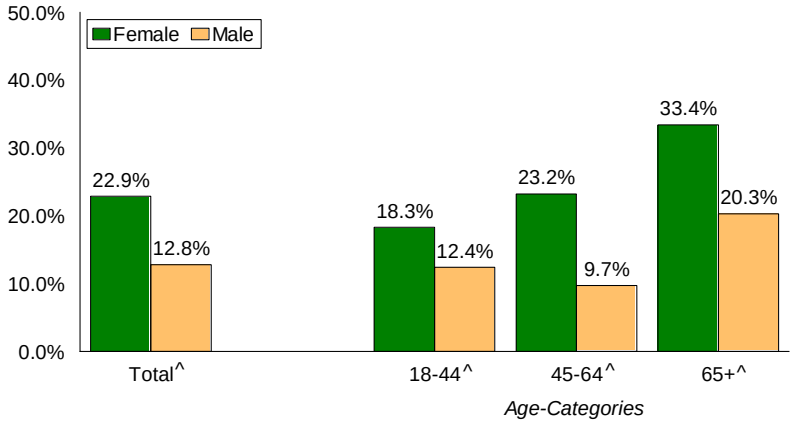
Age

- As age increases fruit and vegetable consumption increases among Nebraska adults. Older adults in Nebraska (aged 65 years and older) are 1.8 times more likely then younger adults (aged 18-64 years) to consume 5-a-day, 28.1 percent and 15.7 percent respectively (p<.001).

Gender

- Slightly more than 1 in every 5 female adults in Nebraska (22.9%) consumes 5-a-day compared to just 12.8 percent of male adults (Figure 7). This indicates that female adults in Nebraska are 1.8 times more likely than male adults in Nebraska to consume 5-a-day (p<.001).
- While females are more likely than males to consume 5-a-day across all ages, the gender disparity in 5-a-day consumption is greatest among Nebraska adults aged 45-64 years (relative risk 2.4) (Figure 7).

Figure 7: 5-a-day Consumption*
Among Nebraska Adults by Gender and Age, 2002

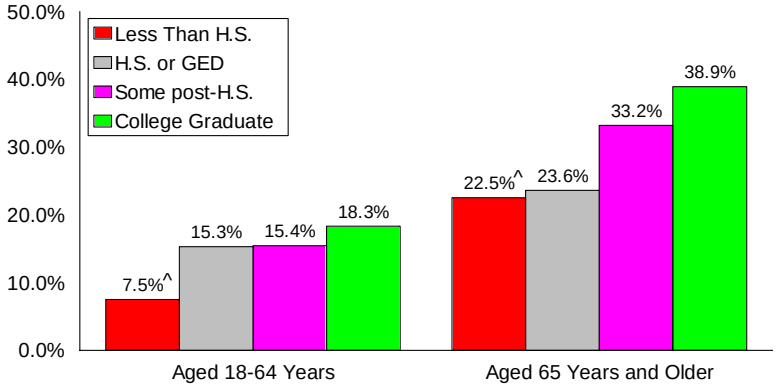


*Adults that consume 5 or more daily servings of fruits and vegetables
^The female percentage is significantly higher than the male percentage at the .001 level
Source: 2002 Nebraska Behavioral Risk Factor Survey

Education & Income

- Level of education is associated with 5-a-day consumption but income is not.
- As level of education increases, 5-a-day consumption increases among both younger and older adults (Figure 8). Among Nebraska adults aged 18-64 years, college graduates are 2.4 times more likely than adults with less than a high school education to consume 5-a-day, 18.3 percent and 7.5 percent respectively.

Figure 8: 5-a-day Consumption*
Among Nebraska Adults by Education, 2002



*Adults that consume 5 or more daily servings of fruits and vegetables
^Significantly lower than all other education categories at the .05 level
^^Significantly lower than adults with some college and college graduates at the .05 level
Listwise n=3,716 valid cases, 667 missing cases (15.2%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

Race/Ethnicity

- Compared to Whites, African Americans are 19 percent less likely and Hispanics are 28 percent less likely to consume 5-a-day (p<.05 and .01 respectively).

Urban/Rural

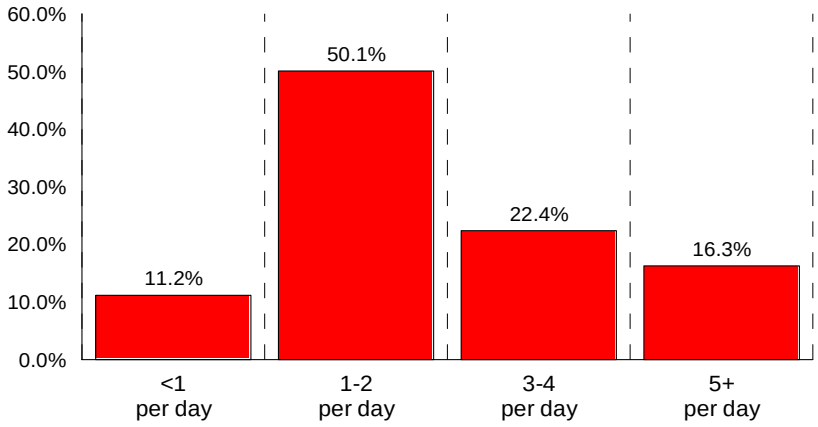
- 5-a-day consumption does not differ by urban and rural county classification.

Fruit and Vegetable Consumption among Nebraska High School Students[10]

2003 Highlights

- Just 1 in every 6 Nebraska high school students (16.3%) meet the USDA recommendation of 5 or more daily servings of fruits and vegetables (5-a-day) (Figure 9).
- In fact, 3 in every 5 students (61.3%) eats 2 or fewer servings of fruits and vegetables per day, far below the USDA recommendation.

Figure 9: Daily Servings of Fruits and Vegetables Among Nebraska High School Students*



*Average number of times per day that fruits and vegetables were eaten during the 7 days preceding the survey
n=2,750 valid cases, 183 missing cases (6.2%)
Source: 2003 Nebraska Youth Risk Behavior Survey

Compared to the Nation in 2003[11]

- High school students nationally are 35 percent more likely than high school students in Nebraska to consume 5-a-day, 22.0 percent and 16.3 percent respectively.

Descriptive Analysis of Fruit and Vegetable Consumption, 2003

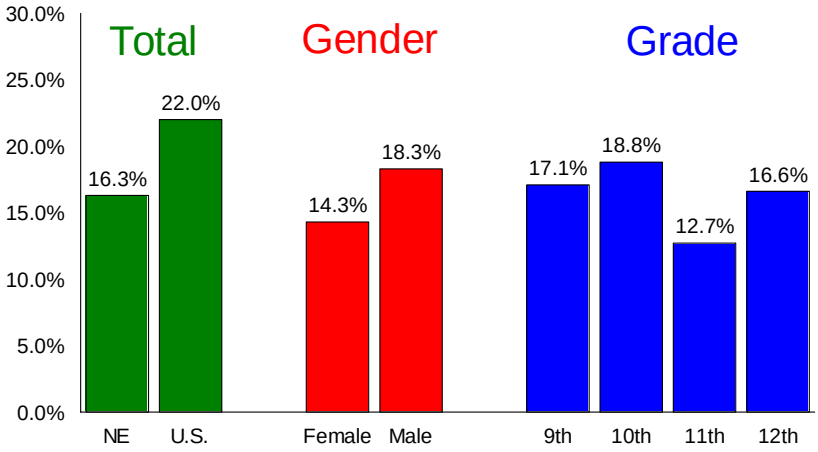
Gender

- Male students are 28 percent more likely than female students to consume 5-a-day, 18.3 percent and 14.3 percent respectively ($p<.01$) (Figure 10).

Grade

- Students in grades 9 and 10 are 23 percent more likely than students in grades 11 and 12 to consume 5-a-day, 18.0 percent and 14.6 percent respectively ($p<.05$).

Figure 10: 5-a-day Consumption* Among Nebraska High School Students, 2003



*Students that reported consuming fruits and vegetables 5 or more times per day during the 7 days preceding the survey
Source: 2003 Nebraska Youth Risk Behavior Survey

Milk Consumption

Introduction

In the past several years, a growing body of research suggests that dairy products (including milk, cheese and yogurt) may play a role in weight management efforts when coupled with a balanced reduced-calorie diet[12]. Many of these studies conclude that dairy consumption, which is high in dietary calcium, decreases the risk for overweight and obesity while lowering the risk for insulin resistance syndrome.

Milk Consumption among Nebraska High School Students[10]

Indicator Definition

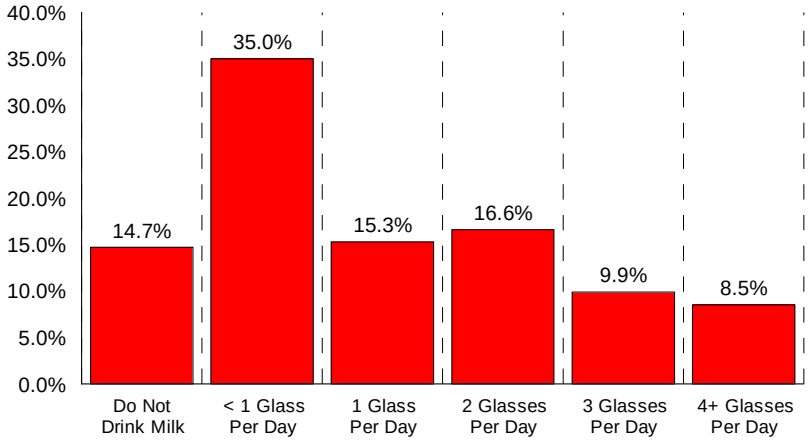
Regular Milk Consumption represents the percentage of Nebraska high school students that consumed 3 or more glasses of milk per day during the 7 days preceding the survey.

Nebraska HP2010 Objective: None Established

2003 Highlights

- More than 8 in every 10 Nebraska high school students (85.6%) drank milk during the seven days preceding the survey, however half (49.6%) consumed less than one glass per day (Figure 11).
- Less than 1 in every 5 students (18.4%) consumed milk regularly during the seven days preceding the survey.
- Among students that drank milk during the seven days preceding the survey and were aware of the fat content in the milk they drank, more than 1 in every 4 students (27.7%) drank no 1% fat or skim milk, meaning they consumed only higher fat (2% or whole) milk.

Figure 11: Average Glasses of Milk Drunk Per Day Among Nebraska High School Students



*Self-reported milk consumption during the 7 days preceding the survey, n=2,888 (missing=45)
n=2,888 valid cases, 45 missing cases (1.5%)
Source: 2003 Nebraska Youth Risk Behavior Survey

Compared to the Nation in 2003[11]

- While Nebraska high school students appear slightly more likely than U.S. high school students to consume milk regularly, the difference is non-significant, 18.4 percent and 17.1 percent respectively.

Descriptive Analysis of Milk Consumption, 2003

Gender

- Male students are more likely than female students to consume any amount of milk, and when consuming, they tend to consume larger amounts of milk. These findings are particularly concerning given the calcium recommendations for adolescent females. Dairy products are an excellent source of calcium and can help to maximize peak bone mass and protect the skeleton against

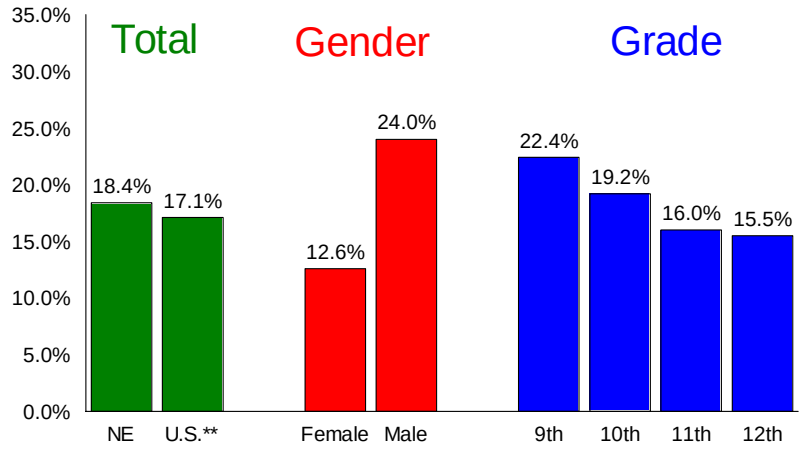
future risk for osteoporosis. Male students are nearly twice as likely as female students to consume milk regularly, 24.0 percent and 12.6 percent respectively (p<.001) (Figure 12).

- Although male students are more likely to consume milk, female students are more likely to consume 1% fat or skim milk. Among students that drank milk during the seven days preceding the survey and were aware of the fat content in the milk they drank, female students were 9 percent more likely than male students to often or always consume 1% fat or skim milk during the seven days preceding the survey, 57.8 percent and 53.0 percent respectively (p<.05).

Grade

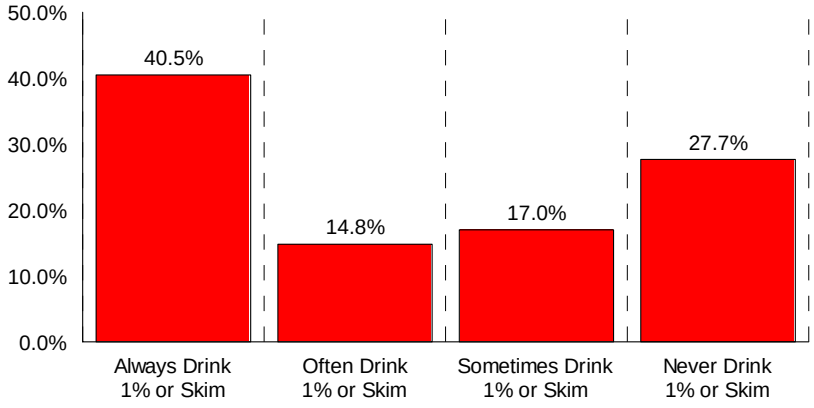
- As grade level increases, milk consumption decreases (Figure 12). Students in grade 9 (22.4%) were more likely than students in grades 11 (16.0%) and 12 (15.5%) to regularly consume milk during the seven days preceding the survey (p<.01).

Figure 12: Regular Milk Consumption Among Nebraska High School Students* by Gender and Grade, 2003



*Students that reported consuming 3 or more glasses of milk per day during the seven days preceding the survey
Source: 2003 Nebraska Youth Risk Behavior Survey
**Source: MMWR, Vol. 53, No. SS-2, May 21, 2004

Figure 13: 1% Fat or Skim Milk Consumption Among Nebraska High School Students that drink milk and are aware of the fat content in the milk they usually drink*



*Among those that consumed milk during the seven days preceding the survey and have know ledge of the fat content in the milk they usually drink
n=2,226
Source: 2003 Nebraska Youth Risk Behavior Survey

Soda Consumption

Introduction

According to the USDA, soft drink consumption in the United States (including soda, fruit flavored and part juice drinks, and sports drinks) increased 500 percent in the past 50 years[13]. Among all soft drinks, soda is the most frequently consumed[13]. The high consumption of sugar that results from soft drink consumption is contrary to the Dietary Guidelines for Americans that recommend choosing sensibly to limit intake of beverages and foods that are high in added sugar[13].

Soda Consumption among Nebraska High School Students[10]

Indicator Definitions

Regular Soda Consumption represents the percentage of Nebraska high school students that consumed 12 or more ounces of soda per day during the 7 days preceding the survey.

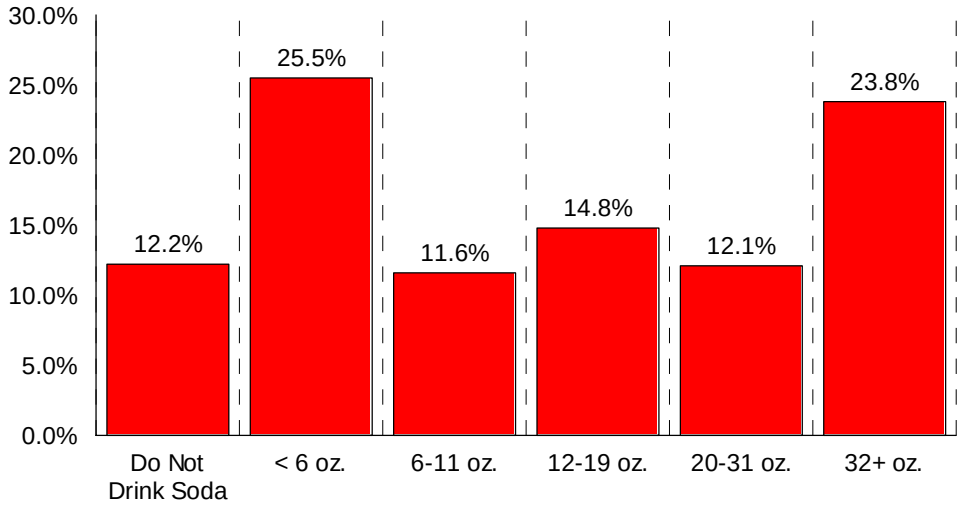
Excessive Soda Consumption represents the percentage of Nebraska high school students that consumed 32 or more ounces of soda per day during the 7 days preceding the survey.

Nebraska HP2010 Objective: None Established

2003 Highlights

- Almost 9 in every 10 Nebraska high school students (87.8%) drank soda during the seven days preceding the survey.
- Half (50.7%) drink soda regularly (12 or more ounces of soda per day) while 1 in every 4 students (23.8%) drink soda excessively (32 or more ounces of soda per day).
- The majority of soda consumed by Nebraska high school students is regular (non-diet) soda, which contains a large number of empty sugar calories. Among students that drank soda during the seven days preceding the survey, 2 in every 3 (63.6%) consumed only regular (non-diet) soda.

Figure 14: Average Ounces of Soda Drunk Per Day Among Nebraska High School Students*



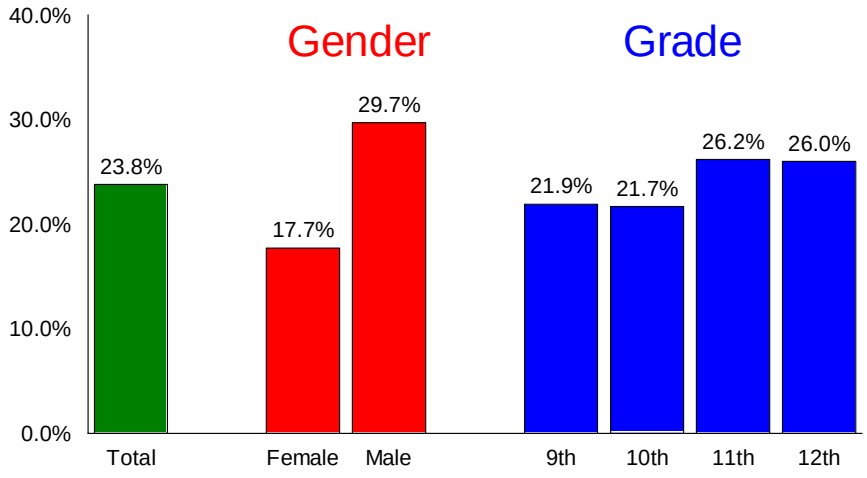
*This variable represents soda consumption behaviors during the 7 days preceding the survey and was created by combining (two questions) the soda consumption frequency and amount questions
n=2,558 valid cases, 375 missing cases (12.8%)
Source: 2003 Nebraska Youth Risk Behavior Survey

Descriptive Analysis of Soda Consumption, 2003

Gender

- Male students are more likely than female students to consume any amount of soda, and when consuming, they tend to consume larger amounts of soda. Male students were 1.7 times more likely than female students to consume 32 or more ounces of soda per day during the seven days preceding the survey, 29.7 percent and 17.7 percent respectively (p<.001).
- Male students are not only more likely to consume soda, but are also more likely to consume regular (non-diet) soda when consuming. Among students that drank soda during the seven days preceding the survey, male students were 1.4 times more likely than female students to consume only regular (non-diet) soda, 74.3 percent and 52.4 percent respectively (p<.001)

Figure 15: Percentage of Nebraska High School Students that drink 32 or more oz. of soda daily* by Gender and Grade

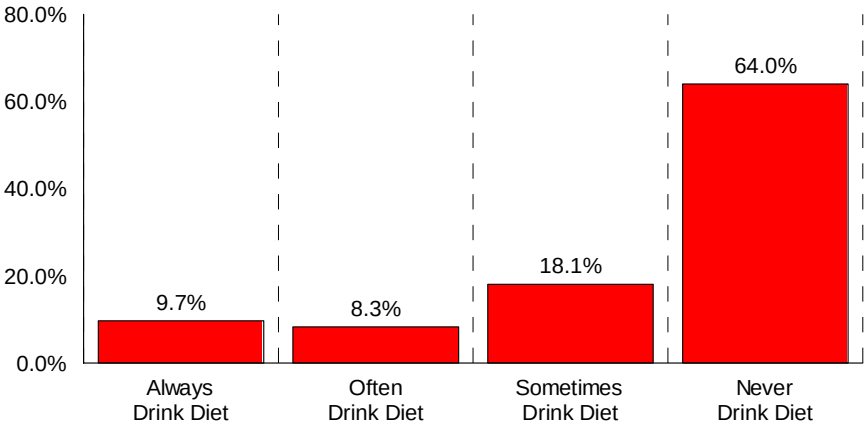


*Students that reported consuming 32+ oz. of soda daily during the 7 days preceding the survey
Source: 2003 Nebraska Youth Risk Behavior Survey

Grade

- Soda consumption varies across grade levels with the highest daily consumption among students in the 11th and 12th grades (Figure 15). Students in grades 11 and 12 were 20 percent more likely than students in grades 9 and 10 to consume 32 or more ounces of soda per day during the seven days preceding the survey, 26.1 percent and 21.8 percent respectively (p<.05).

Figure 16: Diet Soda Consumption Among Nebraska High School Students that Drink Soda*



*Represents frequency of diet soda consumption during the seven days preceding the survey among students that reported drinking soda
n=2,345
Source: 2003 Nebraska Youth Risk Behavior Survey

Physical Inactivity

Introduction

According to the CDC, more than 60 percent of U.S. adults do not engage in the recommended amount of physical activity, while 25 percent are not active at all[14]. Among youth, nearly half of all Americans aged 12-21 years are not vigorously active on a regular basis[15]. In addition, about 14 percent of young people report no recent physical activity[15].

Regular physical activity has numerous health benefits including decreased risk for heart disease and stroke. These benefits indicate that:

- Physical activity is as important to the development of CHD as controlling high blood pressure, controlling high blood cholesterol, and not smoking[16].
- Physically inactive people are almost twice as likely to develop CHD as people who engage in regular physical activity[17].
- Moderate to high levels of physical activity can reduce the risk of having a stroke (including total, ischemic, or hemorrhagic)[18].
- Compared to low-active individuals, it is estimated that highly active individuals have a 25-64 percent lower risk of stroke incidence or mortality[18].

Additional benefits from regular physical activity include[14]:

- Decreased risk of developing high blood pressure, colon cancer, and diabetes.
- Reduced blood pressure in some people with hypertension.
- Helps maintain healthy bones, muscles, and joints.
- Reduced symptoms of anxiety and depression and improvements in mood and feelings of well being.
- Helps control weight, develops lean muscle, and reduces body fat.

No Leisure Time Physical Activity Among Nebraska Adults, 2002[5]

Indicator Definition

No Leisure Time Physical Activity represents the percentage of adults that, other than their regular job, did not participate in any physical activities or exercises during the 30 days preceding the survey.

Nebraska HP2010 Objective:
15 percent (#22-1)

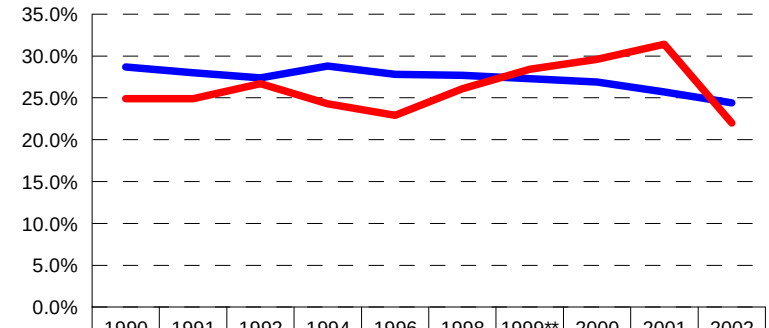
2002 Highlights

- More than 1 in every 5 Nebraska adults (22.0%), an estimated 268,000 to 300,000 Nebraska adults, do not engage in leisure time physical activity (Figure 17).

Trends

- Between 1996 and 2001, no leisure time physical activity increased 37.1 percent, from 22.9 percent to 31.4 percent (sig at .001 level) before declining dramatically in 2002 to 22.0 percent (Figure 17).

Figure 17: No Leisure Time Physical Activity* Among NE and U.S. Adults



	1990	1991	1992	1994	1996	1998	1999**	2000	2001	2002
Nebraska	24.9%	24.9%	26.7%	24.3%	22.9%	26.1%	28.4%	29.6%	31.4%	22.0%
Nation	28.7%	28.0%	27.4%	28.8%	27.8%	27.7%		26.9%	25.7%	24.4%

*Adults that have ever been told by a doctor, nurse, or health professional that their blood cholesterol is high, among those that have every had their blood cholesterol checked.
**National data unavailable for 1999
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

Compared to the Nation in 2002[2]

- Nebraska adults rank relatively well compared to the rest of the nation. In 2002, they ranked tied for 17th lowest (with Connecticut) in no leisure time physical activity among 54 U.S. states and territories (interquartile range 20.9% to 27.3%).
- Compared to bordering states, Nebraska adults are more likely than adults in Colorado (19.3%) to engage in no leisure time physical activity (p<.01), while less likely than adults in Missouri (26.5%) and South Dakota (23.8%) to engage in no leisure time physical activity (p<.001 and .05 respectively).

Descriptive Analysis of No Leisure Time Physical Activity, 2002

Age

- Among Nebraska adults, there is a positive linear relationship between age and no leisure time physical activity, indicating that older adults are more likely than younger adults to not engage in leisure time physical activity.

Gender

- The overall gender difference in no leisure time physical activity is non-significant (23.0% for female and 20.9% for male). However, among Nebraska adults aged 18-24 years, females are 1.9 times more likely than males to not engage in leisure time physical activity, 17.8 percent and 9.5 percent respectively (p<.05).

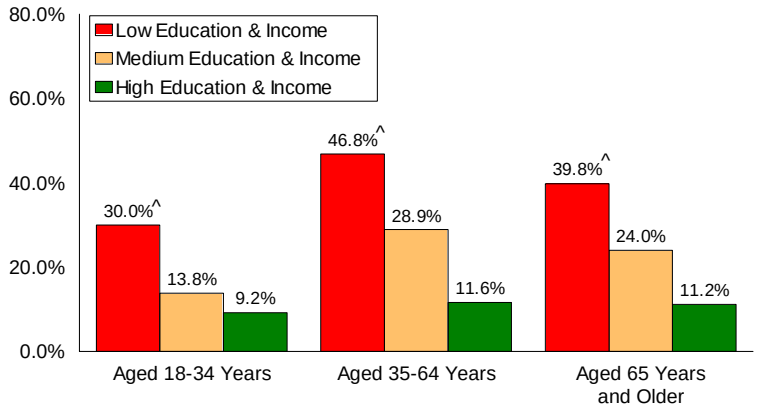
Education & Income

- Nebraska adults with low education and income are far more likely than Nebraska adults with high education and income to not engage in leisure time physical activity (Figure 18).

Race/Ethnicity Highlights from 2001 & 2002 (combined)

- Among Nebraska adults, nearly 2 in every 5 African Americans (38.1%) and more than 2 in every 5 Hispanics (44.2%) do not engage in any leisure time physical activity, making them 43 percent and 71 percent more likely than Whites (25.9%) to not engage in leisure time physical activity respectively. (p<.001 respectively) (Figure 19).

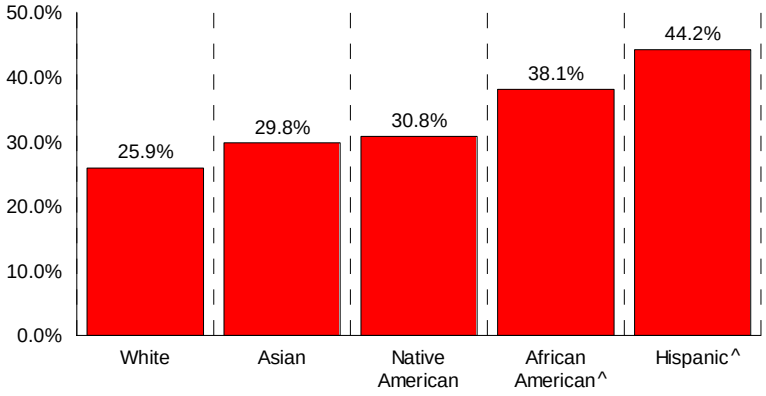
Figure 18: No Leisure Time Physical Activity*
Among Nebraska Adults by Education & Income, 2002**



*Adults that did not engage in any leisure time physical activity (outside of work) during the past 30 days
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc=≥$35K income and education beyond high school

^Significantly higher than medium and high ed/inc at the .001 level
Listwise n=3,715 valid cases, 668 missing cases (15.2%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

Figure 19: No Leisure Time Physical Activity*
Among Nebraska Adults by Race/Ethnicity, 2001-2002



*Adults that did not engage in any leisure time physical activity (outside of work) during the past 30 days
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .001 level
Missing data=250 cases (1.5%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

Urban/Rural

- Nebraska adults aged 18-34 years living outside of Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 55 percent more likely than adults living within Nebraska's three urban-metropolitan counties to not engage in leisure time physical activity, 19.1 percent and 12.3 percent respectively (p<.01). Differences within both middle and older adult age-categories are non-significant.

Recommended Vigorous Physical Activity among Nebraska Adults, 2001[5]

Indicator Definition

Recommended Vigorous Physical Activity represents the percentage of adults that engage in vigorous physical activity for 20 or more minutes on 3 or more days per week.

Nebraska HP2010 Objective: 30 percent (#22-3)

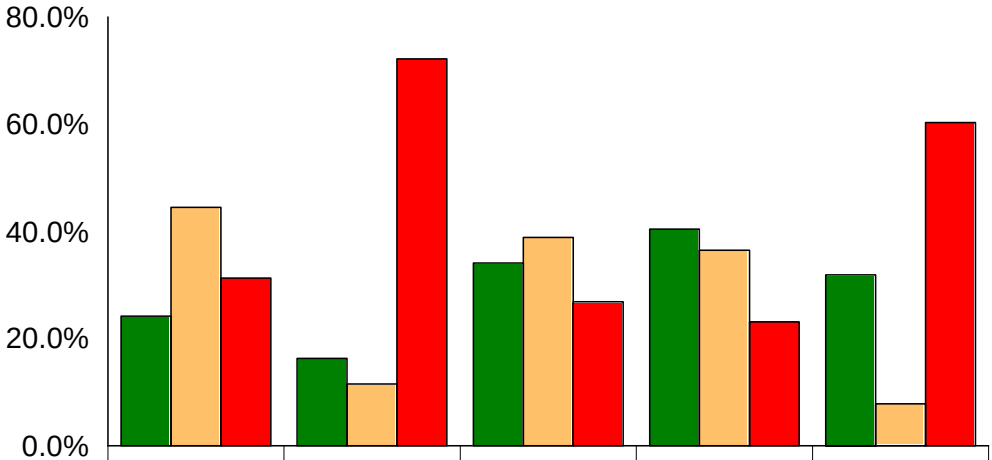
2001 Highlights

- Approximately 1 in every 6 Nebraska adults (16.3%) engages in recommended vigorous physical activity (Figure 20). In contrast, this indicates that 5 in every 6 Nebraska adults, or an estimated 1,064,000 to 1,095,000 Nebraska adults, do not engage in recommended vigorous physical activity.

Trends

- While the trend was inconsistent between 1989-2000, the percentage of Nebraska adults engaging in regular and vigorous physical activity increased 31 percent between 1989-1991 (9.0%) and 1998-2000 (11.8%) (p<.001).

Figure 20: Physical Activity Among Nebraska Adults



	Moderate PA*	Vigorous PA*	Recommended PA*	Regular Walking**	Regular Strengthening Exercise**
Sufficient Activity	24.2%	16.3%	34.1%	40.4%	31.9%
Insufficient Activity	44.5%	11.5%	38.9%	36.5%	7.8%
Inactive	31.3%	72.2%	26.9%	23.1%	60.3%

Note: See indicator definitions under the appropriate sub-headings within this chapter
*Source: 2001 Nebraska Behavioral Risk Factor Survey
**Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Recommended Moderate Physical Activity among Nebraska Adults, 2001[5]

Indicator Definition

Recommended Moderate Physical Activity represents the percentage of adults that engage in moderate physical activity for 30 or more minutes on 5 or more days per week.

Nebraska HP2010 Objective: 30 percent (#22-2)

2001 Highlights

- Approximately 1 in every 4 Nebraska adults (24.2%) engages in recommended moderate physical activity (Figure 20). In contrast, this indicates that 3 in every 4 Nebraska adults, an estimated 959,000 to 996,000 adults, do not engage in recommended moderate physical activity.

Trends

- Between 1989 and 2000, inconsistent variation in regular and sustained physical activity occurred, indicating no overall change during the time period.

Recommended Physical Activity among Nebraska Adults, 2001[5]

Indicator Definition

Recommended Physical Activity represents the percentage of adults that engage in moderate physical activity (for 30 or more minutes on 5 or more days per week) or vigorous physical activity (for 20 or more minutes on 3 or more days per week).

Nebraska HP2010 Objective: None Established

2001 Highlights

- Approximately 1 in every 3 Nebraska adults (34.1%) engages in recommended physical activity (Figure 20). However, in contrast, more than 1 in every 4 Nebraska adults (26.9%) does not engage in any moderate or vigorous physical activity while 2 in every 5 (38.9%) engage in an insufficient amount. It is estimated that between 830,000 and 870,000 Nebraska adults fail to engage in recommended physical activity.

Trends

- Between 1989 and 2000, recommended physical activity has remained stable.

Compared to the Nation in 2002[19]

- Nebraska adults' rank 50th lowest in recommended physical activity among all 50 states and the District of Columbia (interquartile range 43.8% to 50.7%).
- Compared to bordering states, Nebraska adults are less likely than adults in all six bordering states to engage in recommended physical activity.

Descriptive Analysis of Recommended Physical Activity

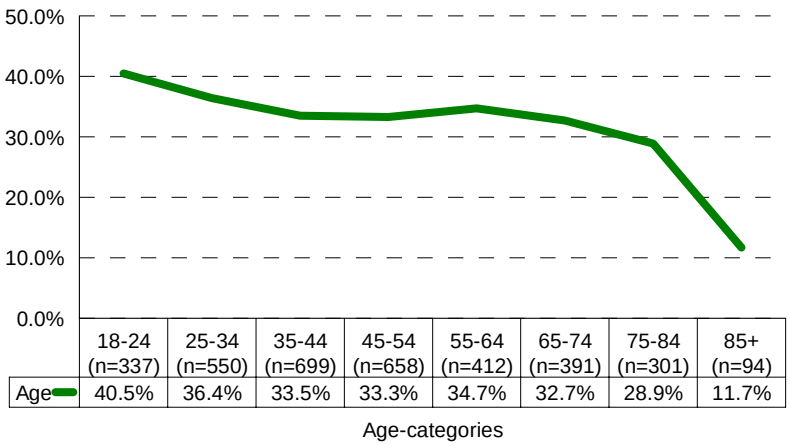
Age

- Among Nebraska adults, there is a negative linear relationship between age and recommended physical activity, indicating that younger adults are more likely than older adults to engage in recommended physical activity (Figure 21).

Gender

- While male adults in Nebraska appear slightly more likely than female adults in Nebraska to engage in recommended physical activity, 35.7 percent and 32.6 percent respectively, the difference is non-significant.
- Although an overall gender difference does not exist for recommended physical activity, a difference does exist among older adults. Among Nebraska adults aged 65 years and older, males are 26.2 percent more likely than females to engage in recommended physical activity ($p<.05$).

Figure 21: Recommended Physical Activity* Among NE Adults by Age, 2001



*Adults that engage in sufficient moderate activity, sufficient vigorous activity, or both
Listwise n=3,442, 257 missing cases (6.9%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

Education & Income

- Nebraska adults with high education and income are far more likely than Nebraska adults with low education and income to engage in recommended physical activity. These differences occur among Nebraska adults aged 18-35 years (relative risk 1.4), aged 35-64 years (relative risk 1.3), and aged 65 years and older (relative risk 1.6).

Race/Ethnicity

- African American and Hispanic adults in Nebraska are 20 percent and 18 percent less likely than White adults respectively to engage in recommended physical activity.

Urban/Rural

- Among Nebraska adults, there is no difference in recommended physical activity between Nebraska adults living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

Regular Walking among Nebraska Adults, 2003[20]

Indicator Definition

Regular Walking represents the percentage of adults that walk for 30 or more minutes on 5 or more days per week for recreation, exercise, to get to and from places, or for any other reason.

Nebraska HP2010 Objective: None available

2003 Highlights

- Approximately 2 in every 5 Nebraska adults (40.4%) engages in regular walking (Figure 20). In contrast, this indicates that 3 in every 5 Nebraska adults, or an estimated 752,000 to 785,000 Nebraska adults, do not engage in regular walking. More specifically, nearly 1 in every 4 Nebraska adults (23.1%) does not walk for at least 10 minutes at a time during an average week.

Descriptive Analysis of Regular Walking

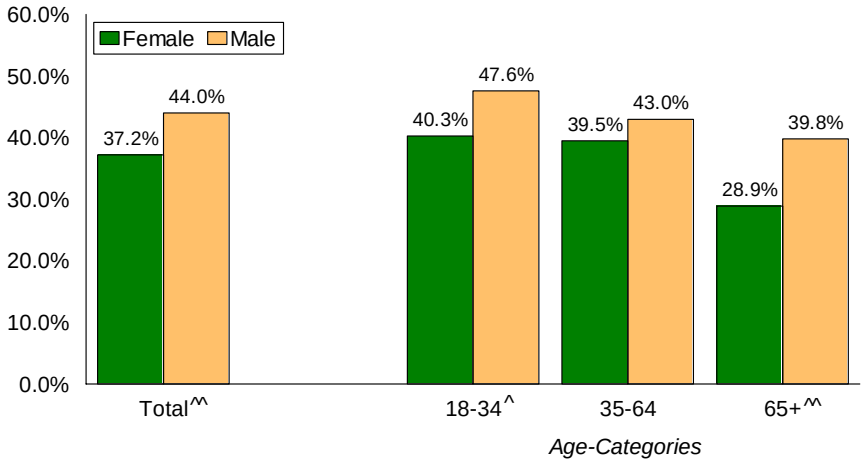
Age

- There is a negative linear association between age and regular walking, indicating that younger adults are more likely than older adults to engage in regular walking. The most dramatic declines in regular walking occur among Nebraska adults aged 75 years and older.

Gender

- Male adults in Nebraska are 18 percent more likely than female adults in Nebraska to engage in regular walking, 44.0 percent and 37.2 percent respectively (p<.001) (Figure 22). The most dramatic gender disparity occurs among Nebraska adults aged 65 years and older where males are 36 percent more likely than females to engage in regular walking, 39.3 percent and 28.9 percent respectively (p<.001).

Figure 22: Regular Walking*
Among Nebraska Adults by Gender and Age, 2003



*Adults that walk for 30 or more minutes on 5 or more days during an average week
Gender difference is significant at the ^.01 level or ^^.001 level
Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Education & Income

- Among Nebraska adults aged 65 years and older, adults with low education and income (28.9%) are 1.6 times less likely than adults with high education and income (45.7%) to engage in regular walking (p<.001).

Race/Ethnicity

- No significant racial/ethnic disparities exist in regular walking among Nebraska adults. African American adults in Nebraska (36.2%) appear slightly less likely than White adults in Nebraska (40.5%) to engage in regular walking, however the difference was non-significant.

Urban/Rural

- Nebraska adults living inside of Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 13 percent more likely than adults living outside of Nebraska's three urban-metropolitan counties to engage in regular walking (p<.001).

Regular Strengthening Exercise among Nebraska Adults, 2003[20]

Indicator Definition

Regular Strengthening Exercise represents the percentage of adults that do any activities to increase muscle strength or tone such as lifting weights, pull-ups, push-ups, or sit-ups on 3 or more days per week.

Nebraska HP2010 Objective: None available

2003 Highlights

- Approximately 1 in every 3 Nebraska adults (31.9%) engages in regular strengthening exercise. In contrast, 7.8 percent engage in strengthening exercise on one or two days per week while 60.3 percent do not engage in any strengthening exercise.

Descriptive Analysis of Regular Strengthening Exercise

Age

- There is a negative linear association between age and regular strengthening exercise, indicating that younger adults are more likely than older adults to engage in regular strengthening exercise.

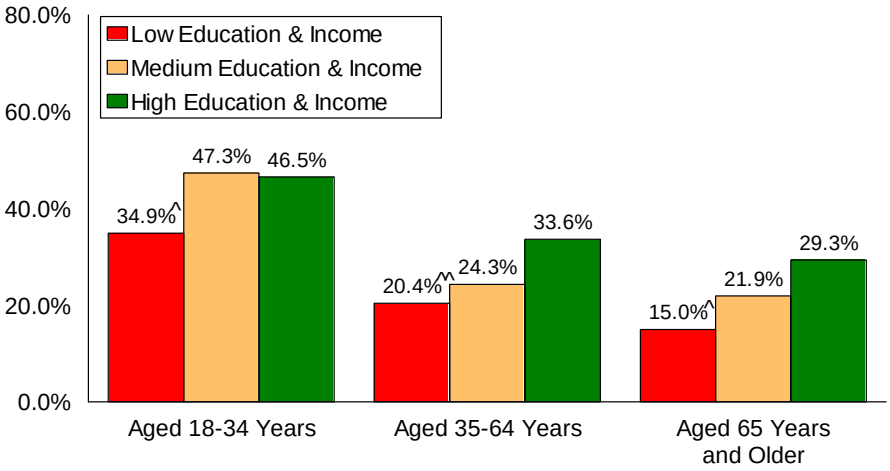
Gender

- Male adults in Nebraska are 41 percent more likely than female adults in Nebraska to engage in regular strengthening exercise, 37.7 percent and 26.8 percent respectively (p<.001). The most dramatic gender disparity occurs among younger Nebraska adults aged 18-24 years where males are 76 percent more likely than females to engage in regular strengthening exercise, 65.5 percent and 37.2 percent respectively (p<.001).

Education & Income

- Nebraska adults with high education and income are more likely than adults with low education and income to engage in regular strengthening exercise among adults aged 18-34 years (relative risk 1.33), aged 35-64 years (relative risk 1.65), and aged 65 years and older (relative risk 1.95) (Figure 23).

Figure 23: Regular Strengthening Exercise* Among Nebraska Adults by Education & Income, 2003**



*Adults that did not engage in any leisure time physical activity (outside of work) during the past 30 days
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc=≥$35K income and education beyond high school
^Significantly lower than medium & high ed/inc at .05 level
^^Significantly lower than high ed/inc at .001 level
Listwise n=4929 valid cases, 2090 missing cases (29.8%)
Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Race/Ethnicity

- Among Nebraska adults, no significant differences in regular strengthening exercise exist between Whites and any racial/ethnic minority population. African American adults in Nebraska (37.6%) appear slightly more likely than White adults in Nebraska (31.5%) to engage in regular strengthening exercise, however the difference was non-significant.

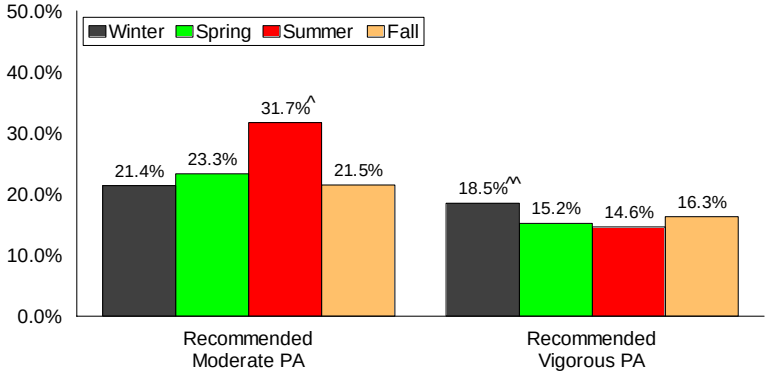
Urban/Rural

- Nebraska adults living inside of Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 27 percent more likely than adults living outside of Nebraska's three urban-metropolitan counties to engage in regular strengthening exercise (p<.001).

Seasonal Variation in Physical Activity among Nebraska Adults, 2001[5]

- Nebraska adults are more likely to engage in recommended moderate physical activity during the summer season (of July, Aug., and Sept.) than during any other season (Figure 24).
- In contrast, Nebraska adults are more likely to engage in recommended vigorous physical activity during the winter season (of Jan., Feb., and March) (18.5%) than they are during the summer season (14.6%) ($p<.05$).

Figure 24: Seasonal Variation* in Physical Activity Among Nebraska Adults, 2001



*Seasons include respondents that completed the survey in the winter (Jan. Feb. March), Spring (April, May, June), Summer (July, Aug., Sept.) and Fall (Oct., Nov., Dec.)
^Significantly higher than all other seasons at the .001 level
^^Significantly higher than the summer season at the .05 level
Source: 2001 Nebraska Behavioral Risk Factor Survey

Occupational Inactivity among Nebraska Adults, 2001[5]

Indicator Definition:

Occupational Inactivity represents the percentage of adults that mostly sit or stand at their work, among Nebraska adults that are employed.

Nebraska HP2010 Objective: None Established

2001 Highlights

- Among Nebraska adults that are employed:
  - More than 3 in every 5 (62.9%) have inactive jobs (requiring mostly sitting or standing at work)
  - 1 in every 5 (21.0%) have jobs that require mostly walking,
  - and 1 in every 6 (16.0%) have jobs requiring mostly heavy labor or physically demanding work

Descriptive Analysis of Occupational Physical Activity, 2001

Age

- Nebraska adults aged 18-24 years and 65 years and older that are employed, are less likely to have inactive jobs, and more likely to have jobs that require mostly walking.

Gender

- Among Nebraska adults that are employed, females are 27.9 percent more likely than males to have inactive jobs, 71.1 percent and 55.6 percent respectively ($p<.001$) (Figure 25). In contrast, males and females are equally likely to have jobs that require mostly walking, however males (23.6%) are 3.1 times more likely than females (7.6%) to have jobs that require mostly heavy labor or physically demanding work (Figure 25).

Education & Income

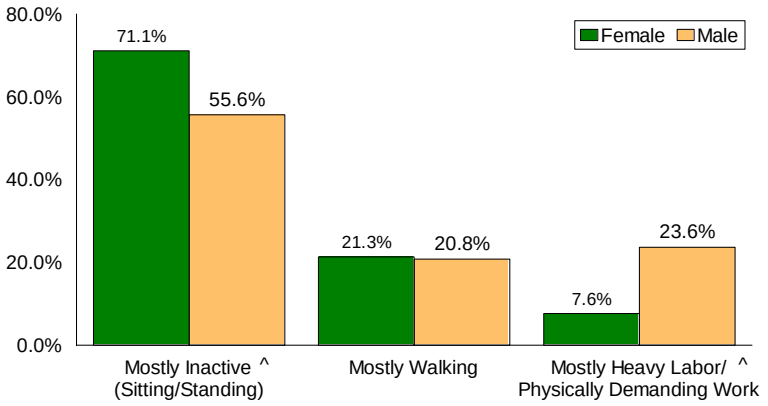
- Among Nebraska adults that are employed, as level of education increases, occupational inactivity increases, indicating that the more educated adults are more likely to have jobs that require mostly sitting or standing.

- Among Nebraska adults that are employed, college graduates are more likely than those with less than a high school education to have inactive jobs among those aged 18-34 years (relative risk 1.8) and aged 35-64 years (relative risk 1.4).

Race/Ethnicity

- Among Nebraska adults that are employed, Whites are 12 percent more likely than African Americans and 14 percent more likely than Hispanics to have inactive jobs.

Figure 25: Occupational Physical Activity Among Nebraska Adults that are Employed by Gender, 2001



^Significant difference at the .001 level
Listwise n=2,210
Source: 2001 Nebraska Behavioral Risk Factor Survey

Urban/Rural

- Among Nebraska adults that are employed, adults living inside Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy) are 20.7 percent more likely than adults living outside of Nebraska's three urban metropolitan counties to have inactive jobs, 69.3 percent and 57.4 percent respectively.
- In contrast, among Nebraska adults that are employed, adults living outside Nebraska's three urban metropolitan counties are twice as likely as adults living inside Nebraska's three urban metropolitan counties to have jobs that require mostly heavy labor or physically demanding work, 21.1 percent and 10.4 percent respectively.

Physical Activity among Nebraska High School Students[10]

Youth Physical Education Recommendation:
The National Association for Sport and Physical Education (NASPE) recommends that adolescents at the middle and high school level engage in 225 minutes of physical education per week (including a mixture of structured and unstructured vigorous and moderate physical activity) and attend weekly physical education that provides exercises that improve strength and flexibility at least 3 times per week.

Indicator Definitions:

Sufficient Moderate Physical Activity represents the percentage of students that engage in 30 or more minutes of activity that did not make them sweat or breathe hard on five or more of the seven days preceding the survey.

Sufficient Vigorous Physical Activity represents the percentage of students that engage in 20 or more minutes of activity that made them sweat and breathe hard on three or more of the seven days preceding the survey.

Regular Strengthening Exercise represents the percentage of students that did exercises to strengthen or tone their muscles on three or more of the seven days preceding the survey.

Sufficient Physical Activity In All Its Forms represents the percentage of students that engaged in sufficient vigorous activity, sufficient moderate activity, and regular strengthening exercises during the seven days preceding the survey.

Insufficient Physical Activity represents the percentage of students that did not participate in sufficient vigorous activity and did not participate in sufficient moderate activity during the seven days preceding the survey.

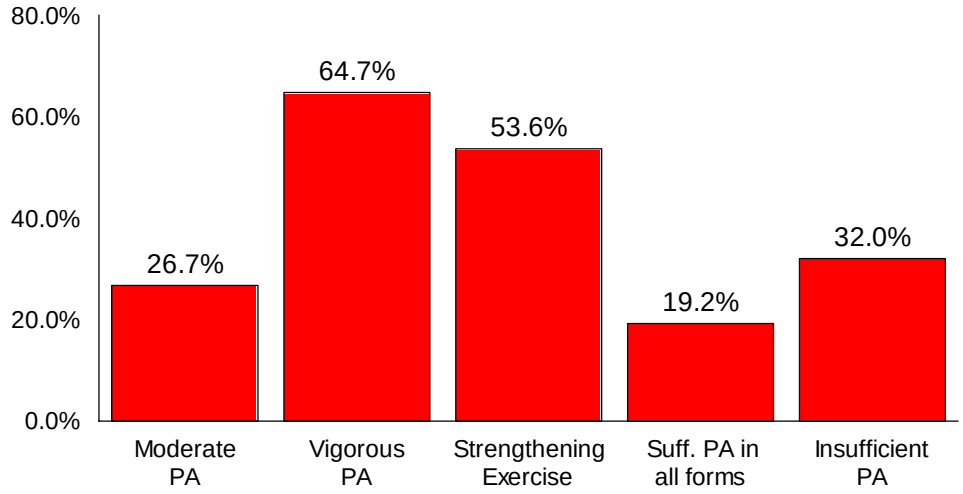
Nebraska HP2010 Objectives:

- Sufficient Moderate Physical Activity: 35 percent (#22-6)
- Sufficient Vigorous Physical Activity: 85 percent (#22-7)

2003 Highlights (Figure 26)

- 1 in every 4 students (26.7%) engage in sufficient moderate physical activity (30 or more minutes of activity that did not make them sweat or breathe hard on five or more of the seven days preceding the survey).
- 2 in every 3 students (64.7%) engage in sufficient vigorous physical activity (20 or more minutes of activity that made them sweat and breathe hard on three or more of the seven days preceding the survey).
- Slightly more than half of all students (53.6%) engage in regular strengthening exercises (did exercises to strengthen or tone their muscles on three or more of the seven days preceding the survey).
- Collectively, participation in sufficient levels of physical activity (in all its forms) is particularly low. Only 1 in every 5 students (19.2%) engages in sufficient physical activity (indicating that they engaged in sufficient vigorous activity, sufficient moderate activity, and regular strengthening exercises during the seven days preceding the survey).
- In contrast, approximately 1 in every 3 students (32.0%) does not engage in a sufficient amount of physical activity (insufficient physical activity).

Figure 26: Percentage of Nebraska High School Students Participating in Sufficient Levels of the Following Activities, 2003



Note: See indicator definitions under the appropriate sub-headings within this chapter
PA=Physical Activity
Source: 2003 Nebraska Youth Risk Behavior Survey

Physical Activity Trends:

- Between the early 1990s and 2003, participation in sufficient vigorous physical activity among Nebraska high school students declined significantly, while participation in regular strengthening exercises has remained stable. In particular, the percentage of students engaging in sufficient vigorous physical activity declined 7 percent from between 1991 (69.6%) and 2003 (64.7%) ($p<.001$).

Compared to the Nation in 2003[11]

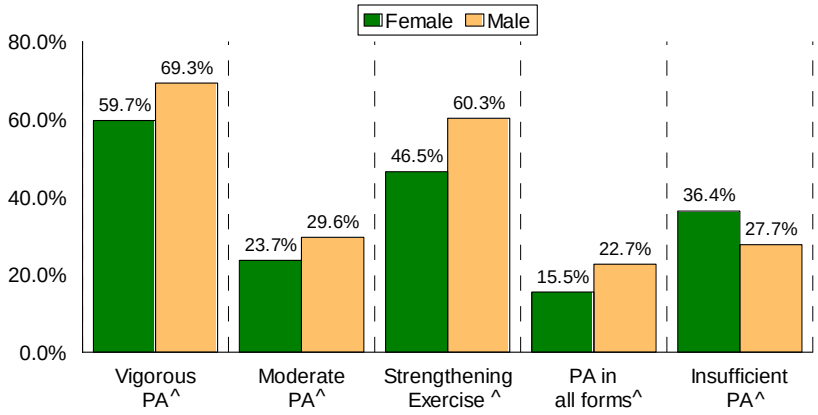
- While high school students in Nebraska appear slightly more likely than high school students nationally to engage in sufficient moderate physical activity, sufficient vigorous physical activity, and regular strengthening exercise, the differences are non-significant.

Descriptive Analysis of physical activity levels, 2003

Gender (Figure 27)

- Male students were 47 percent more likely than female students to engage in sufficient physical activity (in all forms) during the seven days preceding the survey, 22.7 percent and 15.5 percent respectively (p<.001).
- The greatest (male to female) gender disparity in physical activity occurs in the participation of regular strengthening exercise (60.3% and 46.5% respectively, relative risk 1.30) followed by participation in sufficient moderate physical activity (29.6% and 23.7% respectively, relative risk 1.25) and sufficient vigorous physical activity (69.3% and 59.7% respectively, relative risk 1.16) (all sig at p<.001).

Figure 27: Percentage of Nebraska High School Students Participating in Sufficient Levels of the Following Activities By Gender, 2003



Note: See indicator definitions under the appropriate sub-headings within this chapter
PA=Physical Activity
^Gender difference significant at the .001 level
Source: 2003 Nebraska Youth Risk Behavior Survey

Grade

- Across all forms of physical activity, as grade level increases, physical activity decreases. Students in grade 9 (22.3%) were more likely than students in grades 11 (17.2%) and 12 (16.6%) to engage in sufficient physical activity (in all forms) during the seven days preceding the survey (sig at the .05 and .01 level respectively).

Sports Team Participation among Nebraska High School Students[10]

Indicator Definition

Regular Sports Team Participation represents the percentage of students that participated on two or more sports teams during the 12 months preceding the survey.

2003 Highlights

- Approximately 3 in every 5 Nebraska high school students (62.0%) participated on one or more sports teams during the 12 months preceding the survey, while, nearly 2 in every 5 did not participate on any sports teams during the 12 months preceding the survey.
- Approximately 2 in every 5 students (41.9%) engage in regular sports team participation.

Trends in Sports Team Participation

- The trend in regular sports team participation among Nebraska high school students is declining.

Between 1993 and 2003, regular sports team participation declined 15.2 percent, from 49.4 percent to 41.9 percent respectively (p<.001).

Compared to the Nation in 2003[11]

- High school students in Nebraska are 8 percent more likely than high school students nationally to participate on one or more sports teams during the seven days preceding the survey, 62.0 percent and 57.6 percent respectively (p<.05).

Descriptive Analysis of Sports Team Participation, 2003

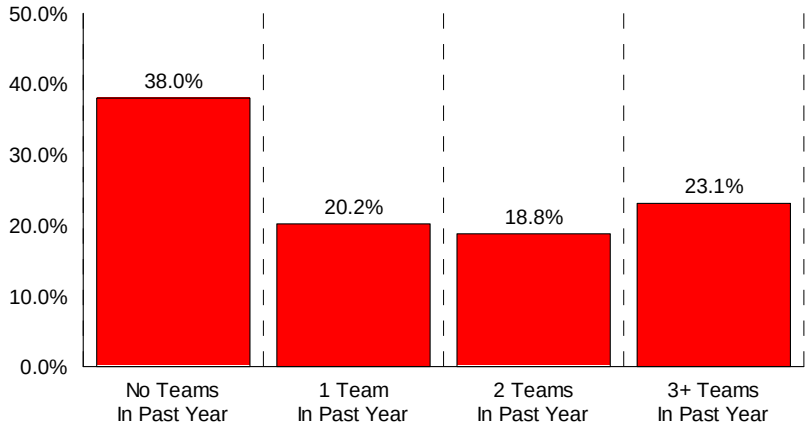
Gender

- Nearly half of all male students (48.2%) engage in regular sports team participation compared to approximately 1 in every 3 female students (35.2%), indicating that male students are 37 percent more likely than female students to engage in regular sports team participation (p<.001).

Grade

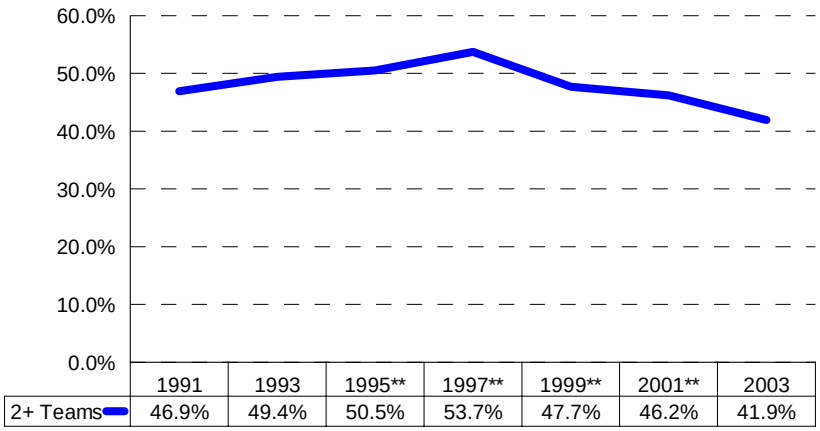
- As grade level increases, sports team participation decreases. Students in grade 9 (48.2%) are more likely than students in grades 10 (42.2%), 11 (38.0%), and 12 (38.3%) to engage in regular sports team participation (p<.05, .001, and .001 respectively).

Figure 28: Sports Team Participation Among Nebraska High School Students, 2003



Listwise n=2,751 valid cases, 182 missing cases (6.2%)
Source: 2003 Nebraska Youth Risk Behavior Survey

Figure 29: Trends in Regular Sports Team Participation* Among Nebraska High School Students, 1991-2003



	1991	1993	1995**	1997**	1999**	2001**	2003
2+ Teams	46.9%	49.4%	50.5%	53.7%	47.7%	46.2%	41.9%

*Students that reported participating on two or more sports teams during the 12 months preceding the survey
**Data were not weighted due to a low respone rate
Source: 2003 Nebraska Youth Risk Behavior Survey

Physical Education Class Participation among Nebraska High School Students[10]

Indicator Definitions

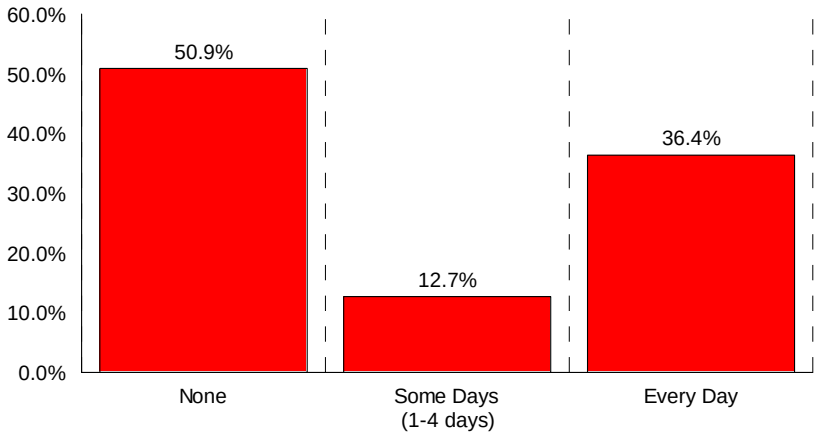
Daily PE represents the percentage of students that attend PE class on 5 days during an average week when they are in school.

Quality Daily PE represents the percentage of students that attend PE class on 5 days during an average week when they are in school and participate in exercise or sports for more than 20 minutes during an average PE class.

2003 Highlights

- Half of all Nebraska high school students attend physical education (PE) class during an average school week, however just slightly more than 1 in every 3 students (36.4%) attend PE class daily.
- Among students enrolled in PE class, approximately 9 in every 10 (87.3%) exercise for more than 20 minutes during an average PE class.
- Just 1 in every 3 Nebraska high school students (33.3%) receives quality daily PE.

Figure 30: Average Weekly PE Class Attendance Among Nebraska High School Students, 2003



Listwise n=2,560 valid cases, 373 missing cases (12.7%)
Source: 2003 Nebraska Youth Risk Behavior Survey

Trends in PE class

- Since the early 1990s, self-reported participation in quality daily PE class among Nebraska high school students has increased. Between 1993 and 2001, the percentage of Nebraska high school students receiving quality daily PE increased 26.1 percent, from 26.4 percent to 33.3 percent respectively (sig at .001 level).

Compared to the Nation in 2003[11]

- High school students in Nebraska are 28 percent more likely than high school students nationally to attend PE class daily, 36.4 percent and 28.4 percent respectively (p<.001).

Descriptive Analysis of PE Class Participation, 2003

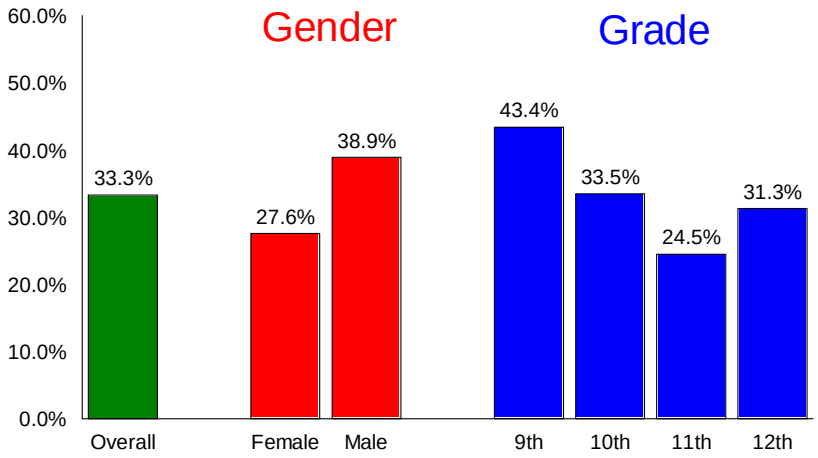
Gender

- Male students are 40.9 percent more likely than female students to receive quality daily PE, 38.9 percent to 27.6 percent respectively (p<.001).

Grade

- As grade level increases, PE class participation decreases. Students in grade 9 (43.4%) are more likely than students in grades 10 (33.5%), 11 (24.5%), and 12 (31.3%) to receive quality daily PE (p<.001 respectively).

Figure 31: Quality Daily PE Class* Among Nebraska High School Students by Gender and Grade, 2003



*Students that reported attending PE class daily and exercising for >20 minutes during an average PE class
Source: 2003 Nebraska Youth Risk Behavior Survey

- Likely due to graduation requirements, students in grade 12 are more likely than students in grade 11 to receive quality daily PE, 31.3 percent and 24.5 percent respectively (p<.01).

High Blood Pressure

Introduction

The health consequences of high blood pressure, including increased risk for heart disease and stroke, are serious[21]. As a result, the CDC emphasizes the importance of early detection, treatment, and control of high blood pressure[21]. In 2001, an estimated 50 million Americans (or 1 in every 5) had high blood pressure while more than 46,000 died from it[22]. Unfortunately, of those with high blood pressure, 30 percent do not even know they have it while an additional 25 percent are on medication but do not have their high blood pressure under control[23].

Diagnosed High Blood Pressure among Nebraska Adults, 2001[5]

Indicator Definition

Diagnosed High Blood Pressure represents the percentage of adults that have ever been told by a doctor, nurse, or other health professional that their blood pressure is high.

Nebraska HP2010 Objective: 16 percent (#12-9)

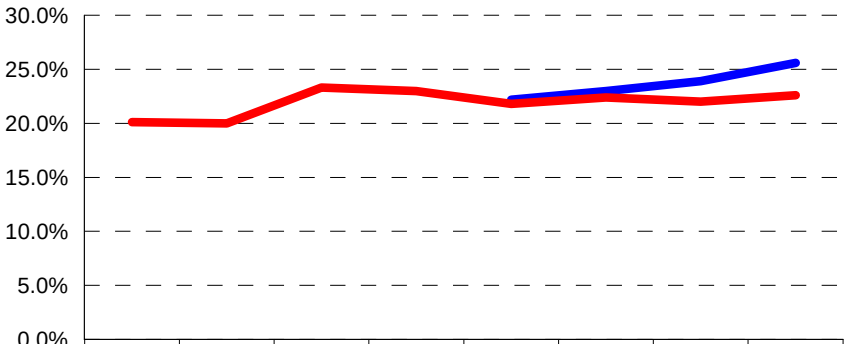
2001 Highlights

- Nearly 1 in every 4 (22.6%), or an estimated 274,000 to 309,000 Nebraska adults have diagnosed high blood pressure.

Trends

- Between 1989 and 2001, the trend in diagnosed high blood pressure among Nebraska adults has remained virtually unchanged (Figure 32).

Figure 32: Diagnosed High Blood Pressure* Among NE and U.S. Adults, 1989-2001



	1989	1990	1991	1993	1995	1997	1999	2001^
Nebraska	20.1%	20.0%	23.3%	23.0%	21.8%	22.4%	22.0%	22.6%
Nation					22.2%	23.0%	23.9%	25.6%

*Adults that were ever told by a doctor, nurse, or other health professional that they have high blood pressure
^The 2001 questionnaire no longer filters for blood pressure screening, making the denominator value different from years 1989-1999.
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

Compared to the Nation in 2001[2]

- Nebraska ranks 8th lowest in diagnosed high blood pressure among 54 U.S. states and territories (interquartile range 24.0% to 25.6%).
- Compared to bordering states, Nebraska adults are less likely than adults in Iowa (25.5%) and Missouri (26.5%) to have diagnosed high blood pressure ($p<.01$ and .001).

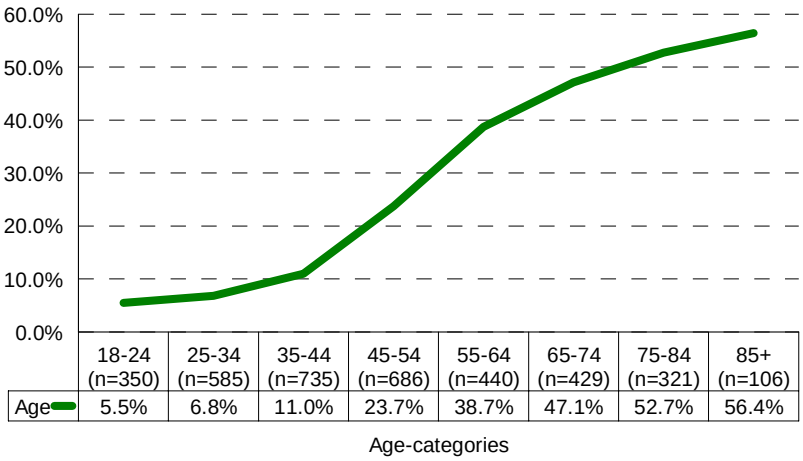
Descriptive Analysis of Diagnosed High Blood Pressure, 2001

Age

- Among Nebraska adults, there is a positive linear relationship between age and diagnosed high blood pressure, indicating that older adults are more likely than younger adults to have diagnosed high blood pressure (Figure 33).

- The most dramatic increases in diagnosed high blood pressure occur among middle age adults where adults aged 45-54 years are 2.2 times more likely than adults aged 35-44 years and adults aged 55-64 years are 1.6 times more likely than adults aged 45-54 years to have diagnosed high blood pressure (Figure 33).

Figure 33: Diagnosed High Blood Pressure* Among NE Adults by Age, 2001



*Adults that were ever told by a doctor, nurse, or other health professional that they have high blood pressure
Missing data=47 cases (1.3%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

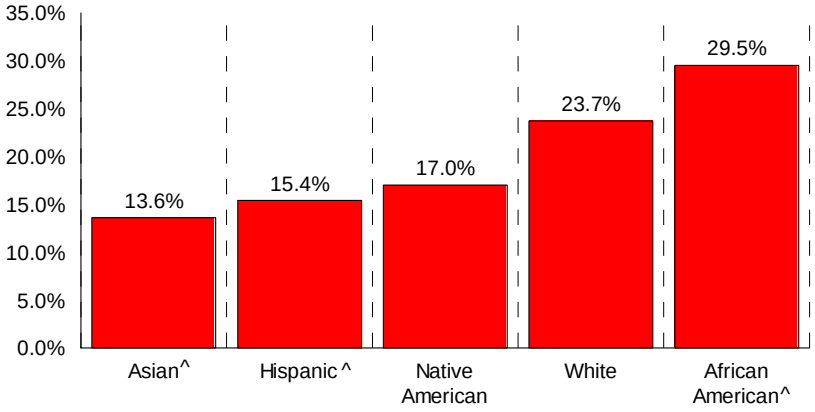
Gender

- While the percentage of female adults in Nebraska with diagnosed high blood pressure appears slightly higher than the percentage for males, 23.7 percent and 21.5 percent respectively, this difference is non-significant.

Education & Income

- Level of education and income is associated with diagnosed high blood pressure among middle age adults in Nebraska (aged 45-64 years), however, there is no significant association among younger or older adults.
- Among middle age Nebraska adults, those with high education and income are 31 percent less likely than those with medium education and income and 42 percent less likely than those with low education and income to have diagnosed high blood pressure (p<.01 and .001 respectively).

Figure 34: Diagnosed High Blood Pressure* Among Nebraska Adults by Race/Ethnicity, 2001



*Adults that were ever told by a doctor, nurse, or other health professional that they have high blood pressure
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .05 level
Missing data=117 cases (1.6%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

Race/Ethnicity

- Compared to Whites, African Americans are 25 percent more likely to have diagnosed high blood pressure, 29.5 percent and 23.7 percent respectively (p<.01) (Figure 34). In contrast, Asians (13.6%) and Hispanics (15.4%) are less likely than Whites to have diagnosed high blood pressure (p<.05 and .001 respectively) (Figure 34).

Urban/Rural

- When controlling for age, there is no difference in diagnosed high blood pressure between Nebraska adults living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

High Blood Pressure Medication among Nebraska Adults, 2001[5]

Indicator Definition

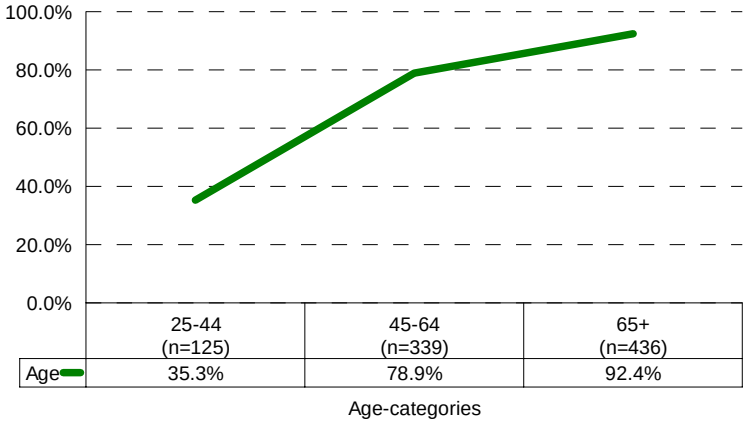
High Blood Pressure Medication represents the percentage of Nebraska adults that are currently taking medication for their high blood pressure, among Nebraska adults with diagnosed high blood pressure.

Nebraska HP2010 Objective: None Established

2001 Highlights

- Among Nebraska adults that have diagnosed high blood pressure, 3 in every 4 (76.2%) are currently taking medication for their high blood pressure.

Figure 35: Taking High Blood Pressure Medication* Among NE Adults That Have Diagnosed High Blood Pressure by Age, 2001



*Adults that are currently taking medication for their high blood pressure, among adults w ith diagnosed high blood pressure
Source: 2001 Nebraska Behavioral Risk Factor Survey

Descriptive Analysis of High Blood Pressure Medication, 2001

Age

- As age increases, blood pressure medication use increases (among Nebraska adults with diagnosed high blood pressure) (Figure 35). Among Nebraska adults with diagnosed high blood pressure, more than 9 in every 10 aged 65 years and older (92.4%) are currently taking medication for their high blood pressure compared to just 1 in every 3 adults aged 25-44 years (35.3%).

Gender

- While male and female adults in Nebraska are equally likely to have diagnosed high blood pressure, among those with diagnosed high blood pressure, females are 17 percent more likely than males to be currently taking medication for their high blood pressure, 81.6 percent and 69.8 percent respectively (p<.001). This disparity is most prominent among Nebraska adults aged 45-64 years (87.1% female and 70.9% male, relative risk 1.23) (p<.001).

Education & Income

- Among Nebraska adults with diagnosed high blood pressure, the percentage of adults currently taking medication for their high blood pressure does not differ by education and income.

Race/Ethnicity

- Among Nebraska adults with diagnosed high blood pressure, African Americans (21.4%) and Whites (23.0%) are equally likely to be currently taking medication for their high blood pressure while Hispanics (39.6%) are 1.7 times more likely than Whites to be currently taking medication for their high blood pressure (p<.001).

Urban/Rural

- Among Nebraska adults with diagnosed high blood pressure, there is no difference in the percentage currently taking medication for their high blood pressure between Nebraska adults living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

High Blood Cholesterol

Introduction

According to 2001 estimates from the National Health and Nutrition Examination Survey, an estimated 105 million Americans have high blood cholesterol (total cholesterol of 200 mg/dl or higher)[22]. When blood cholesterol levels are high, excess cholesterol is deposited in the arteries, including those of the heart, which can lead to narrowing of the arteries and heart disease[24]. The positive news is that studies among people with heart disease have shown that lowering cholesterol can reduce the risk for dying from heart disease, having a nonfatal heart attack, and needing heart bypass surgery or angioplasty[24].

Current Blood Cholesterol Screening among Nebraska Adults, 2001[5]

Indicator Definition

Current Blood Cholesterol Screening represents the percentage of adults that have had their blood cholesterol checked within the 5 years preceding the survey.

Nebraska HP2010 Objective:
80 percent (#12-15)

2001 Highlights

- Approximately 2 in every 3 Nebraska adults (65.4%) have had a current blood cholesterol screening. In contrast, this indicates that approximately 1 in every 3 (34.6%), or an estimated 426,000 to 466,000 Nebraska adults, have not had a current blood cholesterol screening (Figure 36).

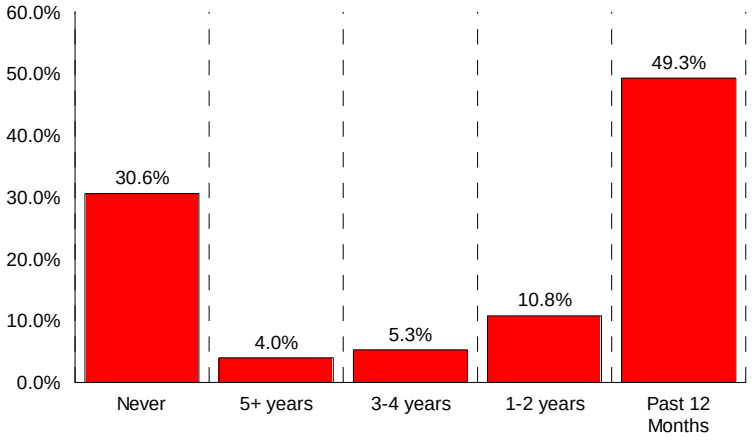
Trends

- Between 1989-2001, current blood cholesterol screening has increased 22 percent among Nebraska adults, from 53.6 percent to 65.4 percent (p<.001) (Figure 37).

Compared to the Nation in 2001[2]

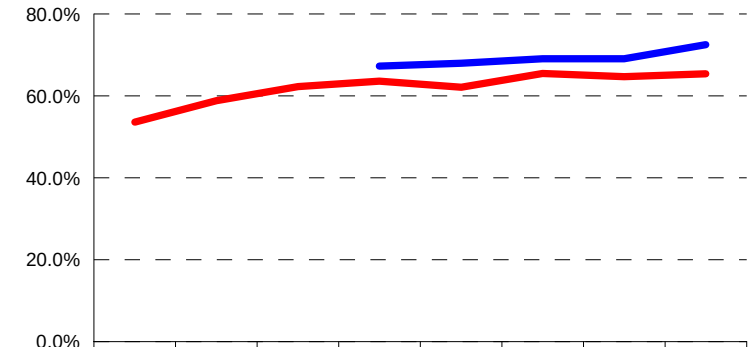
- Nebraska ranks 2nd lowest (only to Guam) in the percentage of adults that have ever had a blood cholesterol screening out of 54 U.S. states/territories (interquartile range 75.3% to 80.3%).

Figure 36: Last Blood Cholesterol Screening Among Nebraska Adults, 2001



n=3,598 valid cases, 101 missing cases (2.7%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

Figure 37: Current Blood Cholesterol Screening* Among NE and U.S. Adults



	1989	1990	1991	1993	1995	1997	1999	2001
Nebraska	53.6%	58.8%	62.3%	63.6%	62.1%	65.5%	64.7%	65.4%
Nation				67.3%	68.0%	69.1%	69.1%	72.5%

*Adults that have had their blood cholesterol checked within the past 5 years
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

- Compared to bordering states, Nebraska adults are less likely than adults in all six bordering states to have ever had their blood cholesterol checked (p<.001).

Descriptive Analysis of Current Blood Cholesterol Screening, 2001

Age

- Among Nebraska adults, there is a positive linear relationship between age and current blood cholesterol screening, indicating that older adults are more likely than younger adults to have had a current blood cholesterol screening.

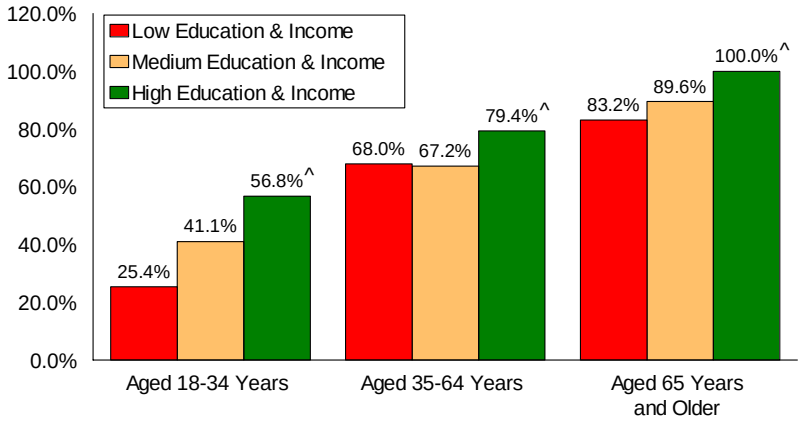
Gender

- Female adults in Nebraska are 11 percent more likely than male adults in Nebraska to have had a current blood cholesterol screening, 68.8 percent and 61.8 percent respectively (p<.001).
- The greatest gender disparity in current blood cholesterol screening occurs among younger adults in Nebraska. Among Nebraska adults aged 18-64 years, close to half of females (46.3%) have had a current blood cholesterol screening, compared to just 1 in every 3 males (36.4%), indicating that females are 27 percent more likely than males to have had a current blood cholesterol screening (p<.01).

Education & Income

- Nebraska adults with high education and income are more likely than Nebraska adults with medium or low income to have had a current blood cholesterol screening (across different age categories) (Figure 38).
- Among Nebraska adults aged 18-34 years, those with high education and income are 1.4 times more likely than those with medium education and income and 2.2 times more likely than those with low education and income to have had a current blood cholesterol screening (p<.001 respectively).

Figure 38: Current Blood Cholesterol Screening* Among Nebraska Adults by Education & Income, 2001**



*Adults that have had their blood cholesterol checked within the past 5 years
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc= ≥$35K income and education beyond high school

^Significantly higher than low and medium ed/inc at <.01 level
Listwise n=2,900 valid cases, 799 missing cases (21.6%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

Race/Ethnicity

- White adults in Nebraska (67.6%) are more likely than Asian (56.4%) and Hispanic (51.1%) adults to have had a current blood cholesterol screening (p<.05 and .001 respectively).

Urban/Rural

- Nebraska adults aged 35-64 years living within Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 11 percent more likely than adults living outside of Nebraska's three urban-metropolitan counties to have had a current blood cholesterol screening, 77.1 percent and 69.4 percent respectively (sig at .001 level). Differences within both younger and older age-categories are non-significant.

Diagnosed High Blood Cholesterol Among Nebraska Adults, 2001[5]

Indicator Definition

Diagnosed High Blood Cholesterol represents the percentage of adults that have ever been told by a doctor, nurse, or other health professional that their blood cholesterol is high, among those that have ever had their blood cholesterol checked.

Nebraska HP2010 Objective: 17 percent (#12-14)

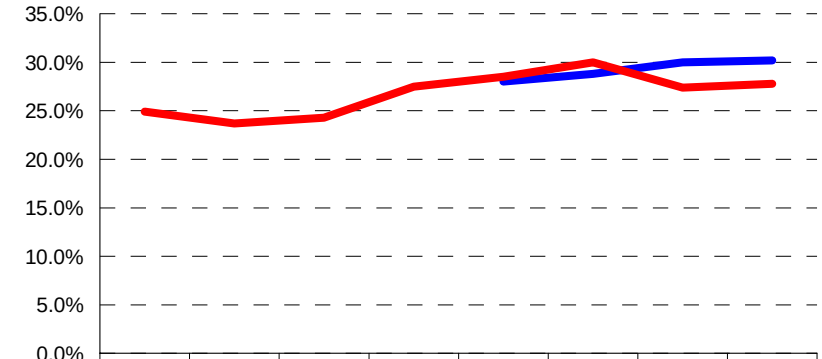
2001 Highlights

- More than 1 in every 4 (27.8%) Nebraska adults, an estimated 337,000 to 380,000, have diagnosed high blood cholesterol.

Trends

- Since around 1990, diagnosed high blood cholesterol among Nebraska adults has increased. Between 1990 and 2001, diagnosed high blood cholesterol increased 17 percent from 23.7 percent to 27.8 percent (p<.05) (Figure 39).

Figure 39: Diagnosed High Blood Cholesterol* Among NE and U.S. Adults



	1989	1990	1991	1993	1995	1997	1999	2001
Nebraska	24.9%	23.7%	24.3%	27.5%	28.5%	30.0%	27.4%	27.8%
Nation					28.0%	28.8%	30.0%	30.2%

*Adults that have ever been told by a doctor, nurse, or health professional that their blood cholesterol is high, among those that have ever had their blood cholesterol checked.
Sources: Nebraska Behavioral Risk Factor Surveillance System; National Behavioral Risk Factor Surveillance System <www.cdc.gov/brfss.index.htm>

Compared to the Nation in 2001[2]

- Nebraska ranks tied for 5th lowest (with South Carolina) in diagnosed high blood cholesterol among 54 U.S. states and territories (interquartile range 29.4% to 31.4%).
- Compared to bordering states, Nebraska adults are less likely than adults in Iowa (30.4%), Missouri (31.3%), and Wyoming (30.5%) to have diagnosed high blood cholesterol (p<.05, .01, and .05 respectively).

Descriptive Analysis of Diagnosed High Blood Cholesterol, 2001

Age

- Among Nebraska adults, there is a positive linear relationship between age and diagnosed high blood cholesterol, indicating that older adults are more likely than younger adults to have diagnosed high blood cholesterol (Figure 40).

Gender

- While the percentage of male adults in Nebraska with diagnosed high blood cholesterol appears slightly higher than the percentage for females, 29.1 percent and 26.6 percent respectively, the difference is non-significant (Figure 41).
- However, among adults 35-64 years of age, male adults in Nebraska are 30 percent more likely than female adults in Nebraska to have high blood cholesterol, 32.1 percent and 24.7 percent respectively (p<.01) (Figure 41).

Education & Income

- There is no association between education and income and diagnosed high blood cholesterol among Nebraska adults.

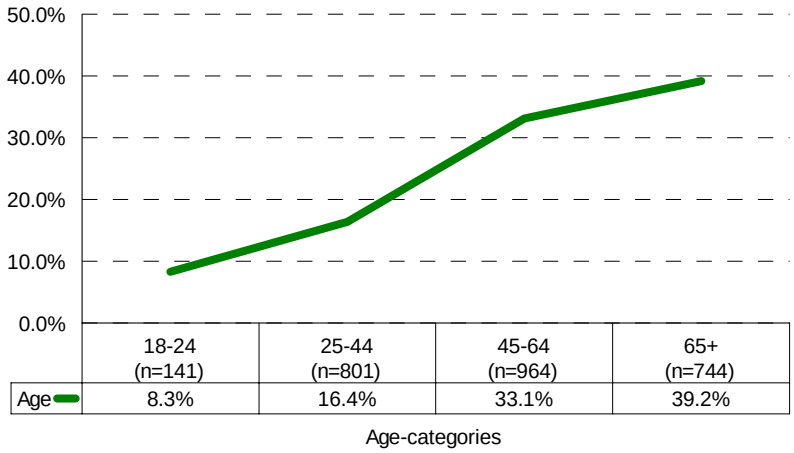
Race/Ethnicity

- Compared to White adults in Nebraska (27.5%), African American (18.7%) and Hispanic (17.5%) adults are less likely to have diagnosed high blood cholesterol (p<.01 and .001 respectively).

Urban/Rural

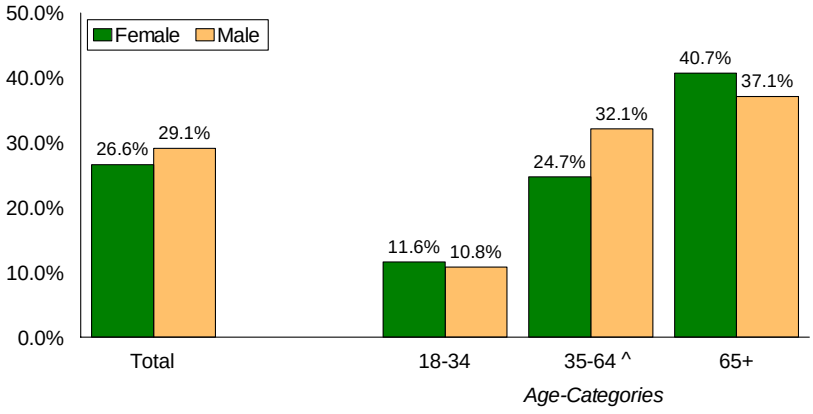
- Nebraska adults aged 35-64 years living outside of Nebraska's three urban-metropolitan counties (Douglas, Lancaster, and Sarpy) are 18.4 percent more likely than adults living within Nebraska's three urban-metropolitan counties to have diagnosed high blood cholesterol, 30.3 percent and 25.6 percent respectively (p<.05). Differences within both younger and older age-categories are non-significant.

Figure 40: Diagnosed High Blood Cholesterol*
Among NE Adults by Age, 2001



*Adults that have ever been told by a doctor, nurse, or health professional that their blood cholesterol is high, among those that have ever had their blood cholesterol checked.
Source: 2001 Nebraska Behavioral Risk Factor Survey

Figure 41: Diagnosed High Blood Cholesterol*
Among Nebraska Adults by Gender and Age, 2001



*Adults that have ever been told by a doctor, nurse, or health professional that their blood cholesterol is high, among those that have ever had their blood cholesterol checked.
^The male percentage is significantly higher than the female percentage at the .01 level
Source: 2001 Nebraska Behavioral Risk Factor Survey

Diabetes

Introduction

The health consequences of diabetes, including increased risk for heart disease and stroke, are serious[25]. Heart disease and stroke contribute to approximately 65 percent of deaths among diabetics, with heart disease being the leading cause of diabetes-related death[25]. Diabetic adults compared to non-diabetic adults have heart disease death rates about 2 to 4 times higher[25]. In addition, stroke risk is 2 to 4 times higher among people with diabetes[25]. Frighteningly, type 2 diabetes, formerly considered "adult onset" diabetes, is now being diagnosed more frequently among children and adolescents[26].

Diabetes Mortality

Between 1990 and 2000, 3,415 deaths among Nebraska residents were directly attributed to diabetes, while an additional 9,852 deaths occurred from other diseases in which diabetes was a contributing factor[27]. The death rate from diabetes in Nebraska increased 50 percent between 1990 and 2000, increasing from 15.0 to 22.2 deaths per 100,000 population[27].

Diabetes Prevalence among Nebraska Adults, 2002[5]

Indicator Definition

Diagnosed diabetes represents the percentage of adults that have ever been told by a doctor that they have diabetes (excluding gestational diabetes).

Nebraska HP2010 Objective: 25 per 1,000 adults (18 and older) (#5-3)

2002 Highlights

- About 1 in every 17 Nebraska adults, or an estimated 66,000 to 84,000 Nebraska adults, has diagnosed diabetes (5.8%).

Trends

- Between 1989 and 2002, the trend in diagnosed diabetes among Nebraska adults has remained virtually unchanged at about 5 percent.

Compared to the Nation in 2002[2]

- Nebraska adults rank tied for 9th lowest (with Hawaii, Massachusetts, and Washington) in diagnosed diabetes among 54 U.S. states and territories (interquartile range 5.9% to 7.6%).
- Compared to bordering states, Nebraska adults are more likely than adults in Colorado (4.4%) to have diagnosed diabetes ($p<.01$), while less likely than adults in Missouri (7.3%) to have diagnosed diabetes ($p<.01$).

Descriptive Analysis of Diagnosed Diabetes, 2002

Age

- Among Nebraska adults, there is a positive linear relationship between age and diagnosed diabetes, indicating that older adults are more likely than younger adults to have diagnosed diabetes. There is however, a sharp decline in diagnosed diabetes among adults aged 85 years and older, likely resulting from diabetic death prior to age 85.

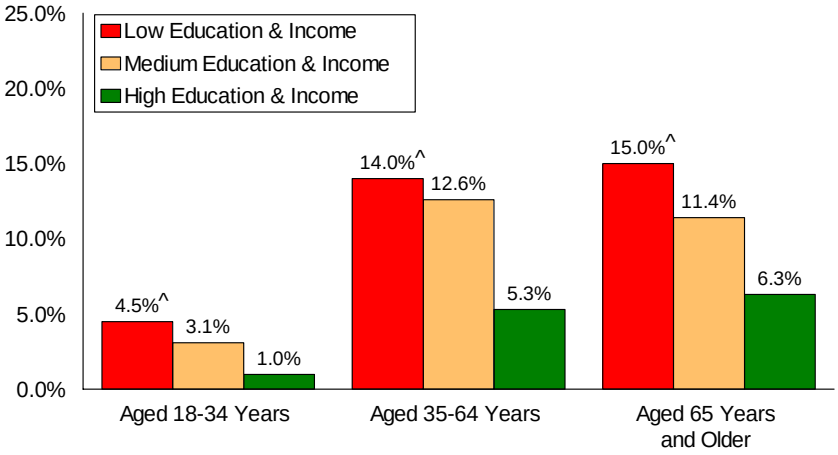
Gender

- While the percentage of male adults in Nebraska with diagnosed diabetes appears slightly higher than the percentage for females, 6.1 percent and 5.6 percent respectively, this difference is non-significant.
- There is however a significant gender difference among Nebraska adults aged 35-64 years, indicating that males are 56 percent more likely than females to have diagnosed diabetes, 7.8 percent and 5.0 percent respectively (p<.01).
- In addition to the 5.6 percent of Nebraska females with diagnosed diabetes, 1.3 percent were diagnosed with gestational diabetes (indicating that they were diagnosed only during pregnancy).

Education & Income

- As level of education and income increase, diagnosed diabetes decreases among Nebraska adults. Nebraska adults with low education and income are more likely than adults with high education and income to have diagnosed diabetes among those aged 25-44 years (relative risk 4.5), aged 45-64 years (relative risk 2.6), and aged 65 years and older (relative risk 2.4).

Figure 42: Diagnosed Diabetes*
Among Nebraska Adults by Education & Income, 2002**



*Adults that have been told by a doctor that they have diabetes (excluding gestational diabetes)
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc= ≥$35K income and education beyond high school

^Significantly lower than high education and income at the .05 level
Listwise n=3715 valid cases, 668 missing cases (15.2%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

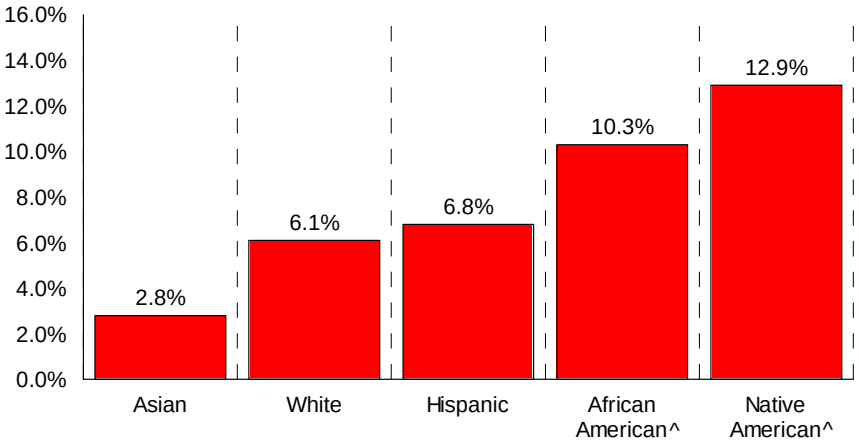
Race/Ethnicity Highlights from 2001 & 2002 (combined)

- African American and Native American adults in Nebraska are 1.7 and 2.1 times more likely than White adults respectively to have diagnosed diabetes (p<.001 and .01 respectively).

Urban/Rural

- There is no difference in diagnosed diabetes between Nebraska adults living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

Figure 43: Diagnosed Diabetes*
Among Nebraska Adults by Race/Ethnicity, 2001-2002



*Adults that have been told by a doctor that they have diabetes (excluding gestational diabetes)
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .05 level
Missing data=259 cases (1.6%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

Cigarette Smoke

Introduction

The health consequences of cigarette smoking, including increased risk for heart disease and stroke, are serious. Nearly 1 in every 5 deaths per year in the United States, about 440,000 annual deaths, results from cigarette smoking[28]. Cigarette smokers, compared to nonsmokers, are 2–4 times more likely to develop coronary heart disease (CHD)[28]. In addition, cigarette smoking approximately doubles a person's risk for stroke[28]. Fortunately, if current smokers stop smoking their risk for CHD and stroke dramatically decrease[29,30].

Preventable Deaths and Diseases Related to Cigarette Smoking in Nebraska[31]

According to Smoking-Attributable Mortality, Morbidity, and Economic Cost (SAMMEC) estimates, approximately 2,450 Nebraskans die from cigarette smoking each year. In 1999, CVD was the second most common cause of tobacco-related death (second to cancer), causing 1 in every 3 tobacco- related deaths (32.8%). Of all CVDs, ischemic heart disease claimed the largest proportion of CVD deaths, accounting for 50 percent.

Years of Productive Life Lost due to Cigarette Smoking in Nebraska[31]

SAMMEC data from 1999 indicate that cigarette smoking results in an estimated 31,000 years of productive life lost (YPLL). Of all YPLL due to cigarette smoking among Nebraskans in 1999, CVD accounted for an estimated 10,400 years.

Health Care Expenditures due to Cigarette Smoking in Nebraska[31]

SAMMEC data from 1998 estimate that Nebraska had over $419 million in smoking-related health care expenditures.

Cigarette Smoking among Nebraska Adults, 2002[5]

Indicator Definition

Current cigarette smoking represents the percentage of adults that have smoked at least 100 cigarettes during their lifetime and currently smoke cigarettes every day or on some days.

Nebraska HP2010 Objective:
12 percent (#27-1a)

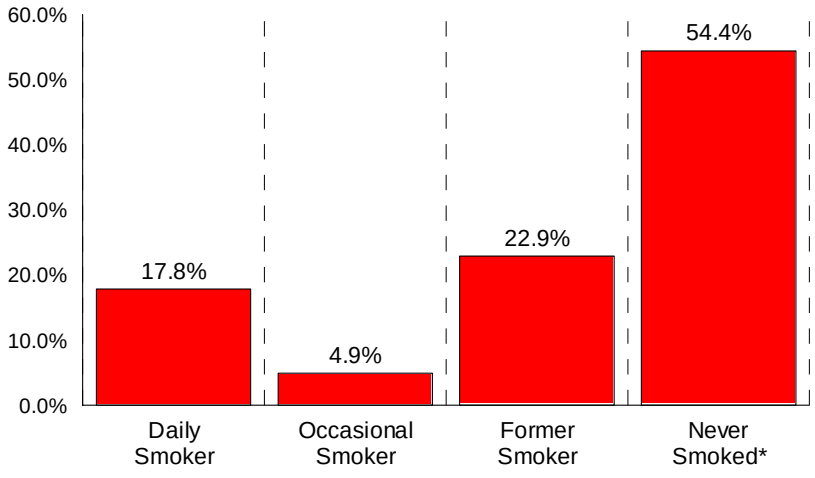
2002 Highlights

- More than 1 in every 5 Nebraska adults (22.7%), an estimated 277,000 to 309,000, currently smokes cigarettes (either daily or on some days) (Figure 44).

Trends

- Between 1989 and 2002, the trend in current cigarette smoking among Nebraska adults has remained virtually unchanged, at approximately 22 percent.

Figure 44: Cigarette Smoking* Among NE Adults, 2002



*Smoked <100 cigarettes during their lifetime
n=4,374 valid cases, 9 missing cases (0.2%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

Compared to the Nation in 2002[2]

- Nebraska adults rank 25th lowest in current cigarette smoking among 54 U.S. states and territories (interquartile range 21.2% to 26.1%).
- Compared to bordering states, Nebraska adults are more likely than adults in Colorado (20.4%) to currently smoke cigarettes ($p<.05$), while less likely than adults in Missouri (26.5%) to currently smoke cigarettes ($p<.001$).

Descriptive Analysis of Current Cigarette Smoking, 2002

Age

- Among Nebraska adults, there is a negative linear relationship between age and current cigarette smoking, indicating that younger adults are more likely than older adults to currently smoke cigarettes.

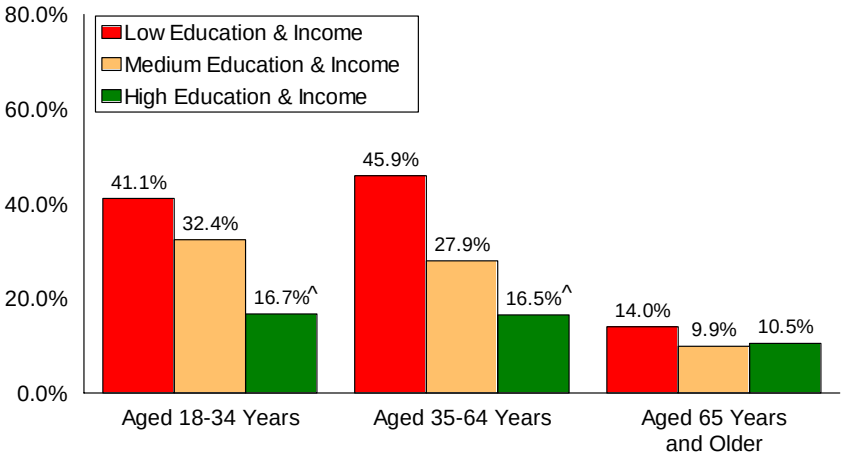
Gender

- Male adults in Nebraska are 36 percent more likely than female adults in Nebraska to currently smoke cigarettes, 26.3 percent and 19.3 percent respectively ($p<.001$).
- The most striking gender disparity in current cigarette smoking occurs among Nebraska adults aged 65 years and older, where males are nearly twice as likely as females to currently smoke cigarettes, 14.9 percent and 7.7 percent respectively ($p<.001$).

Education & Income

- Among Nebraska adults under 65 years of age, as level of education and income increase, current cigarette smoking decreases (Figure 45).

Figure 45: Current Cigarette Smoking* Among Nebraska Adults by Education & Income, 2002**



*Adults that curently smoke cigarettes daily or on some days
**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc=≥$35K income and education beyond high school
^Significantly lower than medium and high education and income at the .001 level
Listwise n=3,709 valid cases, 674 missing cases (15.4%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

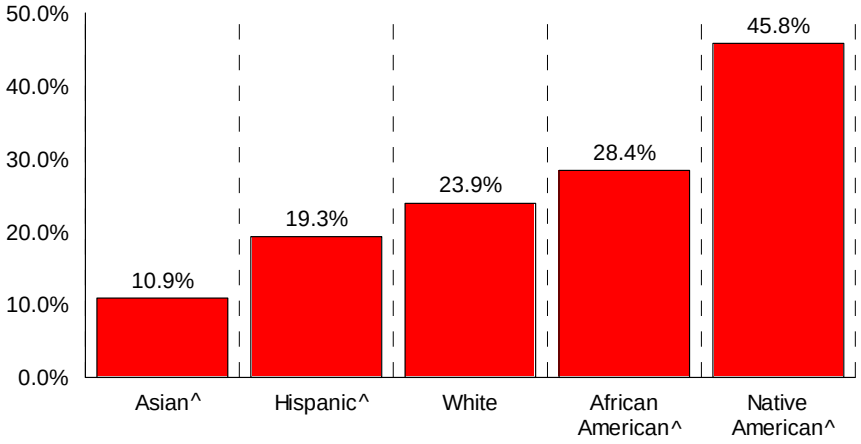
Race/Ethnicity Highlights from 2001 & 2002

- Close to half of all Native American adults in Nebraska currently smoke cigarettes (45.8%), making them more likely than all other racial and ethnic populations to currently smoke cigarettes (Figure 46).
- African American adults in Nebraska are more likely than White adults to currently smoke cigarettes (relative risk 1.2) while Asian and Hispanic adults are less likely than Whites to currently smoke cigarettes (relative risks of 0.46 and 0.81 respectively) (Figure 46).

Urban/Rural

- There is no difference in current cigarette smoking between Nebraska adults living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

**Figure 46: Current Smoking*
Among Nebraska Adults by Race/Ethnicity, 2001-2002**



*Adults that curently smoke cigarettes daily or on some days
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .01 level
Missing data=280 cases (1.7%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

Cigarette Smoking among Nebraska Youth, 2003[31]

Indicator Definition: Current Cigarette Smoking

Current cigarette smoking represents the percentage of high school students that smoked one or more cigarettes during the 30 days preceding the survey.

Nebraska HP2010 Objective: 15 percent (#27-2b)

2003 Highlights for Nebraska High School Students

- Approximately 1 in every 4 Nebraska high school students (24.1%) currently smokes cigarettes.

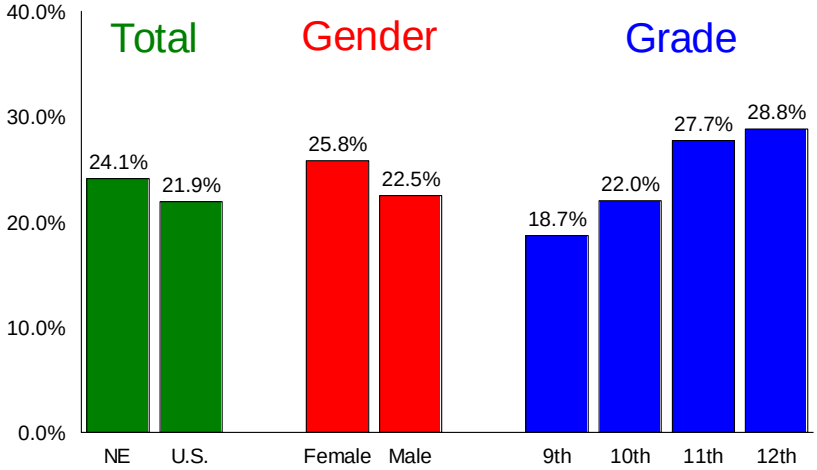
2003 Highlights for Nebraska Middle School Students

- Approximately 1 in every 14 (7%) Nebraska middle school students, in grades 6-8, currently smokes cigarettes.

Cigarette Smoking Trends:

- Between 1997 and 2003, current cigarette smoking declined 39 percent among Nebraska high school students, declining from 39.2 percent to 24.1 percent.
- Current cigarette smoking among Nebraska middle school students declined from 10 percent in 1999 to 7 percent in 2002.

**Figure 47: Current Cigarette Smoking*
Among Nebraska High School Students, 2003**



*Students reporting that they smoked one or more cigarettes during the 30 days preceding the survey
Source: 2003 Nebraska Youth Risk Behavior Survey

Compared to the Nation in 2003[10,11]

- High school students in Nebraska are more likely than high school students nationally to currently smoke cigarettes, 24.1 percent and 21.9 percent respectively ($p<.05$).

Descriptive Analysis of current cigarette smoking, 2003

Gender

- Unlike adults, female high school students are more likely than male high school students to currently smoke cigarettes, 25.8 percent and 22.5 percent respectively.
- Among middle school students in Nebraska, there is no significant gender difference in current cigarette smoking (7 percent for males and 8 percent for females).

Grade

- Current cigarette smoking among Nebraska high school students increases as grade level increases. Students in grade 12 are 1.5 times more likely than students in grade 9 to currently smoke cigarettes, 28.8 percent and 18.7 percent respectively.
- Compared to Nebraska students in grade 6, students in grade 8 are more than three times as likely to currently smoke cigarettes, 3 percent and 10 percent respectively.

Exposure to Secondhand Smoke among Nebraska Infants[31]

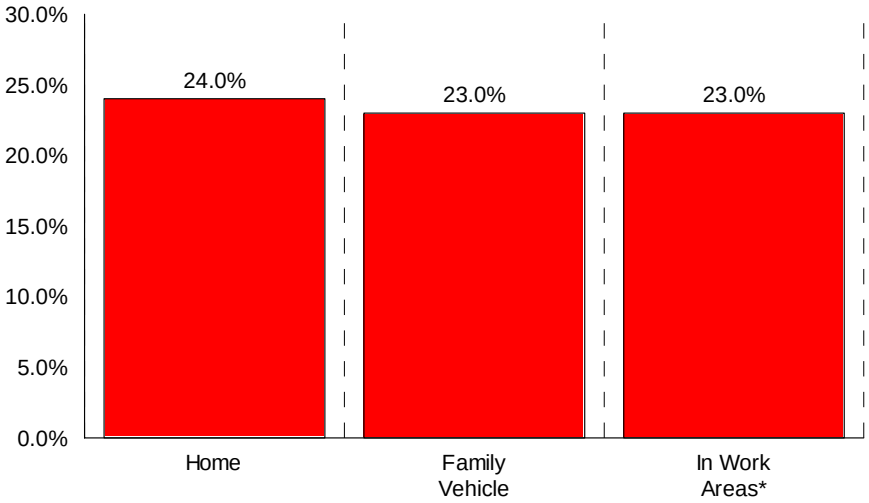
According to data from the Nebraska Pregnancy Risk Assessment Monitoring System (PRAMS), data through December 2003 suggest that, on average, approximately 12 percent of Nebraska infants (or about 1 in every 8) spend at least some time in the same room with a smoker each day.

Exposure to Secondhand Smoke among Nebraska Adults[31]

2003 Highlights

- Approximately 1 in every 4 Nebraska adults (24%) indicate that smoking is allowed in one or more parts of their home.
- Approximately 1 in every 4 Nebraska adults (23%) indicate that smoking is allowed is allowed in the family vehicle.
- Among Nebraska adults that are employed, 23 percent indicated that smoking is allowed in one or more work areas (at their place of employment).

Figure 48: Smoking is allowed in each of the following settings*, reported by Nebraska adults, 2003



*Among Nebraska adults that are employed, smoking is allowed in one or more work areas
Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Multiple Risk Factors for CVD

Introduction

There are a variety of risk factors for cardiovascular disease. These risk factors, when combined, can increase the risk for cardiovascular disease as well as other chronic diseases such as cancer, diabetes, and chronic lung disease[32].

Multiple Risk Factors for CVD among Nebraska Adults[5]

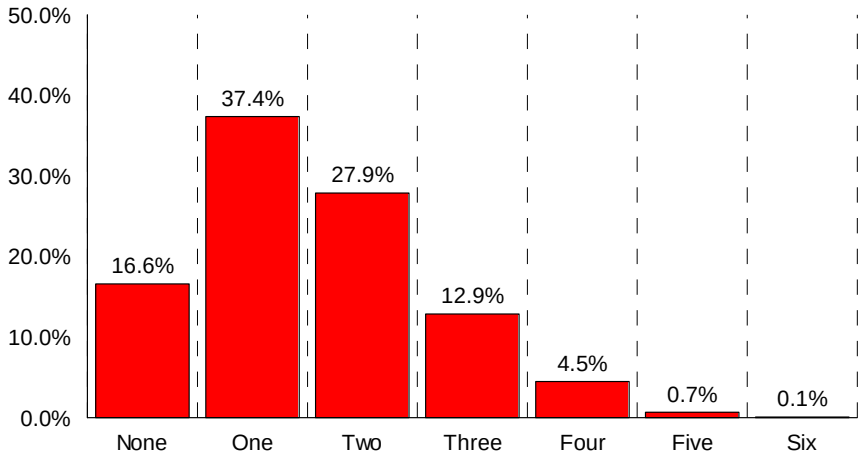
Indicator Definition

Two or more CVD Risk Factors represents the percentage of adults that are at risk from two or more of the following six CVD risk factors: obesity, no recommended physical activity, high blood pressure, high blood cholesterol, diabetes, and current cigarette smoking.

2001 Highlights

- Among Nebraska adults, more than 8 in every 10 (83.4%) has one or more CVD risk factors, nearly half has 2 or more CVD risk factors, and nearly 1 in every 5 (18.2%) has 3 or more CVD risk factors.

Figure 49: Number of Preventable Risk Factors for CVD* Among Nebraska Adults, 2001



*From the following six CVD risk factors: obesity, no recommended physical activity, high blood pressure, high blood cholesterol, diabetes, and current cigarette smoking
Missing data=522 cases (14.1%)
Source: 2001 Nebraska Behavioral Risk Factor Survey

Descriptive Analysis of 2 or more CVD risk factors, 2001

Age

- Among Nebraska adults, there is a positive linear relationship between age and 2 or more CVD risk factors, indicating that older adults are more likely than younger adults to have 2 or more CVD risk factors (Figure 50). The most dramatic increase occurs between younger and middle aged adulthood (25 to 64 years of age).

Gender

- There is no difference in 2 or more CVD risk factors among Nebraska adults by gender.

Education & Income

- Among Nebraska adults under 65 years of age, as level of education and income increase; the percentage of adults with 2 or more risk factors decreases (Figure 51).
- The most striking difference occurs among Nebraska adults aged 18-34 years where those with low education and income are 59 percent more likely than those with high education and income to have 2 or more CVD risk factors.

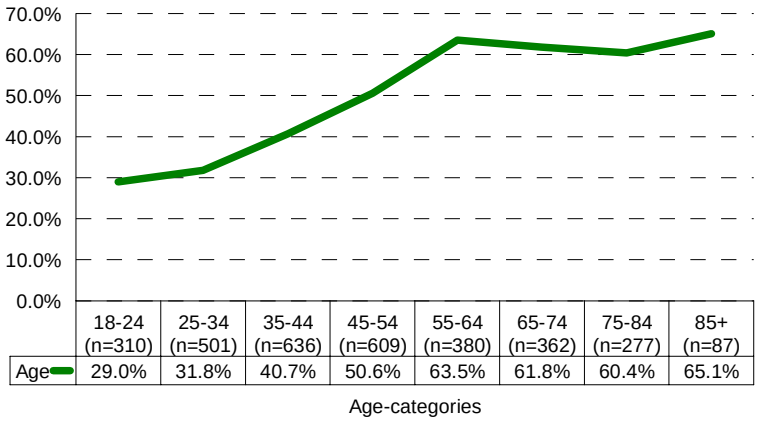
Race/Ethnicity

- Native American adults in Nebraska are more likely than White adults to have 2 or more CVD risk factors (relative risk 1.4) while Asian and Hispanic adults are less likely than Whites to have 2 or more CVD risk factors (relative risks of 0.39 and 0.82 respectively).
- While the difference between African American and White adults in Nebraska with 2 or more CVD risk factors is non-significant, African Americans are 42 percent more likely than Whites to have 3 or more CVD risk factors, 28.3 percent and 19.9 percent respectively (p<.001).
- African American females are 30 percent more likely than African American males in Nebraska to have 2 or more CVD risk factors, 61.4 percent and 47.1 percent respectively (p<.05).

Urban/Rural

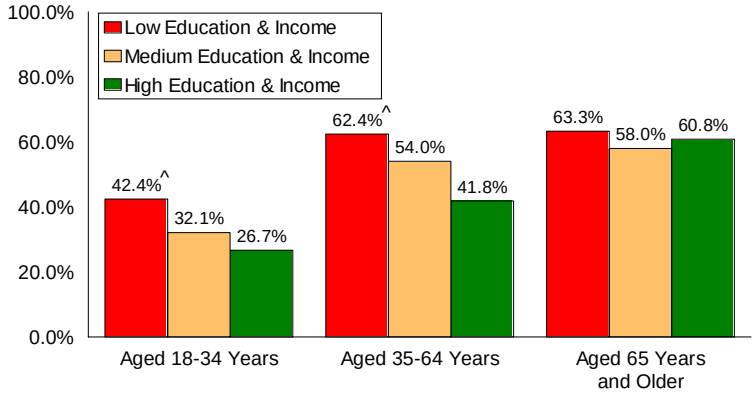
- There is no difference in the percentage of Nebraska adults with 2 or more CVD risk factors among those living inside and outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy).

Figure 50: 2 or More CVD Risk Factors*
Among NE Adults by Age, 2001



*Adults reported 2+ of the following six CVD risk factors: obesity, no recommended physical activity, high blood pressure, high blood cholesterol, diabetes, and current cigarette smoking
Source: 2001 Nebraska Behavioral Risk Factor Survey

Figure 51: 2 or More CVD Risk Factors*
Among Nebraska Adults by Education & Income, 2001**



*Adults reported 2+ of the following six CVD risk factors: obesity, no recommended physical activity, high blood pressure, high blood cholesterol, diabetes, and current cigarette smoking
Source: 2001 Nebraska Behavioral Risk Factor Survey

**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc=≥$35K income and education beyond high school
^Significantly higher than high ed/inc at the .01 level
Listwise n=2,639 valid cases, 1060 missing cases (28.7%)

Table 4: CVD Risk Factors Among Nebraska Adults

	Diagnosed Diabetes 2002#		Obesity 2002#		Diagnosed High Blood Pressure 2001		Current Cholesterol Screening 2001		Diagnosed High Blood Cholesterol 2001		Current Cigarette Smoking 2002#		5-a-day 2002	
	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**
Overall	4,378	5.8%	4,139	23.2%	3,687	22.6%	3,598	65.4%	2,669	27.8%	4,374	22.7%	4,380	18.0%
Age														
18-34	997	1.3%	949	17.8%	935	6.3%	903	41.3%	443	11.2%	997	27.7%	998	16.8%
35-64	2,212	6.4%	2,083	27.2%	1,861	22.3%	1,834	72.8%	1,463	28.2%	2,206	24.0%	2,212	15.1%
65+	1,146	12.1%	1,096	21.2%	856	50.0%	828	86.2%	744	39.2%	1,147	10.6%	1,146	28.1%
Gender														
Female	2,735	5.6%	2,536	20.4%	2,267	23.7%	2,214	68.8%	1,690	26.6%	2,732	19.3%	2,734	22.9%
Male	1,643	6.1%	1,603	26.0%	1,420	21.5%	1,384	61.8%	979	29.1%	1,642	26.3%	1,646	12.8%
Race+														
African American	922	10.3%	850	31.0%	402	29.5%	393	65.2%	277	18.7%	919	28.4%	520	15.2%
Asian	151	2.8%	143	8.6%	73	13.6%	71	56.4%	44	21.5%	153	10.9%	80	22.9%
Hispanic	1,128	6.8%	844	22.8%	504	15.4%	493	51.1%	273	17.5%	1,128	19.3%	620	13.5%
Native American	106	12.9%	101	30.8%	-	-	-	-	-	-	106	45.8%	60	23.3%
White	13,707	6.1%	12,965	22.7%	6,164	23.7%	6,024	67.6%	4,518	27.5%	13,687	23.9%	7,543	18.7%
Urban/Rural++														
Urban Metro	1,926	5.9%	1,814	21.8%	1,643	20.7%	1,611	65.4%	1,201	24.8%	1,923	23.7%	1,927	17.8%
Non-Urban Metro	2,441	5.8%	2,315	24.3%	2,027	24.2%	1,970	65.6%	1,458	30.1%	2,440	21.9%	2,442	18.3%

*Non-weighted sample size value

**Weighted percentage

+Racial categories include non-hispanic only; Includes respondents from both the BRFSS and Minority Oversample BRFSS

++Urban Metro includes adults living in Douglas, Lancaster, or Sarpy counties; Non-Urban Metro includes all other counties

Race/Ethnicity includes data from 2001 and 2002 combined

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

Note: blank cells respresent insufficient data to calculate percentage (n<50)

Source: Nebraska Behavioral Risk Factor Surveillance System

Table 5: Physical Activity among Nebraska Adults

	No Leisure Time PA^ 2002#		Sufficient Moderate PA^ 2001		Sufficient Vigorous PA^ 2001		Recommended PA^ 2001		Regular Walking^^ 2003		Regular Strengthening Exercise^^ 2003	
	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**
Overall	4,380	22.0%	3,478	24.2%	3,546	16.3%	3,462	34.1%	5,462	40.4%	5,832	31.9%
Age												
18-34	998	15.6%	896	22.3%	893	25.5%	887	38.2%	1,334	44.0%	1,414	45.2%
35-64	2,212	23.1%	1,776	24.7%	1,805	15.2%	1,769	33.7%	2,860	41.2%	3,024	28.5%
65+	1,145	29.7%	786	26.3%	824	4.8%	786	29.2%	1,225	32.8%	1,345	20.4%
Gender												
Female	2,733	77.0%	2,126	24.7%	2,191	13.8%	2,120	32.6%	3,710	37.2%	3,941	26.8%
Male	1,647	79.1%	1,352	23.7%	1,355	19.4%	1,342	35.7%	1,752	44.0%	1,891	37.7%
Race+												
African American	922	38.1%	317	10.2%	355	15.2%	300	24.1%	134	36.2%	135	37.6%
Asian	153	29.8%	65	11.2%	64	23.0%	61	32.3%	-	-	-	-
Hispanic	1,131	44.2%	422	17.8%	458	9.7%	412	24.8%	230	40.1%	246	31.7%
Native American	106	30.8%	-	-	-	-	-	-	-	-	-	-
White	13,711	25.9%	5,279	20.8%	5,663	12.9%	5,162	30.2%	4,953	40.5%	5,306	31.5%
Urban/Rural++												
Urban Metro	1,926	19.8%	1,562	21.7%	1,575	20.2%	1,551	35.4%	2,516	42.9%	2,638	36.0%
Non-Urban Metro	2,444	23.8%	1,906	26.3%	1,960	13.1%	1,901	33.1%	2,946	38.1%	3,194	28.4%

*Non-weighted sample size value

**Weighted percentage

+Racial categories include non-hispanic only; Includes respondents from both the BRFSS and Minority Oversample BRFSS

++Urban Metro includes adults living in Douglas, Lancaster, or Sarpy counties; Non-Urban Metro includes all other counties

Race/Ethnicity includes data from 2001 and 2002 combined

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

Note: blank cells respresent insufficient data to calculate percentage (n<50)

^Source: Nebraska Behavioral Risk Factor Surveillance System

^^Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Table 6: CVD Risk Factors among Nebraska Adults by Education and Income by Age

	Diagnosed Diabetes 2002		Obesity 2002		Diagnosed High Blood Pressure 2001		Current Cholesterol Screening 2001		Diagnosed High Blood Cholesterol 2001		Current Cigarette Smoking 2002		5-a-day 2002	
	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**
Aged 18-34 years														
Low[1]	111	1.7%	98	24.5%	111	5.9%	107	25.4%	35	7.1%	111	41.4%	111	18.0%
Medium[2]	436	1.6%	422	15.1%	405	6.8%	389	41.1%	186	11.7%	436	32.4%	437	17.3%
High[3]	336	1.0%	328	17.6%	275	6.7%	269	56.8%	169	14.0%	336	16.7%	336	15.0%
Aged 35-64 years														
Low[1]	249	10.0%	238	34.5%	207	28.3%	205	68.0%	152	24.4%	247	45.9%	249	9.7%
Medium[2]	790	9.0%	755	31.5%	710	24.6%	701	67.2%	537	30.3%	790	27.9%	790	12.0%
High[3]	935	3.5%	896	23.0%	685	17.8%	676	79.4%	577	28.1%	931	16.5%	935	17.8%
Aged 65+ years														
Low[1]	348	15.0%	340	24.5%	254	52.4%	245	83.2%	218	40.8%	348	14.0%	348	25.3%
Medium[2]	388	11.4%	379	20.8%	249	44.8%	244	89.6%	227	37.2%	388	9.9%	388	32.3%
High[3]	122	6.3%	119	15.1%	64	50.1%	64	100.0%	63	38.0%	122	10.5%	122	26.9%

1. education of ≤ high school graduate and household income of < $25 thousand annually
2. neither low nor high education and income
3. education beyond high school (some college or college graduate) and household income of ≥ $35 thousand annually

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

*Non-weighted sample size value

**Weighted percentage

Source: Nebraska Behavioral Risk Factor Surveillance System

Table 7: Physical Activity among Nebraska Adults by Education and Income by Age

	No Leisure Time PA^ 2002		Sufficient Moderate PA^ 2001		Sufficient Vigorous PA^ 2001		Recommended PA^ 2001		Regular Walking^^ 2001		Regular Strengthening Exercise^^ 2002	
	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**
Aged 18-34 years												
Low[1]	111	30.0%	102	19.3%	104	16.4%	102	31.1%	131	47.1%	144	34.9%
Medium[2]	437	13.8%	390	23.0%	386	26.0%	386	38.8%	516	43.9%	545	47.3%
High[3]	336	9.2%	272	25.4%	271	31.3%	270	44.3%	511	45.9%	534	46.5%
Aged 35-64 years												
Low[1]	249	46.8%	197	26.0%	203	8.4%	197	29.1%	247	35.7%	271	20.4%
Medium[2]	790	28.9%	685	25.9%	691	11.6%	680	31.0%	978	42.3%	1,045	24.3%
High[3]	934	11.6%	660	22.8%	670	22.8%	658	38.0%	1,334	42.0%	1,379	33.6%
Aged 65+ years												
Low[1]	348	39.8%	242	20.5%	251	3.9%	242	23.7%	323	28.9%	355	15.0%
Medium[2]	388	24.0%	237	34.1%	241	6.9%	235	37.2%	445	32.8%	483	21.9%
High[3]	122	11.2%	61	37.0%	63	7.3%	61	38.4%	158	45.7%	173	29.3%

1. education of ≤ high school graduate and household income of < $25 thousand annually
2. neither low nor high education and income
3. education beyond high school (some college or college graduate) and household income of ≥ $35 thousand annually

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

*Non-weighted sample size value

**Weighted percentage

^Source: Nebraska Behavioral Risk Factor Surveillance System

^^Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Table 8: Nutrition among Nebraska High School Students, 2003

	5-a-day		Regular Milk Consumption		Regular Soda Consumption		Excessive Soda Consumption	
	n*	%**	n*	%**	n*	%**	n*	%**
Overall	2,750	16.3%	2,888	18.4%	2,558	50.7%	2,558	23.8%
Gender								
Female	1,389	14.3%	1,447	12.6%	1,293	42.8%	1,293	17.7%
Male	1,359	18.3%	1,439	24.0%	1,263	58.5%	1,263	29.7%
Grade								
9th	589	17.1%	625	22.4%	570	48.7%	570	21.9%
10th	803	18.8%	842	19.2%	751	46.1%	751	21.7%
11th	689	12.7%	721	16.0%	634	53.0%	634	26.2%
12th	660	16.6%	691	15.5%	595	55.3%	595	26.0%

*Non-weighted sample size value

**Weighted percentage

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

Source: 2003 Nebraska Youth Risk Behavior Survey

Table 9: Physical Activity among Nebraska High School Students, 2003

	Sufficient Moderate PA		Sufficient Vigorous PA		Regular Strengthening Exercise		Sufficient PA in all its forms		Insufficient PA		Regular Sports Team Participation		Quality Daily PE Class	
	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**	n*	%**
Overall	2,879	26.7%	2,882	64.7%	2,896	53.6%	2,852	19.2%	2,859	32.0%	2,751	41.9%	2,540	33.3%
Gender														
Female	1,436	23.7%	1,439	59.7%	1,444	46.5%	1,424	15.5%	1,428	36.4%	1,378	35.2%	1,283	27.6%
Male	1,441	29.6%	1,441	69.3%	1,450	60.3%	1,426	22.7%	1,429	27.7%	1,371	48.2%	1,256	38.9%
Grade														
9th	619	28.2%	620	71.0%	625	59.7%	612	22.3%	613	25.9%	594	48.2%	537	43.4%
10th	843	29.0%	841	66.9%	846	54.1%	833	20.6%	835	29.0%	808	42.2%	759	33.5%
11th	722	24.0%	724	63.0%	724	52.9%	717	17.2%	720	33.4%	704	38.0%	637	24.5%
12th	686	25.5%	688	57.1%	692	47.5%	681	16.6%	682	40.0%	637	38.3%	600	31.3%

*Non-weighted sample size value

**Weighted percentage

Note: see indicator definitions under the appropriate sub-headings within this chapter for further detail

Source: 2003 Nebraska Youth Risk Behavior Survey

Chapter 5: Barriers to Cardiovascular Health

Introduction

There are numerous barriers, or obstacles, to achieving cardiovascular health (CVH) within both the primary and secondary cardiovascular disease prevention and control arenas. Primary prevention consists of preventing the disease in persons who do not have any symptoms of the disease while secondary prevention consists of preventing discomfort, disability, and death, and reducing expenses among persons with the disease. These barriers can occur within individuals (through a lack of knowledge, skills, or motivation) or within society (through a variety of different settings, such as communities, worksites, schools, faith-based organizations, and the health care system).

Within this chapter, CVH barriers are separated into primary and secondary prevention categories. The primary prevention category addresses individual barriers as well as barriers within the community, worksite, and school settings. The secondary prevention category addresses individual barriers as well as barriers related to health care access and quality of care. While some data are currently available on barriers to CVH within Nebraska, there is a strong need to obtain more data that will help identify and explain additional CVH barriers that can help guide future CVD prevention and control efforts within Nebraska.

Cardiovascular Health Barrier Highlights

Some key barriers to the primary prevention of CVD among Nebraska residents

- People in Nebraska spend excessive amounts of time engaged in electronic sedentary behaviors, such as television viewing, playing video games, or using the computer.
- Many Nebraska youth are using high-risk weight loss methods to try and lose weight, such as fasting, diet pills, vomiting and/or laxative use.
- Most worksites in Nebraska provide little or no support for physical activity.
- Nebraska residents regularly frequent restaurants, fast food shops, and food stands without the selection of the lower-fat items they desire.
- Students at Nebraska elementary schools are not being allowed to walk and bike to school as frequently as they desire.
- Perceived neighborhood safety from crime is an issue for many Nebraska adults, especially for those at lower socioeconomic status and those living in urban environments.
- While public schools in Nebraska (teaching grades 6-12) offer some supports for physical activity and healthy eating, many more opportunities could be provided.

Some key barriers to the secondary prevention of CVD among Nebraska residents

- Most Nebraska adults cannot properly identify all of the signs and symptoms of a heart attack and stroke.
- Less than half of Nebraska adults (35 and older) with high blood pressure, high blood cholesterol, and diabetes take aspirin regularly (among those with no aspirin-related health problems).
- Approximately 145,000 Nebraska adults under 65 years of age (or about 1 in every 7) have no health care coverage.
- EMS response times for heart attack average 40 minutes from dispatch to arrival at a health care facility, and are higher for residents in rural counties.
- Quality of care barriers for CVD exist for Nebraska Medicaid Managed Care enrollees and Nebraska Medicare enrollees.

Barriers to the Primary Prevention of CVD

Electronic Sedentary Behaviors

Introduction

Electronic sedentary behaviors (ESB), including television viewing, video game system use, and computer use, can lead to decreases in activity while simultaneously encouraging increases in caloric intake. Not only do high levels of television use take opportune time away from physical activity, but according to research conducted by the Centers for Disease Control and Prevention (CDC), the incidence of obesity is highest among children who watch four or more hours of television daily. The U.S. Surgeon General recommends decreases in television viewing and other sedentary behaviors for the prevention of overweight and obesity[1].

Electronic Sedentary Behaviors among Nebraska Adults[2]

Adult Indicator Definitions

Regular ESB represents the percentage of Nebraska adults that engage in television viewing (while sitting or lying down) and computer use (outside of work) for 3 or more hours per day.

Excessive ESB represents the percentage of Nebraska adults that engage in television viewing (while sitting or lying down) and computer use (outside of work) for 5 or more hours per day.

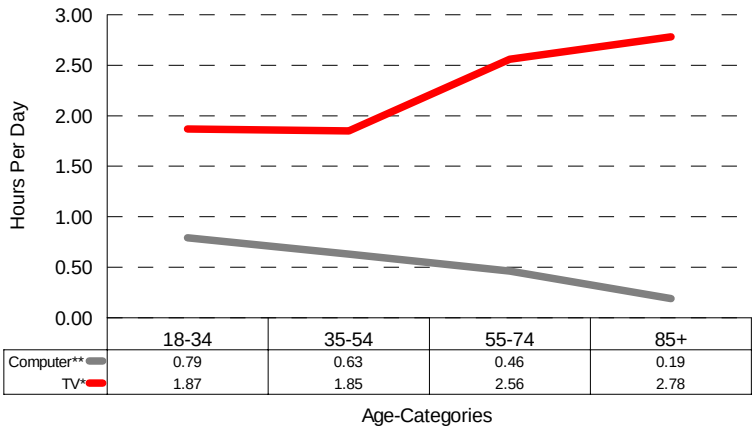
2003 Highlights

- On average, Nebraska adults watch 2 hours and 6 minutes of television (while sitting or lying down) per day and use the computer (while not at work) for 36 minutes per day; for a total of 2 hours and 42 minutes per day.
- 2 in every 5 Nebraska adults (39.8%) engage in regular ESB while about 1 in every 7 (13.6%) engage in excessive ESB.

Descriptive Analysis of ESB

- Among Nebraska adults, as age increases, daily television viewing increases (among adults 35 and older) while daily computer use decreases (Figure 1).

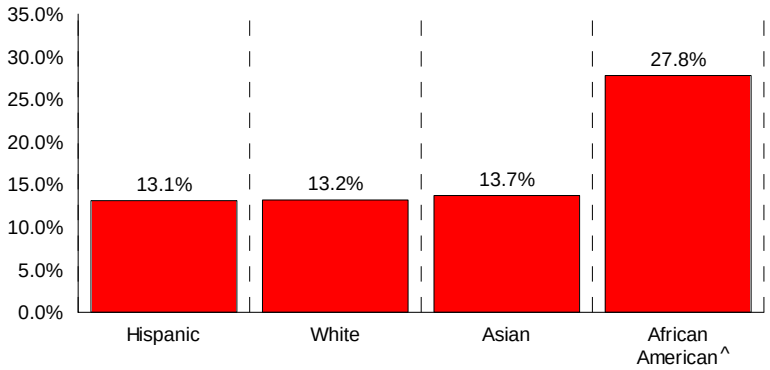
Figure 1: Daily Television Viewing* and Computer Use (in hours) Among Nebraska Adults by Age, 2003**



*Represents the average hours per day watching television while sitting or lying down
**Represents the average hours per day spent using the computer outside of work
Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

- Male adults in Nebraska, compared to female adults, spend more time per day (approximately 22 minutes more) both watching television and using the computer ($p<.01$).
- Among Nebraska adults, as education and income increase, television viewing decreases while computer use increases.
- Among Nebraska adults, average daily computer use between Whites and African Americans is nearly equal (36 and 38 minutes respectively), however African Americans watch nearly an hour more of television per day (2 hours, 59 minutes to 2 hours, 4 minutes respectively) (Figure 2).
- While television viewing does not differ between adults living inside or outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy), daily computer use is higher among urban metropolitan residents.

Figure 2: Excessive ESB* Among Nebraska Adults by Race/Ethnicity, 2003



*Represents the percentage of Nebraska adults that engage in television viewing (while sitting or lying down) and computer use (outside of work) for 5 or more hours per day.
Note: (a) racial categories include non-hispanic only (b) insufficient data for Native Americans
^Difference between race/ethnicity and white is significant at the .001 level
Missing data=1,356 cases (19.3%)
Source: 2003 Nebraska Adult Tobacco/Social Climate Survey

Electronic Sedentary Behaviors among Nebraska High School Students[3]

Youth Indicator Definitions

Regular ESB represents the percentage of Nebraska high school students that engage in television viewing, video game system use, and computer use (excluding homework) for 3 or more hours during an average school day.

Excessive ESB represents the percentage of Nebraska high school students that engage in television viewing, video game system use, and computer use (excluding homework) for 5 or more hours during an average school day.

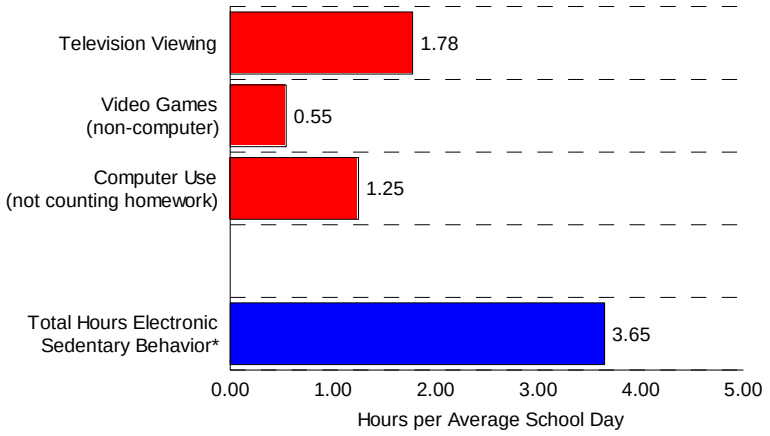
Excessive Television Viewing represents the percentage of Nebraska high school students that watch television for 3 or more hours during an average school day.

2003 Highlights

- Collectively, Nebraska high school students spend more than 3½ hours watching television, using video game systems, or using the computer (excluding homework) during an average school day.
- Specifically, during an average school day, students spend approximately 1 hour and 45 minutes (1.78 hours) watching TV, 1 hour and 15 minutes (1.25 hours) using the computer (excluding homework) and approximately 30 minutes (0.55 hours) playing video games on a video game system (Figure 3).

- Two in every five students (40.4%) engage in regular ESB (3 or more hours during an average school day) while more than 1 in every 4 (27.3%) engages in excessive ESB (5 or more hours during an average school day).
- Greater than 1 in every 4 students (28.0%) engages in excessive television viewing (spends 3 or more hours watching TV during an average school day).

Figure 3: Average Hours of Electronic Sedentary Behavior Among Nebraska High School Students (per average school day), 2003

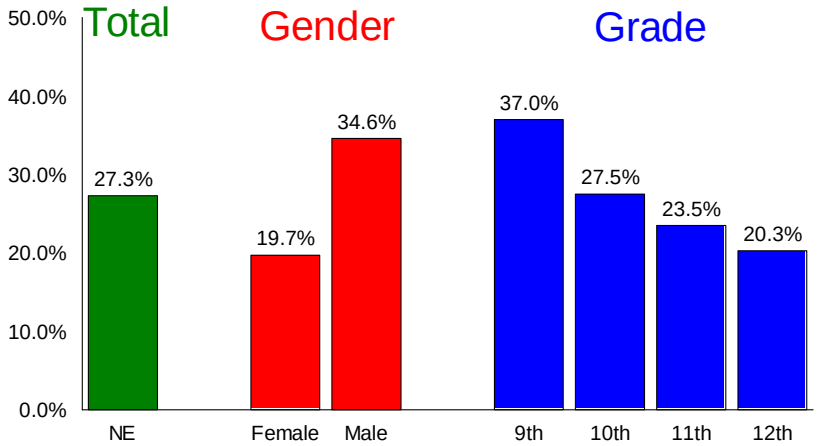


*represents the sum of TV, video games, and computer use.
Source: 2003 Nebraska Youth Risk Behavior Survey

Descriptive Analysis of ESB

- Male students are significantly more likely than female students to engage in both regular (47.9% and 32.5% respectively, p<.001) and excessive ESB (34.6% and 19.7% respectively, p<.001).
- Of all ESBs, the greatest gender disparity occurs in the use of video game systems, where male students, compared to females students, spend more than five times the amount of time playing video games on a video game system (0.91 hours and 0.17 hours per average school day respectively, p<.001).
- As grade level increases, hours of ESB decrease. Ninth grade students compared to 12th grade students, spend approximately 1 hour more per school day engaging in ESB (4.27 hours and 3.28 hours respectively).

Figure 4: Percentage of Nebraska High School Students Engaging in 5+ Hours of ESB During an Average School Day*, 2003



*Percentag of students that w atch TV, play video games, or use the computer (not counting homew ork) for 5 or more hours during an average school day
Source: 2003 Nebraska Youth Risk Behavior Survey

High-Risk Weight Loss Methods

Introduction

There are a variety of methods that one can use to try and lose weight. Unfortunately, for many reasons including poor self esteem, societal pressures to maintain an ideal body image, and a lack of environmental and policy supports for physical activity and healthy eating; many individuals try to lose weight or maintain their current body weight using high-risk weight loss methods.

High-Risk Weight Loss Methods among Nebraska High School Students, 2003[3]

Youth Indicator Definitions

Currently Trying to Lose Weight represents the percentage of Nebraska high school students that reported trying to lose weight during the 30 days preceding the survey.

Using High Risk Weight Loss Methods to Lose Weight represents the percentage of Nebraska high school students that reported fasting (for 24 hours of more), taking diet pills or supplements (without a doctors advice), or vomiting or using laxative to try and lose weight during the 30 days preceding the survey, among those that are currently trying to lose weight.

2003 Highlights

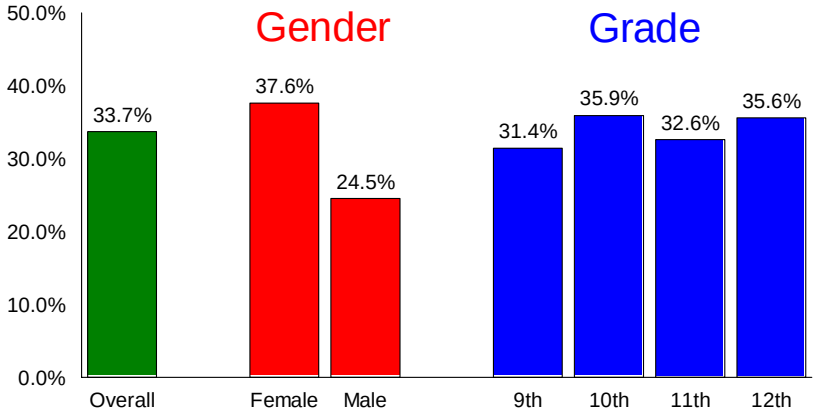
Currently Trying to Lose Weight

- Nearly half of Nebraska high school students (46.3%) are currently trying to lose weight.
- Female students are 2.5 times more likely than male students to report that they are currently trying to lose weight, 65.4 percent to 26.1 percent respectively (p<.001).

Weight Loss Methods

- The encouraging news is that among Nebraska high school students that are currently trying to lose weight, 2 in every 3 (66.9%) use the recommended weight loss method of both diet (including less food, fewer calories, or foods low in fat) and exercise to lose weight.
- However, 1 in every 3 students (33.7%) that are currently trying to lose weight use one or more of the following high-risk weight loss methods to lose weight: fasting (for 24 hours or more), taking diet pills or supplements (without a doctors advice), or vomiting or laxative use (Figure 5).

Figure 5: Percentage of Nebraska High School Students that use High-Risk Weight Loss Methods to Lose Weight*, 2003
Among Students that are Currently Trying to Lose Weight



*Percentag of students that fasted for 24 hours or more, took diet pills or supplements without a doctors advice, or vomited or used laxatives during the 30 days preceding the survey
Source: 2003 Nebraska Youth Risk Behavior Survey

- In particular, fasting (for 24 hours or more) is the most common high-risk weight loss method used by Nebraska students. Among students that are currently trying to lose weight, 1 in every 4 (23.2%) fasts, followed by the use of diet pills/supplements (15.0%) and vomiting/laxative use (10.8%).
- Among students that are currently trying to lose weight, females are 53 percent more likely than males to have used high-risk weight loss methods to lose weight (Figure 5).

Environmental and Policy Barriers

Introduction

Given the number of people in Nebraska engaging in unhealthy behaviors that increase their risk for CVD, public health prevention efforts cannot rely solely upon individualized interventions that target one person at a time. Rather, according to CDC's public health approach, the prevention of CVD risk factors requires coordinated policy and environmental changes that affect large populations simultaneously.

Current research is indicating increased physical activity and healthful eating behaviors within environments that have structural and policy support systems in place that encourage these behaviors. These support systems are most effective in locations where large numbers of people frequent, such as: community neighborhoods, facilities, and events; worksites; schools; faith-based organizations; and the health care system.

Community Barriers to Physical Activity and Healthy Eating

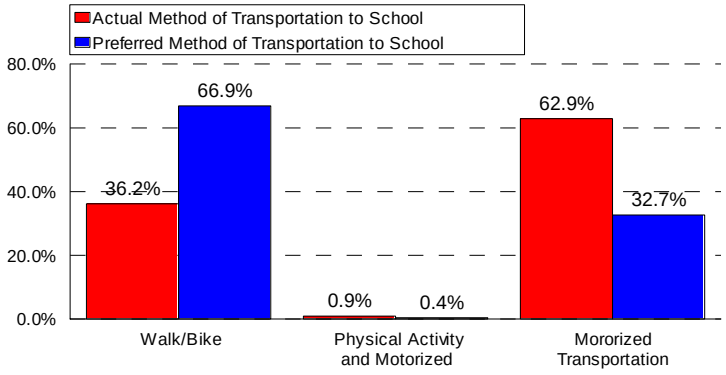
High Calorie Convenience Foods, 2001[4]

- According to a recent report by The National Alliance for Nutrition and Activity (NANA), portion sizes for most food and beverage in the United States have increased substantially over time[5]. These increases (due in large part to "value marketing") are particularly noticeable within the fast-food industry; where an original McDonald's burger, fries, and 12-ounce Coke provided 590 calories, today's super sized Quarter Pounder with Cheese meal provides 1,550 calories[5].
- About 1 in every 7 (14.6%) Nebraska adults eats meals from a restaurant, fast food shop, or food stand (including take out or delivery) an average of at least 1 time per day, while about 1 in every 4 (23.8%) frequents them an average of at least 4 times per week.
- Although restaurants are beginning to incorporate more heart healthy options into their menus, about 3 in every 4 (74.4%) Nebraska adults would still like to see more lower-fat options available in restaurants, fast food shops, and food stands.
- The positive news is that data are supporting the consumption of low-fat items when they are available. Among Nebraska adults with lower-fat items available at the restaurants they patron, more than half (56.5%) order lower-fat items (usually, often, or sometimes when eating meals from a restaurant, fast food shop, or food stand).

Parent/Community Support for Youth Physical Activity, 2003[6]

- Among 1,417 Nebraska elementary school students that participated in the 2003 Nebraska Walk-to-School Day Event, there is clearly a stronger desire to get to school by walking and biking than is permitted by their parents/ legal guardians (Figure 6). While about 2 in every 3 of these students (66.9%) would prefer to walk or bike to school, just 1 in every 3 (36.2%) usually gets to school by walking or biking.

Figure 6: Actual vs Desired method of transportation for getting to elementary school in Nebraska, Among youth that participated in the 2003 Nebraska Walk-to-School Day event

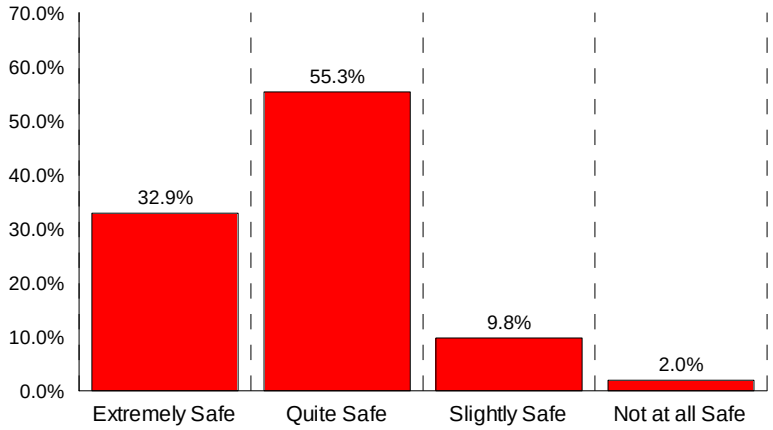


Note: Results represent only the views of 1,417 Nebraska students in grades K-8 from 12 schools that participated in the 2003 Nebraska Walk-to-School Day event at their school. Results are not intended to be respresentative of all Nebraska students in grades K-8.
Source: 2003 Walk-to-School Day Walkability Checklist Survey Results

Perceived Neighborhood and Community Safety, 2001[4]

- While about 1 in every 3 Nebraska adults feels extremely safe from crime in their neighborhood, more than 1 in every 10 (11.8%) feels only slightly or not at all safe.
- Some Nebraska subpopulations are more likely than others to feel unsafe from crime within their neighborhoods:
  - Among Nebraska adults, those with low education and income are twice as likely as those with high education and income to feel just slightly or not at all safe from crime in their neighborhood, 19.1 percent and 9.6 percent respectively (p<.01).
  - Nebraska adults living within Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy) are twice as likely (relative risk 2.1) as those living outside of Nebraska's three urban metropolitan counties to feel just slightly or not at all safe from crime in their neighborhood, 16.2 percent and 7.9 percent respectively (p<.001).

Figure 7: Perceptions of Neighborhood Safety from Crime* Among Nebraska Adults, 2001



*Percentage of Nebraska adults reporting, "how safe from crime do you consider your neighborhood to be?"
n=1,215 valid cases, 14 missing cases (1.1%)
Source: 2001 Nebraska CVD Survey

Worksite Supports for Physical Activity, 2001[4]

2001 Highlights reported by Nebraska adults that are employed

Overall

- 22.5 percent of worksites have exercise equipment such as a gym, pool, or other facilities for employees to use for physical activity.
- 16.6 percent of worksites offer regular physical activity programs, such as exercise classes, fitness counseling, or walking clubs.
- 25.8 percent of worksites encourage employees to exercise more by offering flexible work hours, or by encouraging activities such as using the stairs instead of the elevator and exercising during break times.
- 20.4 percent of worksites pay at least some of the cost for employees to join a health club or attend exercise classes that are not at the worksite.
- Collectively, about 2 in every 5 (40.4%) worksites have one or more of these four physical activity supports (Figure 8). However, less than 1 in every 10 worksites (8.8%) has three of the four supports in place while less than 1 in every 20 worksites (4.3%) has all four supports in place.

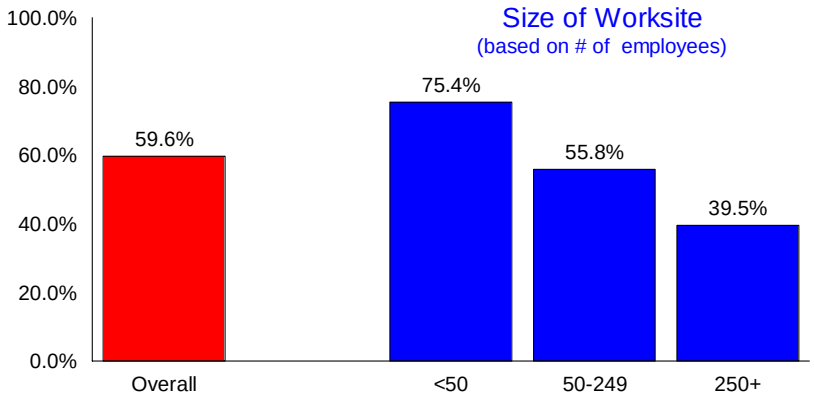
Differences by the number of employees within the worksite

- As the number of employees within the worksite increase, supports for physical activity increase. Worksites with 250 or more employees are 2.5 times more likely than worksites with less than 50 employees to offer one or more supports for physical activity.

Use of physical activity supports

- The key question for most worksites to consider is "what is the cost to benefit ratio," or "will people use the supports if they are in place?" Nebraska data are supporting usage of these supports. Among Nebraska adults that are employed and have one or more physical activity supports within their worksite, 1 in every 4 (24.2%) used a physical activity support at their worksite during the four months preceding the survey. Males were nearly twice as likely as females to use a physical activity support during the four months preceding the survey, 32.4 percent and 16.7 percent respectively (p<.01).

Figure 8: the percentage of Nebraska worksites that do not provide support for physical activity among employees*, 2001
*According to Nebraska adults that are employed***



*According to Nebraska adults that are employed, the percentage of worksites that do not have or support any of the following at their worksite: exercise equipment or facilities, physical activity programs, encouragement for physically activity (through flex-time or stair use), or financial assistance for gym memberships or exercise programs
Source: 2001 Nebraska CVD Survey

School Supports for Physical Activity and Healthy Eating

Healthy Eating Supports Within Nebraska Schools

According to Nebraska School Principals (of 6-12 grade public schools)

- 81 percent offer snacks foods and beverages in vending machines or a canteen/snack bar[7].
- Foods available in schools with vending machines or a canteen/snack bar[7]:
  - 97% - Soft drinks, sports drinks, of fruit drinks (that are not 100% juice)
  - 85% - Bottled water
  - 79% - 100% fruit juice
  - 60% - Non-chocolate candy
  - 59% - Chocolate candy
  - 58% - Salty snacks (not low-fat)
  - 57% - Salty snacks (low-fat)
  - 49% - Low fat baked goods
  - 23% - Fruits and Vegetables
- 52 percent allow the purchase of snack foods during school hours when meals are not being served, while 28 percent allow the purchase of snack foods during meal times[7].
- 73 percent have a contract with a soft drink company, such as Coca-Cola, Pespi-Cola, or Dr. Pepper, giving the company exclusive rights to sell soft drinks in the school[8].
- 17 percent provide less than 20 minutes for students to eat lunch once they are seated[7].
- 12 percent allow fast food (e.g., Pizza Hut, Taco Bell, Subway) to be offered at school meals while an additional 11 percent allow these as a la carte items[8].
- 4 percent have a policy stating fruits and vegetables will be offered at school settings (such as parties, after school programs, staff meetings, parent meetings, or concession stands)[7].

According to Lead Health Education Teachers within 6-12 grade public schools in Nebraska, 2002[9]

- Each of the following was taught in a required health education course:
  - 93% - Benefits of healthy eating
  - 88% - Aiming for a healthy weight through balancing diet and physical activity
  - 87% - Eating disorders
  - 87% - The risks of unhealthy weight-control practices
  - 84% - Accepting body size differences
  - 84% - Choosing a diet low in saturated fat/cholesterol and moderate in total fat
  - 84% - The Food Pyramid
  - 82% - Choosing a variety of fruits and vegetables
  - 81% - Choosing a variety of grains (especially whole grains)
  - 80% - Moderating the intake of sugars
  - 79% - Using food labels
  - 77% - Eating more calcium-rich foods
  - 75% - Preparing healthy meals and snacks
  - 72% - Choosing and preparing foods with less salt
  - 72% - Keeping food safe to eat
- During the two years preceding the survey, 23 percent of lead health education teachers participated in staff development activities about nutrition and dietary behavior; however, 46 percent would like staff development activities about nutrition and dietary behavior.

According to parents/community residents, 2001[4]

- 93.8 percent of Nebraska adults feel that their local public school system should require that all sources of food and drink at school include healthy choices (including cafeteria, vending machines, and school snack bars).

Physical Activity Supports Within Nebraska Schools

According to Nebraska School Principals (of 6-12 grade public schools)

- 99 percent require at least some physical education for students[7].
- 93 percent require that a newly hired physical education teacher or specialist be certified, licensed, or endorsed by the state in physical education[7].
- Among schools that require health education, 77 percent combine required health classes with physical education classes[7].
- 65 percent require that students repeat a required physical education class if failed[7].
- 31 percent of schools allow faculty and staff to use physical activity as punishment (such as running laps and push-ups) for poor behavior in physical education classes[7].
- 42 percent offer opportunities for students to participate in intramural activities or physical activity clubs, however just 15 percent provide transportation home for students who participate in such activities[7].
- 47 percent support walking and bicycling to school[8].
- 46 percent allow children or adults in the community to use indoor physical activity and athletic facilities without being in a supervised program (Figure 9)[8].
- 70 percent allow children or adults in the community to use outdoor physical activity and athletic facilities without being in a supervised program (Figure 9)[8].

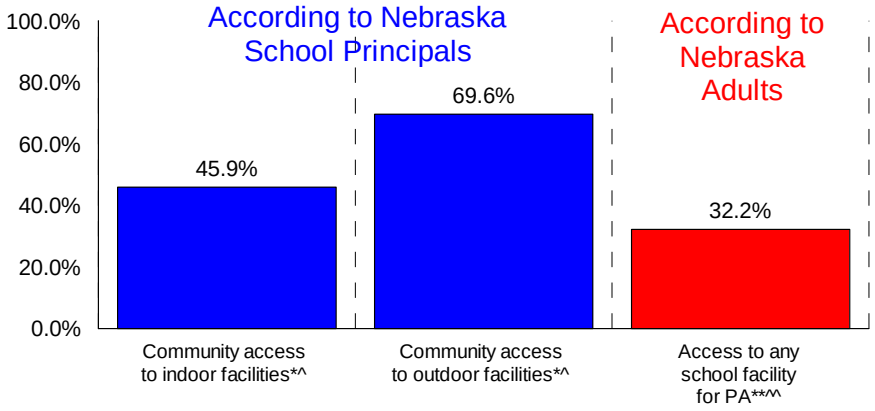
According to Lead Health Education Teachers within 6-12 grade public schools in Nebraska, 2002[9]

- Each of the following physical activity related topics was taught in a required health education course:
  - 92% - Physical, psychological, or social benefits
  - 91% - Health-related fitness
  - 89% - Dangers of performance-enhancing drugs, such as steroids
  - 86% - Phases of a workout
  - 84% - Preventing injury during physical activity
  - 83% - Decreasing sedentary activities
  - 81% - How much physical activity is enough
  - 78% - Weather-related safety
  - 73% - Opportunities for physical activity within the community
  - 70% - Developing an individualized physical activity plan
  - 64% - Monitoring progress toward reaching goals
  - 65% - Overcoming barriers to physical activity
- During the two years preceding the survey, 33 percent of lead health education teachers participated in staff development activities about physical activity and fitness; however, 47 percent would like staff development activities about physical activity and fitness.

According to parents/community residents, 2001[4]

- 32.2 percent of Nebraska adults report that they personally have access to school facilities (either public or private) in their area outside of normal school hours for the purpose of physical activity; a much lower percentage than reported by school principals (Figure 9).
- Among Nebraska adults with access to any school facilities in their area for physical activity, 23.3 percent used one or more of these facilities during the four weeks preceding the survey.
- 96.3 percent of Nebraska adults feel that local schools should require physical education for all students.

Figure 9: Community Access to School Facilities for Physical Activity, according to Nebraska school principals and adults



*Accoring to Nebraska public school principals (of grades 6-12), the percentage of schools allowing children or adults to use indoor or outdoor physical activity/athletic facilities without being in a supervised program
**Percentage of Nebraska adults reporting that they have access to school facilities in their area, outside of normal school hours, for physical activity
^Source: 2002 Nebraska School Health Education Profile
^^Source: 2001 Nebraska CVD Survey

Barriers to the Secondary Prevention of CVD

Heart Attack and Stroke Signs and Symptoms and the importance of 911

Introduction

Heart disease and stroke are serious diseases that require immediate medical care. According to the CDC, almost half of all cardiac deaths in 1999 occurred before emergency services and hospital treatment could be administered[10]. Similarly, the proportion of stroke deaths that occur before patients are transported to hospitals has increased to nearly half of all stroke deaths[11]. This is particularly concerning because thrombolytic drugs (used to treat stroke) have a limited window for administration. Properly recognizing the signs and symptoms of heart attack and stroke and acting immediately by calling 9-1-1 saves lives.

Heart attack warning signs include[10]:

- **Chest discomfort.** Most heart attacks involve discomfort in the center of the chest that lasts for more than a few minutes, or goes away and comes back. The discomfort can feel like uncomfortable pressure, squeezing, fullness, or pain.
- **Discomfort in other areas of the upper body.** Can include pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
- **Shortness of breath.** Often comes along with chest discomfort, but it can occur before chest discomfort.
- **Other symptoms.** May include breaking out in a cold sweat, nausea, or light-headedness.

Stroke warning signs include[12]:

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body.
- Sudden confusion, trouble speaking or understanding.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden, severe headache with no known cause.

Recognition of Heart Attack and Stroke Signs and Symptoms and 9-1-1 as the first emergency response option for heart attack and stroke among Nebraska Adults, 2001[4]

National Healthy People 2010 Objectives[13]

- Increase the proportion of adults aged 20 years and older who are aware of the early warning symptoms and signs of a heart attack and the importance of accessing rapid emergency care by calling 9-1-1 (#12-2).
  - 11 percent among Nebraska adults in 2001
- Increase the proportion of adults who are aware of the early warning symptoms and signs of a stroke (#12-8).
  - 19 percent among Nebraska adults in 2001

2001 Highlights (Table 1)

- Approximately 1 in every 8 Nebraska adults (13.1%) can correctly identify all heart attack signs and symptoms, 1 in every 5 (19.3%) can correctly identify all stroke signs and symptoms, and nearly 9 in every 10 (87.4%) recognize 9-1-1 as the first emergency response option for heart attack and stroke.
- However, collectively, just 1 in every 22 Nebraska adults (4.5%) can correctly identify all heart attack and stroke signs and symptoms and recognize 9-1-1 as the first emergency response option for heart attack and stroke.

Descriptive Analysis

Age

- Nebraska adults aged 75 years and older (1.8%) are less likely than Nebraska adults aged 35-54 (5.9%) and 55-74 (8.6%) years to correctly identify all heart attack signs and symptoms and recognize 9-1-1 as the first emergency response option for heart attack and stroke. This is particularly concerning since adults aged 75 years and older are at much greater risk for heart attack and stroke than younger adults.

Gender

- While the gender difference in correct knowledge of heart attack signs and symptoms is non-significant, females are more likely than males to both correctly identify all stroke signs and symptoms and recognize 9-1-1 as the first emergency response option for heart attack and stroke (Table 1).

Education & Income

- The most dramatic education and income disparity occurs in the recognition of stroke signs and symptoms. Nebraska adults with high education and income are 2.9 times more likely than Nebraska adults with low education and income to correctly identify all stroke signs and symptoms, 28.1 percent and 9.8 percent respectively (sig at .001 level).

Urban/Rural

- Recognition of heart attack and stroke signs and symptoms and 9-1-1 as the first emergency response option for heart attack and stroke does not differ by urban metro and non-urban metro county classification.

Table 1: Knowledge of Signs, Symptoms, and Emergency Response for Heart Attack and Stroke Among Nebraska Adults, 2001

	Overall		Male		Female		Relative Risk
	n*	Weighted %	n*	Weighted %	n*	Weighted %	M:F**
Can correctly identify all heart attack signs and symptoms	1,196	13.1%	403	12.8%	793	13.3%	0.96
Can correctly identify all stroke signs and symptoms	1,189	19.3%	400	15.7%	789	22.7%	0.69^
Recognize 9-1-1 as the first emergency response option for heart attack and stroke	1,194	87.4%	403	85.3%	791	89.4%	0.95^
Can correctly identify all heat attack and stroke signs and symptoms and recognize 9-1-1 as the first emergency response option for heart attack and stroke	1,185	4.5%	399	2.6%	786	6.3%	0.41^

*Non-weighted sample size value
**Relative risk represents the male to female percentage ratio
^The difference between males and females is significant at the .05 level.
Source: 2001 Nebraska CVD Survey

Aspirin Use

Introduction

The American Heart Association recommends aspirin use for patients who have 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[14]. This recommendation is based on sound evidence from clinical trials showing that aspirin helps prevent the recurrence of such events as heart attack, hospitalization for recurrent angina, second strokes, etc. (secondary prevention)[14]. Studies show aspirin also helps prevent these events from occurring in people at high risk (primary prevention)[14].

Aspirin Use among Nebraska Adults aged 35 years and older[4]

2001 Highlights for Nebraska adults aged 35 years and older

- About 1 in every 12 (8.1%) cannot take aspirin for health-related reasons (including both stomach and non-stomach related problems); thus indicating that aspirin use is possible among most, but not all residents.
- Among those with no aspirin-related health problems, about 1 in every 3 (34.1%) takes aspirin daily or every other day. This percentage dramatically increases as age increases, with 60.2 percent of adults 65 years and older taking aspirin daily or every other day.

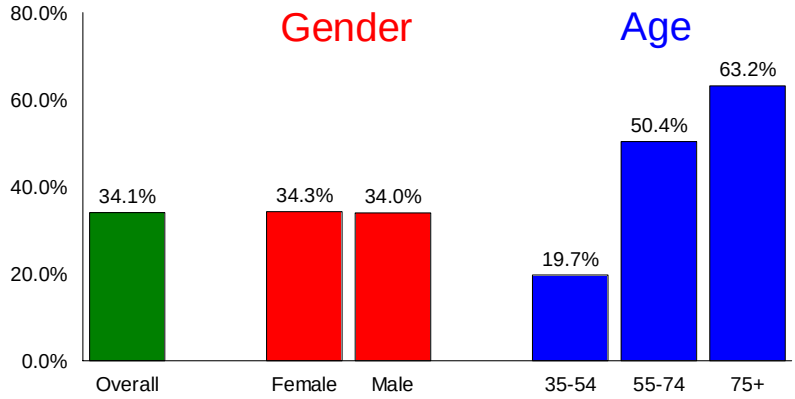
Aspirin use among high-risk individuals with no aspirin related health problems

- Among those with diagnosed CVD (have had a heart attack, stroke, or have been told that they have coronary heart disease), just 2 in every 3 takes aspirin daily or every other day.
- Less than half of those with diagnosed high blood pressure (48.1%), diagnosed high blood cholesterol (45.1%), and diagnosed diabetes (47.8%) are currently taking aspirin daily or every other day.

Why aspirin is taken

- It is encouraging that among those currently taking aspirin, about 4 in every 5 (82.4%) report taking aspirin to reduce the chance of having a heart attack or stroke.

Figure 10: Percentage of Nebraska Adults that Take Aspirin Regularly, Among Those 35 and Older With No Aspirin Related Health Problems, 2001



*Among Nebraska adults, aged 35 years and older, with no aspirin related health problems, the percentage that takes aspirin either daily or every other day
Source: 2001 Nebraska CVD Survey

Access to Health Care

Introduction

"The U.S. health care system is rapidly changing. As this system evolves, health care plans (e.g., health insurance, prepaid plans such as HMOs, and government plans such as Medicaid and Medicare) need to ensure that all Americans have access to affordable, high-quality preventive services, including screening for early detection of chronic diseases."[13]

No Health Care Coverage among Nebraska Adults Aged 18-64 Years, 2002[15]

Nebraska HP2010 Objective[16]: 100% coverage among adults aged 18-64 years (#1-1)

2002 Highlights

- Nearly 1 in every 7 Nebraska adults aged 18-64 years (13.7%) has no health care coverage, an estimated 130,000 to 160,000 residents.

Trends

- Compared to the late 1990's, estimates for no health care coverage among Nebraska adults aged 18-64 years have increased. While just under 10 percent of Nebraska adults aged 18-64 years were without health care coverage from 1997 to 1999, significantly more were without health care coverage in 2001 (16.5%) and 2002 (13.7%).

Compared to the Nation and Bordering States in 2002, among all adults aged 18 years and older[17]

- Nebraska ranks well compared to the nation. Out of 54 U.S. states and territories, Nebraska ranks tied for 18th lowest (with South Dakota) in the percentage of all adults (18 and older) that do not have any health care coverage (interquartile range 11.4% to 17.9%).
- Compared to bordering states, Nebraska adults are less likely to have no health care coverage than adults in Colorado (16.6%) and Wyoming (17.2%) while more likely to have no health care coverage than adults in Iowa (8.8%) ($p<.001$ respectively).

Descriptive Analysis of No Health Care Coverage Among Nebraska Adults Aged 18-64 years

Age

- As age increases, the percentage of Nebraska adults with no health care coverage decreases. Frighteningly, among Nebraska adults aged 18-24 years, 1 in every 5 has no health care coverage (21.1%).

Gender

- Approximately 1 in every 9 adult females in Nebraska (11.2%) has no health care coverage compared to approximately 1 in every 6 adult males (16.2%); indicating that males are 45 percent more likely than females to have no health care coverage ($p<.001$).

Education & Income

- Among Nebraska adults aged 18-64 years, as level of education and income increase, the percentage of Nebraska adults with no health care coverage decreases. Strikingly, among Nebraska adults aged 35-64 years, those with low education and income are 22.5 times more likely than adults with high education and income to have no health care coverage (38.2% and 1.7% respectively).

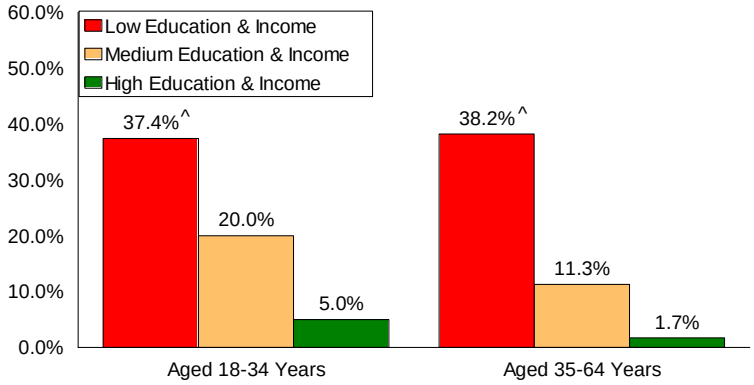
Race/Ethnicity Highlights from 2001 & 2002 (combined)

- Compared to Whites in Nebraska, Hispanics, African Americans, and Native Americans are more likely to have no health care coverage (Figure 12).

Urban/Rural

- Adults living outside of Nebraska's three urban metropolitan counties (Douglas, Lancaster, and Sarpy) are more likely than adults living within Nebraska's three urban metropolitan counties to have no health care coverage.

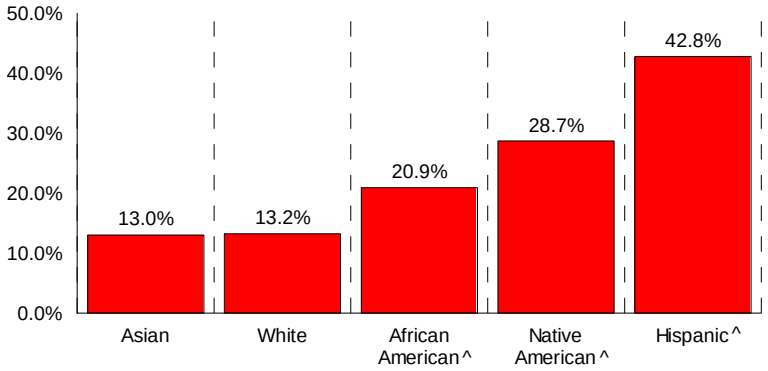
Figure 11: No Health Care Coverage* Among Nebraska Adults by Education & Income, 2002**



*Adults that do not have any kind of health care coverage, including health insurance, prepaid plans, or government plans
^Significantly higher than medium and high ed/inc at the .01 level
Listwise n=2,855 valid cases, 356 missing cases (11.1%)
Source: 2002 Nebraska Behavioral Risk Factor Survey

**Low ed/inc=<$25K income and H.S. or less education, medium ed/inc=neither low nor high ed/inc, high ed/inc= ≥$35K income and education beyond high school

Figure 12: No Health Care Coverage* Among Nebraska Adults Aged 18-64 Years by Race/Ethnicity, 2001-2002



*Adults that do not have any kind of health care coverage, including health insurance, prepaid plans, or government plans
Note: racial categories include non-hispanic only
^Difference between race/ethnicity and white is significant at the .05 level
Missing data=194 cases (1.6%)
Source: Nebraska Behavioral Risk Factor Survey & Nebraska Minority Over-sample Risk Factor Survey

EMS Response Times[18]

In 2000, the average EMS response time for a suspected cardiac event in Nebraska was: 10:10 from dispatch to the scene (or individual in need) and 29:55 from the scene to the health care facility (Figure 17). This indicates that the average Nebraska resident in need of EMS for a suspected cardiac event can expect arrival at a health care facility approximately 40 minutes after the EMS unit is dispatched.

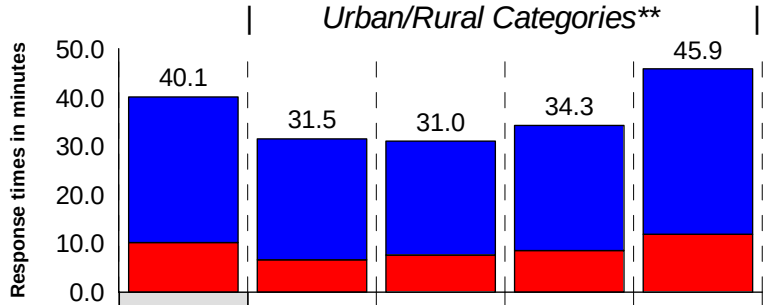
It only takes 4 minutes for the body to sustain brain damage without oxygen. Thus, it is most critical that dispatch to scene times are kept as short as possible. The current dispatch to scene time of 10:10 for cardiac events in Nebraska indicates that many residents likely receive permanent damage or death that could be prevented if faster medical care were available.

Due, in part, to the low population density within many regions of Nebraska, EMS response times for cardiac events differ by place of residence. Nebraska residents of rural-small counties receive longer dispatch to scene (11:52) and scene to health care facility (33:59) times than residents of urban metro (6:39,24:50), non-urban metro (7:35,23:26), and rural-large counties (8:30,25:46). In 2000, EMS dispatch to scene times for cardiac events were, on average, at least 3 minutes and 22 seconds longer in rural-small counties compared to the other three urban/rural regions.

In addition to varying EMS response times across Nebraska, the quality of 9-1-1 telephone coverage differs dramatically by place of residence. This indicates that residents within rural-small Nebraska counties are not only at greater risk from longer transport times, but also may experience complications that delay EMS dispatch..

Some additional information on EMS response times is available within Chapter 3 of this report.

Figure 13: EMS Response Times (in minutes) for Cardiac Events* from Dispatch to Arrival at the Health Care Facility Among Nebraska Residents by Urban/Rural, 2000



	Overall Nebraska	Urban Metro	Urban Non-Metro	Rural-Large	Rural-Small
Number of Transports^	5,584	2,107	1,520	1,053	904
Scene to Hospital (minutes)	29.9	24.8	23.4	25.8	34.0
Dispatch to Scene (minutes)	10.2	6.7	7.6	8.5	11.9

*Includes the average response times (for the times reported) for suspected cardiac events including chest pain, myocardial infactrion, and cardiac arrest
**See methodology for further detail on urban/rural classifications
^This is the minumum number of known transports for suspected cardiac events (some may go unreported)
Source: Nebraska EMS Data

Quality of Care

Introduction

Each year, more than 57,000 Americans die needlessly because they do not receive appropriate health care[19]. Most die from known conditions (about 50,000) such as high blood pressure or elevated cholesterol not being adequately monitored and controlled[19]. Other deaths occur from failure to provide correct preventive or follow-up care[19].

Effectiveness of Care Measures

HEDIS is a tool used to measure performance on important dimensions of care and service and is used by most American health plans. The intent of HEDIS is to provide purchasers and consumers with the information they need to reliably compare the performance of managed health care plans.

Centers for Medicare and Medicaid Services (CMS) Quality Measures are a set of measures looking at the quality of care for numerous health conditions. Within this report, CMS quality measures are specific to Medicare enrollees only.

Quality of Care within Managed Care Plans

Controlling High Blood Pressure

HEDIS Indicator Definition[19]

Controlling High Blood Pressure represents the percentage of adults aged 46-85 years with diagnosed hypertension that have their blood pressure adequately controlled (both the systolic and diastolic pressure must have been ≤140/90 mm/Hg).

2002 National Highlights[19] (Table 2)

- Nationally, in recent years, high blood pressure control has increased among individuals covered by commercial, Medicaid, and Medicare insurance plans.

2003 Nebraska Data for Medicaid Managed Care Enrollees[20] (Table 3)

- Within Nebraska, half of Nebraska Medicaid managed care enrollees (49.9%) with hypertension had their blood pressure controlled.

Cholesterol Management after a Heart Attack

HEDIS Indicator Definition[19]

Cholesterol Management after a Heart Attack represents the percentage of adults aged 18-75 years who had evidence of an acute cardiovascular event and whose LDL-C was screened and controlled to less than 130 mg/dL in the year following the event.

2002 National Highlights[19] (Table 2)

- Nationally, cholesterol management rates increased among individuals covered by commercial, Medicaid, and Medicare insurance plans, however Medicaid and Medicare organizations showed the most significant improvements.
- Nationally, rates for both control and screening of cholesterol within Medicaid plans appear substantially lower than rates within both Medicare and Commercial plans.

Advising Smokers to Quit

HEDIS Indicator Definition[19]

Advising Smokers to Quit represents the percentage of adults aged 18 years and older who were either current smokers or recent quitters, were seen by a practitioner and received advice to quit smoking in the past year.

2002 National Highlights[19] (Table 2)

- Nationally, across all plans, around 2 in every 3 self-identified smokers was seen by a practitioner and received advice to quit smoking in the past year.

Beta-Blocker Treatment after a Heart Attack

HEDIS Indicator Definition[19]

Beta-Blocker Treatment after a Heart Attack represents the percentage of adults aged 35 years and older who were hospitalized and discharged from a hospital after surviving a heart attack who received a prescription for beta-blocker.

2002 National Highlights[19] (Table 2)

- Nationally, since 1999, Beta-Blocker Treatment after a Heart Attack increased across all plans. In 2002, all plans were at 90 percent or higher.

CMS Quality Measures Indicator Definitions[21]

Beta-Blocker at Arrival represents the percentage of AMI patients without beta-blocker contraindications who received a beta blocker within 24 hours after hospital arrival.

Beta-Blocker Prescribed at Discharge represents the percentage of AMI patients without beta-blocker contraindications who received a beta-blocker at hospital discharge.

2002 Nebraska Data for Medicare Enrollees[21] (Table 2)

- Within Nebraska, about 3 in every 4 Medicare enrollees (77.8%) received a beta-blocker at hospital arrival while nearly 9 in every 10 (88.0%) received a beta-blocker at discharge.

Comprehensive Diabetes Care

HEDIS Indicator Definition[19]

Comprehensive Diabetes Care includes a variety of different factors that are important to diabetes care. The measures represent the percentage of adults aged 18-75 years that, during the measurement year, had: (a) an HbA1c test, (b) poorly controlled HbA1c (>9.5%), (c) a serum cholesterol level (LDL-C) screening, (d) their cholesterol level (LDL-C) controlled to less than 130 mg/dL, (e) an eye exam, and (f) a screening for kidney disease (microalbuminuria test).

2002 National Highlights[19] (Table 2)

- Nationally, rates for comprehensive diabetes care improved overall, but performance varied widely across different plans.

2003 Nebraska Data for Medicaid Enrollees[20] (Table 3)

- Within Nebraska, the majority of Medicaid managed care enrollees with diabetes received a HbA1c test as well as an LDL-C cholesterol screening during 2003 (83.0% and 73.2% respectively), however just half received a screening for diabetic nephropathy (49.9%) while only 2 in every 5 (42.1%) received an eye exam.

One of the gaps in Nebraska's health-related data is a thorough understanding of quality of care related to CVD and its associated risk factors for residents covered by different insurance plans. Currently, some HEDIS measures related to CVD and its associated risk factors are reported for Nebraska Medicaid managed care enrollees and Nebraska Medicare enrollees. However, there is additional information available for Medicaid, Medicare, and individuals on private insurance that has not been compiled and/or reported. Accessing and reporting all available quality of care data, as well as exploring other opportunities to collect new quality of care information, would enhance Nebraska's ability to improve and monitor the quality of cardiovascular care in Nebraska.

Table 2: HEDIS Quality of Care Measures Related to CVD for U.S. Residents Covered by Managed Care Plans, 2002

	Commercial	Medicare	Medicaid	Number of Lives That Could be Saved Through*
Blood Pressure				
Controlling high blood pressure	58.4%	56.9%	53.4%	28,300
Blood Cholesterol				
Cholesterol screening after a heart attack	79.4%	77.7%	57.8%	
Cholesterol screened and controlled after a heart attack	61.4%	62.3%	36.7%	6,500
Smoking Cessation				
Advising Smokers to Quit	67.7%	61.5%	63.6%	2,700
Beta-Blocker Treatment				
Beta-blocker treatment after a heart attack	93.5%	93.0%	90.1%	1,700
Diabetes				
HbA1c Test	82.6%	85.0%	74.0%	
HbA1c Poorly Controlled**	33.9%	24.5%	48.2%	13,600
Cholesterol (LDL-C) screening	85.1%	87.9%	71.7%	
Cholesterol control	54.8%	62.6%	43.9%	
Eye Exam	51.7%	68.4%	47.1%	
Screening for Diabetic Nephropathy	51.8%	57.3%	47.8%	

*Number of preventable deaths in America if recommended care was given at the rates seen in the 90th percentile
**Lower percentages are better
Note: definitions for each HEDIS measure can be found under the appropriate sub-heading within this chapter
Source: The State of Health Care Quality, 2003. National Committee for Quality Assurance.

Table 3: Quality of Care Measures Related to CVD for Nebraska Residents Covered by Medicare and Medicaid, 2003

Medicaid Managed Care Enrollees*	
Blood Pressure	
Controlling high blood pressure	49.9%
Diabetes	
HbA1c Test	83.0%
Cholesterol (LDL-C) screening	73.2%
Eye Exam	42.1%
Screening for Diabetic Nephropathy	49.9%
Medicare Enrollees**	
Beta-Blocker Treatment After a Heart Attack	
Beta-Blocker at Arrival	83.0%
Beta-Blocker Prescribed at Discharge	73.2%

Note: definitions for each measure can be found under the appropriate sub-heading within this chapter
*Source: Nebraska Medicaid Claims Data, 2003
**Source: CMS-CDAC Medicare records from CIMRO of Nebraska

Quality of Care within U.S. Hospitals

Introduction

The American Heart Association developed and implemented a national quality improvement initiative, entitled Get With The Guidelines, to help hospitals redesign systems of care to improve guidelines adherence in patients admitted with heart disease and stroke.

The data within Table 4 represent pre-intervention data from 30 consecutive patients at 120 U.S. hospitals[22]:

Table 4: Performance on CVD Related Indicators with U.S. Hospitals

Performance Indicator	Percent of Inpatients
a. Aspirin within 24 yours of admission	75.3%
b. Aspirin at discharge	93.2%
c. Beta-blocker within 24 hours of admission	62.0%
d. Beta-blocker at discharge	79.4%
e. ACE-inhibitor at discharge for patients with LVEF <40%	63.6%
f. Lipid therapy at discharge	66.5%
g. Lipid therapy at discharge if LDL >100 mg/dL	72.8%
h. Blood pressure therapy at discharge	74.5%
I. Smoking cessation counseling	57.2%
j. Referral to cardiac rehabilitation	65.0%

Source: Get With The Guidelines, American Heart Accocaiation
Note: these data represent pre-intervention performance and highlight treatment gaps for each performance indicator

Methodology

Data Sources Used in This Report

Overview of Data Sources

To comprehensively understand the impact of CVD in Nebraska, a variety of data were selected to look at multiple aspects of CVD and its associated risk factors. Within this report, a total of 14 Nebraska data sources were used to examine one or more aspects of CVD. These data sources contained information on mortality, medical care and expenses, emergency medical services response times, CVD prevalence, barriers to cardiovascular health, and adult and youth behaviors and knowledge related to each of the seven preventable risk factors for CVD presented within this report. A variety of national statistics were also presented within this report (and cited accordingly).

Mortality Data

Mortality data in Nebraska are collected on a yearly basis and are based on data from individual death certificates. These death certificates are collected and compiled by the Nebraska Office of Vital Statistics. These data include information on a variety of attributes of the deceased (including age, race/ethnicity, gender, place of residence, and primary and secondary causes of death).

Mortality data used in this report are from years 1979-2001. These data are coded using the International Classification of Disease (ICD), the source for coding mortality data by cause. Data collected during years 1979 to 1998 used the 9th revision of the ICD (ICD-9). In 1999, the ICD updated its coding system to the 10th revision (ICD-10). To compare data that were coded with the ICD-9 codes to data that were coded with the ICD-10 codes, comparability ratios must be applied to all ICD-9 data. Subsequently, all data presented within this report that were coded using the ICD-9 codes (aside from total CVD mortality which has virtually identical comparison), were modified to allow for comparability to ICD-10 data (unless noted). For additional information on ICD comparability ratios and methods, view the National Center for Health Statistics website at <http://www.cdc.gov/nchs/datawh/nchsdefs/Comparability%20Ratio.htm>. The cause of death mortality codes and comparability ratios used in this report are included in Table 1.

Nebraska Hospital Discharge Data

Information on each hospital discharge is reported from acute care hospitals in Nebraska to the Nebraska Association of Hospitals and Health Systems (NAHHS). This information is reported by hospitals using the Uniform Billing Form (UB-92) and is transmitted electronically to the Nebraska Hospital Information System (NHIS) at NAHHS, using the DataTrac software. Ultimately the information is acquired by the Nebraska Health and Human Services System (NHHSS) from NAHHS.

There are two types of hospital discharge records available in Nebraska, emergency department (ER) and inpatient (IP). This report contains information from both records. Furthermore, these data are separated using an encrypted patient identifier (provided to NHHSS by NHIS) to eliminate the duplication of records by one individual patient. Hospital discharge records contain information on the date of admission, date of discharge, patient's age, gender, county of residence, and primary and secondary ICD-9-CM diagnosis codes. Information is not available on the race or ethnicity of the patient.

There are two limitations of these data. First, the number of records reported by acute care hospitals to the NHIS is lower than the number or records the same hospitals report to the NHHSS annually, indicating incomplete data. As a result, records are reported as estimates (that underestimate the true values)

Table 1: International Classification of Disease (ICD) Mortality Codes Used within this Report

Cause of Death	ICD-9 (years 1979-1998)	ICD-10 (years 1999-2001)	Comparability Ratio*
Total CVD	390-459	I00-I99	1.0000
Heart Disease	390-398, 402, 404, 410-429	I00-I09, I11, I13, I20-I51	0.9858
Coronary Heart Disease	410-414, 429.2	I20-I25	0.9990
Heart Failure	428	I50	1.0410
Sudden Cardiac Death	NA	I00-I09, I11, I13, I20-I51, Q20-Q24**	NA
Stroke	430-434, 436-438	I60-I69	1.0588
High Blood Pressure	401-404	I10-I15	-^
Alzheimer's Disease	NA	G30	NA
Birth Defects	NA	Q00-Q99	NA
Cancer	NA	C00-C97	NA
Chronic Lung Disease	NA	J44, J47	NA
Diabetes	NA	E10-E14	NA
Homicide	NA	X85-Y09, Y87.1	NA
Pneumonia	NA	J12-J18	NA
Suicide	NA	X60-X84, Y87.0	NA
Unintentional Injuries	NA	V01-X59, Y85-Y86	NA

*The ratio that must be applied to data coded through ICD-9 to allow for comparison to data coded through ICD-10
**Sudden Cardiac Deaths must include these ICD codes and must have occurred in one of the following locations: outpatient care, emergency department, residence, nursing home, or other out of hospital death
^High Blood Pressure comparability ratio is unknown, thus, ICD-9 data in this report were unmodified
NA: this information was not used in this report
Source: National Center for Health Statistics (NCHS)

rather than census figures. The following represents the percentage of completeness for each year of the Nebraska Hospital Discharge Data (calculated by dividing the number of actual cases in the database by the number of cases reported to the NHIS): year (% inpatient records, % ER records): 1996 (83%, 44%), 1997 (83%, 52%), 1998 (83%, 65%), 1999 (87%, 70%), 2000 (87%, 75%), 2001 (82%, 76%).

The second limitation is that Nebraska residents receiving care outside the State of Nebraska are not included in the database. Since the rate and trend of migration for medical care is unknown, the true number of hospitalizations and ER visits for Nebraska residents is beyond speculation. Particular caution should be used when comparing hospitalization rates geographically, since residents of some counties may be more likely than residents in other counties to receive their medical care out of state.

Nebraska Medicaid Claims Data (NMCD)

The Medicaid program is a partnership of federal and state government that funds approved health care and related services for individuals who meet eligibility requirements. Physicians and other health care providers submit information to the state or to insurance companies contracting with the state.

NMCD data represent inpatient, outpatient, and pharmacy records for Nebraska Medicaid enrollees. They also provide information on the date of the medical encounter, the enrollee's age, gender, and race/ethnicity. Within this report, all NMCD represent people enrolled in the Nebraska Medicaid program during the calendar year (CY) 2001. To be included within the database, the enrollee must have been a resident of Nebraska, been born before the end of the CY 2001, and not have a gender listed as "unborn." Services for individuals with "unborn" as gender were generally services for expectant mothers who were Medicaid eligible because of their unborn child. They were excluded because the age of these individuals is generally listed as zero, but the services performed are generally for an adult.

The results listed in this report were obtained using Medicaid claims and encounters that were accessed through the Medicaid MEDSTAT DataScan data warehouse through the Nebraska Medicaid Managed Care Program. While the results listed in this report are population parameters (not estimates), the accuracy of the results may be limited by rounding, missing or erroneous records, or other limitations of the administrative data source.

Prescription data for Medicaid enrollees is presented within this report. CVD-related drug prescriptions include antihypertensive and diuretics, antihyperlipidemic, antithrombotics, thrombotics, and not specified cardiac drugs. Vitamin supplements and "CVD devices and non-drugs" are included in the number that received a CVD-related drug prescription but are excluded from the CVD-related drug costs.

While most were covered for the entire year, some Nebraska Medicaid enrollees were covered for only part of CY 2001. As a result, we adjusted the Medicaid population to reflect eligibility years (or the number of enrollees if enrollees were enrolled for 12 months). To do this, we summed the number of months that each enrollee was covered by Medicaid during 2001 and divided them by 12. Eligibility years (which is commonly used in similar analysis) creates denominator values that are more conducive to calculating representative rates.

In 2001, 244,802 Nebraska residents were enrolled in Nebraska's Medicaid system for any amount of time. However, this population converted to 191,055 eligibility years, indicating that a large number of enrollees were enrolled for less than 12 months.

The numbers, rates, and costs of hospitalization presented within this section may slightly under represent the actual numbers that occurred within Nebraska's Medicaid population (due to the selection of specific billing codes during analysis). In contrast, the total medical encounters contain all encounters, including those that may be missing from the hospitalization statistics.

Death certificate data in Nebraska were linked with the Nebraska Medicaid Claims data to identify which CVD deaths in 2001 occurred among Medicaid enrollees. The identification information from the 5,763 Nebraska CVD deaths in 2001 was provided to MEDSTAT for reference against the identification information for all Medicaid enrollees. Deaths due to CVD among Medicaid enrollees represent only those that were enrolled in Medicaid during their time of death.

For additional information on the Nebraska Medicaid Claims Data please contact the Nebraska Managed Care Epidemiologist of the Nebraska Medicaid Managed Care Program at (402) 471-0137.

Nebraska Medicare Claims Data

The Centers for Medicare and Medicaid Services (CMS) administers the Medicare program, as well as works with states to administer Medicaid, the State Children's Health Insurance Program (SCHIP), and health insurance portability standards. The quality improvement organization (QIO) in Nebraska contracting with CMS to improve the quality of health care is CIMRO of Nebraska.

The data in this report represent a sample of hospitalization records for Nebraska Medicare beneficiaries that are drawn by the Clinical Data Abstraction Centers (CDAC) for CMS. This sample consists of hospitalization records for Nebraska Medicare beneficiaries treated in Nebraska hospitals. For measuring beta-blocker at admission, a sample of 36 records was drawn for acute myocardial infarction (AMI) discharges without beta-blocker contraindications at admission. For measuring beta-blocker at discharge, a sample of 75 records was drawn for AMI discharge without beta-blocker contraindications at admission records. For more information on CMS or quality of care for Nebraska Medicare beneficiaries, please contact CIMRO of Nebraska at 402-476-1399.

Table 2: International Classification of Disease Clinical Modification Codes from the 9th revision (ICD-9-CM) Used within this Report for Hospitalization and Medical Care Analysis

Cause of Medical Care	ICD-9-CM Codes	Cause of Medical Care, cont.	ICD-9-CM Codes
Total CVD	390-459	Chronic Obstruction Pulmonary Disease	490-496
Heart Disease	390-398, 402, 404, 410-429	Diabetes	250
Coronary Heart Disease	410-414, 429.2	Digestive System Disorders	530-579
Heart Failure	428	Infections and Paracitic Disease	001-139, 480-487
Stroke	430-434, 436-438	Injuries	800-959
High Blood Pressure	401-404	Mental Health	290-319
Cancer	140-239	Pregnancy and Childbirth	630-676

Source: Nebraska Health and Human Services System

Nebraska Emergency Medical Services Response Time Data

The Nebraska emergency medical services (EMS) response time data contain information on the time from dispatch to the arrival at the health care facility. Each time an EMS transport is completed, the EMS provider completes a form and sends it into the Nebraska Health and Human Services System for entry into a database. Data within the database represents all EMS transports, including both residents and non-residents of Nebraska.

The EMS response time data presented in this report do have some limitations. Within this report, data are presented for CY 2000 (the most complete data available at this time). Data presented within this report are the minimum known number of transports for suspected cardiac events (some may go unreported). This information represents only response times for suspected cardiac events (including chest pain, myocardial infarction, and cardiac arrest). While these data do not represent stroke, it is our belief that response times for stroke may be slightly higher since stroke is a lower priority response than check pain in many Nebraska communities.

Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is a cross-sectional random digit dialed telephone survey of Nebraska adults 18 years of age and older. This survey, which is conducted in all 50 states, the District of Columbia, and three U.S. territories, is developed each year by the CDC and administered by the Nebraska Health and Human Services System. Nebraska began conducting the BRFSS in 1982, and since has conducted the survey on an on-going annual basis. The Nebraska BRFSS is designed to collect information on the health behaviors of adults related to the major causes of morbidity and mortality in the state. This report contains data collected during the years of 1989 to 2002. BRFSS data are weighted to reflect the Nebraska adult population. Subsequently, all BRFSS percentages in this report represent weighted data while all n values represent the un-weighted sample size. If additional information regarding the methodology behind the BRFSS is desired, visit the CDC website at <http://www.cdc.gov/brfss/> or contact the Nebraska BRFSS coordinator at 402-471-0516.

Minority Over-sample Behavioral Risk Factor Survey

Beginning in 2001, the Nebraska Health and Human Services System began conducting an additional BRFSS targeted specifically at minority residents. This survey, identical to the statewide BRFSS used during the same year, is limited to residents of census tracts that have a minority population of greater than 50 percent. For this report, all responses from the BRFSS and the minority over-sample survey

were combined to increase the sample for each race/ethnicity. Data from the minority over-sample survey were only reported when presenting data by race/ethnicity. If additional information regarding the methodology behind the minority over-sample survey is desired contact the Nebraska BRFSS Coordinator at 402-471-0516.

2001 Nebraska CVD Survey

From July to December 2001, data were collected from 1,200 Nebraska adults about their health behaviors, attitudes and beliefs, prevalence, and barriers related to CVD. This study collected information on a cross-section of Nebraska adults, aged 18 years and older, using random digit dialed telephone methodology. The survey was administered by the Behavioral Risk Factor Surveillance System of the Nebraska Health and Human Services System. Once collected, all data were cleaned and weighted (using the CDC weighting scheme developed for the BRFSS) to reflect the Nebraska adult population for CY 2001.

2003 Nebraska Adult Tobacco/Social Climate Survey

This study, funded by the Tobacco Free Nebraska Program, collected information on a cross-section of Nebraska adults, aged 18 years and older, using random digit dialed telephone methodology. The Behavioral Risk Factor Surveillance System of the Nebraska Health and Human Services System administered the survey. Data were collected from 7,019 Nebraska adults between January and December of 2003. Data were analyzed, in large part, by the Bureau of Sociological Research at the University of Nebraska-Lincoln while some analysis was conducted within the Nebraska Health and Human Services System.

The Tobacco Free Nebraska Program allowed the Nebraska CVH Program to add several question to the survey. These additional questions asked about television viewing and computer use as well as walking related behaviors. The survey included a sample of 7,019 Nebraska adults. Once collected, all data were cleaned and weighted (using the CDC weighting scheme developed for the BRFSS) to reflect Nebraska's adult population from 2003.

Youth Risk Behavior Survey (YRBS)

The Youth Risk Behavior Survey (commonly referred to as the YRBS) is part of the National Youth Risk Behavioral Surveillance System that was established by the Centers for Disease Control and Prevention (CDC). The focus of the YRBS is on priority health-risk behaviors (those health-risk behaviors that are established during youth and result in the most significant mortality, morbidity, disability, and social problems during both youth and adulthood).

Nebraska began conducting the YRBS in 1991, and has conducted it every odd calendar year since. This surveillance system targets youth enrolled in grades 9-12 attending public schools in Nebraska. Data are collected by having students complete hard copy surveys in Nebraska schools that were selected through a three-stage cluster sampling design.

Data from 1991, 1993, and 2001 are considered representative of the population, and are subsequently weighted to reflect the 9-12 grade public school student population in Nebraska. Due to an insufficient response rate on the 1995, 1997, 1999, and 2001 surveys, data were not weighted and as a result, are not generalize-able to the population (according to the CDC's criteria). For additional information on the Nebraska YRBS, please visit the following website <http://www.cdc.gov/HealthyYouth/yrbs/index.htm> or contact the Nebraska YRBS coordinator at 402-471-2101.

Nebraska Middle School Youth Tobacco Survey (YTS)

The Nebraska Middle School Youth Tobacco Survey is used to identify tobacco use from a representative sample of Nebraska students in grades 6-8. The 1999 Middle School Youth Tobacco Survey is based on responses of 3,429 students and the 2002 survey is based on responses of 2,812 students.

Nebraska School Health Education Profile Surveys (SHEPS)

The School Health Profiles, developed and coordinated through the CDC, are designed to help state and local education and health agencies monitor the current status of school environments related to health and health education. Nebraska began conducting the SHEPS in 1994 and has been conducting it every even calendar year since.

The sample consists of Nebraska public schools serving students in any of grades 6 through 12. The SHEPS consists of data from two questionnaires, one completed by the school principal and one completed by the lead health education teacher within a particular school. Questionnaires are mailed to the principal, who then designates the school's lead health education teacher to complete the teacher's survey. The 2002 Nebraska SHEPS data were weighted to represent all public schools serving grades 6 through 12 in Nebraska. For additional information on the SHEPS please visit the following website <http://www.cdc.gov/HealthyYouth/profiles/index.htm> or contact the Nebraska SHEPS coordinator at 402-471-2101.

2000 Nebraska School Administrator Survey

In November 2000, the Tobacco Free Nebraska (TFN) Program sent a questionnaire to the principal within all 449 public middle and high schools in Nebraska. The TFN Program allowed the Nebraska Cardiovascular Health Program to add questions to the survey specific to physical activity and nutrition. The TFN Program used a multi-stage mailing and follow-up telephone calls to obtain an 87 percent response rate. Additional methodology information can be obtained in the report entitled *2000 Nebraska School Administrator Survey* which is available on-line at <http://www.hhs.state.ne.us/srd/00SAS.pdf> or by calling (402) 471-2101.

2002/2003 Nebraska Youth Height and Weight Data

In June 2004, the Nebraska CVH Program released a report on the body weight status of Nebraska students in grades K-12, entitled "Overweight Among Nebraska Youth: 2002/2003 Academic School Year." These data represent the heights and weight of more than 40,000 Nebraska students in grades K-12 from 234 Nebraska schools. Data were weighted to the 2002/2003 Nebraska school membership (census) data from the Nebraska Department of Education. A full copy of this report (containing detailed methodology) can be obtained at the following website <http://www.hhs.state.ne.us/hew/hpe/cvh/overweightamongneyouth.htm> or by calling (402) 471-2101.

2003 Nebraska Walk-to-School Day – Walkability Checklist

As part of the 2003 Nebraska Walk-to-School Day event, walkability checklist surveys were given to all students and parents that participated in the event at a school who received mini-grant funding from the Nebraska CVH program. The student results, presented in this report, only represent the 1,417 Nebraska students in grades K-12 that participated in the 2003 Nebraska Walk-to-School Day event at their school. Results are not intended to be representative of all Nebraska students in grades K-8.

Significance Testing

All statements within this report highlighting differences between two populations reflect statistically significant differences (where p<.05 unless noted). Within this report, differences between rates and percentages were tested for significance using different tests.

To compare differences between percentages, the z-test for independent proportions was administered. Significance was determined at the .05, .01, or .001 level using the z-critical values of 1.96, 2.576, and 3.30 respectively. Significance tests were not administered on any subpopulation with a sample size of less than 30 cases.

To compare two age-adjusted rates, 95% confidence intervals were calculated for each rate and examined for an overlapping difference (which determined non-significance). Non-overlapping confidence intervals signified a significant difference between the two rates. Significance tests were not administered on any subpopulation with a sample size of less than 20 events. The formula used to calculate 95% confidence interval ranges for age-adjusted rates is as follows: $R \pm (1.96 \times S.E.)$; where S.E.=R/SQRT(N); R=age-adjusted rate and N=number of cases.

To compare two crude rates, different tests were used depending on whether or not the rates were dependent or independent and on the number of events within each population. When either of the crude rates was based on a number of events between 10 and 99, formula 1 was used. When both of the crude rates were based on 100 or more events, formula 2 was used. If either of the crude rates was based on less than 10 cases, the significance test was not performed. The significance tests for comparing crude rates can be viewed at <http://www.dsf.health.state.pa.us/health/cwp/view.asp?q=235686>.

Urban and Rural Analysis

Nebraska is a sparsely populated state, with the majority of the State's population clustered along the eastern edge of the state. This dense population results in a large number of rural communities across the state. As a result, for data interpretation purposes, Nebraska's counties were divided into four urban and rural categories. The categories are based on city size within each county (which was obtained from the 2000 U.S. Census). Urban/Rural data within this report are presented for all four categories or for the urban-metropolitan counties compared to all other counties (depending on sample size limitations or the variable under observation).

Urban Metropolitan counties have a city with at least 50,000 residents and a county population of at least 100,000. There are 3 urban metropolitan counties in Nebraska.

Urban Non-Metropolitan counties do not meet the metropolitan county requirements, but do have at least one city with a population of 10,000 residents or greater. There are 11 urban non-metropolitan counties in Nebraska.

Rural-Large counties do not meet the urban non-metropolitan county requirements, but do have at least one city with a population of 2,500 residents or greater. There are 27 rural-large counties in Nebraska.

Rural-Small counties do not meet the rural-large county requirements, thus they do not have any cities with a population of 2,500 residents or greater. There are 52 rural-small counties in Nebraska.

Below are the Nebraska counties per urban/rural category for the analysis presented in this report.

Urban Metro
DOUGLAS
LANCASTER
SARPY

Urban Non-Metro
ADAMS
BUFFALO
DAKOTA
DAWSON
DODGE
GAGE
HALL
LINCOLN
MADISON
PLATTE
SCOTTS BLUFF

Rural-Large
BOX BUTTE
BUTLER
CASS
CHERRY
CHEYENNE
COLFAX
CUMING
CUSTER
DAWES
HAMILTON
HOLT
JEFFERSON
KEARNEY
KEITH
KIMBALL
MERRICK
NEMAHA
OTOE
PHELPS
RED WILLOW
RICHARDSON
SALINE
SAUNDERS
SEWARD
WASHINGTON
WAYNE
YORK

Rural-Small
ANTELOPE
ARTHUR
BANNER
BLAINE
BOONE
BOYD
BROWN
BURT
CEDAR
CHASE
CLAY
DEUEL
DIXON
DUNDY
FILLMORE
FRANKLIN
FRONTIER
FURNAS
GARDEN
GARFIELD
GOSPER
GRANT
GREELEY
HARLAN
HAYES
HITCHCOCK
HOOKER
HOWARD
JOHNSON
KEYA PAHA
KNOX
LOGAN
LOUP
MCPHERSON
MORRILL
NANCE
NUCKOLLS
PAWNEE
PERKINS
PIERCE
POLK
ROCK
SHERIDAN
SHERMAN
SIOUX
STANTON
THAYER
THOMAS
THURSTON
VALLEY
WEBSTER
WHEELER

Socioeconomic Status (SES)

Data on both education and income are available within the BRFSS, 2001 CVD Survey, and 2003 ATS/ Social Climate Survey. Given the positive correlation between education and income, these variables were combined to create a proxy measure for socioeconomic status. The following definitions were used to categorize individuals as having a low, medium, or high education and income: individuals with a *low education and income* have an annual household income of < $25 thousand per year and have < a high school education; individuals with a *medium education and income* do not qualify for either the low or high categories; individuals with a *high education and income* have an annual household income of > $35 thousand and were educated beyond a high school (counting any amount of formal education beyond high school). These definitions were selected because they provided a large enough sample within each of the categories for valid comparison.

Years of Productive Life Lost (YPLL)

Years of Productive Life Lost (YPLL) (also commonly referred to as 'years of potential life lost') is a measure of premature mortality within a population. According to the National Center for Health Statistics, YPLL is presented for persons less than 75 years of age because the average life expectancy in the United States is over 75 years. YPLL-75 is calculated using the following eight age groups: under 1 year, 1-14 years, 15-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years. The number of deaths for each age group is multiplied by the years of life lost, calculated as the difference between age 75 years and the midpoint of the age group. For the eight age groups the midpoints are 0.5, 7.5, 19.5, 29.5, 39.5, 49.5, 59.5, and 69.5. For example, the death of a person 15-24 years of age counts as 55.5 years of life lost. Years of potential life lost is derived by summing years of life lost over all age groups. Within this report, YPLL is presented for numerous causes of death. ICD codes for those causes of death are available in Table 1.

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