Iowa Department of Public Health
Division of Health Promotion and Chronic Disease Prevention

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Healthy Iowans

Iowa Chronic Disease Report

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CHRONIC DISEASE REPORT

Iowa Department of Public Health
Promoting and Protecting the Health of Iowans

Thomas Newton, MPP, REHS
Director

Chester J. Culver
Governor

Patty Judge
Lt. Governor

Fall 2009

Dear Colleagues:

I am pleased to present the *Iowa Chronic Disease Report*. The information presented in this report describes the leading causes of chronic disease deaths in Iowa, as well as associated risk factors and inpatient hospitalizations. The report presents current data and adds an historical point of view.

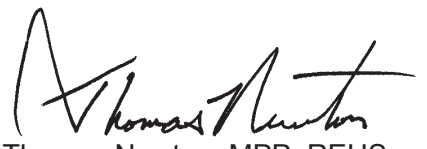
The five leading causes of death among Iowans, in order, were diseases of the heart, malignant neoplasms, cerebrovascular disease, chronic lower respiratory disease, and unintentional injuries. Of these five leading causes of death, all but unintentional injuries are chronic diseases. Of all deaths, approximately 28% were due to diseases of the heart; over one in four Iowans died of heart disease.

One of the most critical conclusions to draw from the information presented in this report is the importance of prevention. In our current society, there are a host of opportunities to prevent chronic disease. Some of these opportunities include:

- Preventing tobacco use
- Achieving and sustaining an ideal body weight
- Increasing physical activity
- Maintaining good nutritional behaviors
- Drinking alcohol in moderation

This report is a project of the Chronic Disease Integration Team at the Iowa Department of Public Health. It is our expectation that the information contained in the report will lead to healthier citizens across the entire state of Iowa, including both adults and children, and a better quality of life.

Sincerely,



Thomas Newton, MPP, REHS
Director

ACKNOWLEDGMENTS

This report was written by Catherine Lillehoj, Ph.D.[1], Joann Muldoon, M.A.,M.S.[1]; Yumei Sun, Ph.D. [1], and Don Shepherd, Ph.D. [1] Members of the Iowa Department of Public Health Chronic Disease Integration Team also contributed to the compilation of this report. This team coordinates and integrates chronic disease programming in Iowa Department of Public Health. Pam Barton and Josh Jungling provided assistance with the design layout of the report and Louise Lex, Ph.D. with the report final editing.

[1] Iowa Department of Public Health, Center for Health Statistics.

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Healthy Iowans

CHRONIC DISEASE REPORT

EXECUTIVE SUMMARY

Chronic diseases, including heart disease, cancer, and diabetes, account for seven out of every 10 deaths and affect the quality of life for tens of thousands of Iowans. Iowans who are afflicted with a chronic disease may experience a long course of illness that is rarely resolved spontaneously. In addition, chronic diseases are generally not cured by medication or not prevented by vaccination. Chronic disabling conditions cause major limitations in activity for Iowans. Although chronic diseases are among the most common health problems, they are also among the most preventable. Adopting healthy behaviors, such as eating nutritious foods, being physically active, and avoiding tobacco use, can prevent or control the negative effects of many chronic diseases.

In 2007, chronic diseases accounted for 68% of all deaths in Iowa. Diseases of the heart accounted for 25% of all deaths; 23% of deaths were due to cancer.

During the last half of the twentieth century, cardiovascular disease age-adjusted mortality rates declined. During the 1990s and into the early 2000s, age-adjusted mortality rates for cardiovascular disease continued to decline; however, the economic impact increased as both hospital discharges and daily hospitalization costs increased.

Age-adjusted cancer mortality rates decreased between 2000 and 2005. As with cardiovascular disease, hospital costs related to cancer have continued to increase. Age-adjusted cancer mortality rates vary greatly by gender. Mortality rates due to lung cancer are higher among men and breast cancer mortality rates are higher among women.

Chronic Lower Respiratory Disease (CLRD) age-adjusted mortality rates have increased steadily over the previous three decades. Between 1979 and 2005, CLRD mortality rates nearly doubled. CLRD mortality rates accounted for 6% of all Iowa deaths in 2006.

Prevention

There are many opportunities to prevent chronic disease; many of the conditions described in the current report are attributable to similar risk factors or behaviors (e.g., physical inactivity) that can be addressed through preventive efforts. Some of the most preventive strategies are listed below.

- Eradicate Tobacco Use

Eradicating tobacco use would greatly decrease the risk of cancer (e.g., lung, esophageal), cardiovascular disease (e.g., coronary heart disease, stroke), and CLRD (e.g., emphysema, chronic bronchitis). Over 40 years ago, the U.S. Surgeon General issued a report linking cigarette smoking with lung cancer. Still, among Iowa adults in 2007, 20.4% reported being a current smoker. In 2006, 22.5%, of high school students and 4% of middle school students reported current cigarette smoking.

- Maintain an Ideal Body Weight

After tobacco use, poor nutrition and physical inactivity combined are the second leading risk factors for chronic disease. Overweight and obesity result from a combination of physical inactivity and overnutrition. Overweight and obesity increase the risk of developing cardiovascular disease and diabetes. Almost 65% of adult Iowans are overweight or obese, an increase of 55% since 1995; in 2007, the prevalence rate of overweight or obesity among Iowans was 64.7%.

- Increase Physical Activity

Regular physical activity reduces the risk of dying from cardiovascular disease and developing diabetes or hypertension, as well as the promotion of weight control and maintenance of healthy bones, muscles, and joints. In 2007, 21.4% of Iowa adults were considered sedentary (i.e., participated in no leisure-time physical activities); 48.4% of Iowa adults met the recommended level of physical activity.

- Eat a Nutritious, Balanced Diet

Among Americans who do not smoke cigarettes, unhealthy diet and inadequate physical activity are major risk factors for death and disability. A nutritious, balanced diet aids in preventing overweight and obesity, hypertension, and elevated serum cholesterol. In 2007, over 80% of adult Iowans did not eat the recommended five servings of fruits and vegetables each day.

- Consume Alcohol in Moderation

Chronic and excessive alcohol use affects every organ of the body. Years of alcohol abuse can result in liver disease, gallstones, and other chronic disorders. Alcohol consumption is also a major risk factor for hypertension and contributes to diabetes. In 2007, 5.6% of Iowa adults were chronic drinkers (i.e., average of one or more alcoholic drinks each day for women and two or more for men). Alcohol use is not just an adult issue. Nationwide, 32% of high school students report having their first alcoholic drink prior to reaching 13 years of age. Males are more likely to be chronic and binge drinkers (i.e., having five or more drinks on one occasion) compared to their counterparts. In Iowa, the number of high school juniors that reported binge drinking decreased to 27% from 41% in 1999 (Iowa Youth Survey, 2008).

Although there have been many medical advances made in the last 50 years for the treatment of chronic diseases, prevention and attention to what can be done to support healthy behaviors remain the most effective avenue to decrease the burden of chronic disease. The report, compiled by the IDPH Chronic Disease Integration team, concludes with several suggested recommendations to prevent chronic diseases among Iowans.

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CHAPTER 1 • INTRODUCTION

Over the past one hundred years we have experienced a shift in the major causes of death from infectious diseases to chronic diseases. The early twentieth century saw a predominance of influenza and pneumonia, tuberculosis, and diarrheal diseases. At the start of the twenty-first century, heart disease, cancer, and cerebrovascular disease (stroke) accounted for nearly two-thirds of all deaths.

Likewise, public health has expanded its emphasis from investigations and preventive measures for communicable disease to understanding the role of behavioral and environmental risk factors in the development of chronic diseases. Public health now involves efforts to minimize these risks. One of the current central roles of public health is to prevent premature death and disability due to chronic diseases within the population.

While most communicable diseases have well defined causes, courses of illness, and cures, chronic diseases generally have more complex causes and develop and persist over long time periods. It is rare that a chronic disease is ever entirely cured.

Epidemiologists have identified a number of risk factors that are associated with chronic diseases. Some of the identified risk factors are elements of the physical environment, such as pollution. Others are genetic. Still others are linked to our sociocultural systems (i.e., poverty, lack of insurance or affordable care). Many if not most risk factors, however, are behavioral. For example, poor diet, physical inactivity, obesity, and tobacco use are risk factors for cardiovascular disease, diabetes, cancer, and osteoarthritis. Reducing just one of these behaviors in the population can reduce the risk of many chronic diseases.

Chronic disease control and prevention can be a very difficult task. First, some chronic disease categories may include many diseases. For example, cardiovascular disease, cancer and arthritis are general terms for hundreds of separate, but related, diseases. In addition, although many risk factors are modifiable, there are some genetic and physiological factors that increase the risk of developing chronic diseases that are not modifiable. Last, chronic diseases typically involve long latency periods and long disease duration, which cause slow changes in disease trends. Therefore, intervention and prevention efforts must be implemented with a long-term perspective.

This report focuses on the chronic diseases that were the leading causes of death from 1997 to 2007 in Iowa. The findings and recommendations are based on the analysis of data from numerous sources. The data sources, analysis methods, disease definitions, and other technical information are discussed in chapter 2. Risk behavior data obtained from the U.S. and Iowa Behavioral Risk Factor Surveillance System (BRFSS) is discussed in chapter 3. Risk behaviors (e.g., tobacco use, overweight and obesity, diet, physical inactivity, and alcohol use) and medical screening utilization (e.g., mammography) are discussed, as well as biological markers such as hypertension and elevated serum cholesterol. Chapter 4 includes data for the leading causes of death in 2006 as well as mortality trends for the past decade. Chapter 5 contains Iowa hospital discharge data from 1995 through 2006 showing trends within the decade by gender for chronic diseases that are among the leading causes of death.

CHAPTER 2 • BACKGROUND AND METHODS

Surveillance, the on-going, systematic collection, analysis, and interpretation of health data, is essential to the planning, implementation, and evaluation of public health practices. Surveillance also includes information dissemination in a timely manner to appropriate stakeholders and the application of surveillance findings to disease prevention and health promotion programs. Surveillance represents a fundamental part of chronic disease prevention and control and is necessary to: identify populations at risk for developing chronic disease; evaluate the effectiveness of interventions; identify emerging chronic diseases; and track trends.

Data analyzed for this report were from a number of sources including vital statistics data, health survey data, and hospital discharge data. Estimates and frequencies were determined using SAS version 9.1 (Statistical Analysis System) and SPSS version 15.0 (Statistical Package for the Social Sciences).

Mortality Data

Mortality data were compiled and tabulated from Iowa Department of Public Health, Bureau of Vital Statistics death records. Age-adjusted death rates were calculated using the year 2000 U.S. population as the standard population.

Hospital Discharge Data

Hospital discharge rates were compiled using the Iowa State Inpatient Database (SID), a database of Iowa hospital discharges. These data represent Iowa resident discharges from all non-Federal acute care hospitals in the state and are compiled from billing records. A resident may have multiple discharges in the same year for the same condition.

Risk Factors

The prevalence of behavioral risk factors and the use of preventive services were estimated using data from the Iowa Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a telephone survey that is conducted throughout the year by the Iowa Department of Public Health in cooperation with the Centers for Disease Control and Prevention. The survey collects health information from randomly selected, non-institutionalized Iowa adults aged 18 years and older.

The prevalence of youth tobacco use was estimated from the Iowa Youth Tobacco Survey. Iowa public school children, grades 6 through 12, were randomly selected for the survey.

Disease Coding

Causes of hospitalization and death were coded to indicate the primary diagnosis at discharge or death (i.e., underlying cause of death). The coding system used for both hospitalizations and deaths was the International Classification of Diseases, Ninth Revision (ICD-9) prior to 1999 and ICD-10 (Tenth Revision) for 1999 and later. The ICD codes in the table below were used to compile the mortality data in this report.

Table 2.1 ICD-9 and ICD-10 Codes for Selected Chronic Disease Mortality Rates

Disease	ICD-9 Codes	ICD-10 Codes
Cardiovascular Disease	390-434, 436-448	I00-I78
Cerebrovascular Disease	430-434, 436-438	I60-I69
Coronary Heart Disease	410-414, 429.2	I20-I25
Chronic Lower Respiratory Disease	490-496 (excluding 495)	J40-J47
Diabetes Mellitus	250	E10-E14
Breast Cancer	174-175	C50
Colorectal Cancer	153-154	C18-C21
Prostate Cancer	185	C61
Lung Cancer	162	C34

All hospitalization data in this report were initially coded using the ICD-9-Clinical Modification (ICD-9-CM). The ICD-9-CM is used internationally to code clinical data and is based on an amended version of the ICD-9 used to code deaths. The updated ICD-10-CM has not yet been employed to code hospitalizations in Iowa.

Because of the large number of ICD-9-CM codes, these codes are further clustered into Clinical Classification System (CCS) groupings. Developed by the Agency for Healthcare Research and Quality (AHRQ), the CCS is a tool for grouping patient diagnoses and procedures into clinically meaningful categories. CCS enables conditions and procedures to be grouped into meaningful clusters thereby facilitating the understanding of patterns of diagnoses. The CCS grouping aids health plans, policy makers, and researchers to analyze costs, utilization, and outcomes associated with specific illnesses and procedures.

Table 2.2 ICD-9 and CCS for Selected Chronic Disease Hospitalization Rates

Disease	**ICD-9 Codes and (*CCS Codes*) ***
All Cardiovascular (Circulatory) Disease	390-459, (*096-121*)
All Major Cardiovascular Disease	390-434.99, 436-438.99, (*111, 113-117*)
All Heart Disease	390-398.99, 402-402.99, 404-404.99, 410-429.99, 429.2, (*100-108*)
All Coronary Heart Disease/ Ischemic Heart Disease	410-414.99, 429.2, (*100-101*)
Heart Failure	428-428.99, (*108*)
Diseases of Arteries, Atherosclerosis	440-449.99, (*114-116*)
Stroke	430-438.99, (*109-113*)
Primary Hypertension	401-401.99, 403-403.99, (*098*)
Hypertensive Heart Disease	402-402.99, 404-404.99, (*099*)
Diabetes	250, (*49-50*)
All Cancer	140-208, (*011-045*)
Colorectal Cancer	153-154, (*014-015*)
Lung Cancer	162, (*019*)
Breast Cancer	174-175, (*024*)
Prostate Cancer	185, (*029*)
Bladder Cancer	188, (*032*)
Cervical Cancer	180, (*026*)
Skin Cancer	172, (*022*)
All Respiratory	480-520, (*122-134*)
Chronic Obstructive Pulmonary Disease (COPD) and Bronchiectasis	490-492, 494, 496, (*127*)
Asthma	493, (*128*)
Influenza/Pneumonia	480-488, (*122-123*)

**Note: (CCS groupings are italicized). Some of the four and five digit subcodes of the three-digit ICD-9 codes listed are not included in the CCS grouping noted, since CCS codes may include dozens of specific four and five-digit ICD-9 codes. See AHRQ website for a complete crosswalk of ICD-9 and CCS codes: http://www.hcupus.ahrq.gov/toolssoftware/ccs/ccsfactsheet.jsp#what*

Disease Definitions

The following definitions describe the chronic disease included in this report.

Cardiovascular Disease

Cardiovascular disease refers to numerous and varied diseases of the heart and blood vessels. Cardiovascular disease includes coronary heart disease and stroke, which are discussed in this report.

Coronary Heart Disease

Coronary heart disease is also known as coronary artery disease or ischemic heart disease. Coronary heart disease results from decreased circulation to the heart muscle, most frequently the result of narrowing of the coronary arteries by arteriosclerosis.

Stroke or Cerebrovascular Disease

Stroke or cerebrovascular disease is a group of diseases that affect the arteries of the central nervous system and result from a clogged or ruptured artery. The loss of blood flow to the nerve tissue in the affected part of the brain causes tissue death within minutes and often results in neurologic deficits.

Cancer

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells (i.e., neoplasms). Abnormal tissue enlargement (i.e., tumors) may be benign or malignant. Malignant tumors contain abnormal genetic material, grow rapidly, are often invasive and spread through the body. Benign tumors grow slowly and are not typically associated with mortality. The cancer diseases described in this report, which are the leading causes of cancer-related death, include lung, breast, and prostate.

Diabetes Mellitus

Diabetes mellitus is a group of diseases in which the tissues that utilize glucose (i.e., muscle, fat, liver) are not able to obtain adequate amounts of insulin due to underproduction by the pancreas or impaired glucose uptake by the tissue cells. Insulin is the hormone, produced by pancreatic beta cells, that binds to receptors on the surface of tissue cells and allows glucose to enter the cells.

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus or adult-onset diabetes. Type 2 diabetes accounts for about 90% to 95% of all diagnosed cases of diabetes and typically beings as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. Type 2 diabetes is associated with older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, and race/ethnicity. Type 2 diabetes is increasingly being diagnosed in children and adolescents, especially those who are overweight.

Chronic Lower Respiratory Diseases

Chronic Lower Respiratory Diseases (CLRD) is a group of diseases which include chronic bronchitis, emphysema, bronchiectasis, and asthma. Chronic Obstructive Pulmonary Disease (COPD) (i.e., chronic bronchitis, emphysema, bronchiectasis) represent a subgroup of CLRD. COPD does not include asthma. Unlike asthma, the impairment in lung function for those with COPD is mostly irreversible and progressive. CLRD are characterized by nonspecific changes in the lung bronchi and surface tissue that lead to chronic lung function impairment.

CHAPTER 3 • CHRONIC DISEASE RISK FACTORS

The purpose of this section is to describe the occurrence of risk factors associated with the development of various chronic diseases. Risk factors are aspects that are known to be associated with health-related conditions and include personal behavior, lifestyle, environmental exposure, and genetic characteristics. Modifiable risk factors, such as tobacco use, poor nutrition, and physical inactivity, are changeable. Non-modifiable risk factors, such as gender, race/ethnicity, and genetic predisposition to diseases or conditions, cannot be changed. Some risk factors are potentially modifiable, such as education level and income.

Individuals may exhibit one or more risk factors associated with developing a chronic disease. Reducing the number of risk factors decreases the risk of developing associated chronic diseases.

The most notable modifiable risk factors are behavioral in nature. Tobacco use, physical inactivity, and poor nutrition are associated with a number of chronic illnesses, including coronary heart disease, stroke, and diabetes. Other modifiable behavior risk factors discussed in this section are overweight, obesity, and alcohol use.

The utilization of screening tests (e.g., mammography, Pap test, blood pressure, serum cholesterol checks) is also described as modifiable risk behaviors. Although utilization of these screening tests does not prevent chronic illnesses, it can increase the likelihood of early detection and treatment, thereby increasing the possibilities of long-term survival and possibly a cure.

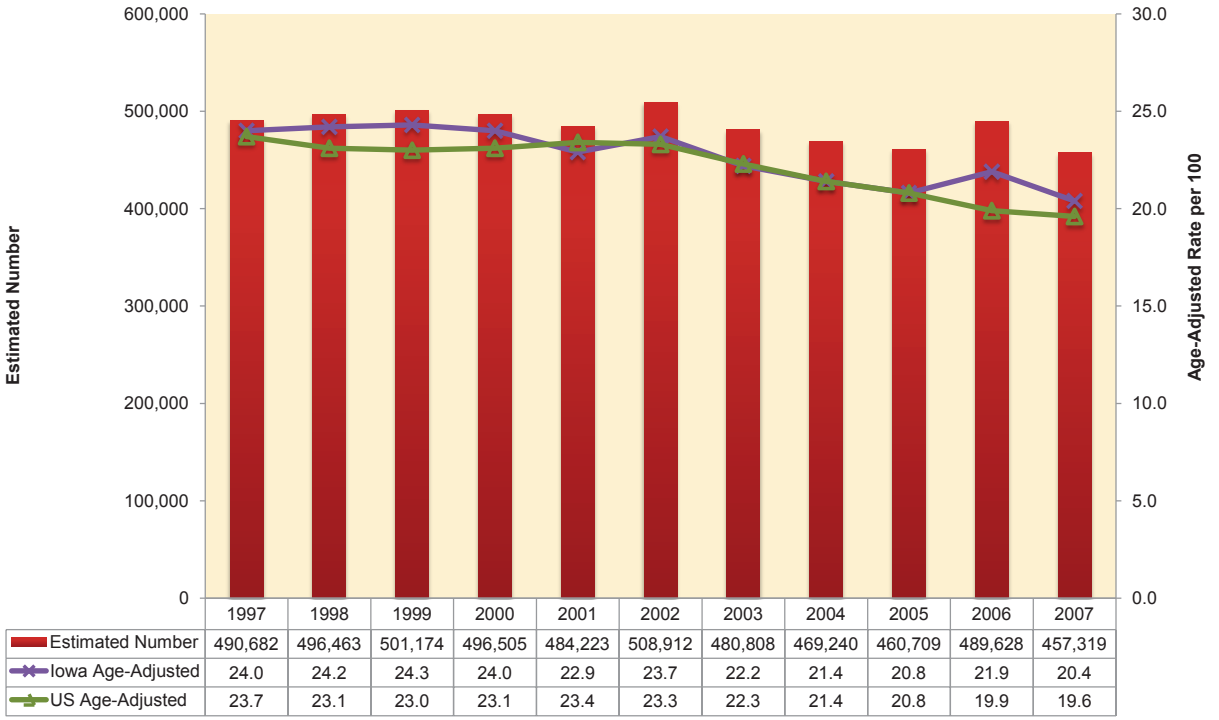
Tobacco Use

Tobacco use is the leading preventable cause of premature death. Use of tobacco increases the risk of cancers (e.g., lung, oral, esophageal, laryngeal), cardiovascular disease (e.g., coronary heart disease, stroke), and chronic lower respiratory diseases (e.g., emphysema, chronic bronchitis, chronic airway obstruction). Across the U.S., cigarette smoking has decreased greatly since the mid-1960s. However, the downward trend flattened in the 1990s and into the twenty-first century among both males and females. Between 1995 and 1999, cigarette smoking caused more than 440,000 deaths annually, approximately 20% of the total U.S. annual mortality. Of these deaths, approximately 148,000 resulted from cardiovascular disease, 156,000 from cancers, 98,000 from respiratory diseases, and 3,000 from environmental tobacco smoke-induced lung cancer. In addition, it has been estimated that nationally, approximately 35,000 ischemic heart disease deaths are induced by environmental tobacco smoke.

Current smoking was defined as smoking at least 100 cigarettes in a lifetime and smoking some days or everyday during the past 30 days. Of all Iowa respondents surveyed in the Behavioral Risk Factor Surveillance System (BRFSS), 20.4% (age-adjusted) reported being a current smoker in 2007, slightly higher than the 19.6% age-adjusted rate nationally (Figure 3.1).

Figure 3.1 Current Tobacco Use, 1997-2007*

*Smoked 100 cigarettes/lifetime & current tobacco smoking every day or some days.

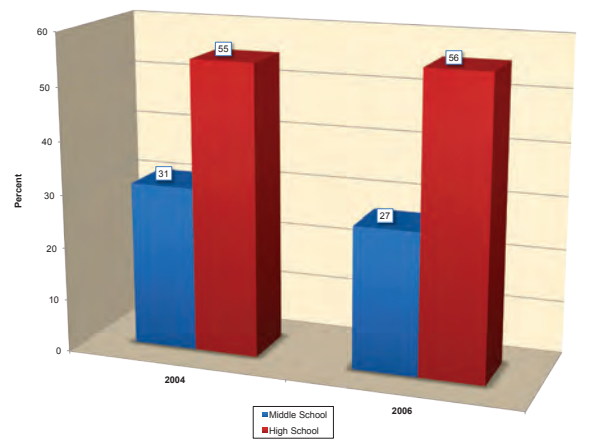


	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	490,682	496,463	501,174	496,505	484,223	508,912	480,808	469,240	460,709	489,628	457,319
Iowa Age-Adjusted	24.0	24.2	24.3	24.0	22.9	23.7	22.2	21.4	20.8	21.9	20.4
US Age-Adjusted	23.7	23.1	23.0	23.1	23.4	23.3	22.3	21.4	20.8	19.9	19.6

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adutls.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Tobacco use is not limited to adults. The 2006 Iowa Youth Tobacco Survey found current (past 30 days) cigarette use was reported by 4 % of Iowa's middle school students (grades 6 through 8) and 22.5 % of Iowa's high school students (grades 9 through 12) (Figure 3.2). The percentages of Iowa high school and middle school students who smoke remain below the most recently available national averages for youth smoking. More than half of all middle school and high school students who are current smokers expressed a desire to quit smoking at the time of the survey.

Figure 3.2 Ever Used Any Tobacco Product



In the survey, students were asked about their use of cigarettes or smokeless tobacco. Students were considered to be current cigarette or smokeless users if they reported using cigarettes or smokeless tobacco within the past 30 days.

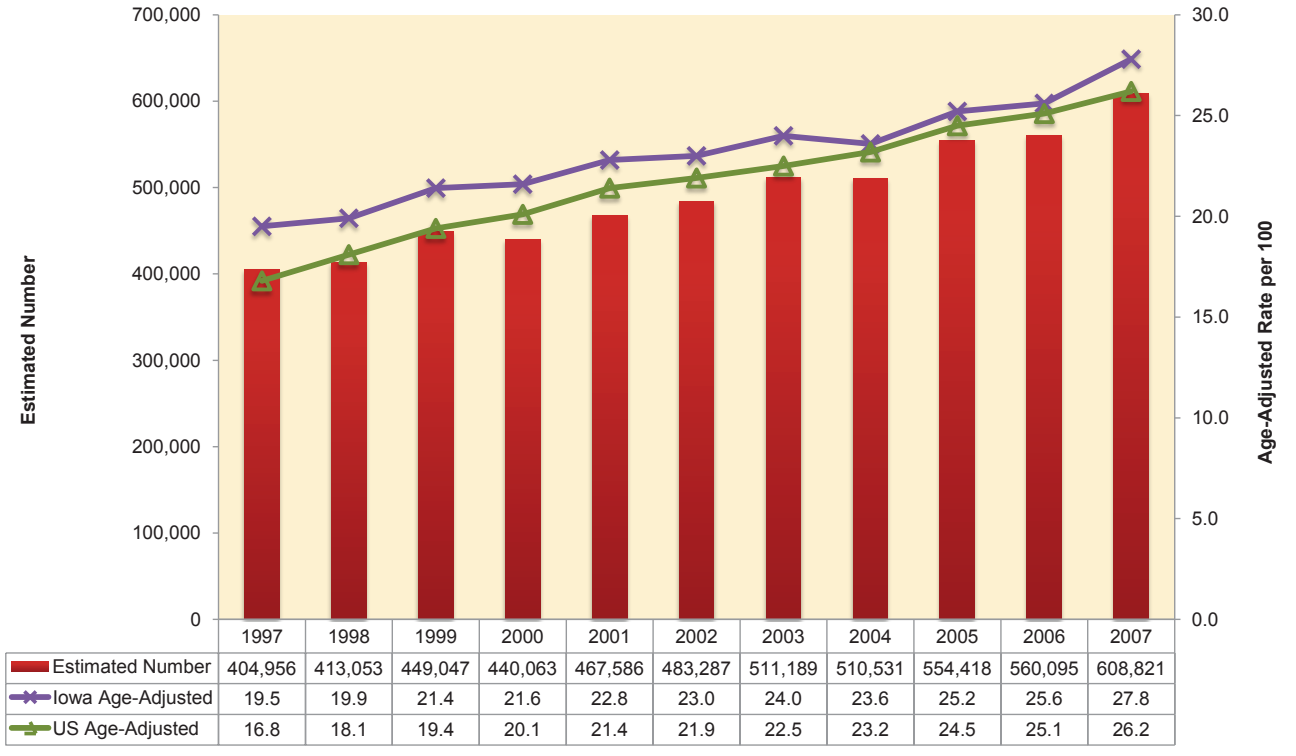
Current cigarette use among high school students has increased slightly since 2004 (i.e., 55% to 56%). Middle school students have dropped in cigarette use (i.e., 31% to 27%).

Overweight and Obesity

Overweight and obesity are functions of two modifiable risk behaviors, notably overeating and physical inactivity. Overweight and obesity are determined using Body Mass Index (BMI) cut-points. A person with a BMI of 25 to 29.9 is considered overweight; a BMI of 30 or more is considered obese. Between 1977 to 1978 and 1994 to 1998, daily caloric intake increased nationally among male adults from 2,239 kcal (kilocalories) to 2,455 kcal. Among women, daily caloric intake increased from 1,534 kcal to 1,646 kcal. Additionally, 60% of adults do not participate in the recommended amount of regular physical activity and 25% of adults are considered sedentary.

In the U.S., obesity among adults increased more than 75% between 1991 and 2002, from 12.6% to 22.1%. In Iowa, the age-adjusted prevalence of obesity increased from 19.5% in 1997 to 27.8% in 2007; the age-adjusted prevalence of overweight increased by 1.2% between 1997 and 2007, from 35.6% to 36.8% (Figures 3.3 and 3.4).

Figure 3.3 Obesity, 1997-2007
***Obese is defined as having a Body Mass Index greater than 30**

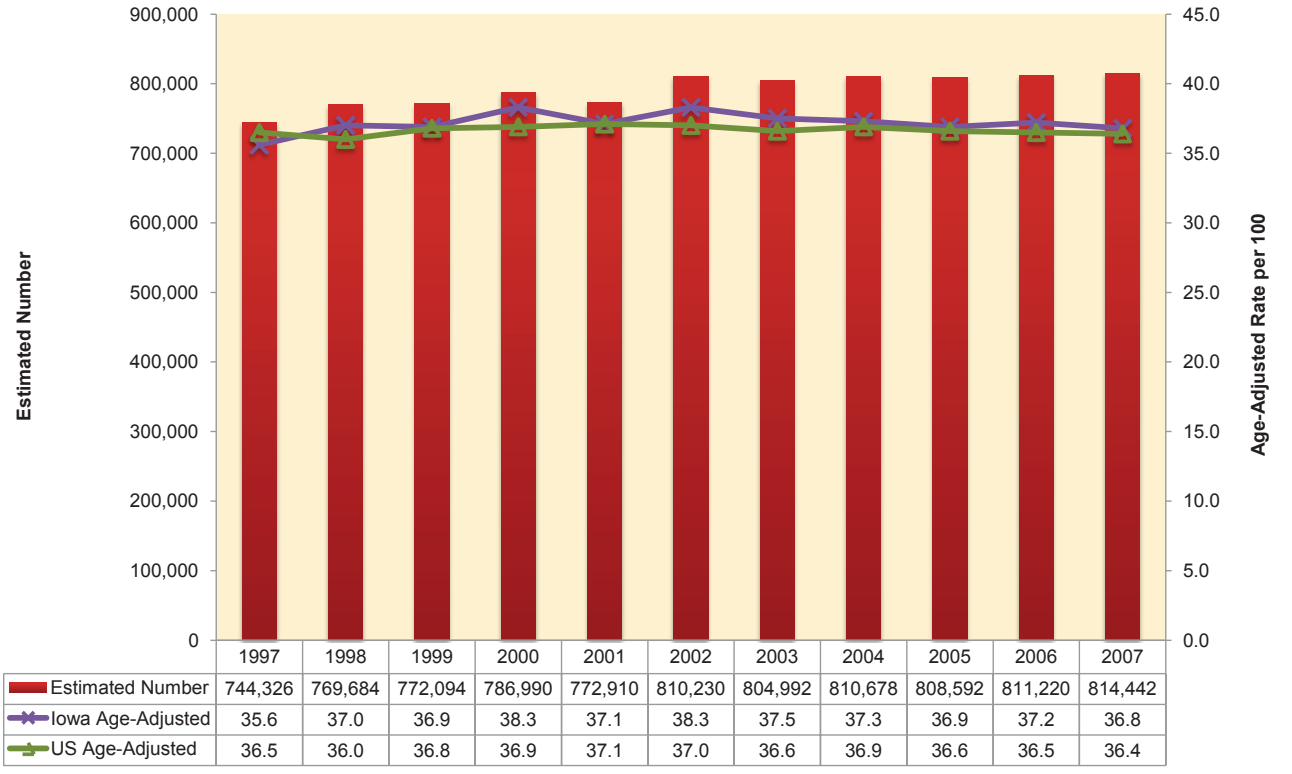


	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	404,956	413,053	449,047	440,063	467,586	483,287	511,189	510,531	554,418	560,095	608,821
Iowa Age-Adjusted	19.5	19.9	21.4	21.6	22.8	23.0	24.0	23.6	25.2	25.6	27.8
US Age-Adjusted	16.8	18.1	19.4	20.1	21.4	21.9	22.5	23.2	24.5	25.1	26.2

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Figure 3.4 Overweight, 1997-2007

*Overweight is defined as having a Body Mass Index between 25-29.9



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	744,326	769,684	772,094	786,990	772,910	810,230	804,992	810,678	808,592	811,220	814,442
Iowa Age-Adjusted	35.6	37.0	36.9	38.3	37.1	38.3	37.5	37.3	36.9	37.2	36.8
US Age-Adjusted	36.5	36.0	36.8	36.9	37.1	37.0	36.6	36.9	36.6	36.5	36.4

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Overweight and obesity are functions of two modifiable risk behaviors, notably overeating and physical inactivity.

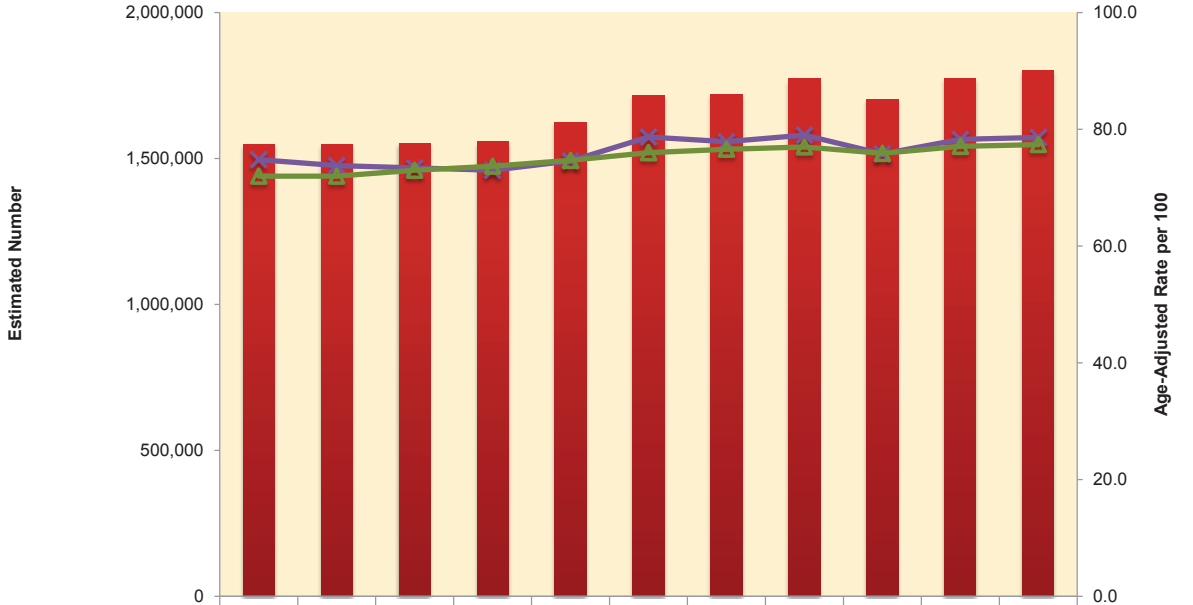
Physical Activity

Regular physical activity improves health by reducing the risk of mortality prior to reaching average life expectancy. Regular physical activity also reduces feelings of depression and anxiety, aids in weight control, decreases the risk of developing diabetes, high blood pressure and colon cancer, plus helps maintain healthy bones, muscles and joints. More than 60% of U.S. adults do not achieve the recommended amount of regular physical activity. In fact, 25% of U.S. adults are not active at all.

Nationally, inactivity increases with age and is more common among women than men, as well as among those with lower income and less education. Nearly half of adolescents (i.e., 12-21 years of age) are not vigorously active on a regular basis; physical activity declines dramatically with age during adolescence. In 2001, 52% of female and 44.4% of male U.S. high school students reported not participating in physical education classes during the school day.

In Iowa, between 1997 and 2007, approximately 28 to 30% of adults did not participate in any leisure-time physical activities.

Figure 3.5 Physical Activity, 1997-2007
*Adults engaged in leisure time physical activity other than regular job in past month
*Note data interpolated to compensate for unreported data.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	1,548,7	1,548,7	1,550,0	1,556,8	1,623,2	1,717,2	1,719,5	1,772,7	1,703,9	1,775,7	1,801,0
Iowa Age-Adjusted	74.8	73.8	73.4	73.0	74.6	78.7	77.9	79.0	75.8	78.3	78.6
US Age-Adjusted	72.0	72.0	73.0	73.7	74.7	76.0	76.6	77.0	75.9	77.1	77.4

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

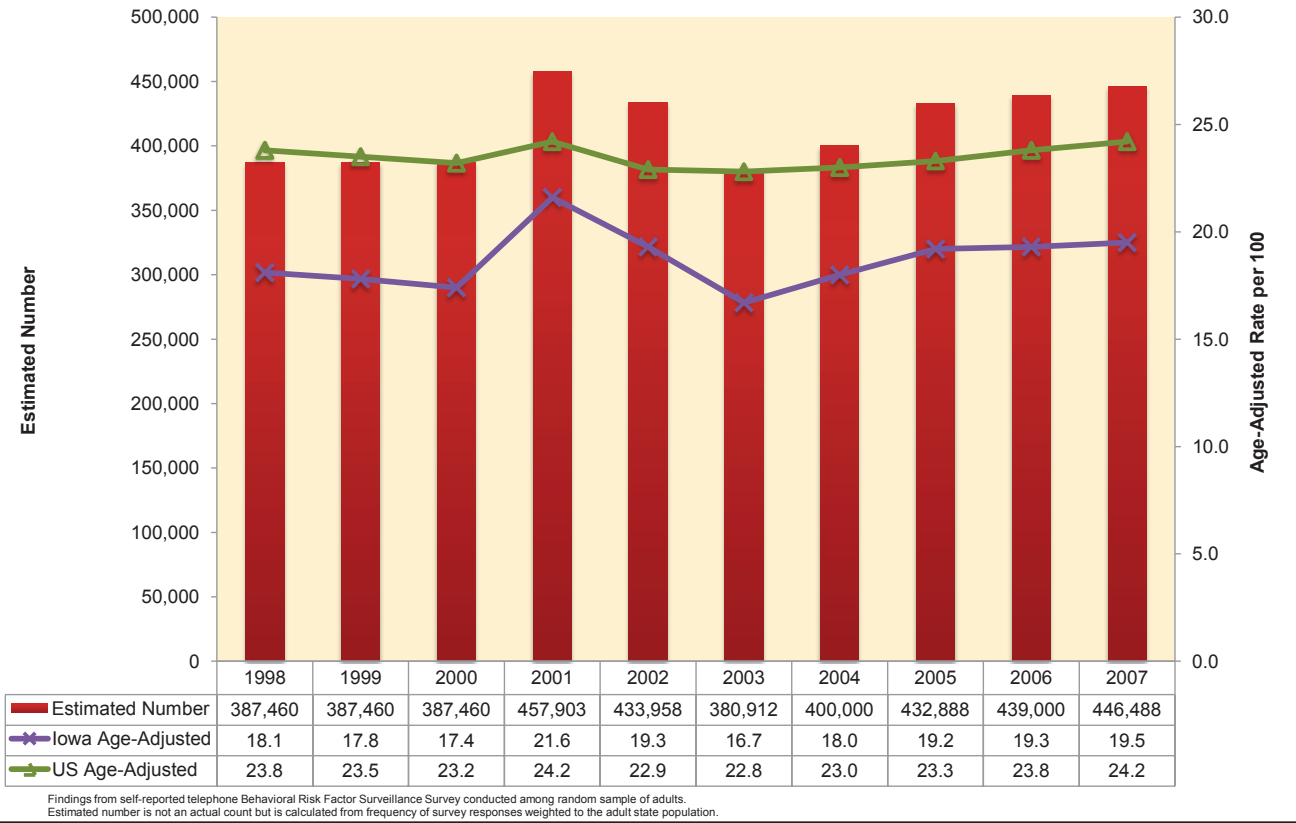
Diet and Nutrition

Among the majority of Americans who do not smoke, unhealthy diet and exercise patterns are the major cause of death and disability. Diets rich in fruits, vegetables, and whole grains are associated with a reduced risk of cancer, cardiovascular disease, overweight and obesity, diabetes, and death prior to reaching life expectancy.

Poor nutrition touches all ages. In 2002, 76.7% of U.S. adults reported eating fewer than five servings of fruits and vegetables each day. In 2001, 79.8% of U.S. high school students reported eating less than five servings of fruits and vegetables each day.

In Iowa, more than 80% of all adults did not eat the recommended number of servings of fruits and vegetables (i.e., at least five) each day (Figure 3.6). Fruit and vegetable consumption was first measured by the BRFSS in 1994.

Figure 3.6 Daily Fruit & Vegetable Consumption, 1998-2007
*Adults consuming > 5 servings per day
*Note data interpolated to compensate for unreported data.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	387,460	387,460	387,460	457,903	433,958	380,912	400,000	432,888	439,000	446,488
Iowa Age-Adjusted	18.1	17.8	17.4	21.6	19.3	16.7	18.0	19.2	19.3	19.5
US Age-Adjusted	23.8	23.5	23.2	24.2	22.9	22.8	23.0	23.3	23.8	24.2

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Alcohol Use

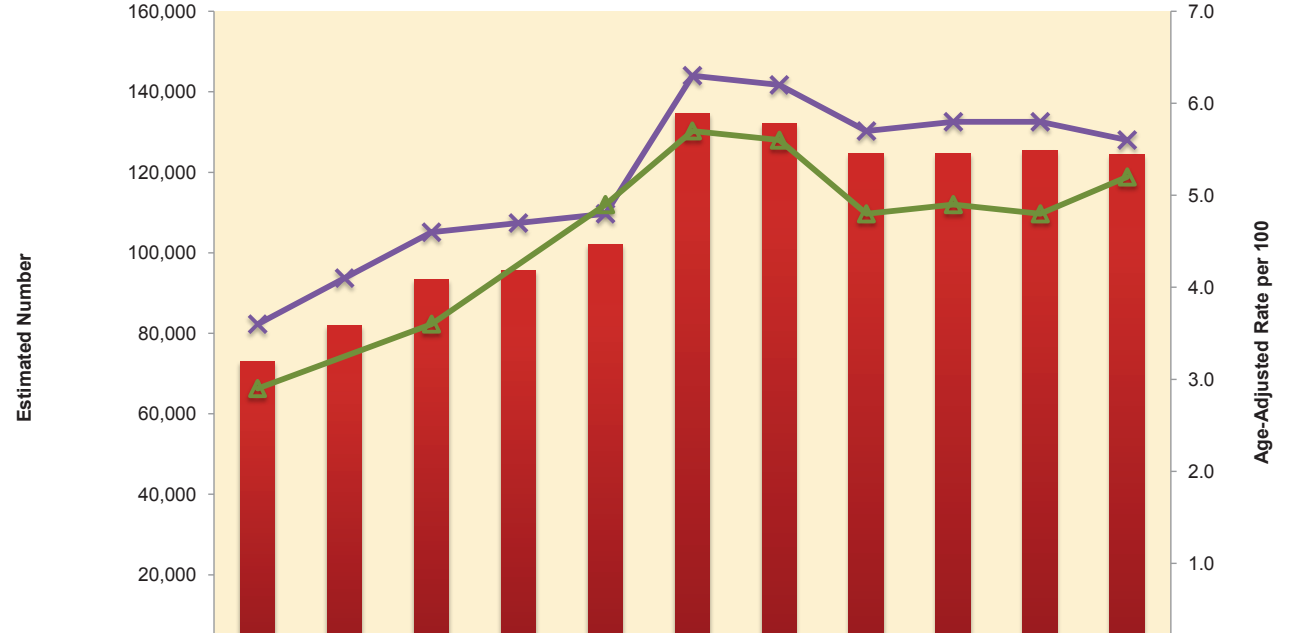
Each year in the U.S., excessive alcohol use accounts for approximately 5% of all deaths, making it the fourth leading cause of death after heart disease, cancer, and stroke. Mortality from all causes is markedly elevated in alcoholics. Alcohol affects every organ of the body, most critically the brain.

Alcohol use is not just an issue for adults. Nationwide, 32% of high school students report having their first alcoholic drink before 13 years of age. Among high school students, males are significantly more likely than females to drink alcohol prior to 13 years of age.

Overall, per capita alcohol consumption has decreased since the 1980s. Two levels of alcohol consumption were examined in Iowa using data from the BRFSS. The first level, chronic drinking, is defined as on average one alcoholic drink for women and two alcoholic drinks for men on most days during the past 30 days. The second level, binge drinking, is defined as five or more alcoholic drinks on one occasion in the past 30 days. In 2001, the definition of chronic drinking changed from 60 drinks in the past 30 days to more than two drinks per day for men and more than one drink per day for women. In 2006, the definition of binge drinking remained the same for men but changed to four drinks per day for women.

In the late 1990s and into the twenty-first century, approximately 20% of Iowa adults reported binge drinking and about 5 to 6% were chronic drinkers. No significant changes in the prevalence of binge drinking or in the prevalence of chronic drinking were observed during this period (Figures 3.7 and 3.8) (changes in the observed trend line due to definitional change).

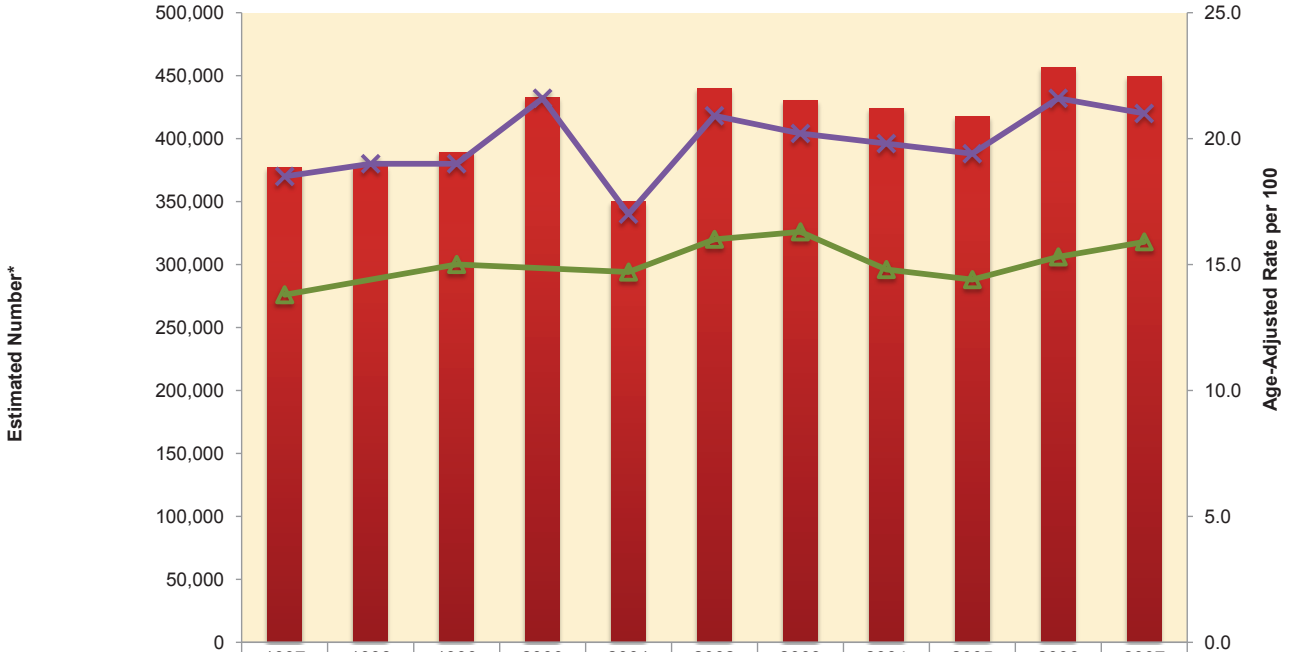
Figure 3.7 Chronic Alcohol Drinking, 1998-2007*
*In 2001 definition of heavy drinking changed from 60 drinks in past 30 days to >2 per day for men and >1 per day for women.
*Note data interpolated to compensate for unreported data.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	72,977	81,881	93,445	95,626	102,077	134,614	132,114	124,663	124,622	125,402	124,396
Iowa Age-Adjusted	3.6	4.1	4.6	4.7	4.8	6.3	6.2	5.7	5.8	5.8	5.6
US Age-Adjusted	2.9		3.6		4.9	5.7	5.6	4.8	4.9	4.8	5.2

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Figure 3.8 Binge Alcohol Drinking, 1997-2007*
*In 2006 definition changed from 5 drinks/day to 4 drinks/day for women.
*Note data interpolated to compensate for unreported data.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	376,900	377,600	389,200	432,400	349,700	439,600	430,300	424,100	417,200	456,400	449,400
Iowa Age-Adjusted	18.5	19.0	19.0	21.6	17.0	20.9	20.2	19.8	19.4	21.6	21.0
US Age-Adjusted	13.8		15.0		14.7	16.0	16.3	14.8	14.4	15.3	15.9

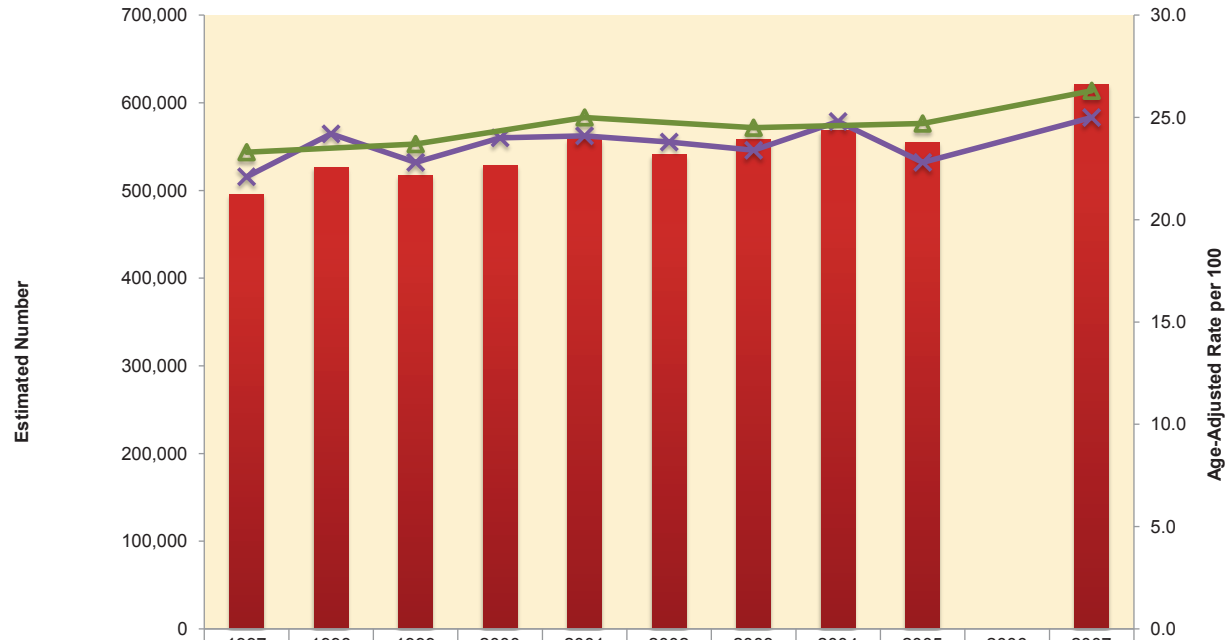
Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults
*Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

Nationwide, 32% of high school students report having their first alcoholic drink before 13 years of age.

Hypertension

High blood pressure contributes substantially to the risks of coronary heart disease, stroke, and other complications of advanced atherosclerosis (i.e., damage to the heart, brain, kidneys). Since the 1970s, the prevalence of high blood pressure has decreased among U.S. adults, varying between 21% and 14%. In the late 1990s and into the twenty-first century, approximately 25% of screened Iowa adults reported being told by a doctor that they have high blood pressure (physician-diagnosed hypertension). The prevalence of screened adults who have physician-diagnosed hypertension increased between 1997 and 2007, from 22.1% to 25% (Figure 3.9).

Figure 3.9 Hypertension, 1997-2007
*Note data interpolated to compensate for unreported data



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	495,286	525,957	516,962	528,671	558,761	540,519	558,337	568,715	555,158		620,369
Iowa Age-Adjusted	22.1	24.2	22.8	24.0	24.1	23.8	23.4	24.8	22.8		25.0
US Age-Adjusted	23.3		23.7		25.0		24.5		24.7		26.3

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

A new report looking at hypertension during two time periods 10 years apart has found that more US adults have high blood pressure than ever before. The prevalence has increased from almost 25% during the first period surveyed (1988–1994) to 28.9% during the second period (1999–2004).

The NHLBI researchers compared the hypertension findings of the third National Health and Nutrition Examination Survey (NHANES III). Data were examined from 16,351 NHANES III respondents and 14,430 people surveyed from 1999 to 2004, all 18 years or older.

The age-standardized prevalence rate for hypertension rose from 24.4% to 28.9%. Being overweight or obese accounted for part but not all of the increase in high blood pressure among different age, sex, and race/ethnicity groups.

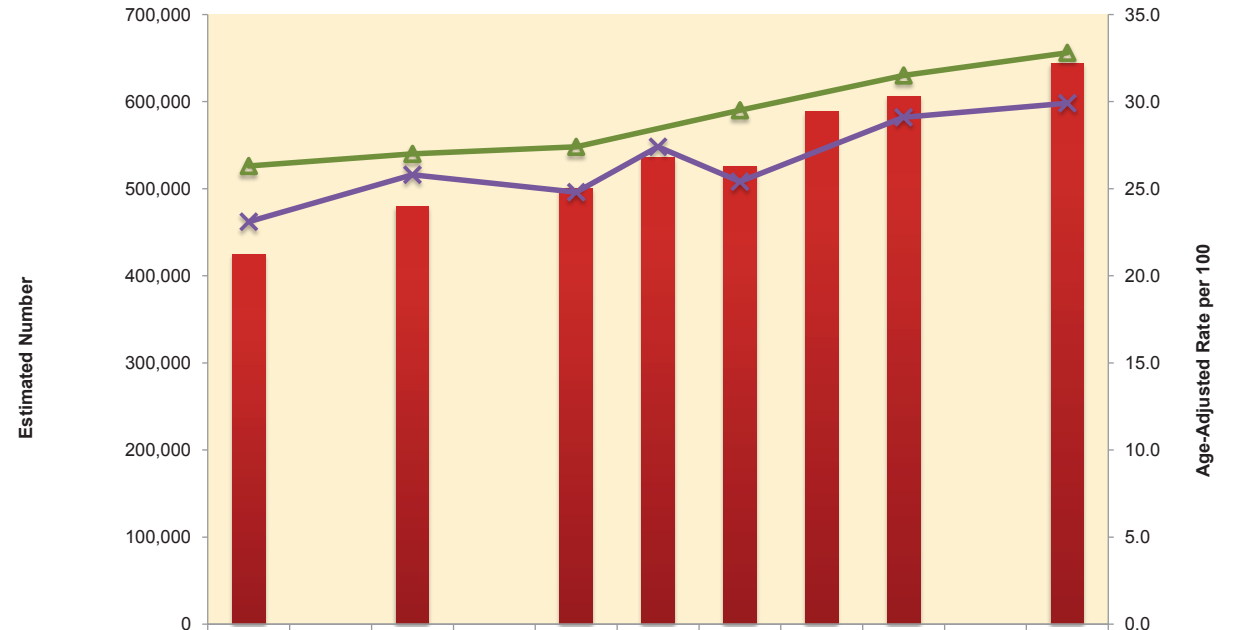
The increase was greater for women than for men; the proportion of women with hypertension is rising two times faster than that of men--and occurred in all racial/ethnic groups. (Cutler JA, Sorlie PD, Wolz M et al. Trends in hypertension prevalence, awareness, treatment and control rates in United States adults between 1988-1994 and 1999-2004. Hypertension 2008; DOI: 10.1161/HYPERTENSIONAHA.108.113357. Available at http://hyperahajournals.org/)

Serum Cholesterol

The risk of coronary heart disease increases as the level of serum cholesterol increases. The public health burden from elevated cholesterol results from the consequences of cardiovascular disease. High cholesterol is thought to account for approximately 30% of coronary heart disease and 20% of strokes in the U.S. Data from the National Health and Nutrition Examination Surveys indicate that the mean cholesterol level of U.S. adults has been declining since 1980. The most important modifiable risk factor for high cholesterol is dietary fat intake.

Among Iowa adults from 1997-2007 who have had their cholesterol tested, approximately 25% were told they have high serum cholesterol. The prevalence of elevated serum cholesterol among those who have been tested increased significantly between 1997 and 2007, from 23.1% to 29.9% (Figure 3.10).

Figure 3.10 Serum Cholesterol, 1997-2007
*Note data interpolated to compensate for unreported data



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Estimated Number	424,103		479,081		500,735	535,765	525,716	588,711	605,858		643,773
Iowa Age-Adjusted	23.1		25.8		24.8	27.4	25.4		29.1		29.9
US Age-Adjusted	26.3		27.0		27.4		29.5		31.5		32.8

Findings from self-reported telephone Behavioral Risk Factor Surveillance Survey conducted among random sample of adults.
Estimated number is not an actual count but is calculated from frequency of survey responses weighted to the adult state population.

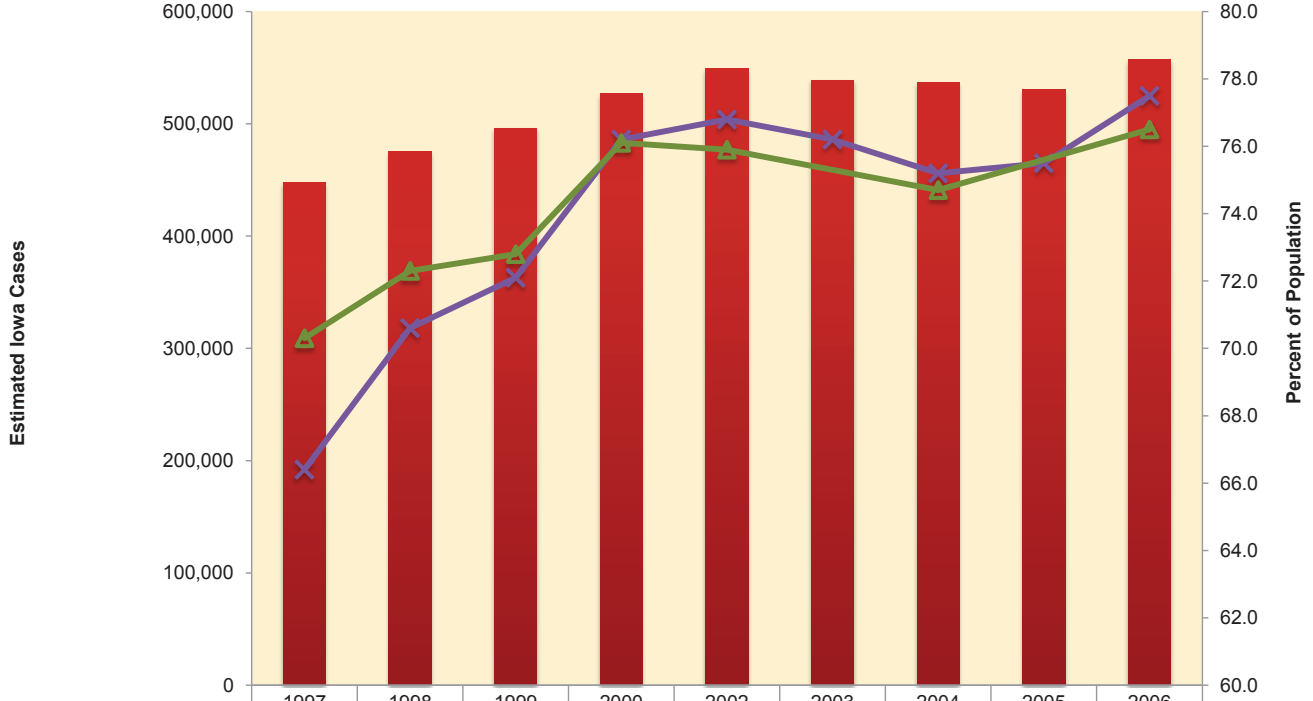
Preventive Behaviors

Use of preventive services and measures can substantially influence the impact of chronic disease, such as cancer. Some cancers (e.g., breast, cervical, colorectal) are easier to treat and ultimately cure if detected early. Regular screening is crucial to early disease detection. The American Cancer Society and National Cancer Institute have recommended that women have a mammogram every one to two years beginning at age 40 for breast cancer screening and a Pap test annually beginning at age 18 for cervical cancer screening, and that men and women have a sigmoidoscopy every five years, colonoscopy every 10 years, and a stool blood test annually beginning at age 50 for colorectal cancer screening.

Breast Cancer Screening

In 2006, 91.2% of all female Iowa respondents age 40 and older reported ever having a mammogram. When asked if they had a mammogram in the past two years, 77.5% of all Iowa women over age 40 reported in the affirmative (BRFSS, 2006). Figure 3.11 shows the prevalence of women ages 40 years and older across the U.S. and in Iowa who have had a mammogram in the past two years. Between 1997 and 2000, there was a steady rise in mammography screening tests among women over 40 years of age, but the rates leveled off in subsequent years. Between 2004 and 2006, there was a slight increase from 77.2% (2004) to 77.5% (2006). The rates for Iowa women were lower than those seen nationally between 1997 and 1999 but then exceeded and remained higher than the national rates.

Figure 3.11 Women aged 40 and Over Had Mammogram in Past 2 Years
*Note data interpolated to compensate for unreported data

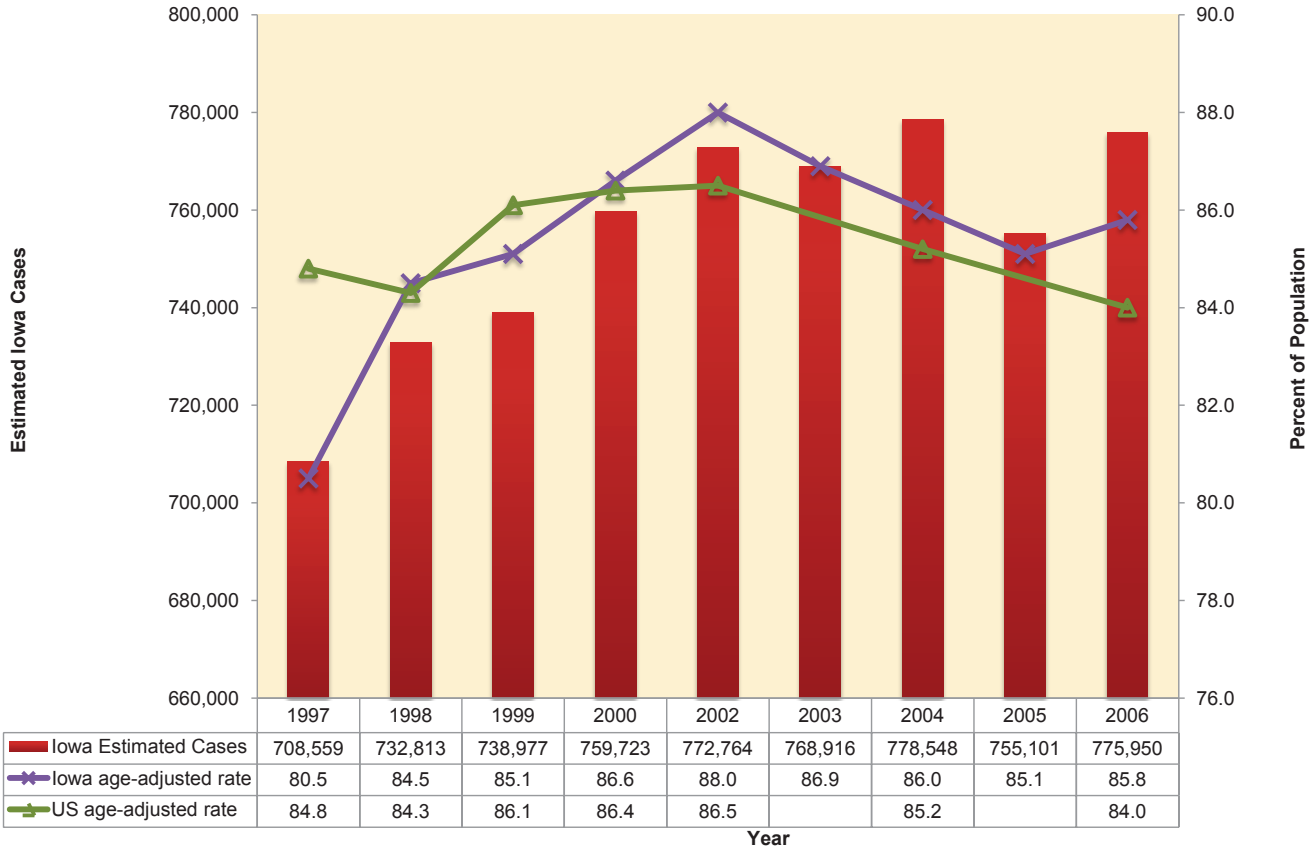


	1997	1998	1999	2000	2002	2003	2004	2005	2006
Iowa Estimated Cases	447,926	475,602	496,255	527,430	549,345	539,003	537,155	530,834	557,431
Iowa Crude Rate	66.4	70.6	72.1	76.2	76.8	76.2	75.2	75.5	77.5
US Crude Rate	70.3	72.3	72.8	76.1	75.9		74.7		76.5

Cervical Cancer Screening

In 2006, 95.4% of Iowa women who had not had a hysterectomy reported ever having had a Pap test. When asked if they had a Pap test in the past three years, 86% of respondents reported having the test (BRFSS, 2006). Figure 3.12 shows the prevalence of women across the U.S. and in Iowa who have had a Pap test in the past three years. Pap test rates for Iowa women increased from 1997 to 2002 and subsequently declined. In comparison with nationwide trends, the Pap test rates are slightly higher among Iowa women between 2002 and 2006.

Figure 3.12 Women had Pap Test in Past 3 Years
*Note data interpolated to compensate for unreported data

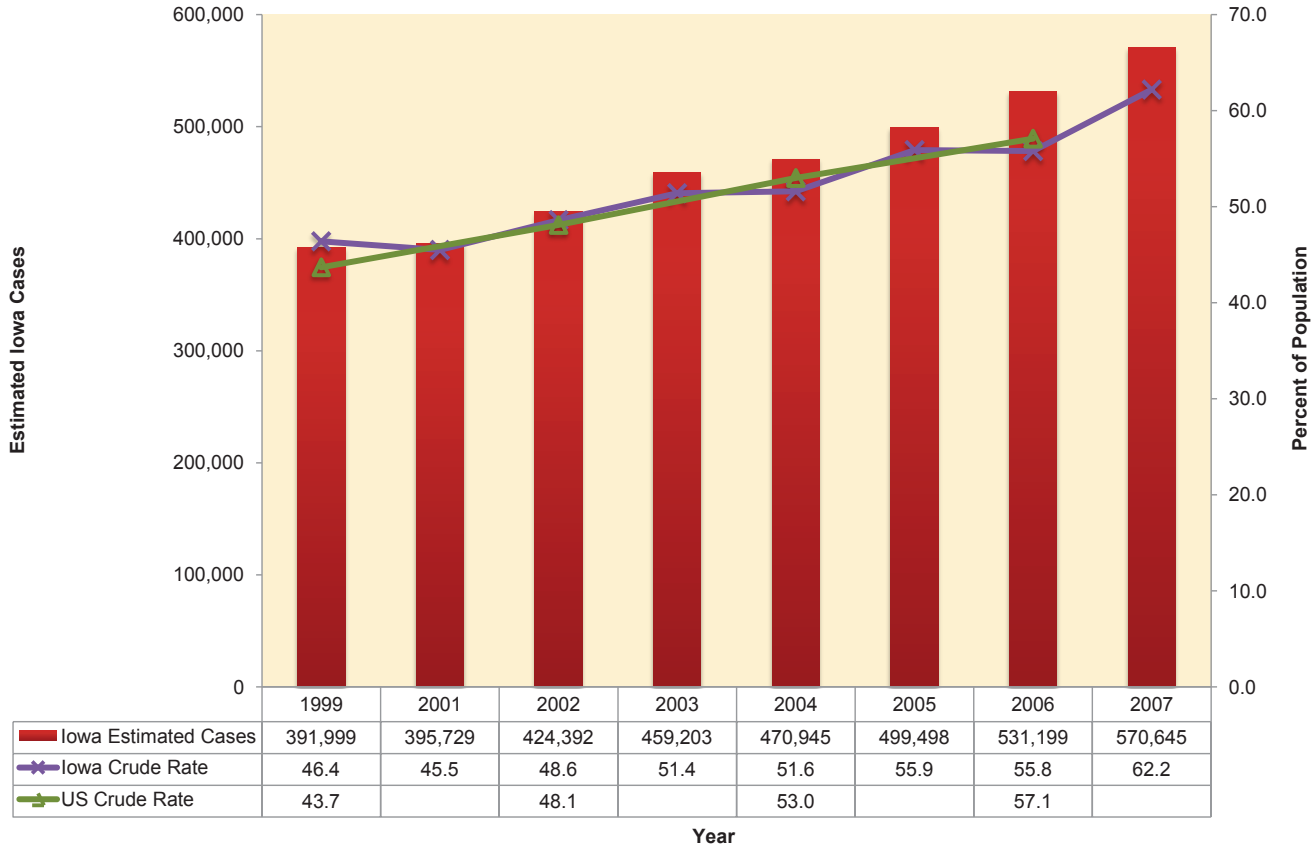


	1997	1998	1999	2000	2002	2003	2004	2005	2006
Iowa Estimated Cases	708,559	732,813	738,977	759,723	772,764	768,916	778,548	755,101	775,950
Iowa age-adjusted rate	80.5	84.5	85.1	86.6	88.0	86.9	86.0	85.1	85.8
US age-adjusted rate	84.8	84.3	86.1	86.4	86.5		85.2		84.0

Colorectal Cancer Screening

Compared to mammography and Pap test, the use of sigmoidoscopy or colonoscopy and a test to determine Fecal Occult Blood in Stool (FOBT) appears to be lower. In 2007, 62% of Iowans 50 years and older reported ever having a sigmoidoscopy or colonoscopy screening test; 52% had a sigmoidoscopy or colonoscopy within the past five years (BRFSS, 2007). Figure 3.13 shows the prevalence of men and women across the U.S. and in Iowa 50 years of age and older who have ever had a sigmoidoscopy or colonoscopy. There was an upward trend in rates for both Iowans and the U.S. from 1999 to 2007.

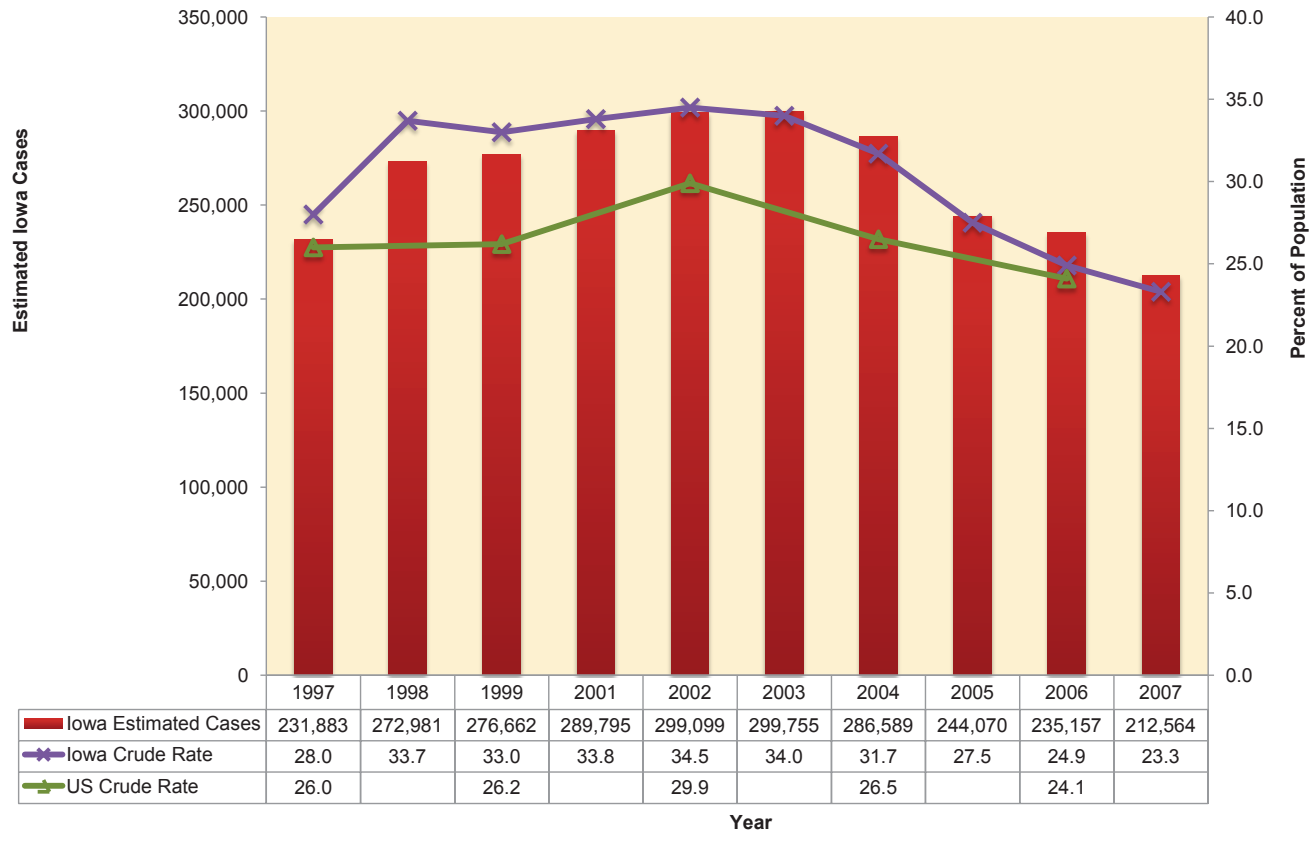
Figure 3.13 People aged 50 and Over Ever Had Sigmoidoscopy/Colonoscopy
*Note data interpolated to compensate for unreported data



	1999	2001	2002	2003	2004	2005	2006	2007
Iowa Estimated Cases	391,999	395,729	424,392	459,203	470,945	499,498	531,199	570,645
Iowa Crude Rate	46.4	45.5	48.6	51.4	51.6	55.9	55.8	62.2
US Crude Rate	43.7		48.1		53.0		57.1	

In 2007, 23.3% of Iowans 50 years of age or older reported having a Fecal Occult Blood Test (FOBT) test in the past two years (BRFSS, 2007). Figure 3.14 shows the prevalence of men and women across the U.S. and in Iowa who have had a FOBT test in the past two years. The figure demonstrates a decline in the use of FOBT since 2003. Figures 3.13 and 3.14 illustrate a decline in the rate of FOBT, while the rate of sigmoidoscopy or colonoscopy is increasing. This trend reflects a change in the preferred screening method. The percentage of Iowans being adequately screened with either method is likely to be fairly constant. Approximately 60% of Iowans 50 years of age and older had met at least one of the colorectal screening criteria within the proper time interval (BRFSS, 2007).

Figure 3.14 People 50 and Older Had FOBT Test in Past 2 Years
*Note data interpolated to compensate for unreported data



	1997	1998	1999	2001	2002	2003	2004	2005	2006	2007
Iowa Estimated Cases	231,883	272,981	276,662	289,795	299,099	299,755	286,589	244,070	235,157	212,564
Iowa Crude Rate	28.0	33.7	33.0	33.8	34.5	34.0	31.7	27.5	24.9	23.3
US Crude Rate	26.0		26.2		29.9		26.5		24.1	

CHAPTER 4 • LEADING CAUSES OF DEATH FROM CHRONIC DISEASES

The five leading causes of death among Iowans in 2006, in order, were: diseases of the heart, malignant neoplasms, cerebrovascular disease, chronic lower respiratory disease, and unintentional injuries. Of these five leading causes of death, all but unintentional injuries are chronic diseases.

Figure 4.1 illustrates the leading causes ordered from the highest to the lowest number of deaths for the total population.

Figure 4.1 Leading Causes of Death, Iowa Residents, 2006

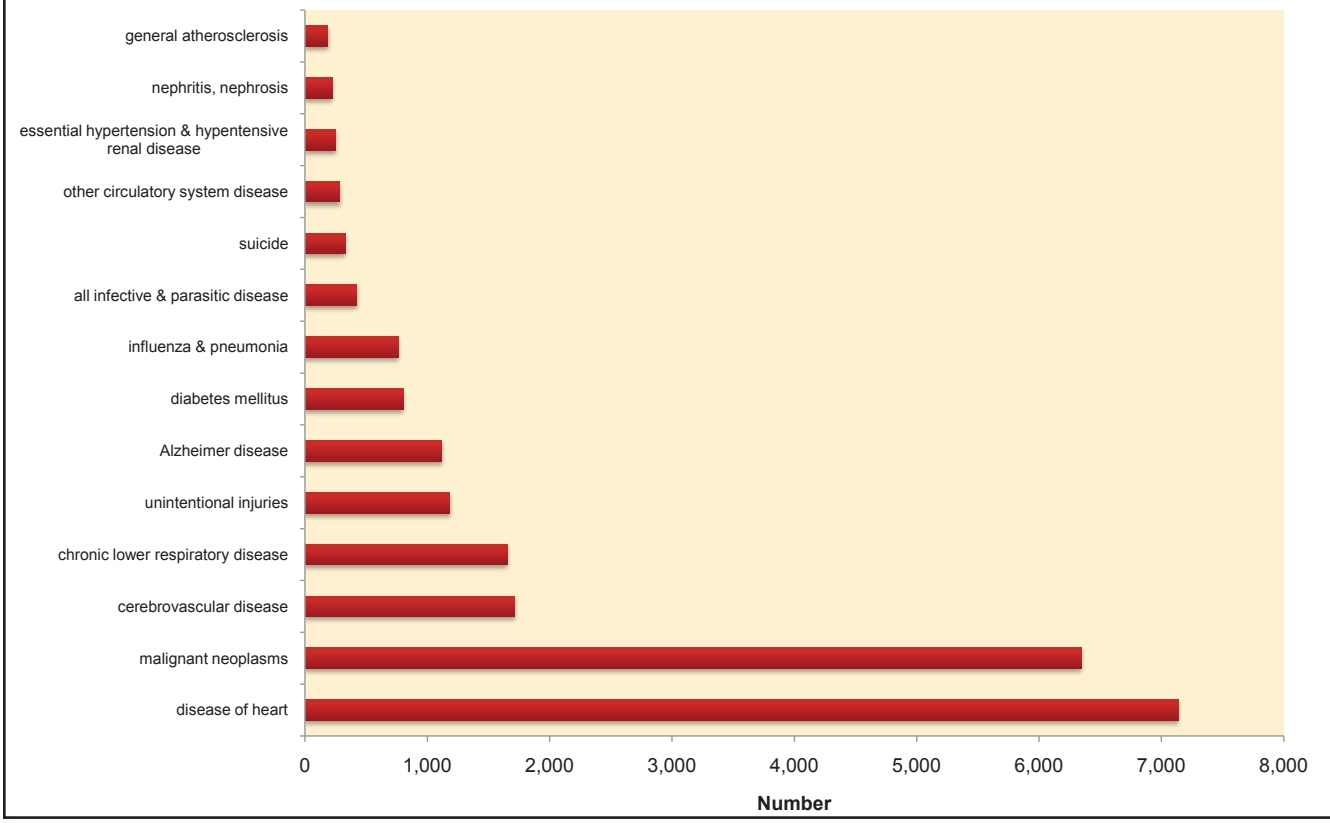
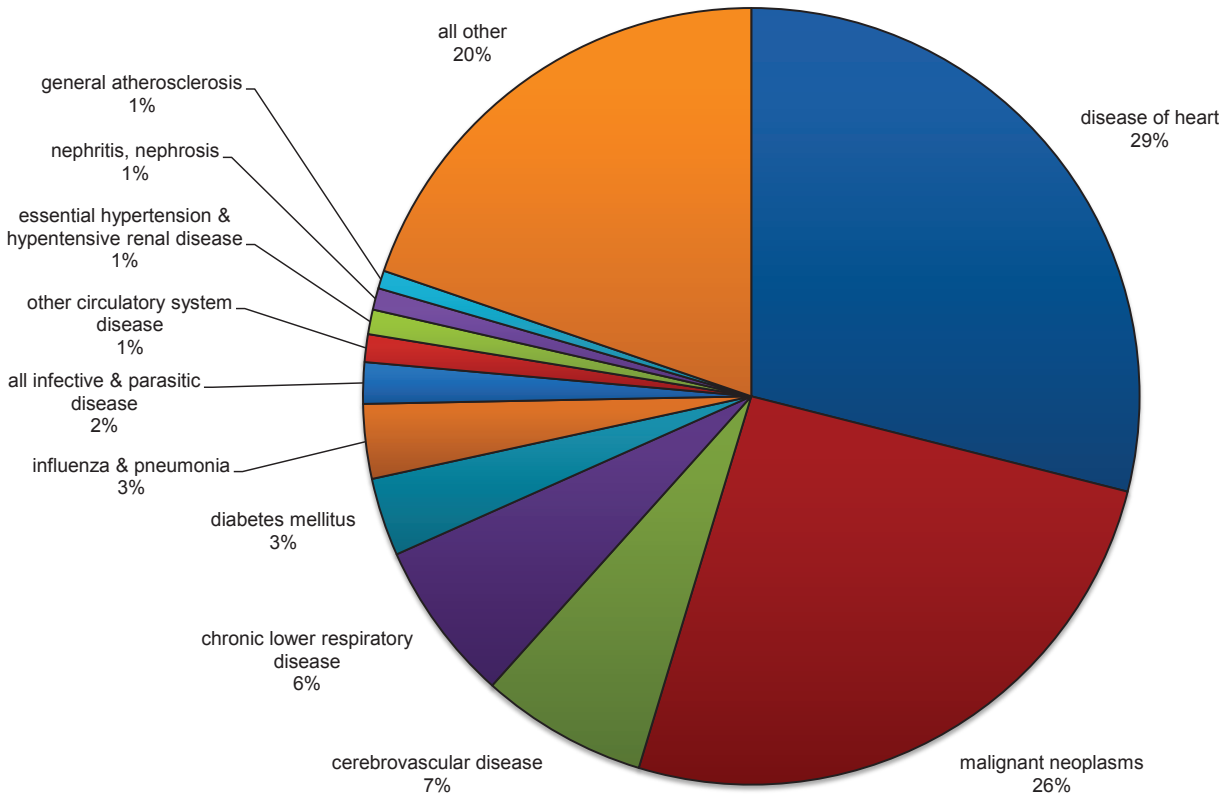


Figure 4.2 displays the percentages of deaths due to the selected chronic diseases. By examining the leading causes of death, statewide and local programs can determine which interventions, prevention activities, and messages are needed for various groups to prevent deaths prior to reaching life expectancy and to improve health across the state. Of all deaths, approximately 28% were due to diseases of the heart; over one in four Iowans died of heart disease.

Figure 4.2 Percent of Selected Chronic Disease-related Deaths, Iowa Residents, 2006



Of all deaths, approximately 28% were due to diseases of the heart; over one in four Iowans died of heart disease.

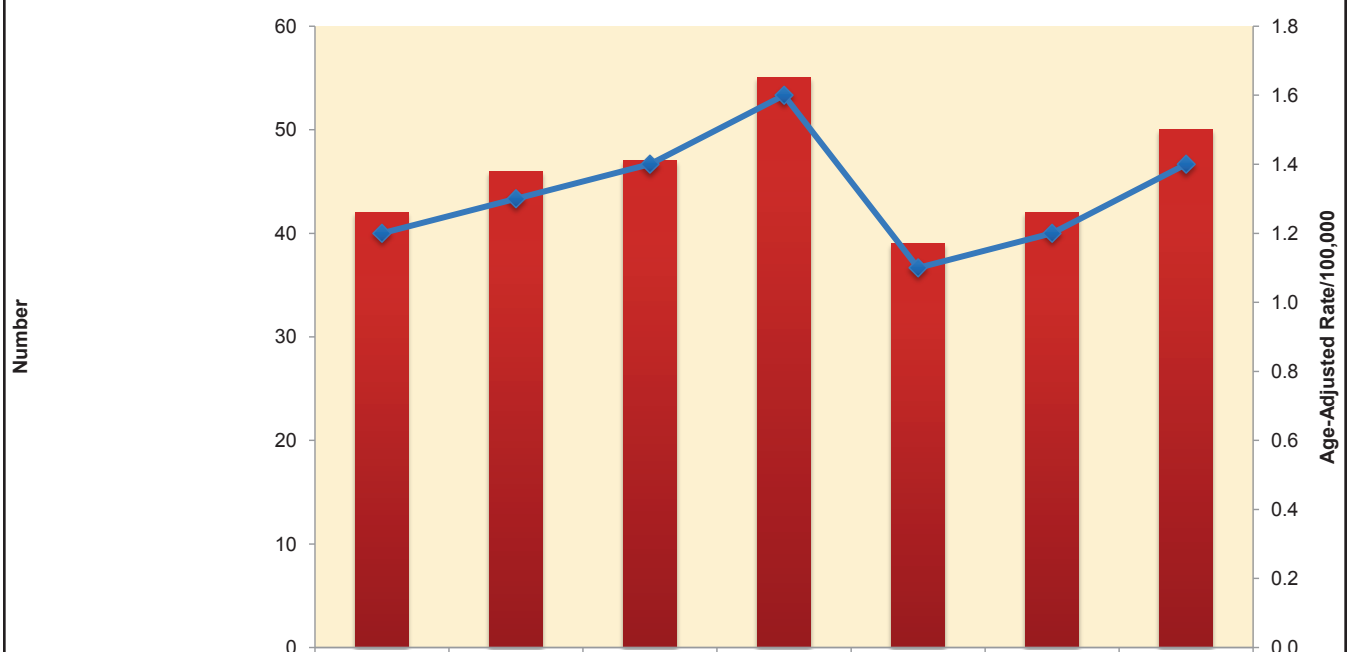
Trends in Chronic Disease Mortality in Iowa

To assess trends in chronic disease mortality, rates were calculated for the leading causes of death for 1999 through 2005.

Cardiovascular Disease

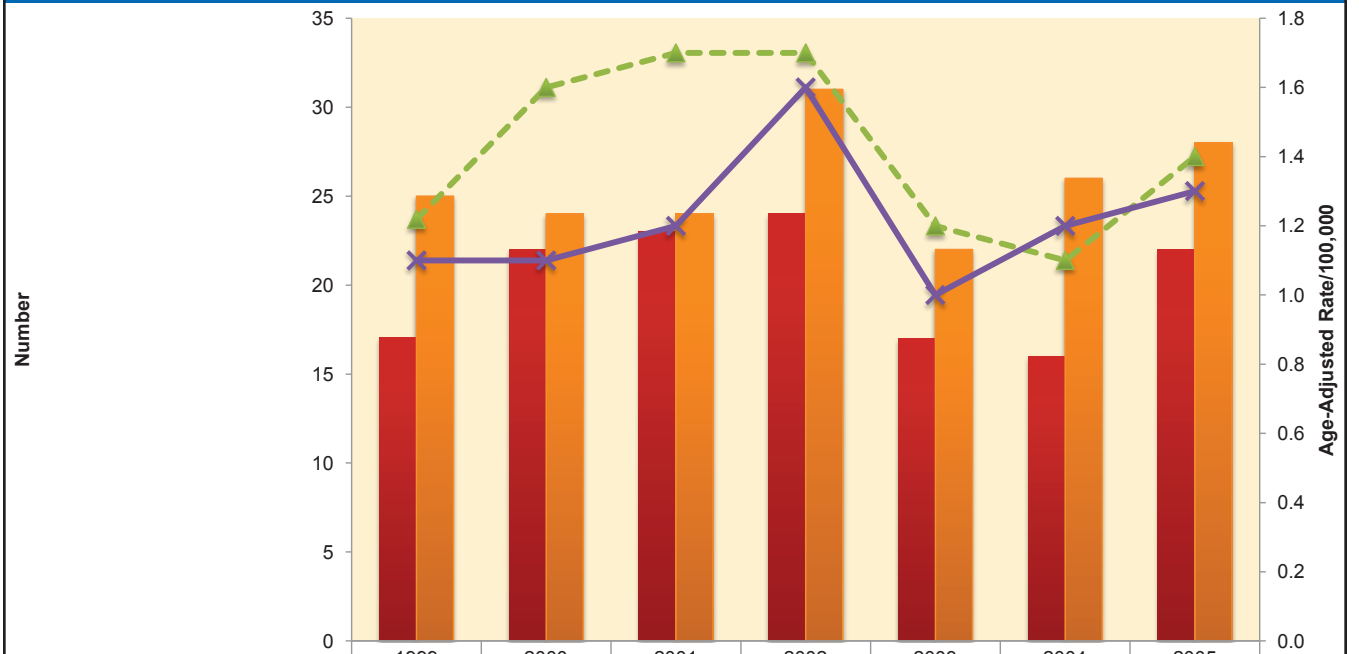
Figures 4.3 through 4.18 illustrate the trend in mortality rates for selected heart disease conditions by ICD-10 codes. All data were compiled from the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics, on-line Database http://wonder.cdc.gov.cmf-ICD-10.html. Figures 4.3 and 4.4 show the age-adjusted mortality rates for "Other Cardiovascular Disease" (ICD-10 I80-I90) between 1999 and 2005. Rates are age-adjusted to allow comparisons over time. When evaluating across time, by age-adjusting rates, mortality is compared to a standard population so that rates are comparable. Mortality rates peaked in 2002 but then decreased in 2003. Between 1999 and 2005, the number and age-adjusted rate of death from other cardiovascular conditions (ICD-10 I80-I99) for both males and females was variable; no consistent increasing or decreasing trend was observed. The rate for men was consistently higher than for women except in 2004 when the rate was slightly lower for men.

Figure 4.3 Other Cardiovascular Disease
Iowa Residents, 1999-2005
ICD-10: I80-I99



	1999	2000	2001	2002	2003	2004	2005
# deaths	42	46	47	55	39	42	50
age-adjusted rate/100,000	1.2	1.3	1.4	1.6	1.1	1.2	1.4

Figure 4.4 Other Cardiovascular Diseases by Gender, Iowa Residents, 1999-2005
ICD-10: I80-I99

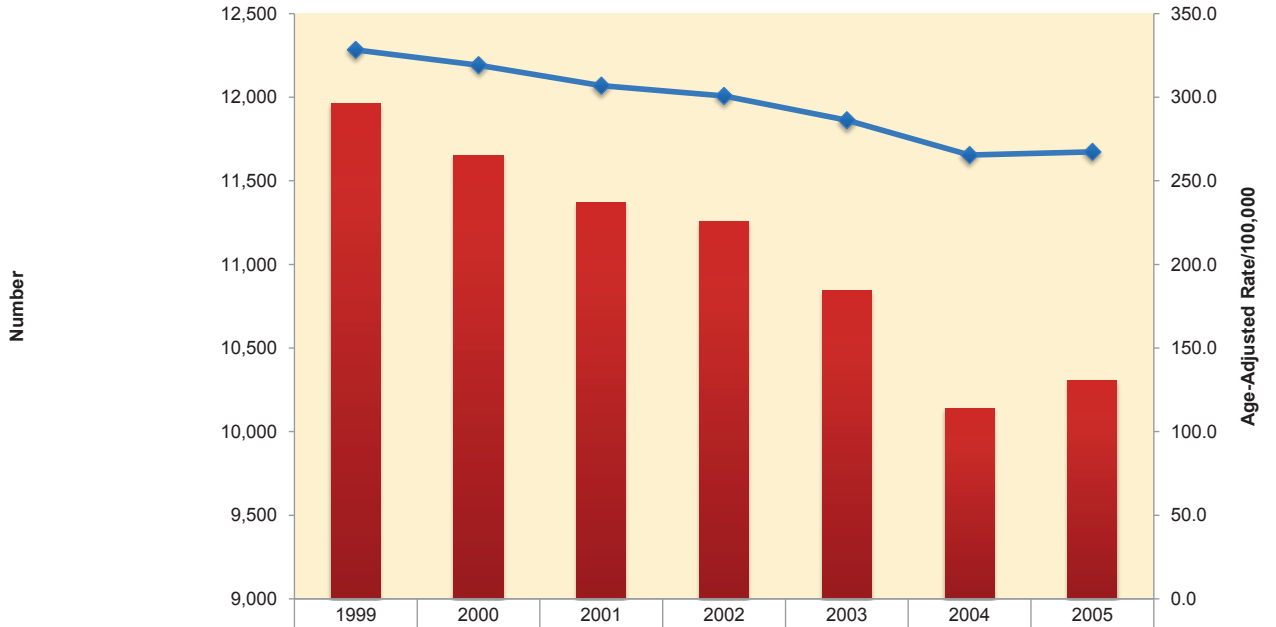


	1999	2000	2001	2002	2003	2004	2005
# M deaths	17	22	23	24	17	16	22
# F deaths	25	24	24	31	22	26	28
M age-adjusted rate/100,000	1.2	1.6	1.7	1.7	1.2	1.1	1.4
F age-adjusted rate/100,000	1.1	1.1	1.2	1.6	1.0	1.2	1.3

Figures 4.5 and 4.6 show the age-adjusted mortality rates for "All Cardiovascular/ Cerebrovascular Disease" (ICD-10 I00-I99, Q20-28) between 1999 and 2005. Mortality rates were at their highest level in 1999, but then decreased steadily until there was a slight increase in 2005. Between 1999 and 2005, the number and age-adjusted rates of death for "All Cardiovascular/Cerebrovascular Disease" (ICD-10 I00-I99, Q20-28) for both males and females demonstrated a consistent decreasing trend. The rate for men was higher than for women across the seven-year time span.

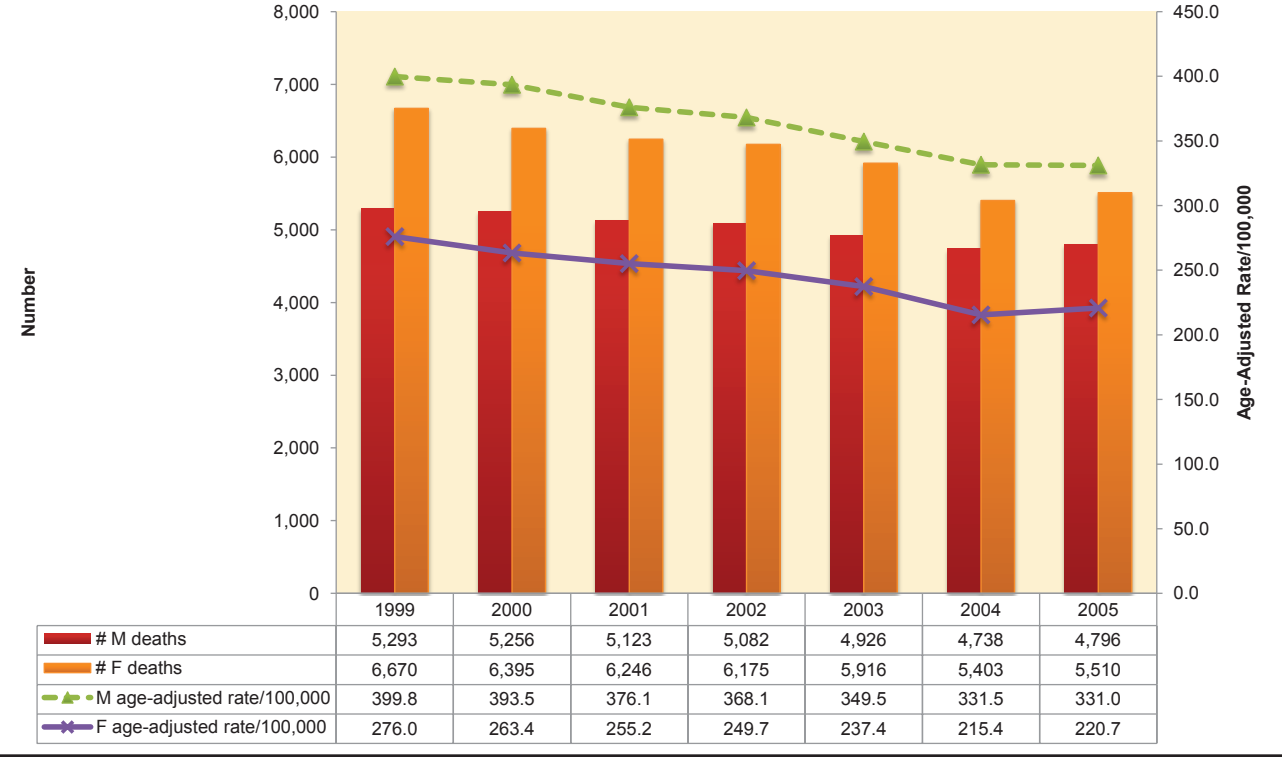
Between 1999 and 2005, the number and age-adjusted rate of death for "All Cardiovascular/Cerebrovascular Disease" for both males and females demonstrated a consistent decreasing trend.

Figure 4.5 All Cardiovascular/Cerebrovascular Disease, Iowa Residents, 1999-2005
ICD-10: I00-I99, Q20-Q28



	1999	2000	2001	2002	2003	2004	2005
# deaths	11,963	11,651	11,369	11,257	10,842	10,141	10,306
age-adjusted rate/100,000	328.3	319.2	306.9	300.7	286.2	265.4	267.3

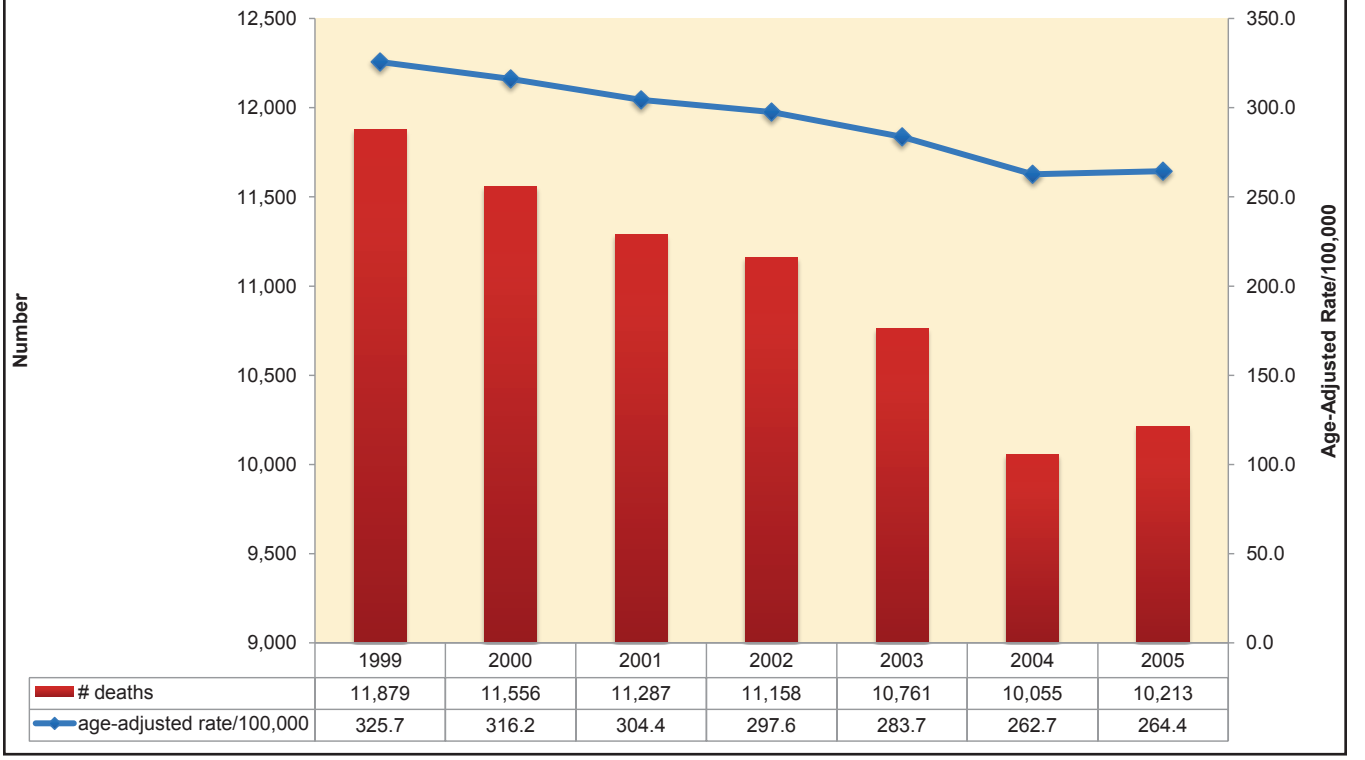
Figure 4.6 All Cardiovascular/Cerebrovascular Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: I00-I99, Q20-Q28



	1999	2000	2001	2002	2003	2004	2005
# M deaths	5,293	5,256	5,123	5,082	4,926	4,738	4,796
# F deaths	6,670	6,395	6,246	6,175	5,916	5,403	5,510
M age-adjusted rate/100,000	399.8	393.5	376.1	368.1	349.5	331.5	331.0
F age-adjusted rate/100,000	276.0	263.4	255.2	249.7	237.4	215.4	220.7

Figures 4.7 and 4.8 shows the age-adjusted mortality rates for "All Major Cardiovascular/Cerebrovascular Disease" (ICD-10 I00-I78) between 1999 and 2005. Mortality rates were at their highest level in 1999, but then decreased steadily until there was a slight increase in 2005. Between 1999 and 2005, the number and age-adjusted rate of death for "All Major Cardiovascular/Cerebrovascular Disease" for both males and females demonstrated a consistent decreasing trend. The rate for men was higher than for women across the seven year timespan.

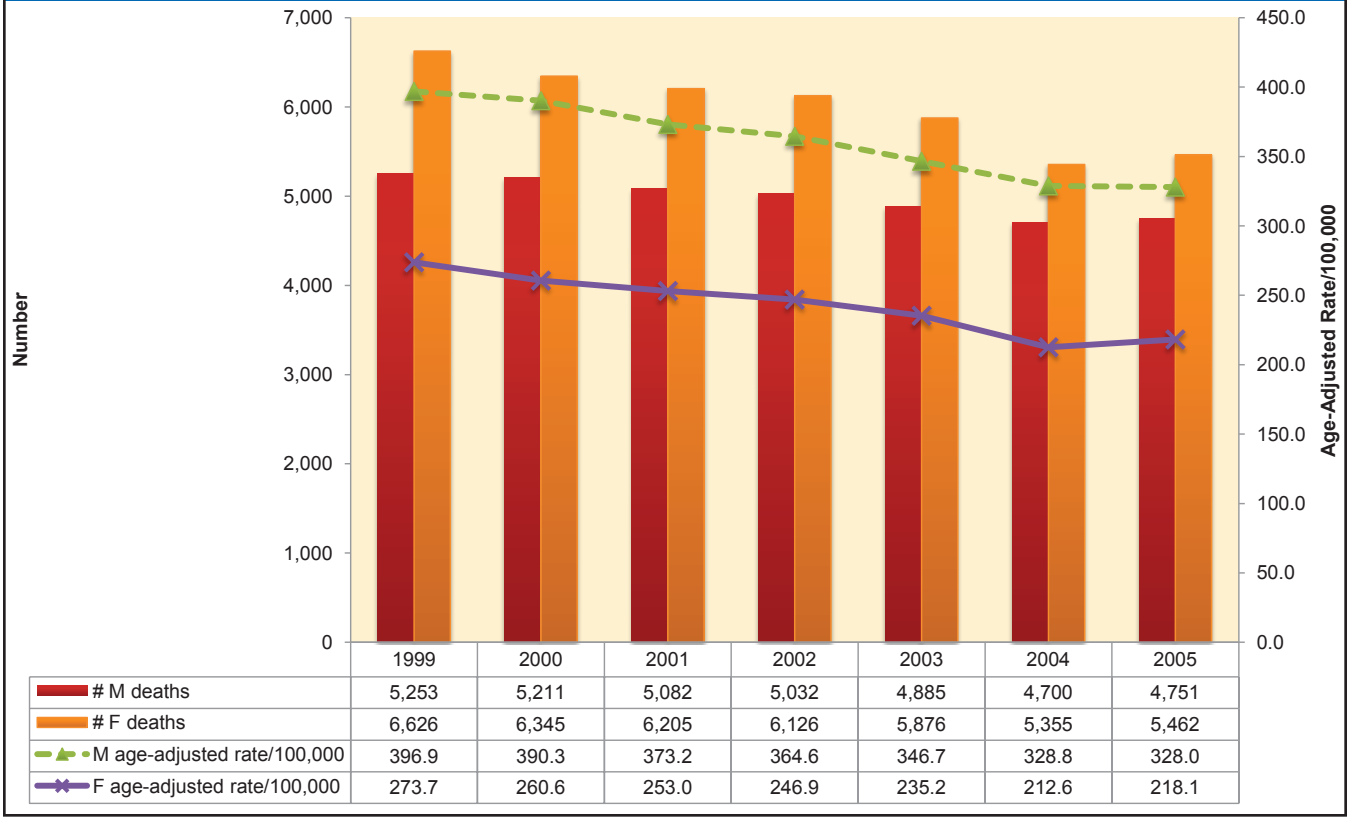
Figure 4.7 All Major Cardiovascular/Cerebrovascular Disease
Iowa Residents, 1999-2005
ICD-10: I00-I78



	1999	2000	2001	2002	2003	2004	2005
# deaths	11,879	11,556	11,287	11,158	10,761	10,055	10,213
age-adjusted rate/100,000	325.7	316.2	304.4	297.6	283.7	262.7	264.4

Mortality rates were at their highest level in 1999, but then decreased steadily until there was a slight increase in 2005.

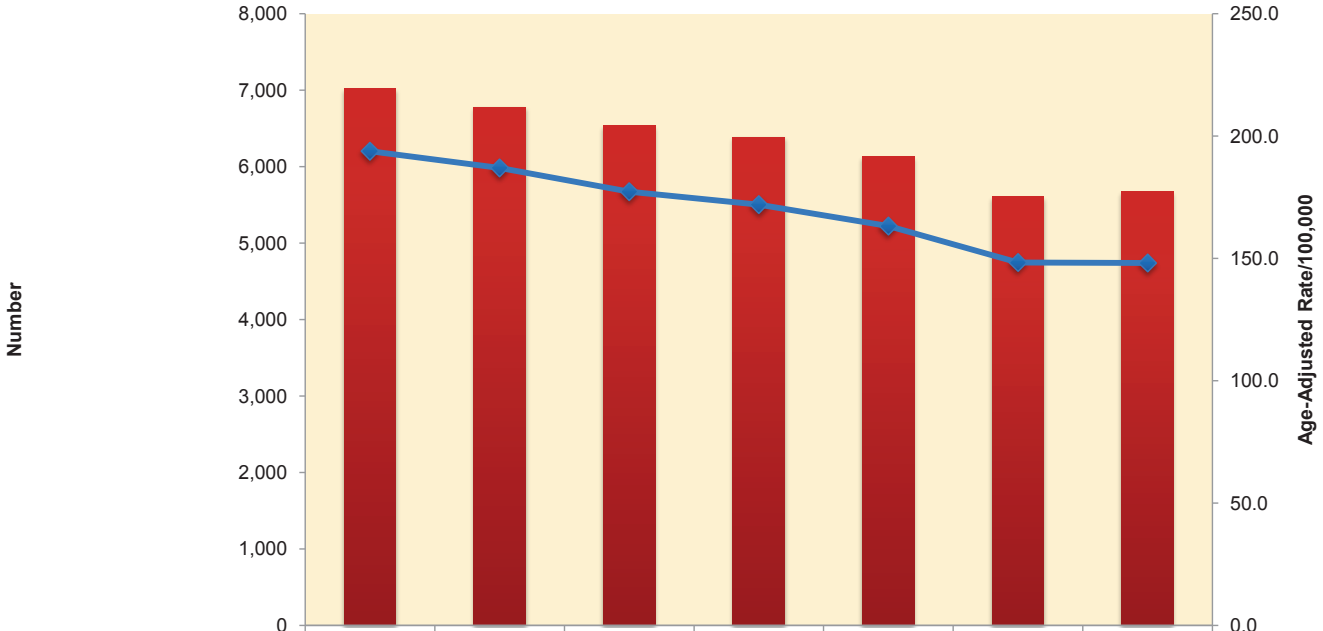
**Figure 4.8 All Major Cardiovascular/Cerebrovascular Disease Deaths
Iowa Residents, 1999-2005
ICD-10: I80-I99**



	1999	2000	2001	2002	2003	2004	2005
# M deaths	5,253	5,211	5,082	5,032	4,885	4,700	4,751
# F deaths	6,626	6,345	6,205	6,126	5,876	5,355	5,462
M age-adjusted rate/100,000	396.9	390.3	373.2	364.6	346.7	328.8	328.0
F age-adjusted rate/100,000	273.7	260.6	253.0	246.9	235.2	212.6	218.1

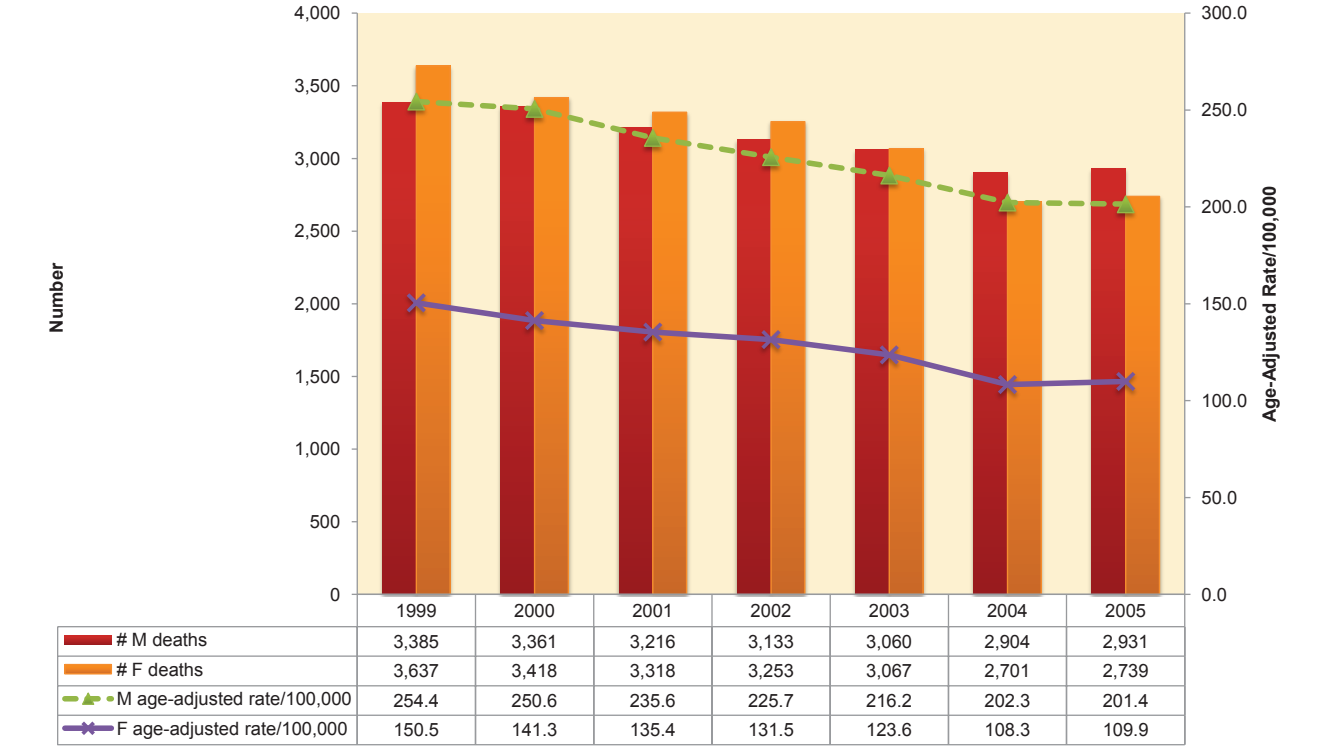
Figures 4.9 and 4.10 show the age-adjusted mortality rates for "Coronary Heart Disease" (ICD-10 I20-I25) between 1999 and 2005. Overall, mortality rates were at their highest level in 1999, but then decreased steadily until 2005. Between 1999 and 2005, the number and age-adjusted rate of death for "Coronary Heart Disease" (ICD-10 I20-I25) for both males and females demonstrated a consistent decreasing trend. The age-adjusted rate for men was higher than for women across the time span.

Figure 4.9 Coronary Heart Disease, Iowa Residents, 1999-2005
ICD-10: I20-I25



	1999	2000	2001	2002	2003	2004	2005
# deaths	7,022	6,779	6,534	6,386	6,127	5,605	5,670
age-adjusted rate/100,000	193.8	187.0	177.3	172.0	163.2	148.3	148.1

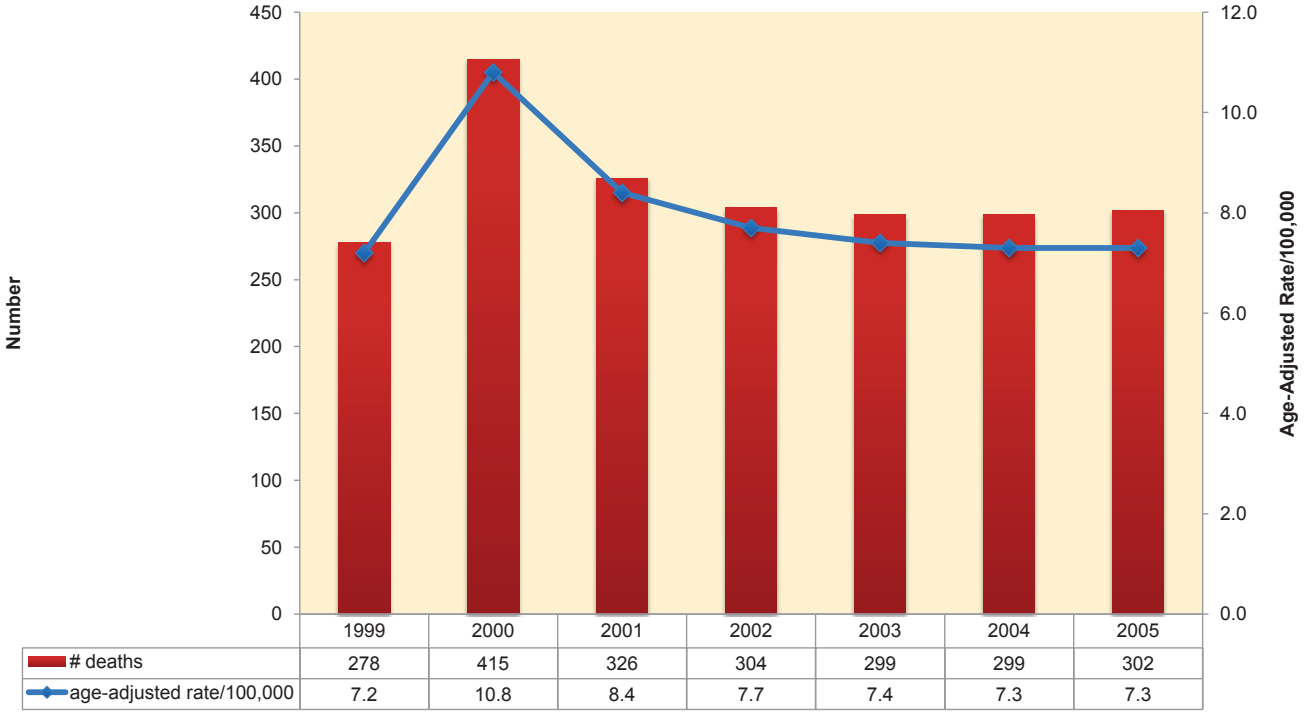
Figure 4.10 Coronary Heart Disease Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: I20-I25



	1999	2000	2001	2002	2003	2004	2005
# M deaths	3,385	3,361	3,216	3,133	3,060	2,904	2,931
# F deaths	3,637	3,418	3,318	3,253	3,067	2,701	2,739
M age-adjusted rate/100,000	254.4	250.6	235.6	225.7	216.2	202.3	201.4
F age-adjusted rate/100,000	150.5	141.3	135.4	131.5	123.6	108.3	109.9

The age-adjusted mortality rates for "Heart Failure" (ICD-10 I50) between 1999 and 2005 are displayed in Figures 4.11 and 4.12. Overall, mortality rates were at their highest level in 2000 but then decreased slightly until 2005. After 2000, the number and age-adjusted rate of death for "Heart Failure" (ICD-10 I50) for both males and females demonstrated a decreasing trend. Thereafter, the rate for men and women was similar across the seven year timespan.

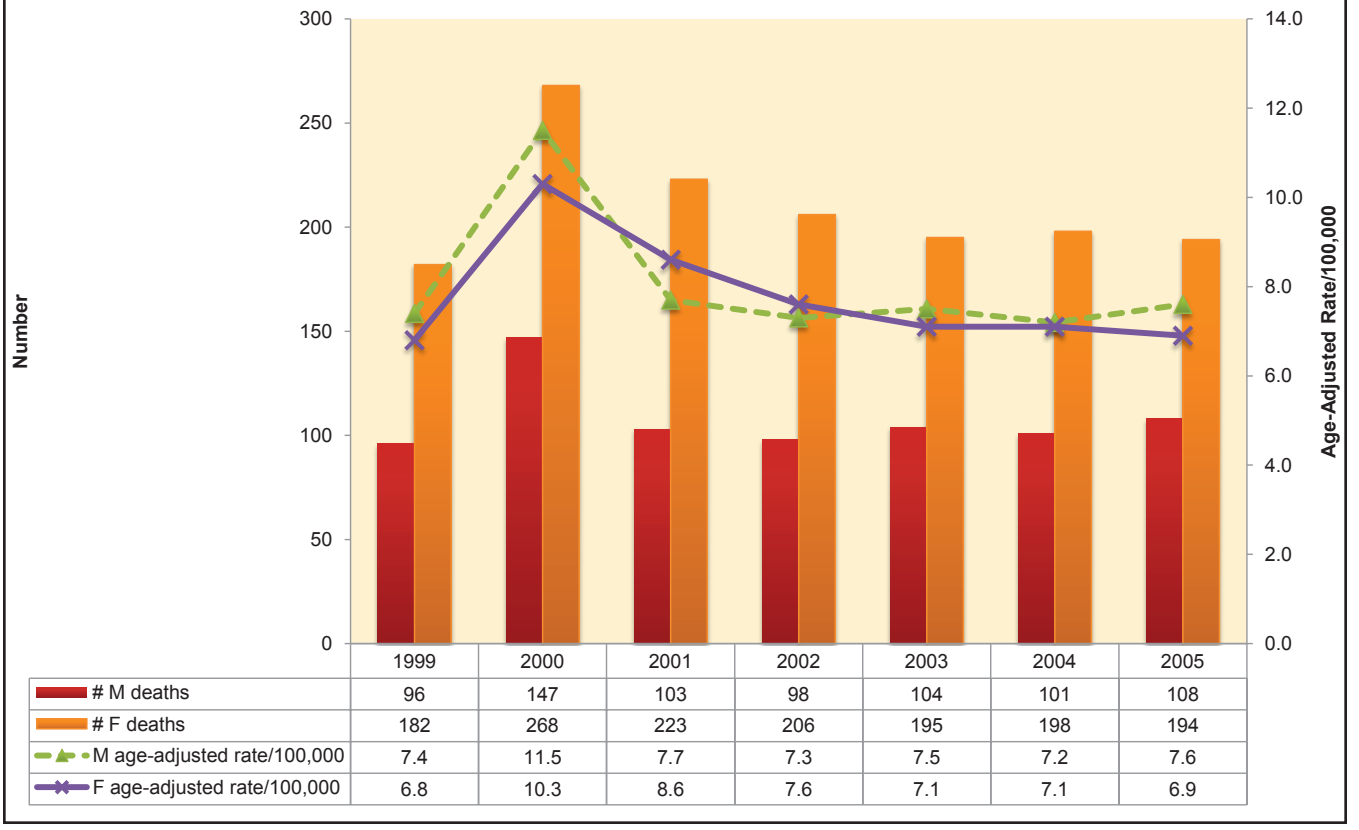
Figure 4.11 Heart Failure, Iowa Residents, 1999-2005
ICD-10: I50



	1999	2000	2001	2002	2003	2004	2005
# deaths	278	415	326	304	299	299	302
age-adjusted rate/100,000	7.2	10.8	8.4	7.7	7.4	7.3	7.3

After 2000, the number and age-adjusted rate of death for "Heart Failure" for both males and females demonstrated a decreasing trend.

Figure 4.12 Heart Failure Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: I50

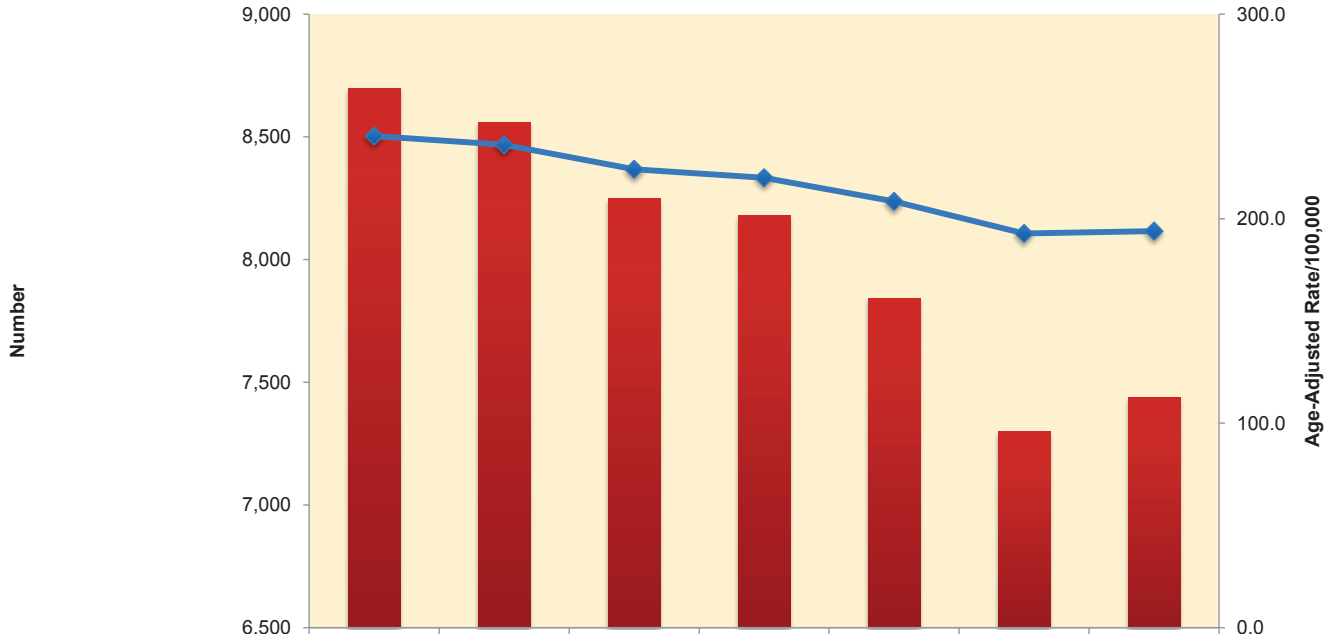


	1999	2000	2001	2002	2003	2004	2005
# M deaths	96	147	103	98	104	101	108
# F deaths	182	268	223	206	195	198	194
M age-adjusted rate/100,000	7.4	11.5	7.7	7.3	7.5	7.2	7.6
F age-adjusted rate/100,000	6.8	10.3	8.6	7.6	7.1	7.1	6.9

The age-adjusted mortality rates for "Heart Disease" (ICD-10 I00-I09, I11, I13, I20-I51) between 1999 and 2005 are displayed in Figures 4.13 and 4.14. Overall, mortality rates were at their highest level in 1999 but then decreased slightly until 2005 when there was a modest increase. Between 1999 and 2005, the number and age-adjusted rate of death for "Heart Disease" for both males and females demonstrated a slightly increasing trend (except for 2000, when men had a slightly higher rate). Thereafter, the rate for men and women decreased.

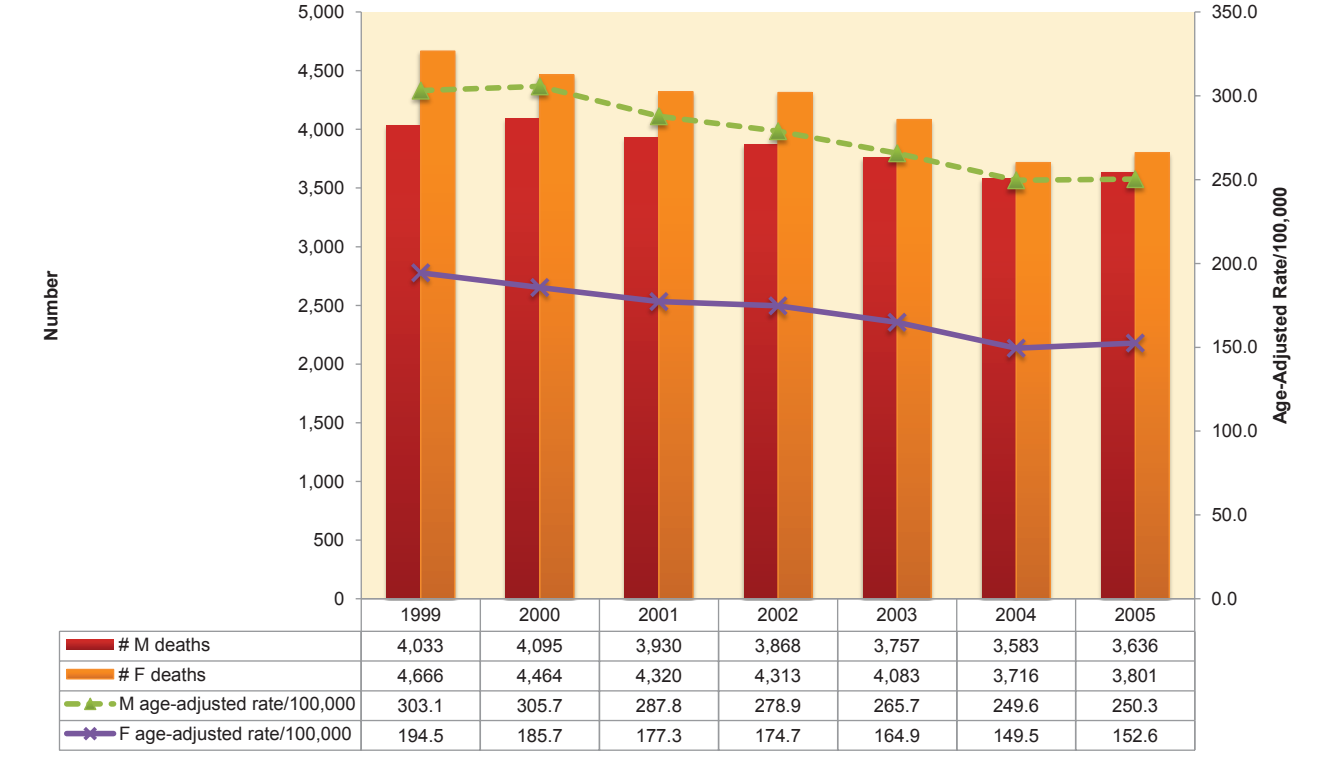
Between 1999 and 2005, the number and age-adjusted rate of death for "Heart Disease" for both males and females demonstrated a slightly increasing trend (except for 2000, when men had a slightly higher rate).

Figure 4.13 Heart Disease, Iowa Residents, 1999-2005
ICD-10: I00-I09, I11, I13, I20-I51



	1999	2000	2001	2002	2003	2004	2005
# deaths	8,699	8,559	8,250	8,181	7,840	7,299	7,437
age-adjusted rate/100,000	240.4	236.1	224.1	220.0	208.4	192.7	193.9

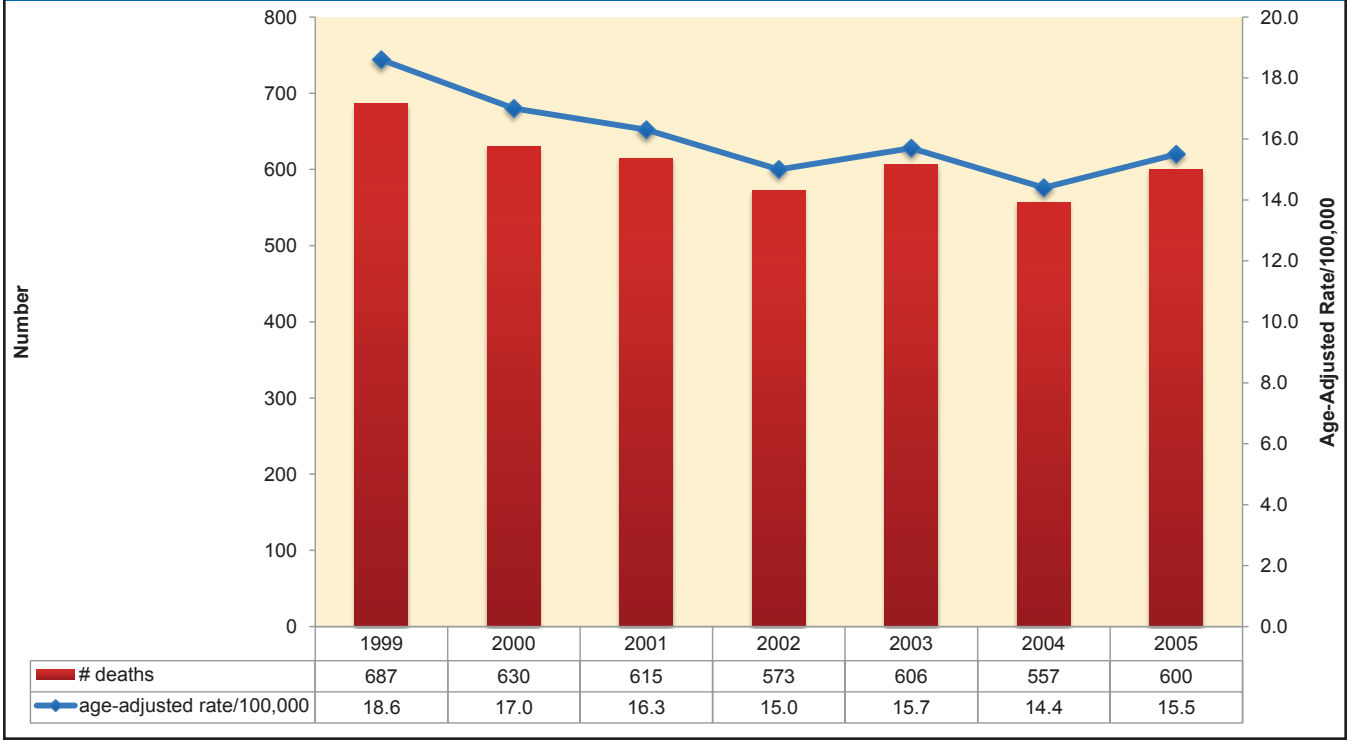
Figure 4.14 Heart Disease Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: I00-I09, I11, I20-I51



	1999	2000	2001	2002	2003	2004	2005
# M deaths	4,033	4,095	3,930	3,868	3,757	3,583	3,636
# F deaths	4,666	4,464	4,320	4,313	4,083	3,716	3,801
M age-adjusted rate/100,000	303.1	305.7	287.8	278.9	265.7	249.6	250.3
F age-adjusted rate/100,000	194.5	185.7	177.3	174.7	164.9	149.5	152.6

Figures 4.15 and 4.16 show the age-adjusted mortality rates for "Diseases of Arteries" (ICD-10 I70-I79) between 1999 and 2005. Overall, mortality rates were at their highest level in 1999, but then decreased slightly until 2005 when there was a modest increase. Between 1999 and 2005, the number and age-adjusted rate of death for "Diseases of the Arteries" for both males and females demonstrated a decreasing trend until 2004 when there was a modest increase for both groups.

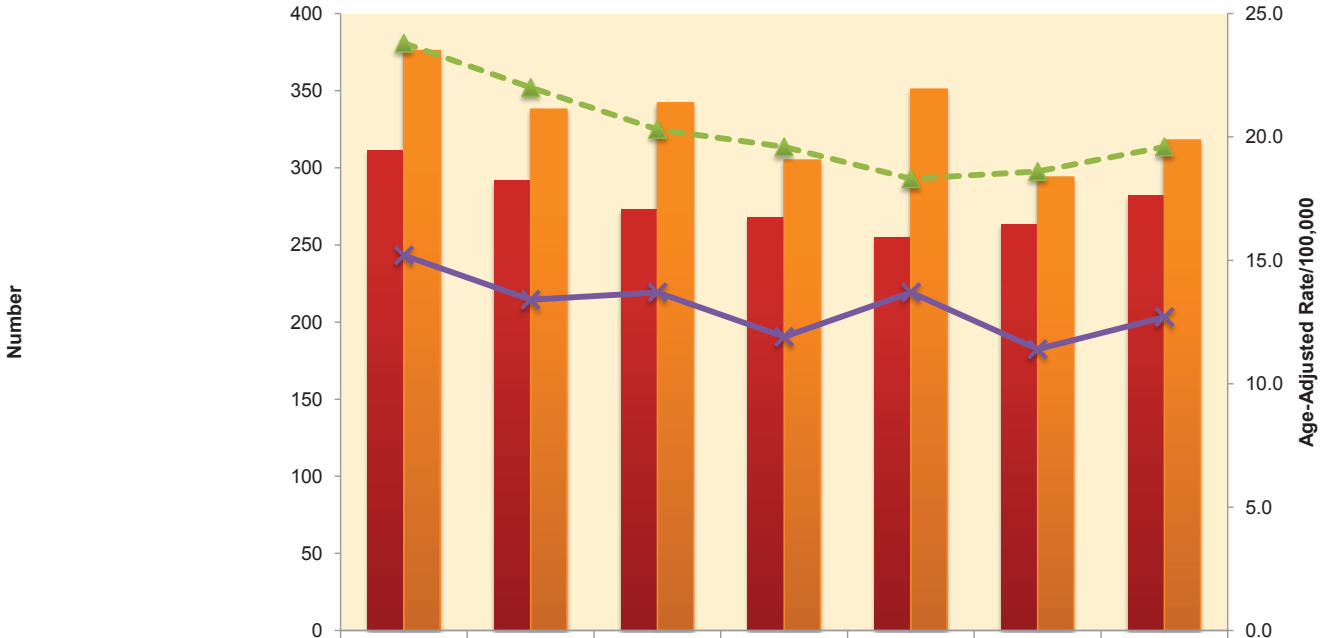
Figure 4.15 Disease of Arteries, Iowa Residents, 1999-2005
ICD-10: I70-I79



	1999	2000	2001	2002	2003	2004	2005
# deaths	687	630	615	573	606	557	600
age-adjusted rate/100,000	18.6	17.0	16.3	15.0	15.7	14.4	15.5

Overall, mortality rates for "Diseases of Arteries" were at their highest level in 1999, but then decreased slightly until 2005 when there was a modest increase.

Figure 4.16 Disease of Arteries Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: I70-I79

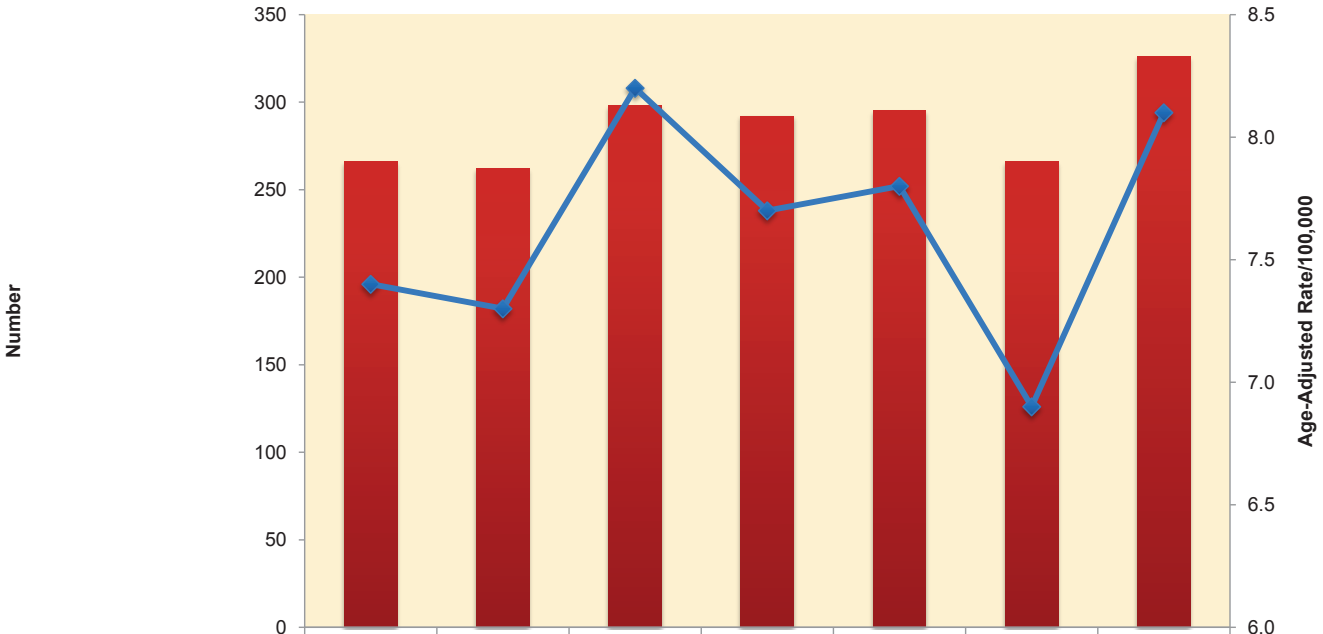


	1999	2000	2001	2002	2003	2004	2005
# M deaths	311	292	273	268	255	263	282
# F deaths	376	338	342	305	351	294	318
M age-adjusted rate/100,000	23.8	22.0	20.3	19.6	18.3	18.6	19.6
F age-adjusted rate/100,000	15.2	13.4	13.7	11.9	13.7	11.4	12.7

Figures 4.17 and 4.18 shows the age-adjusted mortality rates for "Hypertensive Heart Disease" (ICD-10 I11, I13) between 1999 and 2005. Overall, mortality rates were at their highest level in 2005. Between 1999 and 2005, the number and age-adjusted rate of death for "Hypertensive Heart Disease" for both males and females demonstrated a variable trend. The highest rate for men was in 2004 (i.e., 8.7) and for women in 2002 (i.e., 7.6).

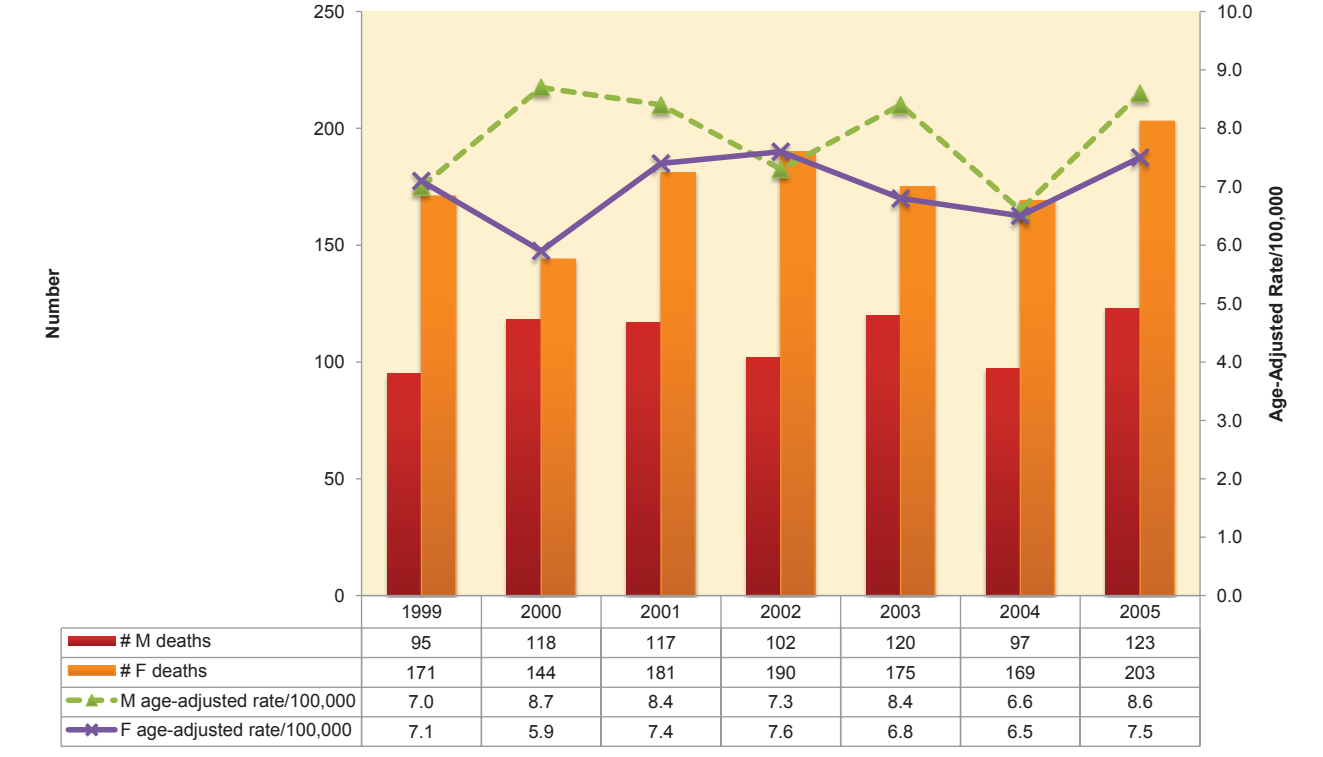
Overall, mortality rates for "Hypertensive Heart Disease" were at their highest level in 2005.

Figure 4.17 Hypertensive Heart Disease, Iowa Residents, 1999-2005
ICD-10: I11, I13



	1999	2000	2001	2002	2003	2004	2005
# deaths	266	262	298	292	295	266	326
age-adjusted rate/100,000	7.4	7.3	8.2	7.7	7.8	6.9	8.1

Figure 4.18 Hypertensive Heart Disease by Gender, Iowa Residents, 1999-2005
ICD-10: I11, I13

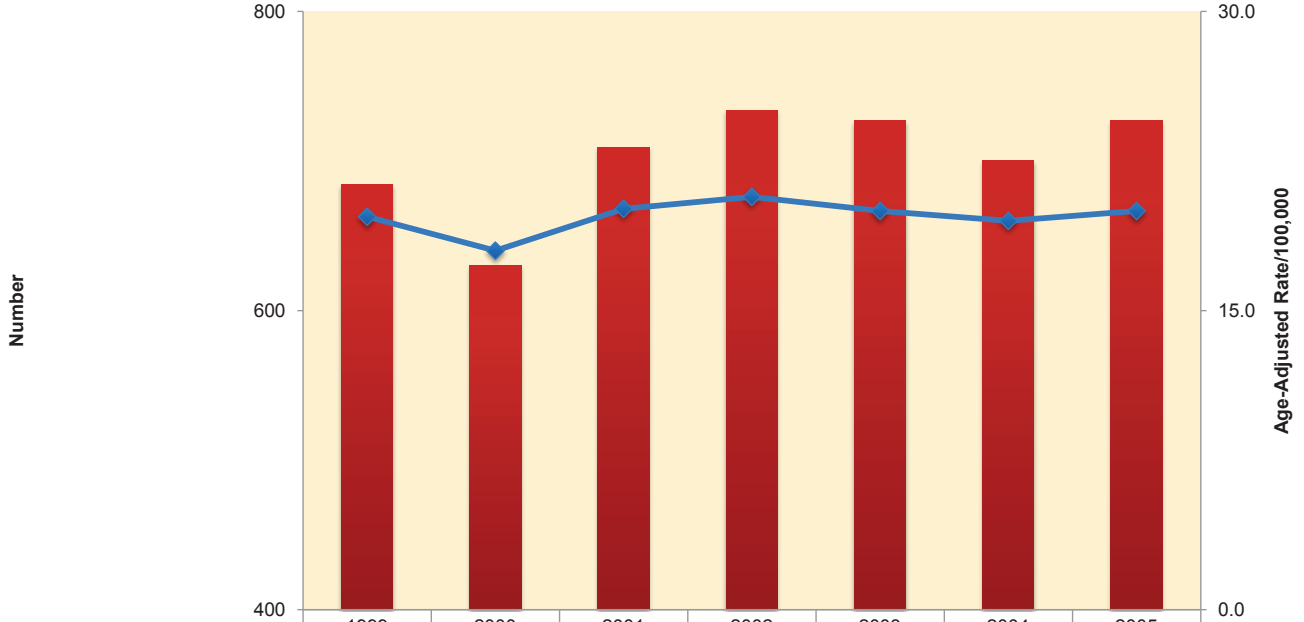


	1999	2000	2001	2002	2003	2004	2005
# M deaths	95	118	117	102	120	97	123
# F deaths	171	144	181	190	175	169	203
M age-adjusted rate/100,000	7.0	8.7	8.4	7.3	8.4	6.6	8.6
F age-adjusted rate/100,000	7.1	5.9	7.4	7.6	6.8	6.5	7.5

Diabetes

Figures 4.19 and 4.20 show the age-adjusted mortality rates for Diabetes (ICD-10 E10-E14) between 1999 and 2005. Overall, mortality rates were at their highest level in 2002 although the rate remained somewhat consistent across the time frame. Both males and females demonstrated a variable trend; the highest rate for men was in 2002 (i.e., 25) and for women was in 1999 (i.e., 18.8).

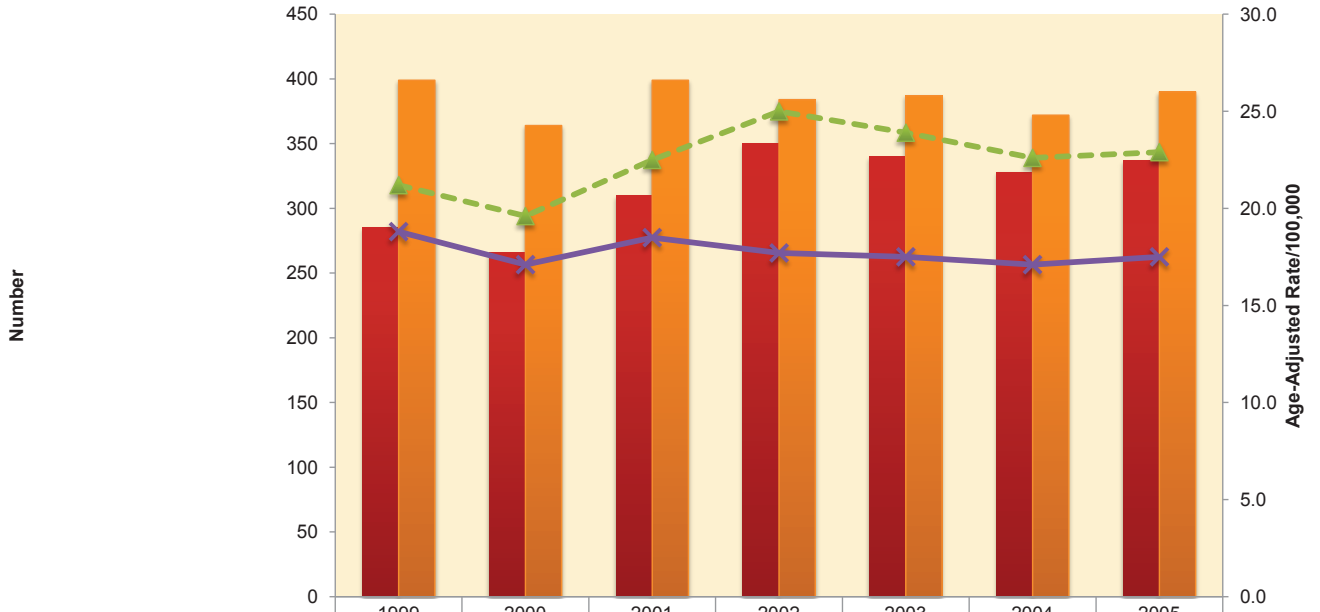
Figure 4.19 Diabetes Deaths, Iowa Residents, 1999-2005
ICD-10: E10-E14



	1999	2000	2001	2002	2003	2004	2005
# deaths	684	630	709	734	727	700	727
age-adjusted rate/100,000	19.7	18.0	20.1	20.7	20.0	19.5	20.0

Overall, mortality rates for Diabetes were at their highest level in 2002 although the rate remained somewhat consistent across the time frame.

Figure 4.20 Diabetes Deaths by Gender, Iowa Residents, 1999-2005
ICD-10: E10-E14



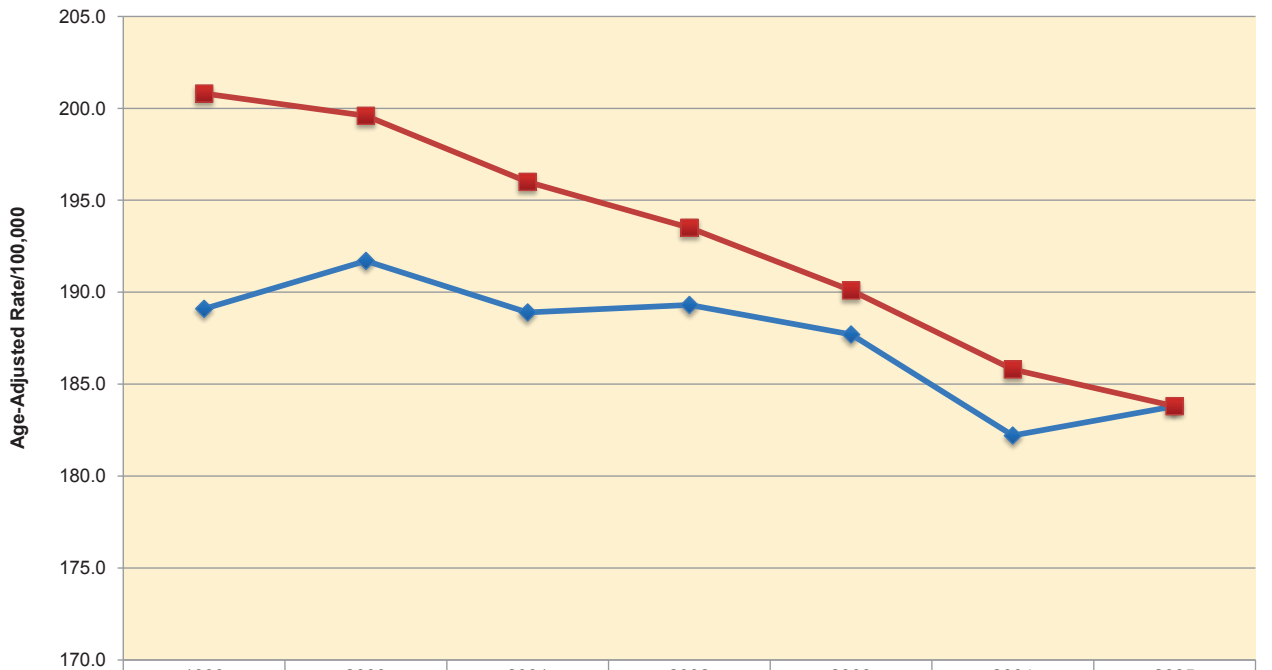
	1999	2000	2001	2002	2003	2004	2005
# M deaths	285	266	310	350	340	328	337
# F deaths	399	364	399	384	387	372	390
M age-adjusted rate/100,000	21.2	19.6	22.5	25.0	23.9	22.6	22.9
F age-adjusted rate/100,000	18.8	17.1	18.5	17.7	17.5	17.1	17.5

Both males and females demonstrated a variable trend; the highest rate for men was in 2002 and for women the highest rate was in 1999.

Cancer

Cancer is the second leading cause of death in Iowa. Figure 4.21 shows cancer mortality rates for Iowa compared to the U.S. Mortality rates in Iowa were similar to those observed for the entire nation, although the statewide mortality rate was slightly below the rates for the U. S. as a whole (Iowa Cancer Registry, 2008).

Figure 4.21 Cancer Mortality, Iowa and United States 1999-2005



	1999	2000	2001	2002	2003	2004	2005
Iowa	189.1	191.7	188.9	189.3	187.7	182.2	183.8
US	200.8	199.6	196.0	193.5	190.1	185.8	183.8

Accounting for more than one-half of all cancer deaths, the leading causes of cancer mortality among both men and women include: lung, breast, colon/rectum, and prostate (Figures 4.22 and 4.23). For Iowa women, mortality rates for lung cancer have increased since 1975. The lung cancer mortality rate exceeded breast and colon/rectum in the late 1980s and has continued to increase. For Iowa women, breast cancer mortality rate has declined significantly since 1993. The decline may be due largely to the combined effects of better treatment and earlier diagnosis. For colon/rectum cancer, the mortality rate has remained relatively stable over time with a slight decline since 1985.

Compared to women, lung cancer incidence and mortality rates for Iowa men have been relatively stable between 1975 and 2005. However, lung cancer mortality rates for men were significantly higher than those for women. The prostate mortality rate showed a slight increase before 1992 and then began to decline. For colon/rectum cancer, the mortality rates were relatively stable over time and began to decline slightly after 1990.

Figure 4.22 Male Cancer Mortality Rate, 1975-2005

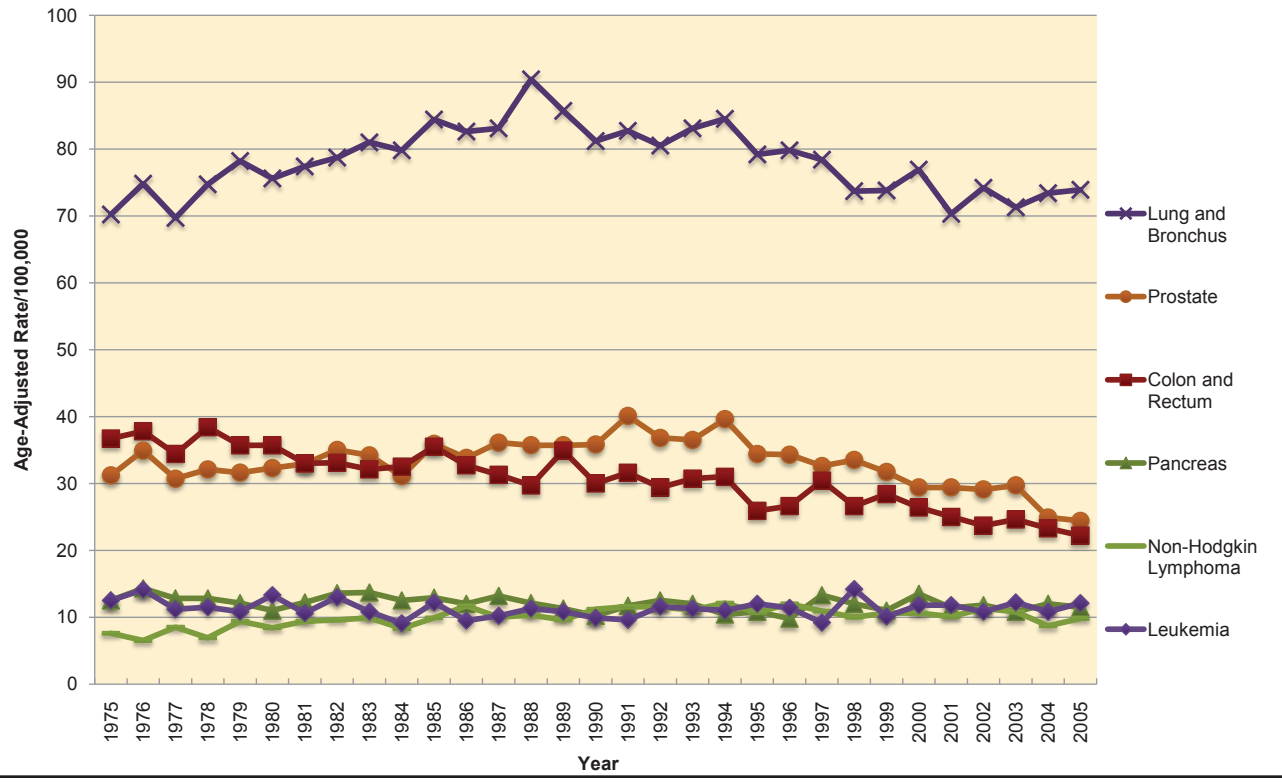
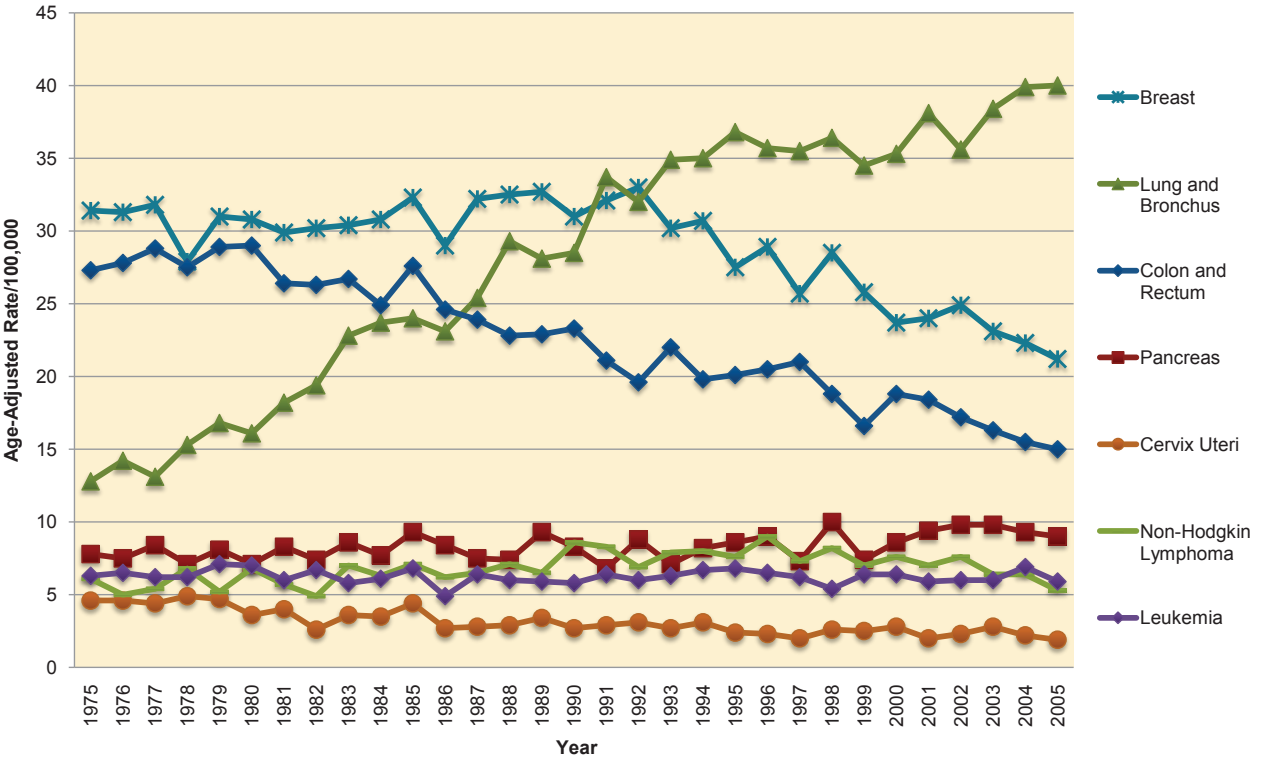


Figure 4.23 Female Cancer Mortality Rate, 1975-2005



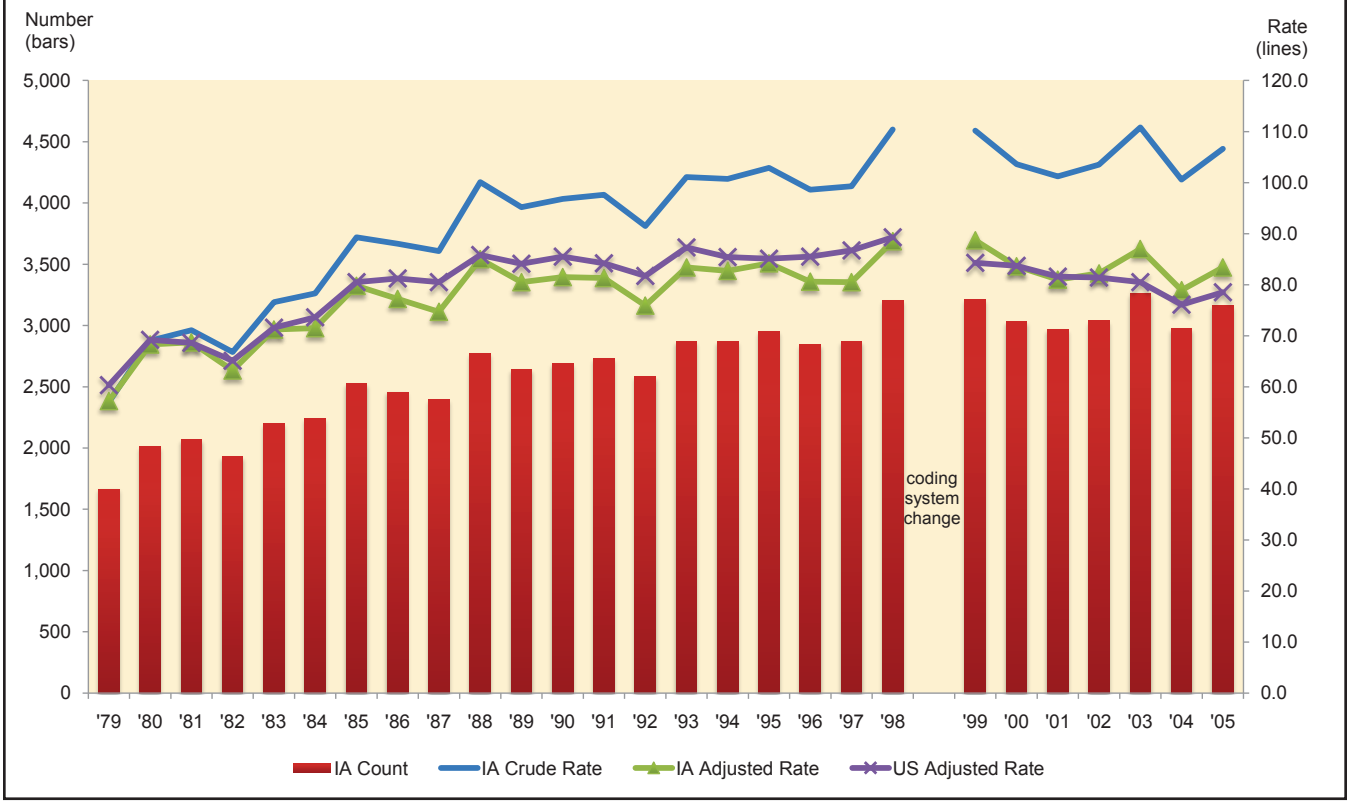
Respiratory Conditions

The number of deaths in Iowa from all respiratory diseases has almost doubled since 1979. Most of that increase occurred between 1979 (N=1,664) and 1998 (N=3,205). Since 1998, the number of respiratory disease deaths has held steady and remained at almost twice the 1979 number. Two-thirds of the increase seen between 1979 and 1998 was due to a dramatic growth in the number of deaths from Chronic Obstructive Pulmonary Disease (COPD). Another 10% was due to an increase in deaths from pneumonia, influenza, and bronchial infections.

Parallel with the increasing number of respiratory-related deaths in Iowa, both the crude and age-adjusted mortality rates from respiratory conditions increased between 1979 and 2005; the crude rate rose by 87% and the adjusted rate by 46%.

In Iowa, the age-adjusted rate of death from respiratory conditions was slightly below the national age-adjusted rate for all years, 1979 through 1998; the rate has been slightly above the age-adjusted national rate since that time.

Figure 4.24 Deaths from all Respiratory Conditions, Iowa Residents, 1979-2005*



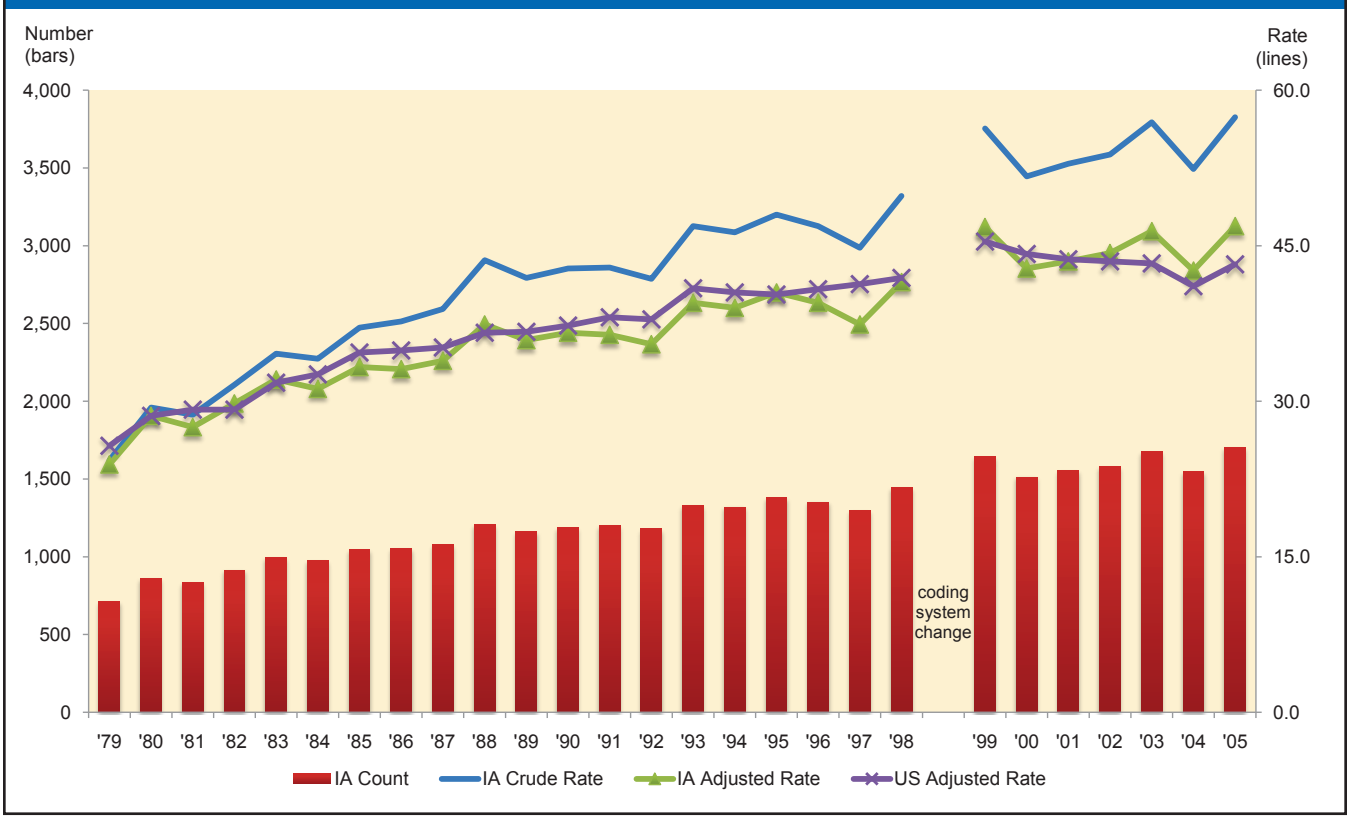
Chronic Lower Respiratory Diseases

In 2005, respiratory diseases accounted for 11% of all Iowa deaths. Of all respiratory deaths, 54% (N=1,703) were from Chronic Lower Respiratory Diseases (CLRD) (e.g., emphysema, asthma, chronic bronchitis) and 29% were due to acute upper and lower respiratory infections.

The annual number of deaths in Iowa from CLRD grew by 140% between 1979 (N=710) and 2005 (N=1,703), a function of a slow, steady annual increase. The crude annual CLRD mortality rate in Iowa from 1979 until 2005 similarly increased (i.e., 136%), rising from 24.3 per 100,000 to 57.4 per 100,000. During this time, the national crude rate rose 97%, increasing to 44.2 per 100,000 in 2005.

The Iowa age-adjusted rate of death from CLRD closely mirrors the national age-adjusted rate for all years 1979 until 2005. Overall differences between the crude Iowa and national rates of death from CLRD can largely be attributed to differences in the age distribution between Iowa and U.S. population (i.e., Iowa has proportionally a higher number of elderly residents than the nation; the elderly are more likely to die from CRLD than are younger adults and youth). Like counts and crude rates, age-adjusted CLRD mortality rates in Iowa increased steadily during the 29 years shown in Figure 4.25 and were almost double their 1979 rate (i.e., 23.9 per 100,000) by 2005 (i.e., 46.9 per 100,000). CLRD accounted for 6% of all Iowa deaths in 2005. Factors related to acquiring and dying from CLRD include: exposure to tobacco smoke, workplace exposure, history of allergies, and lack of appropriate care once CLRD has been acquired.

Figure 4.25 Deaths from Chronic Lower Respiratory Disease, 1979-2005*



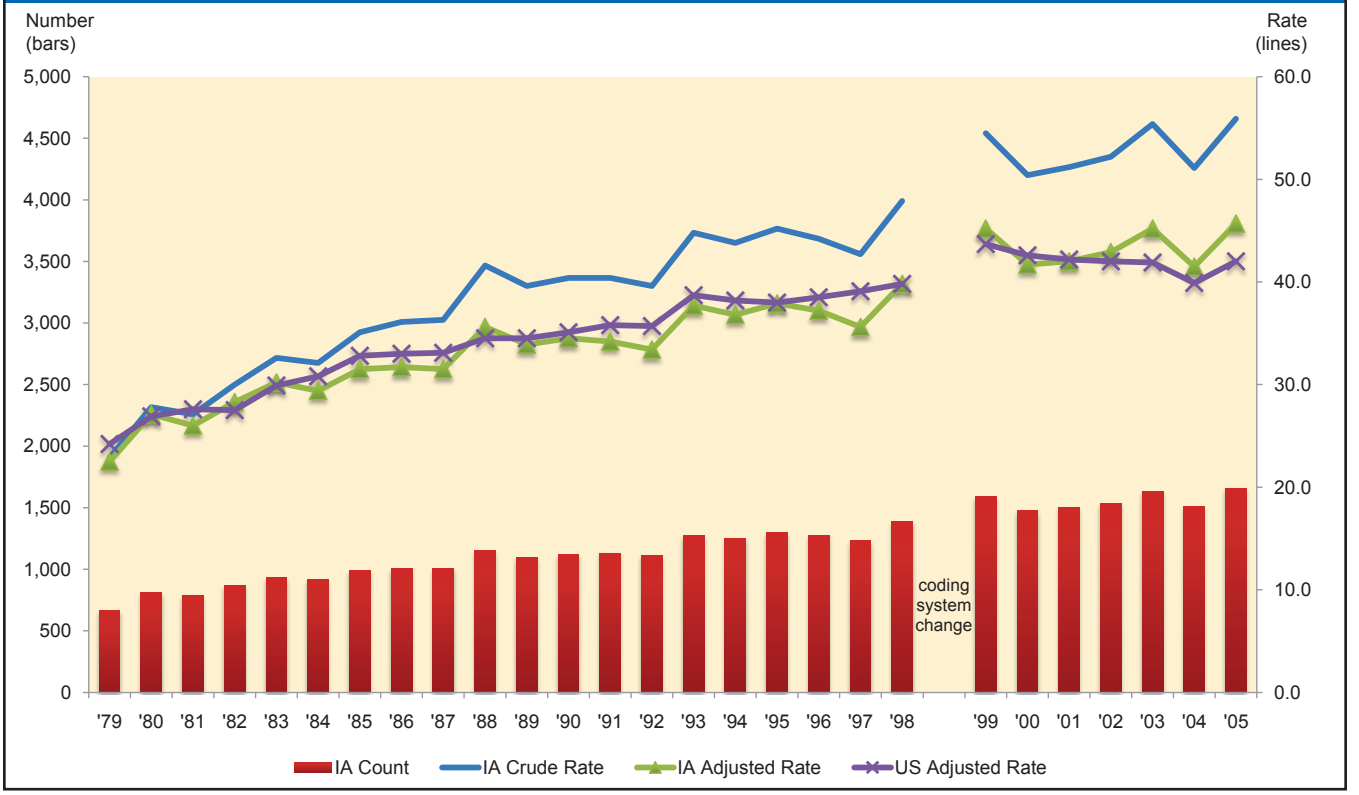
Chronic Obstructive Pulmonary Disease

By definition, COPD is a chronic condition. Factors related to developing COPD include: exposure to tobacco smoke, genetics, environmental exposures, and a history of asthma. COPD mortality includes deaths from chronic bronchitis, emphysema, and bronchiectasis (i.e., asthma is not a COPD) and account for approximately 95% of all chronic lower respiratory-related deaths. (Note: CDC, NCHS guidelines exclude ICD9 495 (i.e., extrinsic allergic alveolitis) from the classification of CLRD and COPD, while the National Institute of Health includes it as a COPD. Iowa deaths from ICD9 code 495 are included. Less than one Iowa death occurred per year from ICD9 code 495 between 1979 and 1998.)

Between 1979 (N=668) and 2005 (N=1,659), the annual number of deaths in Iowa from COPD grew by 150%, a function of a slow, steady annual increase. The national crude death rate from COPD shows a similar trend with rates increasing approximately 85% (i.e., increasing from 24.2 per 100,000 to 44.9 per 100,000).

From 1979 to 2005, the Iowa age-adjusted COPD mortality rate closely parallels the national age-adjusted rate. Overall, differences between the crude Iowa and national mortality rate from COPD can likely be attributed to differences in the age distribution between Iowa and U.S. population. Similar to counts and crude rates, Iowa age-adjusted rates of death from COPD increased steadily across the 27-year period, doubling in magnitude (i.e., 22.5 per 100,000 to 45.7 per 100,000). No deaths from COPD occurred among Iowa residents younger than 25 years of age; only one death occurred among Iowans 25 to 34 years of age; 90% of COPD deaths occurred among Iowans 65 years of age and older (i.e., of the 90%, 68% occurred among Iowans age 75 years and older). Between 2003 and 2005, women and men accounted for approximately the same proportion of all COPD deaths (i.e., women 48%, men 52%).

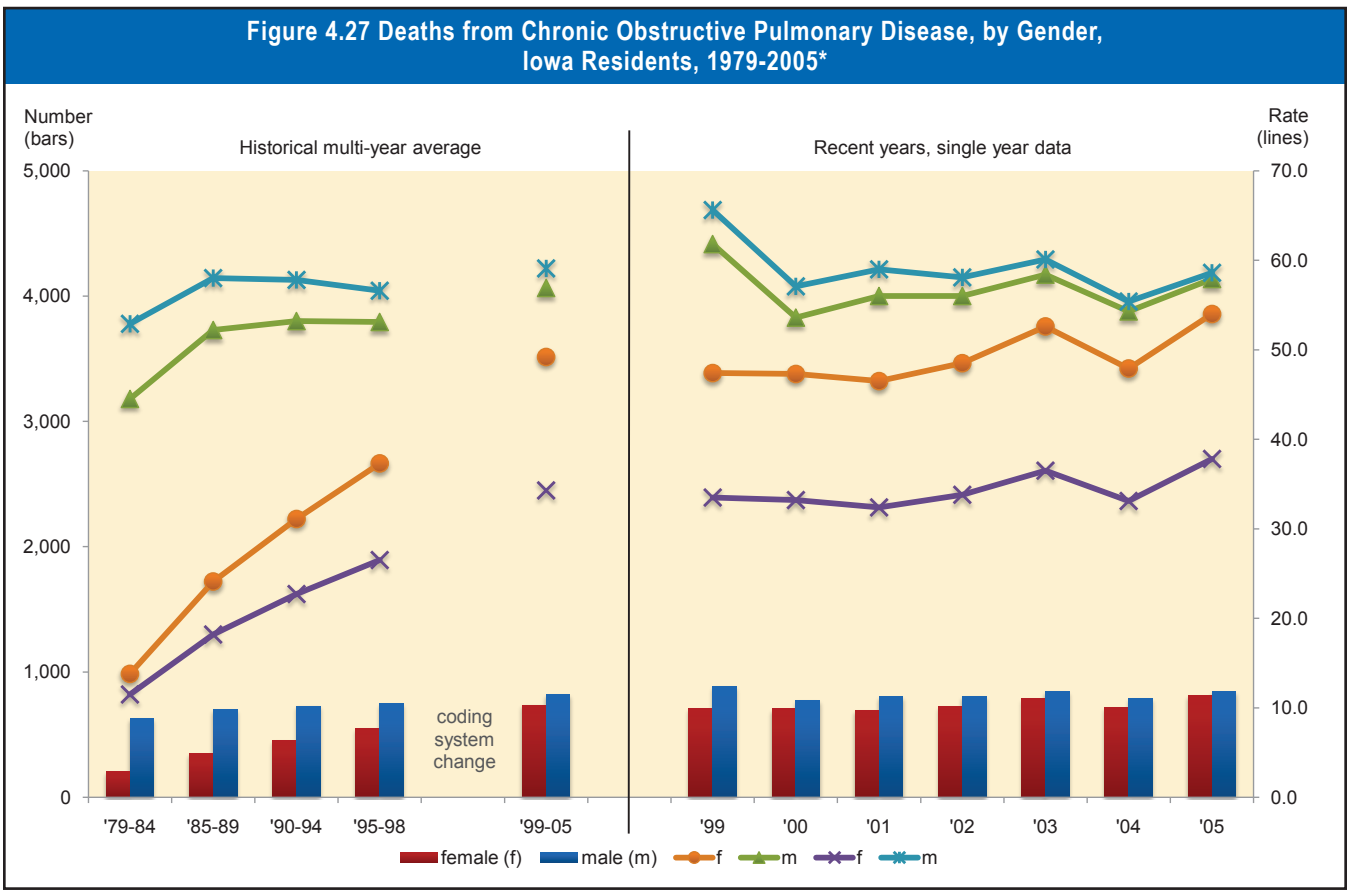
Figure 4.26 Deaths from Chronic Obstructive Pulmonary Disease, 1979-2005*



Among Iowa women, the average annual number of COPD deaths grew by 250% between 1979 to 1984 and 1999 to 2005. For men during this same time, the number increased 30% (see Figure 4.26). Increasing exposure to cigarette smoke among women may account for much of the dramatic increase in COPD deaths. Since 1999, death counts for men have stabilized as counts for women have continued to trend upward, although not as dramatically as in the previous 20 years.

For both men and women across the state, COPD deaths account for more than 97% of all CLRD deaths and about one-half of all respiratory-related deaths. COPD mortality accounted for about 5% to 6% of all deaths in both males and females. Between 2003 and 2005, COPDs were the third leading cause of death among men (i.e., following heart disease and cancer) and the fourth leading cause of death among women (i.e., following heart disease, cancer, and stroke). Since 1990 for women, but not for men, a relatively large difference is seen in crude and age-adjusted mortality rates. This difference is a function of Iowa's aging female population and COPD largely a disease of the elderly. Even taking into account Iowa's aging population, between 1979 and 1984 and between 1999 and 2005, COPD age-adjusted mortality rates for women increased by almost 200% and, for men, by 7%. Increased smoking rates in both men and women likely account for most of the increase.

Figure 4.27 Deaths from Chronic Obstructive Pulmonary Disease, by Gender, Iowa Residents, 1979-2005*



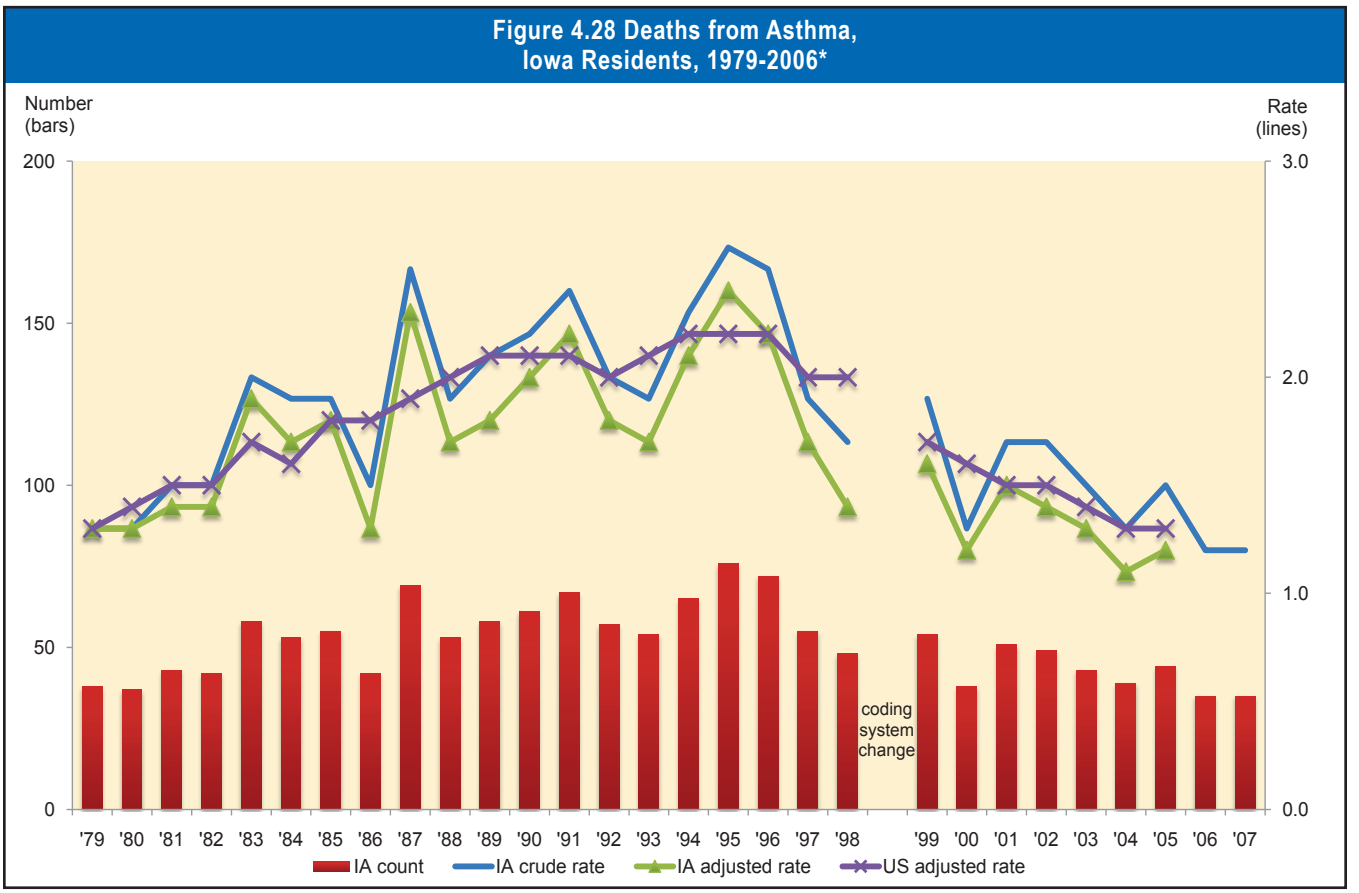
Asthma

Similar to emphysema, chronic bronchitis, and bronchiectasis, asthma is a chronic lung disease. Factors related to developing asthma include: age, gender, race, genetics, and environmental exposure (e.g., tobacco smoke). While asthma is not a leading cause of death, it is one of the most prevalent chronic conditions in Iowa with a rate of around 7% in the adult population; it is a condition for which few deaths should occur since, with proper treatment, asthma is a highly manageable disease.

For each year between 1979 and 2006, asthma was listed as the primary cause of death for fewer than 80 Iowans (i.e., less than 1% of all deaths). During the 28 years shown in Figure 4.28, the number of deaths from asthma peaked during the 1980s and 1990s and is currently at 1979 levels (N=35 deaths in 2006, N=38 deaths in 1979, N=76 deaths in peak year 1995).

Between 1979 and 2006, the annual crude rate of Iowa deaths due to asthma peaked between the late 1980s and the mid-1990s (i.e., 1.3 per 100,000 in 1979 to 2.6 per 100,000 in 1995). By 2006, the Iowa crude rate had dropped to 1.2 per 100,000. Nationally, crude mortality rates demonstrated similar trends; rates peaked in 1996 (i.e., 2.1 per 100,000) and decreased in 2005 (i.e., 1.5 per 100,000). The Iowa age-adjusted asthma death rate closely mirrors the national age-adjusted rate for all years, 1979 to 2005. Overall, differences between the crude Iowa and national rates can largely be attributable to differences in the age distribution between Iowa and the U.S. population.

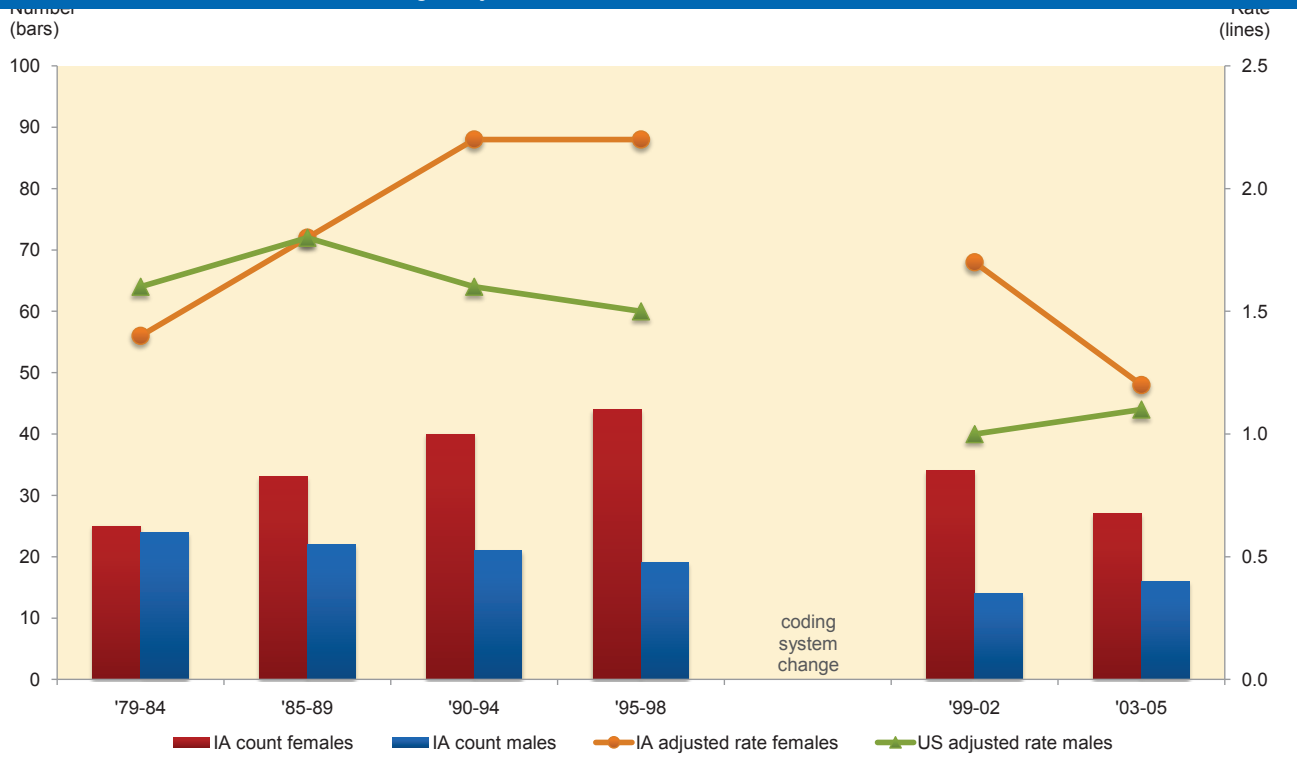
Figure 4.28 Deaths from Asthma, Iowa Residents, 1979-2006*



Females have historically accounted for the majority of asthma deaths and approximately 60% (N=26 per year) of asthma deaths during the period from 2003 until 2005. During this time span, 5% of asthma deaths occurred among children and youth (N=2.3 per year); 60% occurred among Iowans age 65 years and older. For all causes of death, 1.5% were among children and youth; 80% were among Iowans age 65 years and older. On average, Iowans who die from asthma are younger than Iowans who die from other causes. In Iowa, for both gender groups ages 1 to 19 years of age, CLRD, including asthma, are among the 10 leading causes of death.

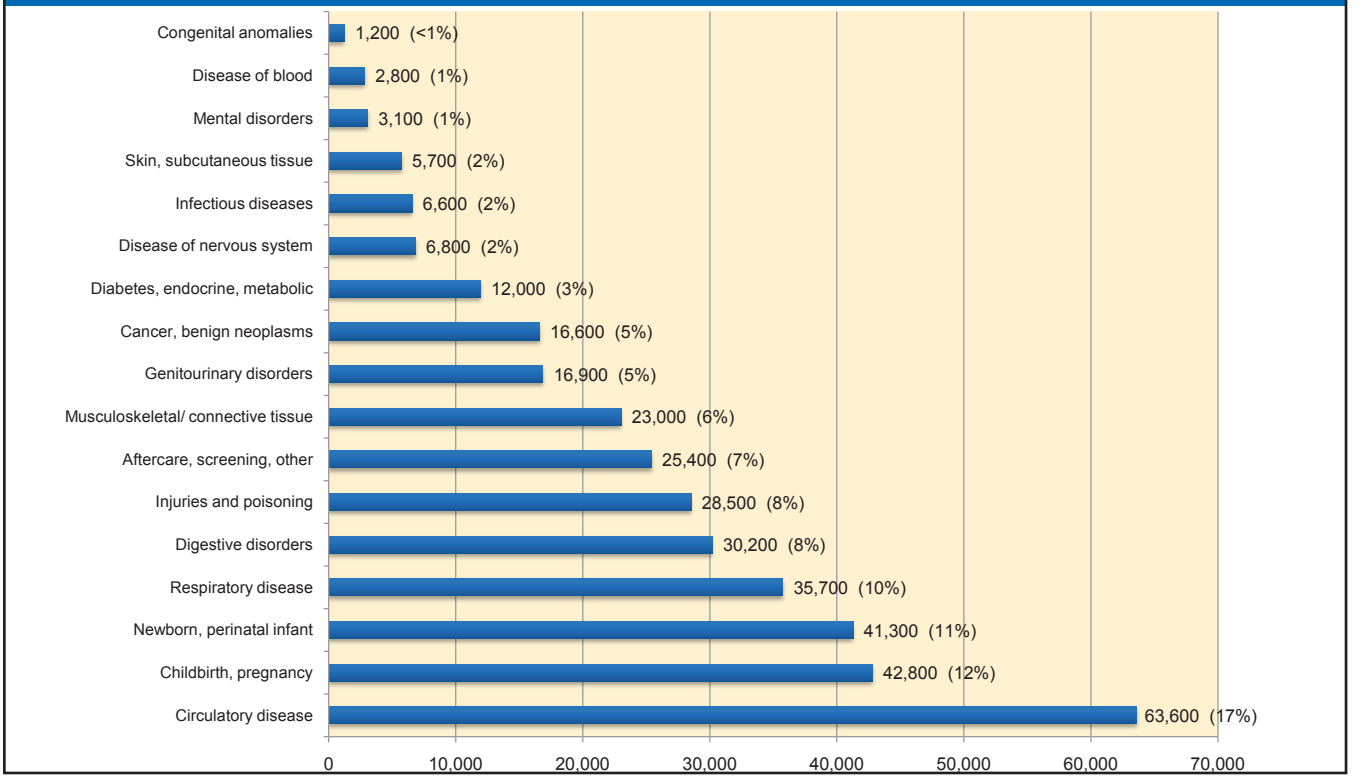
Between 1999 and 2005, 94% of asthma-related deaths occurred among Caucasians, 5% among African-Americans, and 1% among Iowans of other races.

Figure 4.29 Deaths from Asthma, by Gender, Iowa Residents, Age-Adjusted Rates and Counts, 1979-2005**



CHAPTER 5 • LEADING CAUSES OF INPATIENT HOSPITALIZATION FROM CHRONIC DISEASES

Figure 5.1 Number and Percent of All Inpatient Hospitalizations by Primary Discharge Diagnosis, Iowa Residents and Non-Residents, 2006



Source: Iowa SID, AHRQ HCUP.net website
Note: Categorization based on 18 ICD9-CM chapters. Discharge diagnoses were first categorized into single-digit clinical classification (CCS) software codes. Mental disorders exclude discharges from dedicated mental health inpatient units.

There were 366,700 inpatient discharges from Iowa hospitals in 2006. When all discharges are divided into broad categories, circulatory conditions, including stroke and heart disease, were the leading cause of hospitalization and accounted for 17% of all discharges. Deliveries/pregnancy-related conditions and admissions of newborns during the perinatal period were the second (12%) and third (11%) leading cause of hospitalization. Respiratory conditions (10%), including pneumonia, asthma and chronic obstructive pulmonary disease (COPD), were the fourth leading cause of hospitalization. Despite malignant neoplasms (cancer) being the second leading cause of death in Iowa, benign and malignant neoplasms combined ranked only as the tenth leading cause of hospitalization (5%). Endocrine and metabolic disorders (3%), including diabetes, were the eleventh leading cause of hospitalization. Other categories accounting for at least 5% of all hospitalizations were: digestive disorders (8%); injuries (8%); aftercare (7%); musculoskeletal conditions, including back disorders and arthritis (6%); and genitourinary conditions (5%) (Figure 5.1).

Discharges by age and gender

The number of discharges increased dramatically with age through age 84 years. For Iowans older than 84 years, dwindling numbers of hospitalizations reflect the lower number of residents in that age group. Among the elderly, estimates are that about 70% of all hospitalizations are related to chronic disease (MMWR, 11/2/1990). Among the population overall, a much smaller portion (approximately 50% of discharges) are related to chronic disease. (Chronic conditions in the U.S. and Iowa account for 70% of all deaths and about 85%-95% of deaths among those age 65 and older.) (Figures 5.2, 5.3)

In 2006, females accounted for 59% and males for 41% of all hospitalizations of Iowans. When newborns and pregnancy-related discharges are excluded, females accounted for 55% of discharges (Figure 5.2). Looking at hospitalizations in 2006 by age, infants accounted for 12%, children 1-17 years of age for 3%, adults 18-44 years of age for 21%, adults 45-64 for 20% and adults age 65 and older for 43% of all discharges (Figure 5.3).

Figure 5.2 Number and Percent, All Inpatient Hospitalizations, by Age and Gender, Iowa Residents and Non-Residents, 2006

Age	Population of Iowa	Discharges by age						Discharges by gender							
		number		percent		rate/10,000		number by age				percent by age			
		all	excluding newborns/ pregnancy	all	excluding newborns/ pregnancy	all	excluding newborns/ pregnancy	all		excluding newborns/ pregnancy		all		excluding newborns/ pregnancy	
								female	male	female	male	female	male	female	male
<1 yr	39,849	45,195	3,689	12%	1%	11,342	926	21,560	23,599	1,401	2,243	6%	6%	<1%	1%
1-17	672,248	12,155	10,994	3%	4%	181	164	6,339	5,816	5,178	5,816	2%	2%	2%	2%
18-44	1,064,853	78,040	36,454	21%	13%	733	342	61,759	16,280	20,173	16,280	17%	4%	7%	6%
45-64	760,358	72,430	72,395	20%	26%	953	952	36,398	36,032	36,363	36,032	10%	10%	13%	13%
65-84	360,054	117,455	117,455	32%	42%	3,262	3,262	63,394	54,053	63,394	54,053	17%	15%	22%	19%
85+	75,204	41,368	41,368	11%	15%	5,501	5,501	27,365	14,003	27,365	14,003	7%	4%	10%	5%
age missing		19						19							
gender missing <1 year old								45							
All ages	2,972,566	366,662	282,355	100%	100%	1,233	967	216,826	149,791	153,874	128,427	100%		100%	
Percent of total by gender								59%	41%	55%	45%				

Source: Iowa SID, AHRQ HCUP.net, Bridged Race Census Estimates, 2008 vintage
Iowa residents & non-residents are included from all reporting Iowa Hospitals.

Figure 5.3 All Inpatient and Birth-Related Hospitalizations Number by Age, Newborn, and Pregnancy Status, Iowa Residents, 2006

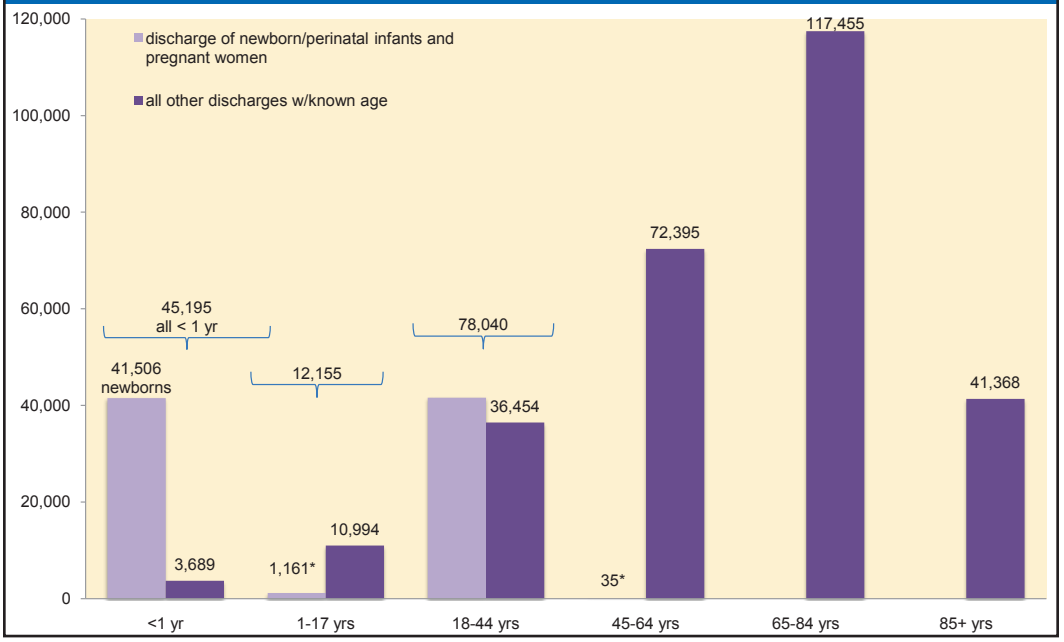
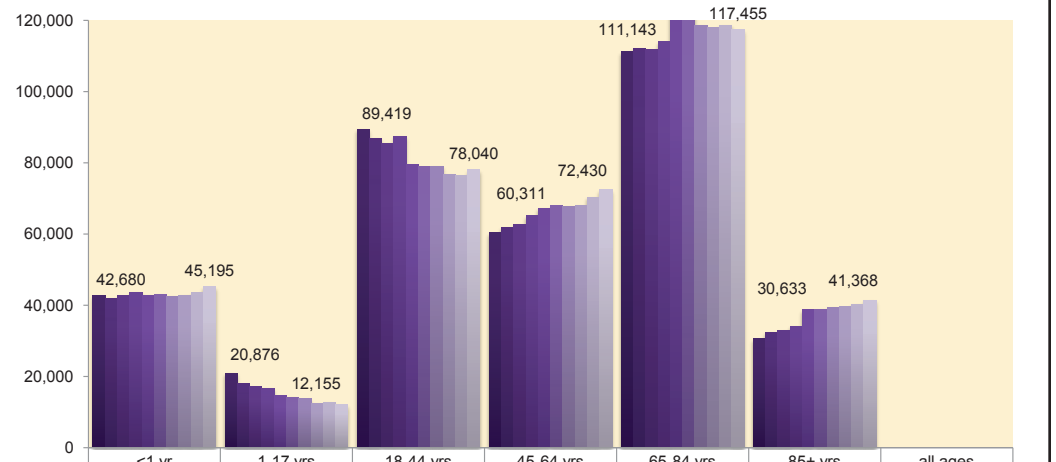


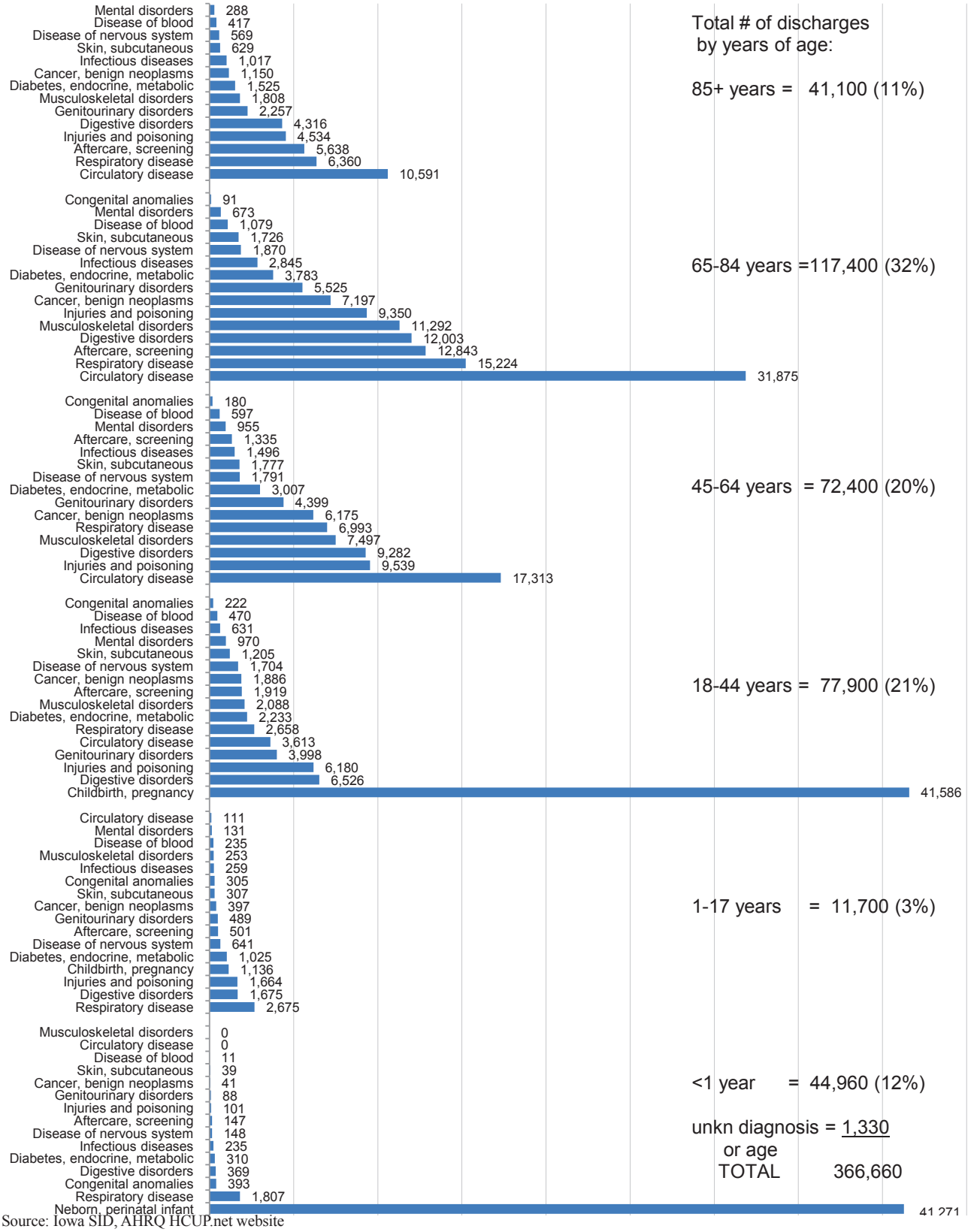
Figure 5.4 All Inpatient Hospitalizations Number by Age and Year, Iowa Residents, 1997-2006



	<1 yr	1-17 yrs	18-44 yrs	45-64 yrs	65-84 yrs	85+ yrs	all ages
1997	42,680	20,876	89,419	60,311	111,143	30,633	355,175
1998	41,923	17,940	86,862	61,862	112,187	32,341	353,207
1999	42,676	17,143	85,496	62,729	111,705	32,990	352,902
2000	43,719	16,787	87,456	65,184	113,938	34,124	361,255
2001	42,817	14,658	79,555	67,177	125,088	38,778	368,092
2002	43,125	14,228	78,889	67,956	121,828	38,914	364,949
2003	42,545	13,768	79,063	67,766	118,555	39,345	361,059
2004	42,766	12,501	76,719	68,099	117,966	39,618	357,680
2005	43,478	12,801	76,532	70,343	118,663	40,316	362,141
2006	45,195	12,155	78,040	72,430	117,455	41,368	366,662

Between 1997 and 2006, that total count of hospitalizations in Iowa increased by 3%. For those persons discharged who were younger than 1 year and 45 years or older, counts of hospitalizations increased during this time; for those 1 to 44 years, counts of hospitalizations decreased (Figure 5.4).

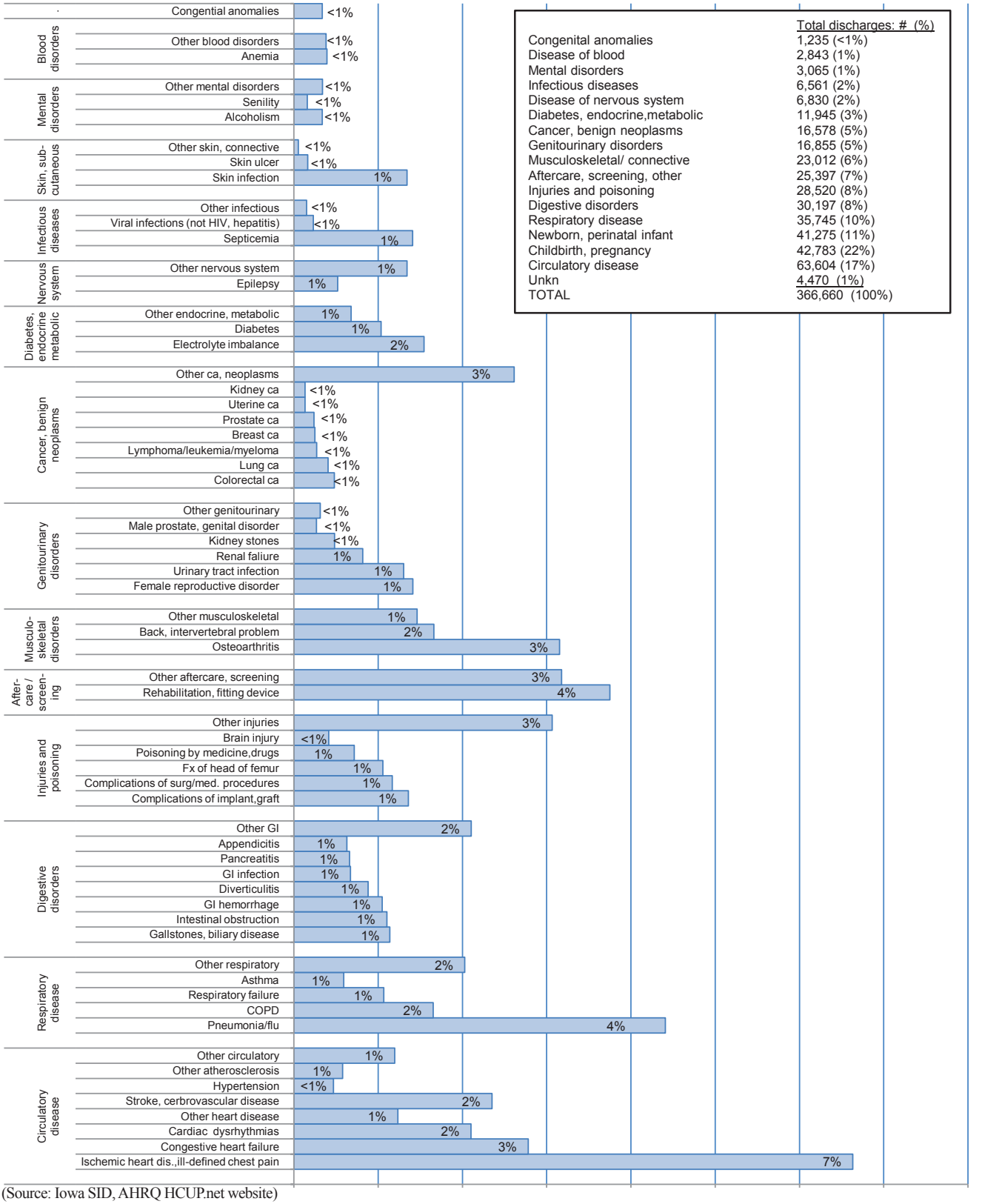
Figure 5.5 Number and Percent of Inpatient Hospitalizations, by Age and Primary Discharge Diagnosis, Iowa Residents and Non-Residents, 2006



Source: Iowa SID, AHRQ HCUP.net website

Note: Categorization based on 18 ICD9-CM chapters. Discharge diagnoses were first categorized into single-digit clinical classification software codes. Includes Iowa residents and non-residents from all reporting Iowa Hospitals.

Figure 5.6 Percent of All Inpatient Hospitalizations, Principal Discharge Diagnosis of Selected Subcategories, Iowa Residents and Non-Residents, 2006



(Source: Iowa SID, AHRQ HCUP.net website)

Note: Categorization based on 18 ICD9-CM chapters. Discharge diagnoses were first categorized into single-digit clinical classification (CCS) software codes. Mental disorders exclude discharges from dedicated mental health inpatient units. Includes discharges of Iowans residents and non-residents from all reporting hospitals.

Discharges by Age and Broad Diagnostic Groupings

In 2006, for all age groups 45 years and older, circulatory conditions were the leading cause of hospitalization. For persons ages 18 to 44 years, childbirth and pregnancy-related discharges were the leading cause of hospitalization. For those 1 to 17 years of age, respiratory conditions were the leading cause of hospitalization; for infants (persons <1 year of age), 92% of hospitalizations were of newborns or perinatal period-related discharges (Figure 5.5).

Discharges for Selected Subcategories: Clinical Classifications Software (115) Codes

In Iowa in 2006, four chronic diseases (heart disease (26% of deaths), cancer (23% of deaths), stroke (6% of deaths) and chronic obstructive pulmonary disease (6% of deaths) accounted for almost two-thirds of all deaths; these same four diseases accounted for only one-fifth of all hospitalizations. In 2006, all heart diseases accounted for 13% (46,800), malignancies for 4% (14,400), stroke 2% (8,600) and COPD 2% (6,100) of all hospitalizations. No subgroup of cancer accounted for more than 1% of all hospitalizations.

Of the subcategories of illness shown in Figure 5.6, chronic conditions that accounted for the most hospitalizations were: ischemic heart disease/acute myocardial infarction/ ill-defined chest pain and coronary heart disease (7%); congestive heart failure (3%); cardiac dysrhythmias (2%) ; stroke (2%); COPD (2%); osteoarthritis (3%); and back/intervertebral problems (2%).

Discharges by Age Using Specific Diagnostic Groupings - Clinical Classification Software Codes

The Agency for HealthCare Research and Quality (AHRQ) classifies the 14,000 plus ICD9-CM discharge diagnosis codes used by the HealthCare Utilization Project (HCUP) database into 259 clinically meaningful 'clinical classification software' (CCS) codes. These CCS codes are used throughout this chapter to group discharge diagnoses. The rankings in Figure 5.7 are of these 259 individual CCS codes. The 20 pregnancy-related CCS codes were grouped together, so that the leading chronic conditions can be observed for persons in the 18 to 44 years age group and for the group of all ages combined. If this were not done, individual CCS codes for pregnancy-related discharges would account for 12 of the 15 leading causes of hospitalizations among Iowans 18 to 44 years of age, and two of the leading causes for all ages combined.

For Iowans and non-Iowans discharged from Iowa hospitals who were age 44 years and younger, most of the leading causes of hospitalizations were for acute conditions; for those who were middle age and older, chronic disease-related discharges predominated (Figure 5.7).

Among chronic diseases, heart disease predominates. The CCS system categorizes heart disease into a dozen classes; four of these classes (coronary atherosclerosis, heart attacks/ischemic heart disease, cardiac dysrhythmias, congestive heart failure) were among the leading causes of hospitalization for every age group.

Other chronic disease CCS classes that ranked among the 15 leading causes of hospitalization for one or more age groups were: rehabilitation care, osteoarthritis, spondylosis/intervertebral and back disorders, stroke, chronic obstructive pulmonary disease (COPD), diabetes, gallstones/biliary tract disease, menstrual disorders, pancreatic disorders other than diabetes, gastrointestinal hemorrhage, appendicitis, epilepsy, fracture of the head of the femur (in the very old) and asthma in the young.

(Note: The AHRQ HCUP.net inpatient database used in Figures 5.1- 5.7 in this chapter include discharges of Iowa residents from out-of-state hospitals. Since the online HCUP data set does not allow data to be readily broken down across age, gender, year, county and diagnostic groups, the remainder of the figures in this chapter rely on the Iowa Department of Public Health's State Inpatient Database (SID). The Iowa SID database does not have access to discharges of Iowans seen in out-of-state hospitals. For 2006, the total number of discharges for Iowa residents in the HCUP database was 366,662, while for the Iowa SID, the total was 345,072, indicating about 6% of all discharges of Iowa residents were from out-of-state hospitals.)

Figure 5.7 All Inpatient Hospitalizations, Number and Rate by Age, Primary Discharge Diagnosis, Iowa Residents and Non-Residents, 2006

Rank	<1 year		1-17		18-44		45-64		65-84		85+		All Ages	
1	Liveborn	39,968	Pneumonia (except by TB & sexual. transmitted)	1,176	All childbirth, pregnancy	41,586	HEART DISEASE coronary athero-sclerosis	4,185	Rehabilitation care, fitting of prostheses, etc.	7,906	Pneumonia (except by TB & sexually transmitted)	3,746	All childbirth, pregnancy	42,783
2	Acute bronchitis	872	All childbirth, pregnancy	1,136	SPONDYLOSIS intervertebral disc disorders, back problems	1,167	OSTEO-ARTHRITIS	4,123	Pneumonia (except by TB & sexually transmitted)	6,735	Rehabilitation care, fitting of prostheses, etc.	3,368	Liveborn	39,968
3	Other perinatal conditions	655	Fluid and electrolyte disorders	645	Gallstones, Biliary tract disease	1,147	Pneumonia (except by TB & sexually transmitted)	2,518	OSTEO-ARTHRITIS	6,625	HEART DISEASE congestive heart failure, non-hypertensive	3,255	Pneumonia (except by TB & sexually transmitted)	15,628
4	Pneumonia (except by TB & sexually transmitted)	569	Appendicitis and other appendiceal conditions	582	Skin and subcutaneous tissue infections	1,059	HEART DISEASE (probable) nonspecific chest pain	2,455	HEART DISEASE coronary athero-sclerosis	6,436	FRACTURE of NECK of FEMUR (hip)	1,847	Rehabilitation care, fitting of prostheses, etc.	13,753
5	Hemolytic jaundice/ perinatal jaundice	364	ASTHMA	491	DIABETES with complications	977	HEART DISEASE acute myocardial infarction	2,300	HEART DISEASE congestive heart failure, non-hypertensive	5,202	HEART DISEASE cardiac dysrhythmias	1,355	HEART DISEASE coronary athero-sclerosis	11,770
6	Fluid and electrolyte disorders	231	Intestinal infection	395	Menstrual disorders	974	SPONDYLOSIS intervertebral disc disorders, back problems	1,980	HEART DISEASE cardiac dysrhythmias	4,221	STROKE acute cerebrovascular disease	1,348	OSTEO-ARTHRITIS	11,558
7	Intestinal infection	193	Acute bronchitis	322	Appendicitis and other appendiceal conditions	934	Rehabilitation care, fitting of prostheses, etc.	1,931	COPD (chronic obstructive pulmonary dis.)	3,610	Urinary tract infections	1,288	HEART DISEASE congestive heart failure, non-hypertensive	10,200
8	Digestive congenital anomalies	152	Epilepsy, convulsions	299	Pneumonia (except by TB & sexually transmitted disease)	884	HEART DISEASE cardiac dysrhythmias	1,728	HEART DISEASE acute myocardial infarction	2,963	HEART DISEASE acute myocardial infarction	1,140	HEART DISEASE cardiac dysrhythmias	7,708
9	Short gestation, low birth weight, fetal growth retardation	152	Skin and sub-cutaneous tissue infections	295	GESTATIONAL DIABETES	860	COPD (chronic obstructive pulmonary dis.)	1,536	STROKE acute cerebrovascular disease	2,656	Fluid and electrolyte disorders	1,138	HEART DISEASE acute myocardial infarction	6,784
10	Respiratory distress syndrome	132	Urinary tract infections	278	Complications of surgical procedures or medical care	839	Skin and subcutaneous tissue infections	1,532	SPONDYLOSIS intervertebral disc disorders, back problems	6,095	Other aftercare	1,112	SPONDYLOSIS intervertebral disc disorders, back problems	6,095
11	Viral infections	129	CANCER- CHEMO or RADIO-THERAPY	268	HEART DISEASE (probable) nonspecific chest pain	823	Complication of device, implant or graft	1,502	Septicemia (except in labor)	2,478	Gastrointestinal hemorrhage	962	COPD (chronic obstructive pulmonary dis.)	6,062
12	HEART DISEASE cardiac/circula-tory congenital anomalies	125	Fracture of lower limb	247	Poisoning by other medications and drugs	809	Complications of surgical procedures or medical care	1,468	Complications of device, implant or graft	2,351	Septicemia (except in labor)	935	HEART DISEASE (probable) nonspecific chest pain	5,769
13	Fever of unknown origin	125	Noninfec-tious gastro-enteritis	205	Pancreatic disorders (not diabetes)	778	HEART DISEASE congestive heart failure, non-hypertensive	1,458	Fluid and electrolyte disorders	2,231	Other fractures	766	Fluid and electrolyte disorders	5,666
14	Other upper respiratory infections	108	Poisoning by other medications and drugs	193	Abdominal pain	766	DIABETES with complications	1,241	Other aftercare	2,212	HEART DISEASE coronary athero-sclerosis	756	STROKE acute cerebrovascular disease	5,241
15	Septicemia (except in labor)	90	Other upper respiratory infections	191	Fracture of lower limb	727	Septicemia (except in labor)	1,224	HEART DISEASE (probable) nonspecific chest pain	2,072	COPD (chronic obstructive pulmonary dis.)	720	Septicemia (except in labor)	5,167
16	Urinary tract infections	88	Other upper respiratory infections	191	Diabetes mellitus with complications	977	Biliary tract disease	1,110	Respiratory failure, insufficiency, arrest (adult)	1,933	Aspiration pneumonitis, food/vomitus	712	Septicemia (except in labor)	5,167
Sum of columns: Disch'rgs-HCUP.net		45,195		12,155		78,040		72,430		117,455		41,368		366,662

=chronic respiratory disease
=heart disease
=stroke
=diabetes
=cancer
=chronic musculoskeletal disorders

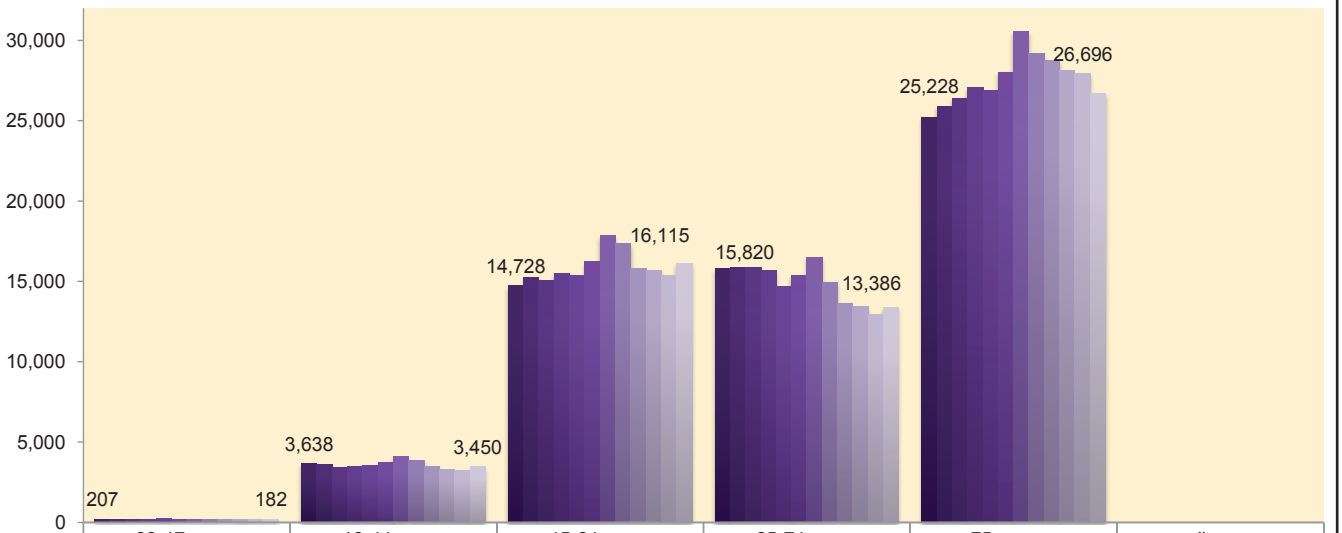
Source: AHRQ HCUP.net website, Iowa SID
Discharges grouped by ICD9-CM chapter titles and single-digit clinical classification (CCS) software codes

Figure 5.8 Percent of Inpatient Hospitalizations from Selected Circulatory Conditions, by Age and Gender, Iowa Residents, 2006

By Disease, Age and Gender, Percent of Discharges, 2006										Circulatory Diseases by Type, 2006	
Circulatory Disease	Age						Gender				
	0-17	18-44	45-64	65-74	75+	all ages	female	male	both f & m	percent	number
all heart disease	**<1%**	**6%**	**28%**	**23%**	**43%**	**100%**	**46%**	**54%**	**100%**	**74%**	**43,981**
ischemic heart dis.	<1%	4%	35%	27%	34%	100%	38%	62%	100%	28%	17,023
congestive heart failure	<1%	3%	14%	18%	65%	100%	53%	47%	100%	16%	9,714
stroke/cerebrovascular	**<1%**	**3%**	**20%**	**21%**	**55%**	**100%**	**51%**	**49%**	**100%**	**14%**	**8,107**
other circulatory										**13%**	**7,741**
all circulatory	**<1%**	**6%**	**27%**	**22%**	**45%**	**100%**	**48%**	**52%**	**100%**	**100%**	**59,829**
number of circulatory discharges	182	3,450	16,115	13,386	26,696	59,829	28,497	31,332	59,829		
All Discharges, All Causes, 2006											
percent	16%	21%	20%	14%	29%	100%	59%	41%	100%		
number	54,504	73,773	67,376	47,975	101,444	345,072					

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: all heart disease (100-108), ischemic heart disease (100-101), congestive heart failure (108) and cerebrovascular/stroke (109-113).

Figure 5.9 Inpatient Hospitalizations from Selected Circulatory Conditions, Trends by Age, Principal Discharge Diagnosis, Iowa Residents, 2004-2006



All circulatory

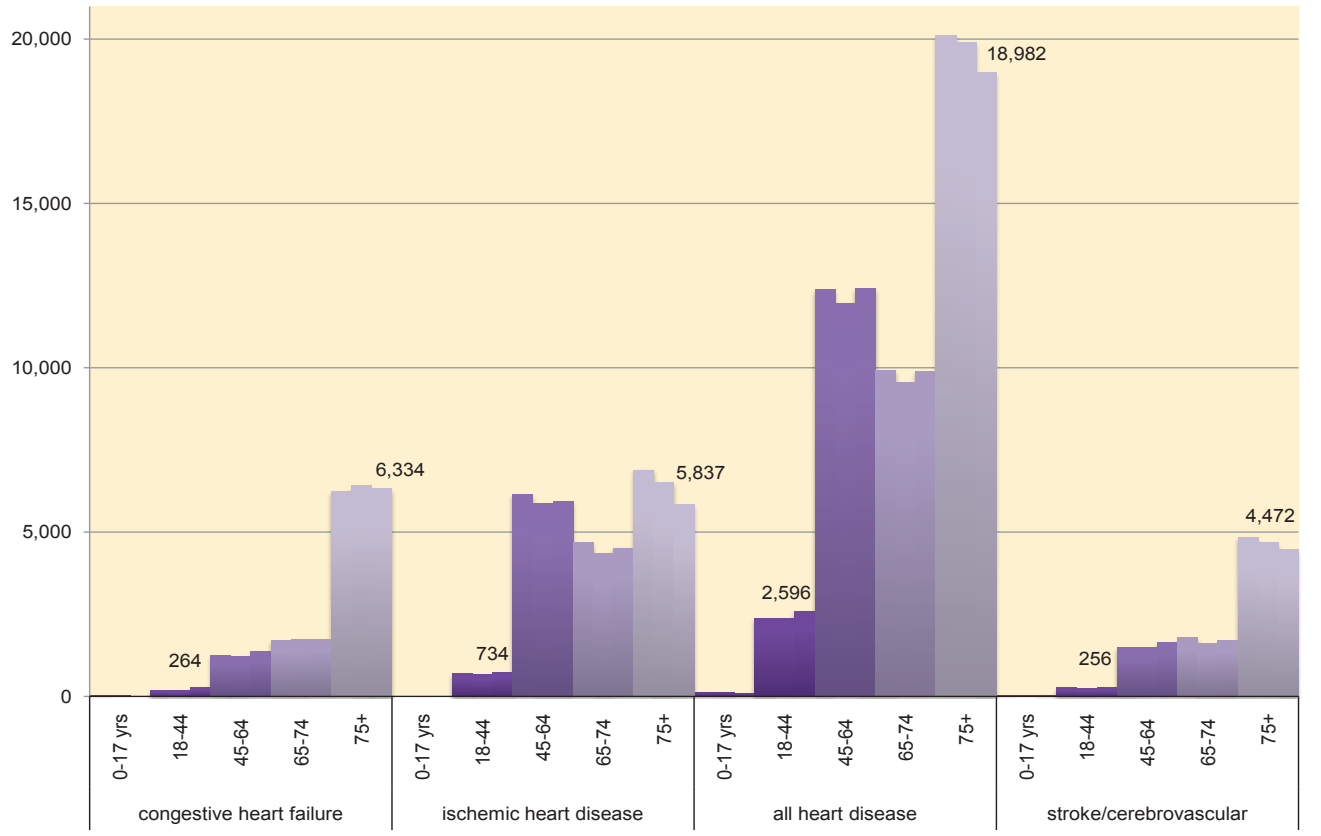
	00-17 years	18-44 years	45-64 years	65-74 years	75+ years	all ages
1995	207	3,638	14,728	15,820	25,228	59,621
1996	192	3,577	15,269	15,838	25,888	60,764
1997	182	3,445	15,050	15,878	26,408	60,963
1998	174	3,455	15,512	15,682	27,064	61,887
1999	223	3,521	15,345	14,697	26,894	60,680
2000	172	3,729	16,229	15,393	28,027	63,550
2001	179	4,074	17,856	16,518	30,546	69,173
2002	207	3,857	17,375	14,943	29,202	65,584
2003	160	3,505	15,789	13,601	28,758	61,813
2004	205	3,266	15,699	13,423	28,130	60,723
2005	191	3,222	15,375	12,913	27,913	59,614
2006	182	3,450	16,115	13,386	26,696	59,829

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: all heart disease (100-108), ischemic heart disease (100-101), congestive heart failure (108) and cerebrovascular/stroke (109-113).

In 2006:

- Circulatory diseases accounted for 17% of all hospital discharges (59,829 of 345,072) (Figure 5.8).
- Heart disease accounted for 74% of all circulatory-related discharges (46,876 of 59,829) and 13% of all hospitalizations.
- Stroke and cerebrovascular disease accounted for 13% of all circulatory discharges and 2% of all discharges.
- 39% of discharges from heart disease were attributable to ischemic heart disease (coronary artery disease, angina, unexplained chest pain, heart attacks) while 22% of discharges from heart disease were due to congestive heart failure.
- Iowans less than 44 years of age accounted for only about 6% of all circulatory-related discharges, while Iowans 45 to 74 accounted for about half of all circulatory admissions.
- Iowans 75 and older accounted for 45% of all circulatory discharges, 65% of congestive heart failure discharges, 55% of all stroke/cerebrovascular discharges and 45% of all circulatory discharges.
- Ischemic heart disease discharges were fairly evenly divided between 45 to 64 year olds, 65 to 74 year olds and those 75 and older: each accounted for 27% to 35% of all ischemic heart disease discharges.
- Overall, 52% of circulatory discharges were males. However, males comprised 62% of all discharges for ischemic heart disease. Slightly more females than males were discharged for stroke (51% female) and congestive heart failure (53% female). Males represented 41% of all discharges in 2006 but 45% of all discharges when pregnancy and newborn discharges are excluded.

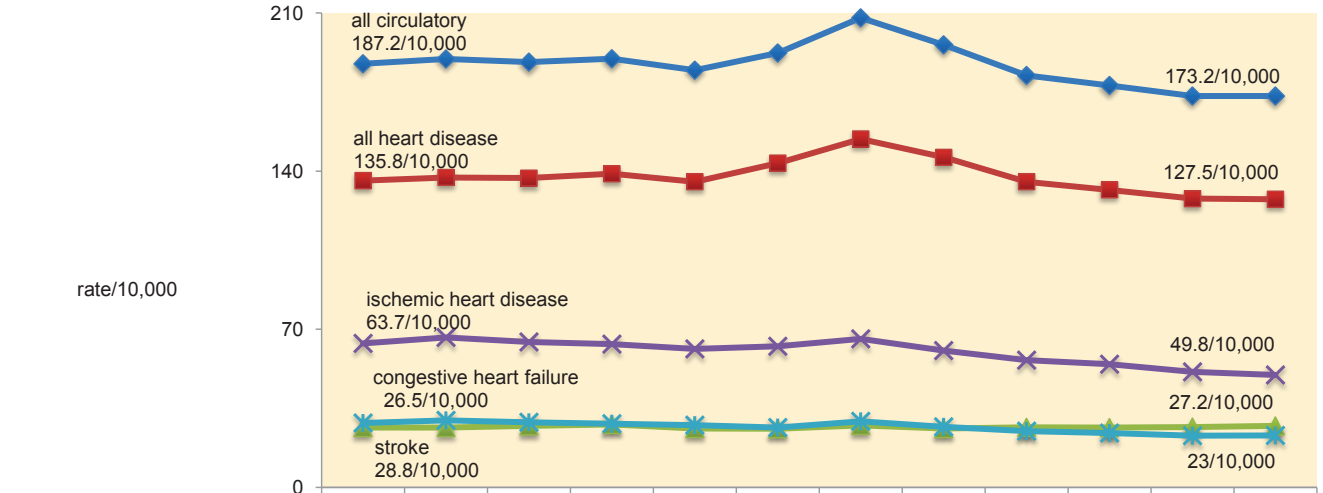
Figure 5.10 Circulatory-Related Inpatient Hospitalization, Trends by Age, Iowa Residents, 1995-2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: circulatory-related (96-121).

Between 1995 and 2006, the number of circulatory discharges were up slightly for Iowans 45 to 64 years and 75 years and older, but down slightly for all other age groups. Iowans 75 years and older accounted for roughly half of all circulatory discharges while those 45 to 64 and 65 to 74 years of age accounted for about 25% of circulatory discharges (Figure 5.10).

Figure 5.11 Inpatient Hospitalization from Selected Circulatory Conditions, Trends in the Age-Adjusted Rate, Iowa Residents, 1995-2006

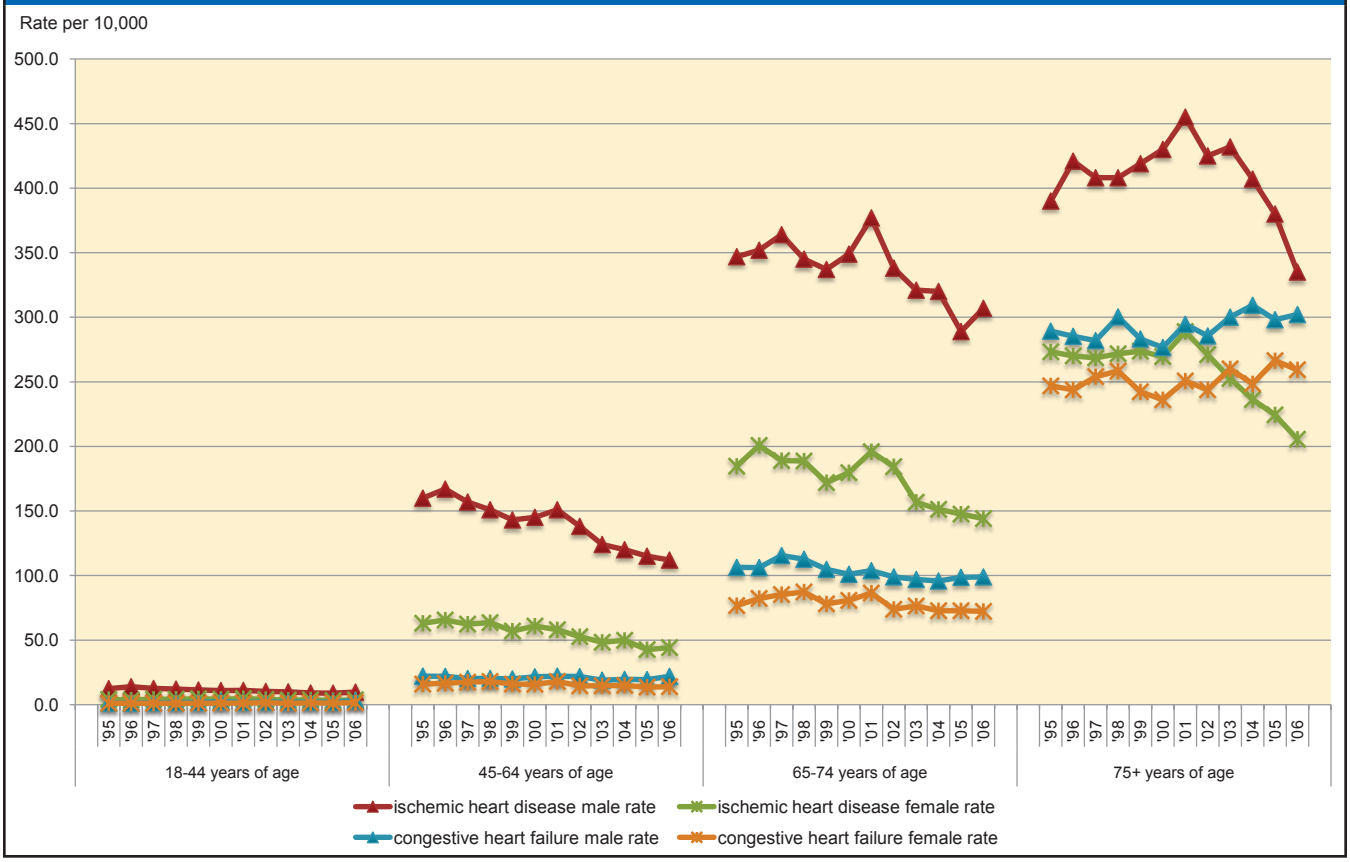


	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
all circulatory adjusted rate	187.5	189.6	188.2	189.7	184.7	192.3	207.8	195.9	182.3	177.9	173.2	173.2
all heart disease adj. rate	135.8	137.2	136.9	138.8	135.3	143.5	154.2	146.1	135.3	131.7	127.8	127.5
congest. heart failure adj. rate	26.5	26.5	27.2	27.9	26.1	26.0	27.5	26.1	26.6	26.5	26.7	27.2
ischemic heart dis. adj. rate	63.7	66.4	64.4	63.4	61.3	62.5	65.7	60.6	56.3	54.5	51.1	49.8
stroke adjusted rate	28.5	29.7	28.8	28.2	27.6	26.5	29.3	26.8	24.9	24.1	22.9	23.0

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: all circulatory (096-121), all heart disease (100-108), ischemic heart disease (100-101), congestive heart failure (108) and cerebrovascular/stroke (109-113). Age-adjusted rates weight age-specific rates in order to eliminate differences in the overall crude rate of hospitalization between 1995 and 2006 that might be caused solely by Iowa's population being slightly older in 2006 than it was in 1995.

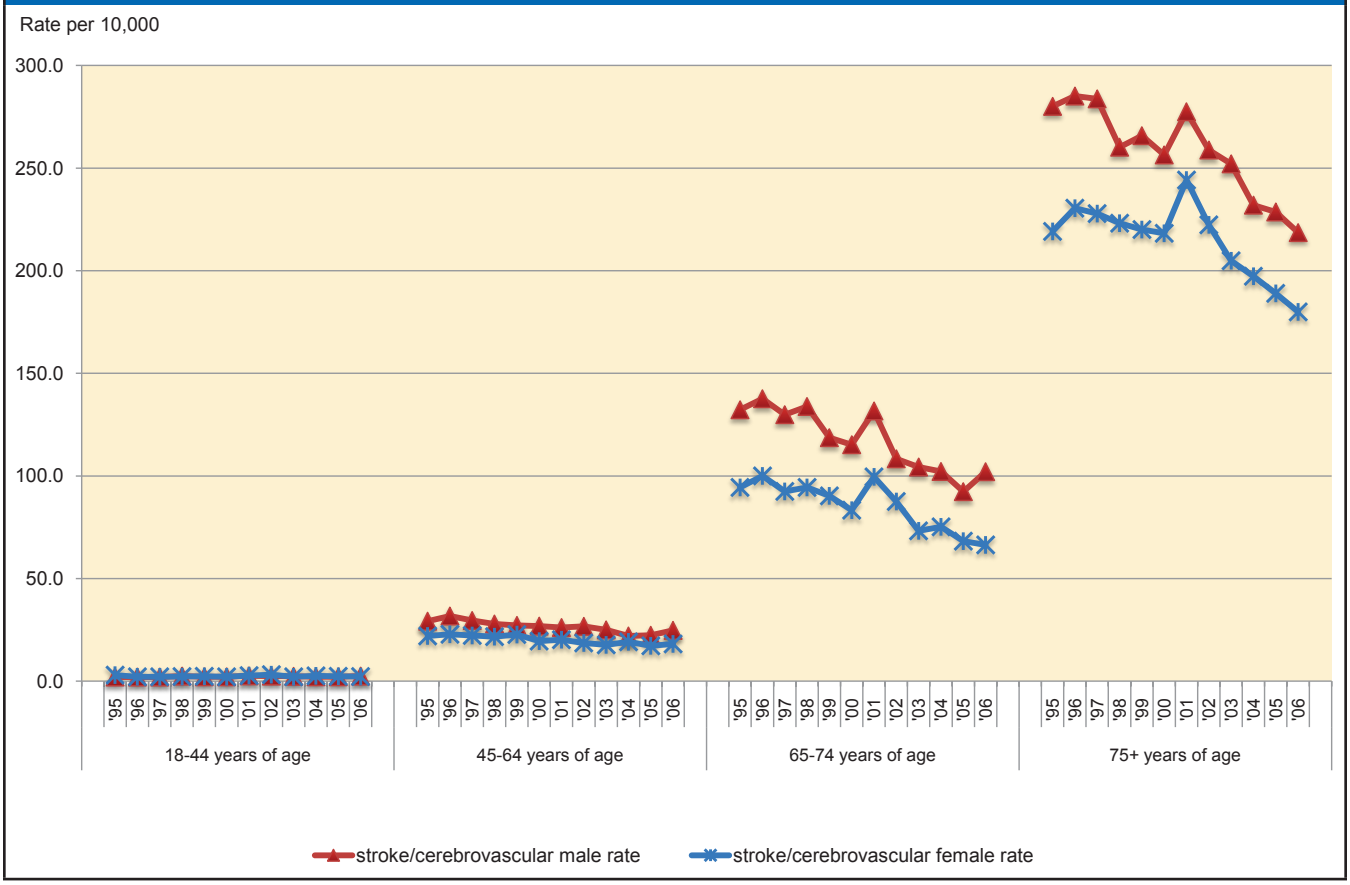
Between 1995 and 2006, the age-adjusted rate of hospitalization for selected circulatory conditions declined, except for congestive heart failure which remained steady. Hospitalization rates for both ischemic heart disease and stroke declined about 20%: heart disease dropped from 63.7/10,00 to 49.8/10,000 and stroke from 28.5/10,000 to 23/10,000 (Figure 5.11).

Figure 5.12 Inpatient Hospitalizations from Ischemic Heart Disease and Congestive Heart Failure, Trends in Age-Specific Rates by Gender, Iowa Residents, 1995-2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: ischemic heart disease (100-101) and congestive heart failure (108).

Figure 5.13 Inpatient Hospitalizations from Cerebrovascular Disease, Trends in Age-Specific Rates by Gender, 1995-2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software code: cerebrovascular/stroke (109-113).

For all age groups between 1995 and 2006, rates of hospitalization for males for ischemic heart disease, congestive heart disease, all heart disease, stroke/cerebrovascular disease and all circulatory diseases exceeded those same conditions rates for females.

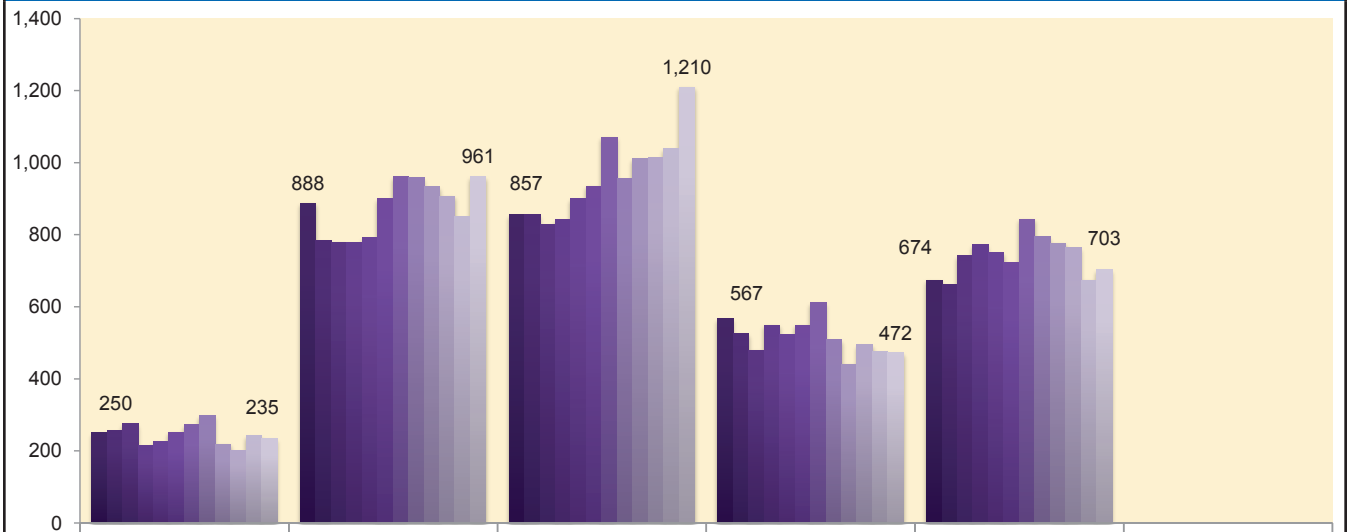
Rates of hospitalization for males for ischemic heart disease were about 50% greater than for females, rates of congestive heart failure about 20% greater, and rates for stroke/cerebrovascular disease about 25% greater for males than for females (Figure 5.12, 5.13). For every circulatory condition shown, rates of hospitalization within gender increased with age (Figures 5.12, 5.13).

Figure 5.14 Percent of Inpatient Hospitalizations from Diabetes, by Age and Gender, Iowa Residents, 2006

Diabetes	Age						Gender		
	0-17	18-44	45-64	65-74	75+	all ages	female	male	both f & m
percent	7%	27%	34%	13%	20%	100%	43%	57%	100%
number	235	961	1,210	472	703	3,581	1,555	2,026	3,581*
crude rate/10,000	3.3	9	15.8	23	30.5	12.0	10.5	11.6	12.0
age-adjusted rate/10,000						11.3	9.3	13.5	11.3
By Age and Gender: Number and Percent, All Discharges, All Causes, 2006									
percent	16%	21%	20%	14%	29%	100%	59%	41%	100%
number	54,504	73,773	67,376	47,975	101,444	345,072	*Diabetes comprises 1% of all discharges.		

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: diabetes (49-50). (Age-adjusted rates weight age-specific rates in order to eliminate differences in the overall crude rate of hospitalization across time that might be caused solely by Iowa's population growing slightly older or younger over time. Diabetes prevalence generally increases with age).

Figure 5.15 Inpatient Hospitalizations from Diabetes, Principal Discharge Diagnosis, Trends by Age, Iowa Residents, 1995-2006



diabetes

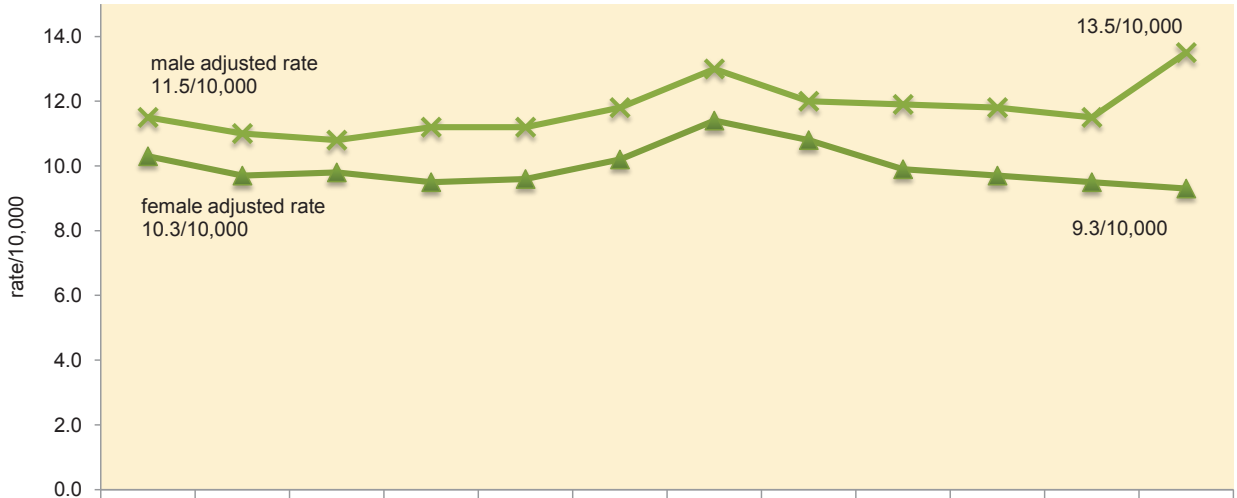
	00-17 years	18-44 years	45-64 years	65-74 years	75+ years	all ages
1995	250	888	857	567	674	3,236
1996	257	785	857	526	661	3,086
1997	275	779	828	480	741	3,103
1998	214	778	841	549	773	3,155
1999	225	791	900	522	752	3,190
2000	252	901	935	549	724	3,361
2001	273	962	1,071	611	843	3,760
2002	298	959	955	508	794	3,514
2003	219	934	1,012	441	777	3,383
2004	200	907	1,013	495	765	3,380
2005	243	851	1,038	475	674	3,281
2006	235	961	1,210	472	703	3,581

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: diabetes (49-50).

In 2006:

- Diabetes accounted for 1% of all hospital discharges (3,581 of 345,072) (Figure 5.14).
- Iowans less than 18 years of age accounted for 7%; Iowans 18 to 44 accounted for 27%; Iowans 45 to 64 for 34%; and Iowans age 65 years and older, for 33% of diabetes discharges.
- Overall, 57% of diabetes discharges were males.
- Both the crude and adjusted rates of diabetes discharges were higher for males than for females (crude rate: 11.6/10,000 for males vs. 10.5/10,000 for females; adjusted rate (13.5/10,000 for males vs. 9.3/10,000 for females). The adjusted rate of diabetes discharge was 45% higher in males compared to females (Figure 5.14).
- Between 1995 and 2006, the count of discharges from diabetes was up slightly for Iowans 18 to 44 years, 45 to 64 years and 75 years and older and down for Iowans birth to 17 years of age and 65 to 74 years of age (Figure 5.15).

Figure 5.16 Inpatient Hospitalization from Diabetes, Trends in the Gender-Specific, Age-Adjusted Rate, Iowa Residents, 1995-2006

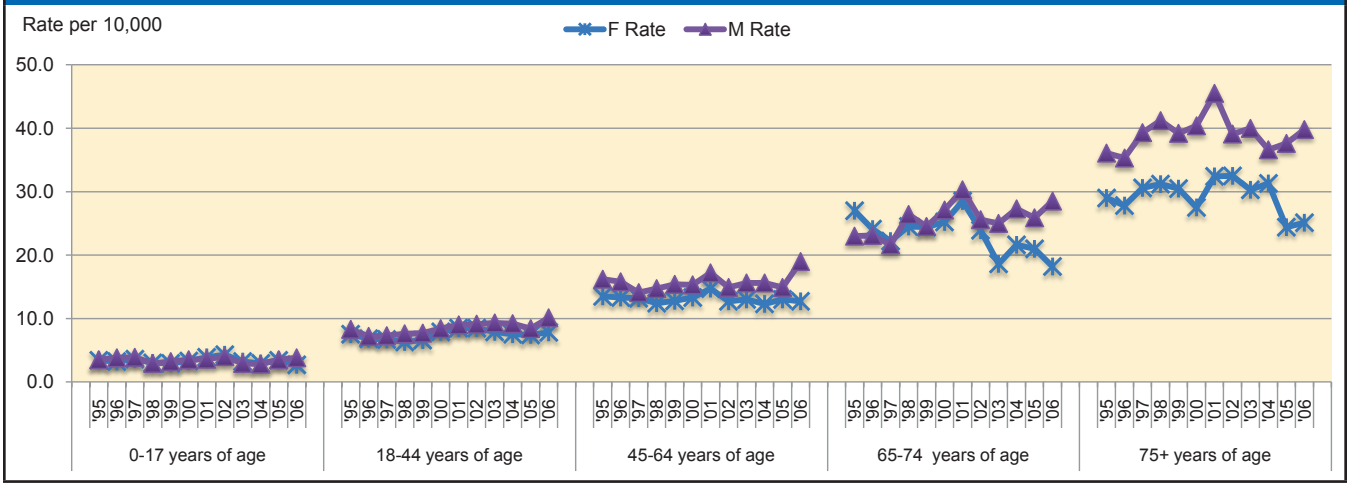


	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
F number	1,673	1,574	1,606	1,582	1,602	1,673	1,887	1,782	1,643	1,640	1,578	1,555
M number	1,563	1,512	1,497	1,569	1,586	1,683	1,870	1,729	1,740	1,740	1,703	2,026
F adjusted rate	10.3	9.7	9.8	9.5	9.6	10.2	11.4	10.8	9.9	9.7	9.5	9.3
M adjusted rate	11.5	11.0	10.8	11.2	11.2	11.8	13.0	12.0	11.9	11.8	11.5	13.5
F crude rate	11.4	10.7	10.9	10.7	10.8	11.2	12.6	11.9	11.0	10.9	10.5	10.3
M crude rate	11.2	10.8	10.6	11.1	11.1	11.7	13.0	12.0	12.0	12.0	11.6	13.8
F & M number	3,236	3,086	3,103	3,151	3,188	3,356	3,757	3,511	3,383	3,380	3,281	3,581
F & M adjusted rate	10.9	10.3	10.2	10.3	10.4	10.9	12.1	11.3	10.8	10.7	10.4	11.3
F & M crude rate	11.3	10.7	10.7	10.9	10.9	11.5	12.8	12	11.5	11.4	11.1	12

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: diabetes. (Age-adjusted rates weight age-specific rates in order to eliminate differences in the overall crude rate of hospitalization that might be caused solely by Iowa's population growing slightly older or younger over time.)

Age-adjusted rates of inpatient discharges from diabetes were higher for males than for females between 1995 and 2006; the age-adjusted rate of hospitalization for diabetes decreased about 10% for females, while increasing about 17% for males. Between 2001 and 2006, rates continued to decline for females, which showed no consistent trend for males.

Figure 5.17 Inpatient Hospitalization from Diabetes, Trends in Age-Specific Rates, by Gender, 1995-2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software code: diabetes (49-50).

For most years, for all adult age groups, rates of hospitalization from diabetes for males exceeded that for females. The difference in rates between the sexes was most pronounced among those age 75 years and older, with rates in 2006 being about 60% greater among men 75 years and older than among women of that same age (Figures 5.17, 5.18).

Figure 5.18 Inpatient Hospitalization from Diabetes Trends in Age-Specific Counts and Rates, by Gender, 1995-2006

Diabetes, Principal Discharge Diagnosis by Age, Gender and Year

Crude age-specific rate/10,000

Year	00-17 yr		18-44 yrs		45-64 yr		65-74 yr		75+ yr		Age-adjusted rate (all ages)		
	F	M	F	M	F	M	F	M	F	M	F	M	F&M
1995	3	4	8	8	14	16	27	23	29	36	10	11	11
1996	3	4	7	7	13	16	24	23	28	35	10	11	10
1997	4	4	7	7	13	14	22	22	31	39	10	11	10
1998	3	3	6	8	12	15	25	26	31	41	10	11	10
1999	3	3	7	8	13	15	24	25	31	39	10	11	10
2000	3	4	8	8	13	15	25	27	28	40	10	12	11
2001	4	4	9	9	15	17	29	30	32	46	11	13	12
2002	4	4	9	9	13	15	24	26	33	39	11	12	11
2003	3	3	8	9	13	16	19	25	30	40	10	12	11
2004	3	3	8	9	12	16	22	27	31	37	10	12	11
2005	3	4	7	8	13	15	21	26	24	38	10	11	10
2006	3	4	8	10	13	19	18	29	25	40	9	13	11

Number by age

Year	00-17 yr		18-44 yrs		45-64 yr		65-74 yr		75+ yr		All Ages		
	F	M	F	M	F	M	F	M	F	M	F	M	F&M
1995	120	130	418	470	397	460	333	234	405	269	1,673	1,563	3,236
1996	113	144	377	408	398	459	294	232	392	269	1,574	1,512	3,086
1997	128	147	370	409	406	422	266	214	436	305	1,606	1,497	3,103
1998	106	108	349	428	389	451	290	258	448	324	1,582	1,569	3,155
1999	105	120	362	429	413	487	284	237	438	313	1,602	1,586	3,190
2000	119	132	430	468	439	496	289	260	396	327	1,673	1,683	3,361
2001	139	133	459	501	497	574	323	288	469	374	1,887	1,870	3,760
2002	150	148	455	502	441	513	267	241	469	325	1,782	1,729	3,514
2003	111	108	423	511	462	550	207	234	440	337	1,643	1,740	3,383
2004	99	101	398	509	450	563	239	256	454	311	1,640	1,740	3,380
2005	117	126	391	460	485	553	231	244	354	320	1,578	1,703	3,281
2006	95	140	409	552	488	722	200	272	363	340	1,555	2,026	3,581

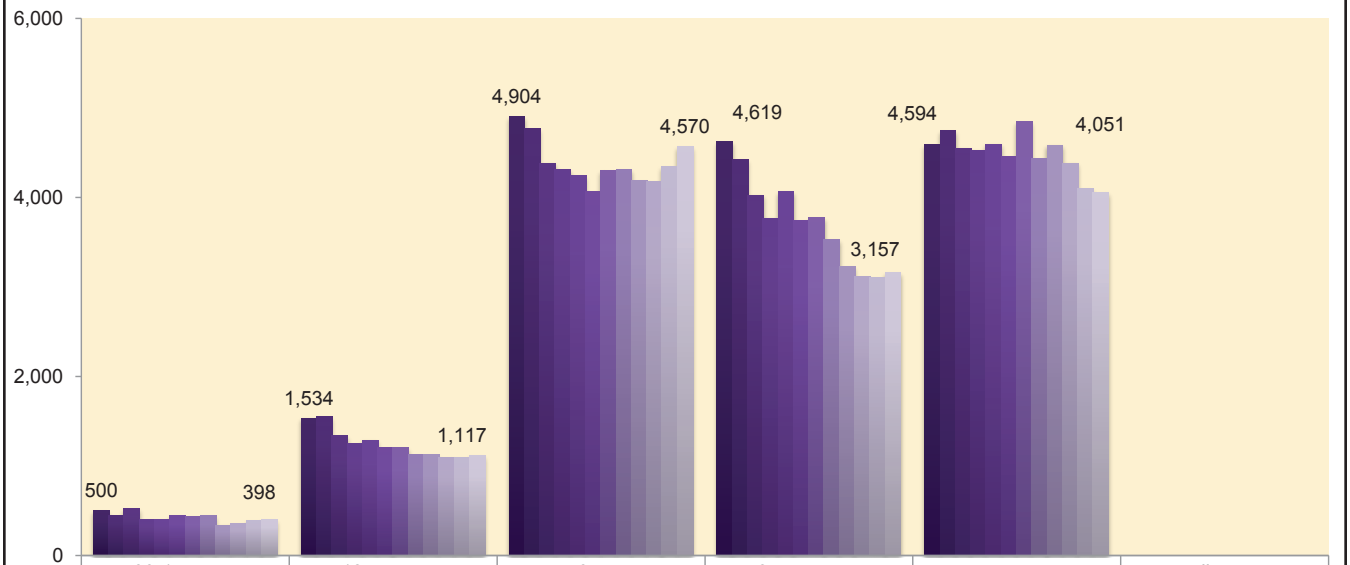
Figure 5.19 Percent of Inpatient Hospitalizations from Selected Cancers, by Age and Gender, Iowa Residents, 2006

Cancer type	Age						Gender			Distribution of cancers by type	
	0-17	18-44	45-64	65-74	75+	all ages	female	male	both f & m	percent	number
colorectal	<1%	4%	26%	25%	46%	100%	52%	48%	100%	13%	1,664
lung	0%	2%	31%	32%	35%	100%	43%	57%	100%	10%	1,394
breast	0%	12%	34%	21%	33%	100%	99%	1%	100%	6%	856
prostate	0%	0%	53%	30%	17%	100%		100%	100%	6%	787
bladder	0%	2%	18%	22%	58%	100%	25%	75%	100%	3%	366
cervical	0%	58%	28%	7%	6%	100%	100%		100%	1%	127
skin, melanoma	0%	15%	48%	9%	27%	100%	39%	61%	100%	<1%	33
other cancers										61%	8,099
all cancers	**3%**	**8%**	**34%**	**24%**	**30%**	**100%**	**52%**	**48%**	**100%**	100%	13,293*
number of all cancer discharges	398	1,117	4,570	3,157	4,051	13,293	6,890	6,400	13,293		
all cancer crude rate/10,000	5.6	10.4	59.8	153.7	176.0	45.0	45.0	44.0	45.0		
all cancer adjusted rate/10,000						39.0	38.0	42.0	39.0		
All Discharges, All Causes, 2006											
percent	16%	21%	20%	14%	29%	100%	59%	41%	100%		
number	54,504	73,773	67,376	47,975	101,444	345,072*					

*Cancer comprises 4% of all discharges.

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: colorectal cancer (100-108); lung cancer (100-101); breast cancer (108); prostate cancer (029); bladder cancer (032); cervical cancer (026), melanoma (022); and all cancers (011-045).

Figure 5.20 Trends by Year and Age in the Number of Inpatient Hospitalizations from All Cancers, Iowa Residents, 1995-2006



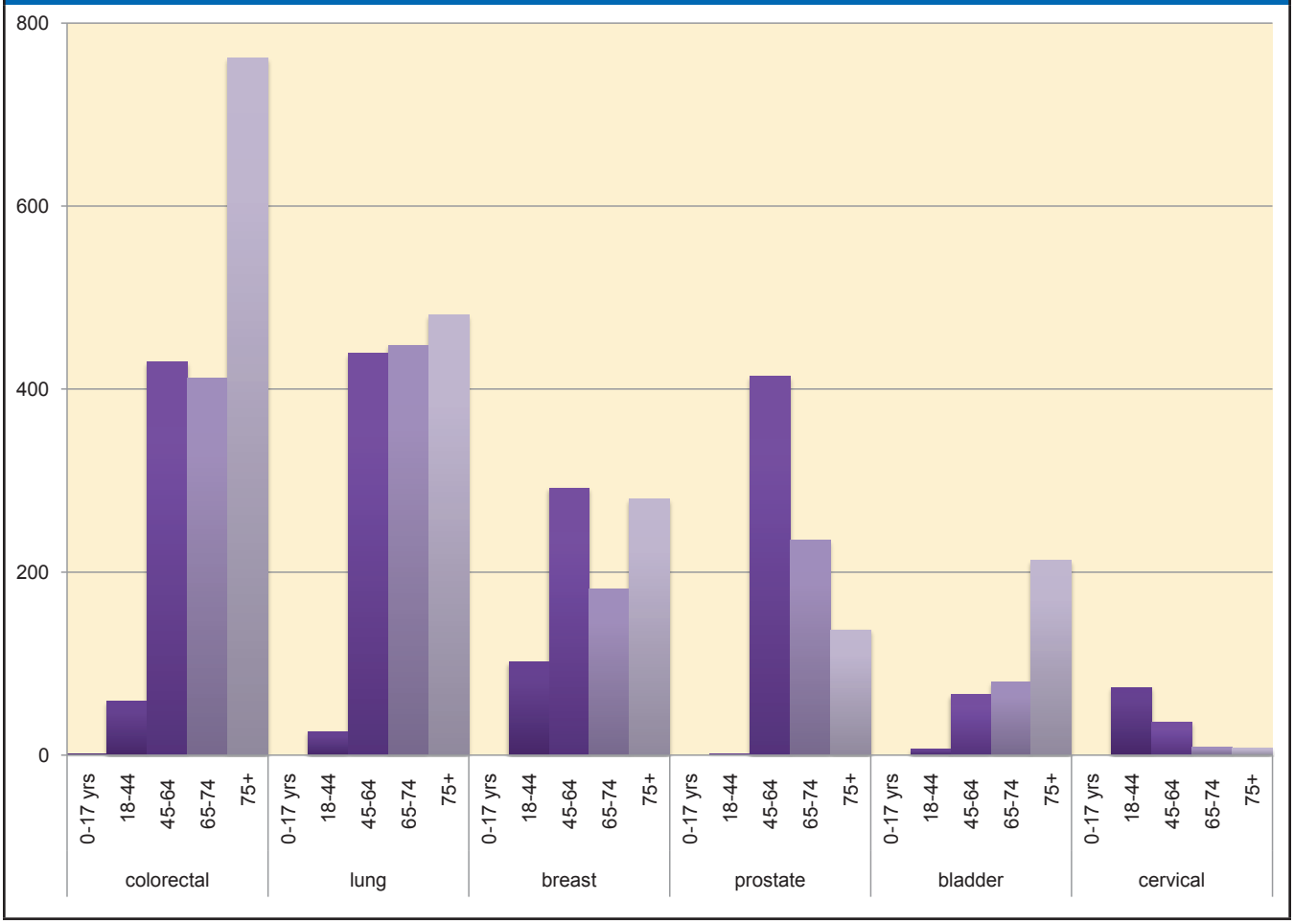
	00-17 years	18-44 years	45-64 years	65-74 years	75+ years	all ages
1995	500	1,534	4,904	4,619	4,594	16,151
1996	446	1,547	4,767	4,424	4,746	15,930
1997	525	1,342	4,382	4,023	4,550	14,822
1998	404	1,247	4,312	3,767	4,529	14,259
1999	405	1,289	4,242	4,067	4,596	14,599
2000	447	1,204	4,063	3,744	4,459	13,917
2001	433	1,201	4,299	3,774	4,851	14,558
2002	446	1,127	4,312	3,531	4,429	13,845
2003	338	1,129	4,187	3,232	4,582	13,468
2004	353	1,099	4,181	3,118	4,383	13,134
2005	392	1,093	4,347	3,105	4,098	13,035
2006	398	1,117	4,570	3,157	4,051	13,293

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software (CCS) codes: all cancers (011-045).

In 2006:

- Malignancies (cancers) accounted for 4% of all hospital discharges (12,780 of 345,072) (Figure 5.19).
- Colorectal cancer accounted for the most of all cancer-related discharges (13% or 1,664 of 12,780) but only 1% of all hospitalizations.
- Lung cancer accounted for 11%, breast for 7%, prostate for 6%, bladder for 3%, and cervical cancer for 1% of all cancer-related discharges.
- Iowans less than 45 years of age accounted for only about 11% (1,381) of all cancer-related discharges, while Iowans 45 to 74 years accounted for 59% (7,511) of cancer-related discharges in 2006. Iowans 75 years and older accounted for 30% of all discharges from cancer.
- Females comprised 52% of discharges from cancers. However, males comprised 75% of all discharges from lung cancer, 61% of discharges from melanoma, and 75% of all discharges from bladder cancer.

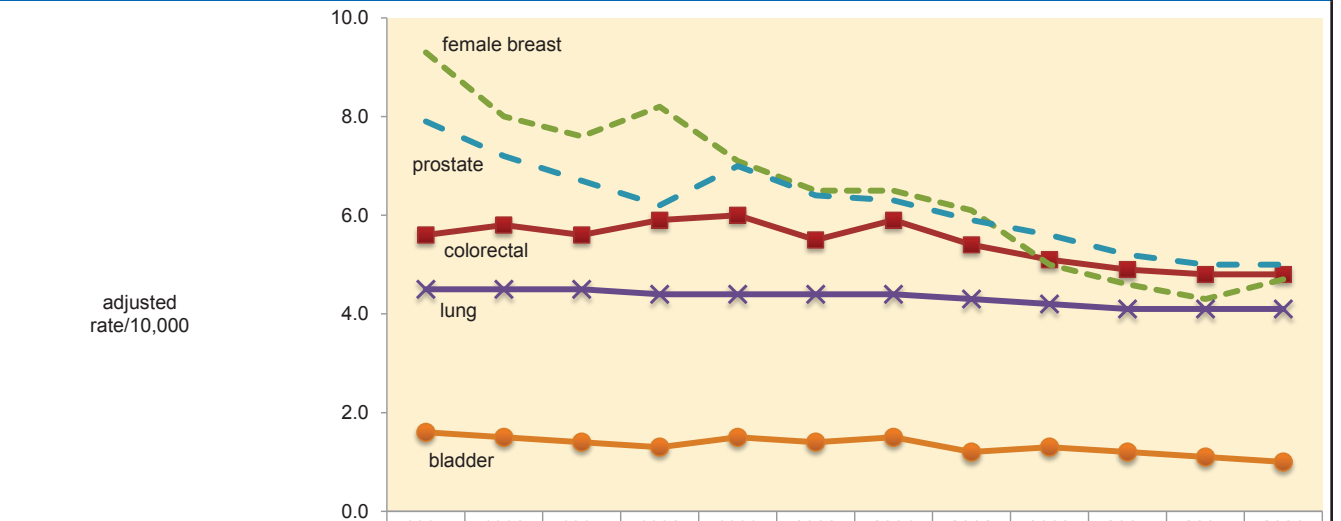
Figure 5.21 Number of Inpatient Hospitalizations from Selected Cancers, by Age, Iowa Residents, 2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: colorectal cancer (100-108); lung cancer (100-101); breast cancer (108); prostate cancer (29); bladder cancer (32); cervical cancer (26).

Discharge numbers from colorectal, bladder and lung cancer were greatest among Iowans 75 years and older. For all cancers shown in Figure 5.3, except for cervical cancer, counts of discharges were lowest among Iowans birth to 17 years and next lowest among those 18 to 44 years of age. For cervical cancer, counts of discharges were highest among Iowa women ages 18 to 44 years of age and decreased with age in the 45 to 75 years and older age group.

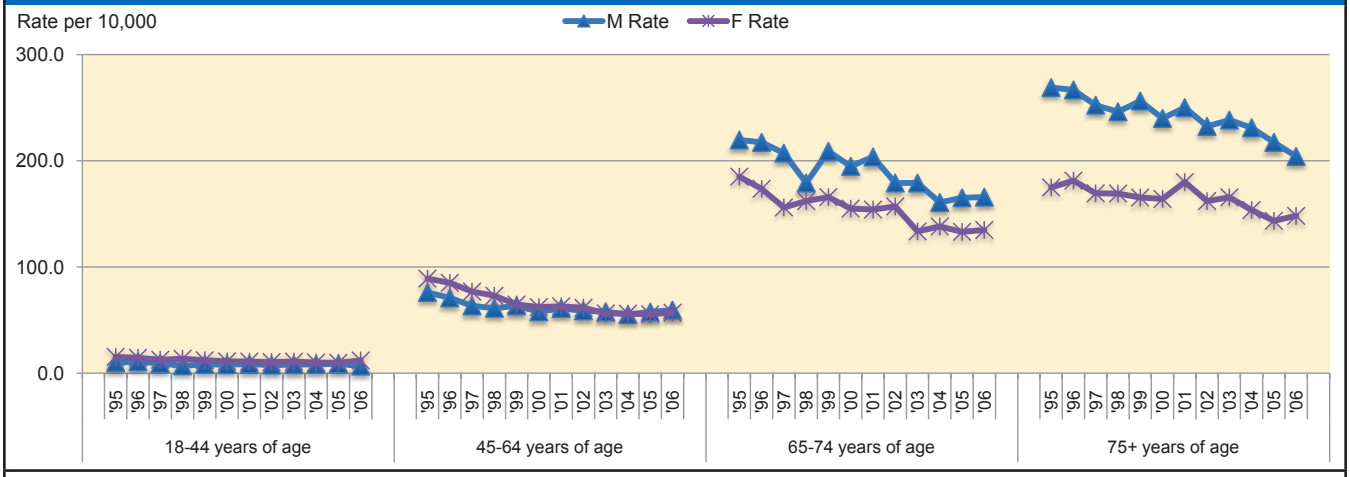
Figure 5.22 Inpatient Hospitalization from Selected Cancers, Trends in the Age-Adjusted Rate, Iowa Residents, 1995-2006

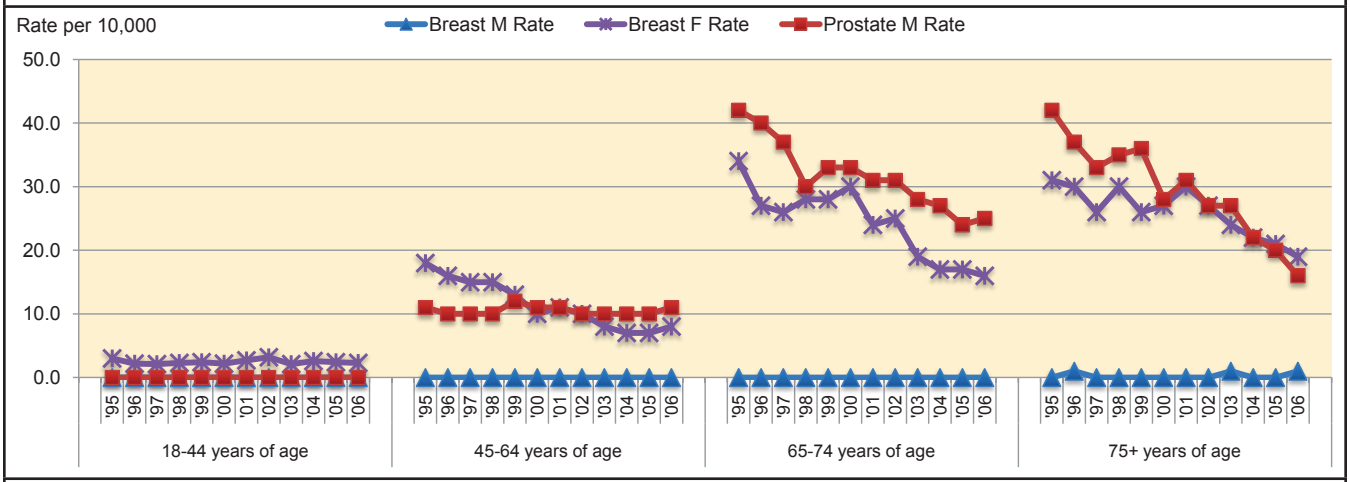


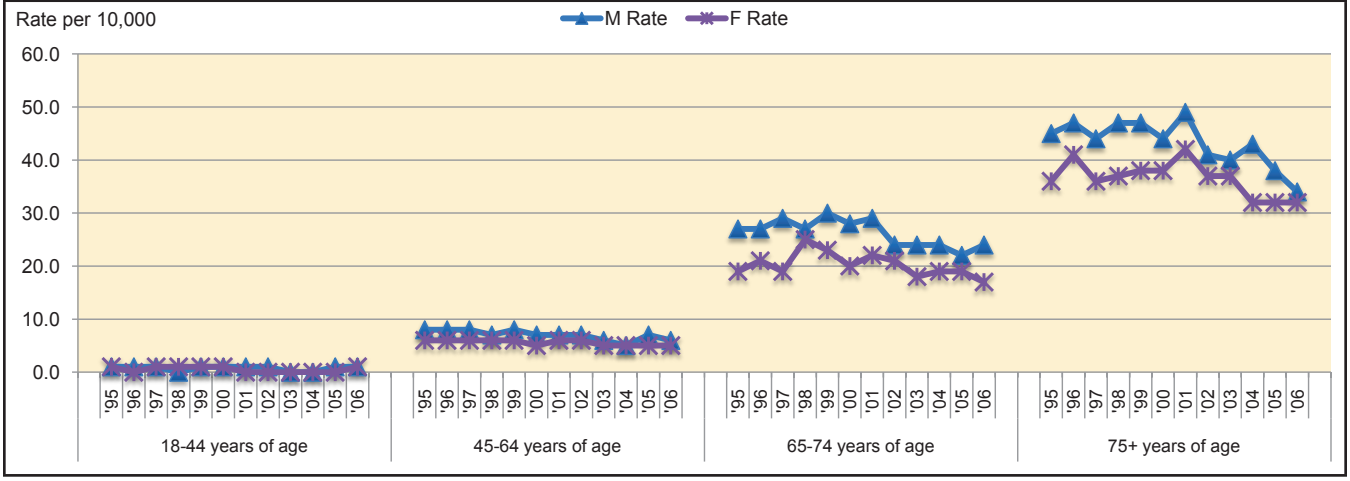
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
All cancer age-adjusted rate	52.5	51.3	47.2	45.1	45.7	43.3	44.9	42.6	40.9	39.6	39.2	39.6
colorectal	5.6	5.8	5.6	5.9	6.0	5.5	5.9	5.4	5.1	4.9	4.8	4.8
female breast (rate for females only)	9.3	8.0	7.6	8.2	7.1	6.5	6.5	6.1	5.0	4.6	4.3	4.7
lung	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.3	4.2	4.1	4.1	4.1
prostate (rate for males only)	7.9	7.2	6.7	6.2	7.0	6.4	6.3	5.9	5.6	5.2	5.0	5.0
bladder cancer	1.6	1.5	1.4	1.3	1.5	1.4	1.5	1.2	1.3	1.2	1.1	1.0
cervical	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0
skin (melanomas only)	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Between 1995 and 2006, for all of the cancers in Figure 5.22, the age-adjusted rate of hospitalization declined between 1995 and 2006. The age-adjusted rate of hospitalization declined 14% for colorectal cancer, 49% for breast cancer, 37% for prostate cancer, 9% for lung cancer and 38% for bladder cancer (bladder cancer rates were relatively low, beginning in 1998). For melanomas and cervical cancers, age-adjusted rates were very low across the 12 years and changed little between 1995 and 2006 (data provided in table above).

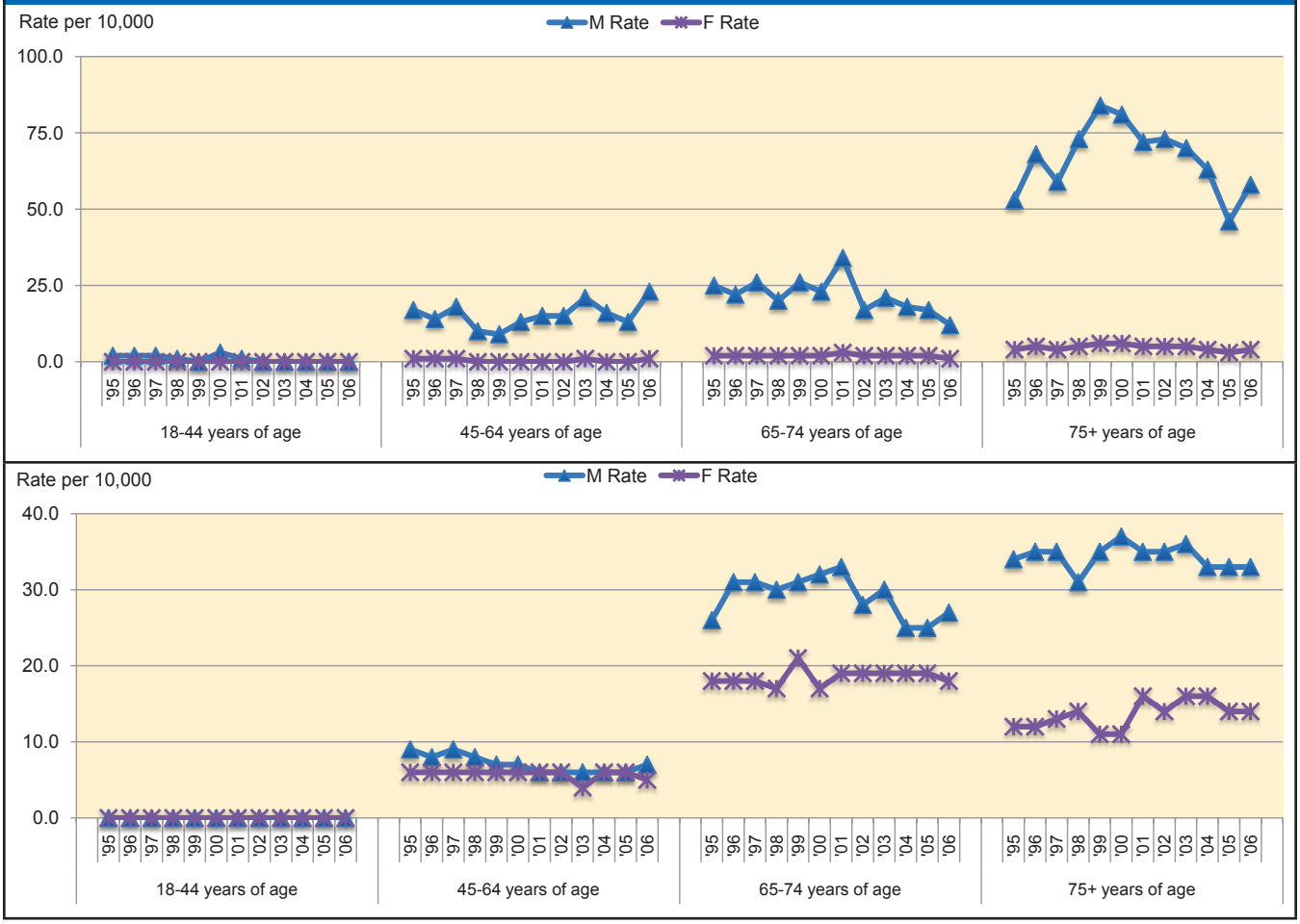
Figures 5.23 – 5.25 Inpatient Hospitalizations from All and Selected Cancers, Trends in Age-Specific Rates, by Gender, Iowa Residents, 1995-2006







Figures 5.26 – 5.27 Inpatient Hospitalizations from All and Selected Cancers, Trends in Age-Specific Rates, by Gender, Iowa Residents, 1995-2006



For all years 1995 to 2006, age/gender-specific hospitalization rates were higher in men than in women for all cancers combined, colorectal, lung and bladder cancer. The rate differences between men and women was greatest for lung and bladder cancers, both closely linked to cigarette smoking.

Rates of hospitalization for both men and women decreased for colorectal, breast and prostate cancer. The decline in rates of hospitalization was greatest for breast and prostate cancer.

Figure 5.28 Percent of Inpatient Hospitalizations from Asthma, Chronic Obstructive Pulmonary Disease (COPD) and Pneumonia/Influenza by Age and Gender, Iowa Residents, 2006

Respiratory disease	Age						Gender			Respiratory diseases by type	
	0-17	18-44	45-64	65-74	75+	all ages	female	male	both f & m	percent	number
all respiratory disease	**12%**	**7%**	**19%**	**18%**	**43%**	**100%**	**52%**	**48%**	**100%**	**100%**	**34,081***
flu/pneumonia	11%	6%	16%	16%	51%	100%	52%	48%	100%	45%	15,360
chronic obstructive pulmonary disease	<1%	2%	25%	29%	43%	100%	52%	48%	100%	17%	5,789
asthma	25%	23%	28%	9%	16%	100%	67%	33%	100%	6%	2,084
other respiratory										32%	10,848
number of respiratory discharges	4,259	2,467	6,635	6,052	14,668	34,081	17,794	16,285	34,081		
all respiratory crude rate/10,000	60	23	87	295	637	114	118	111	114		
all respiratory adjusted rate/10,000						102	96	111	102		
All Discharges, All Causes, 2006											
percent	54%	73%	66%	47%	100%	340%	59%	41%	100%		
number	54,504	73,773	67,376	47,975	101,444	345,072					

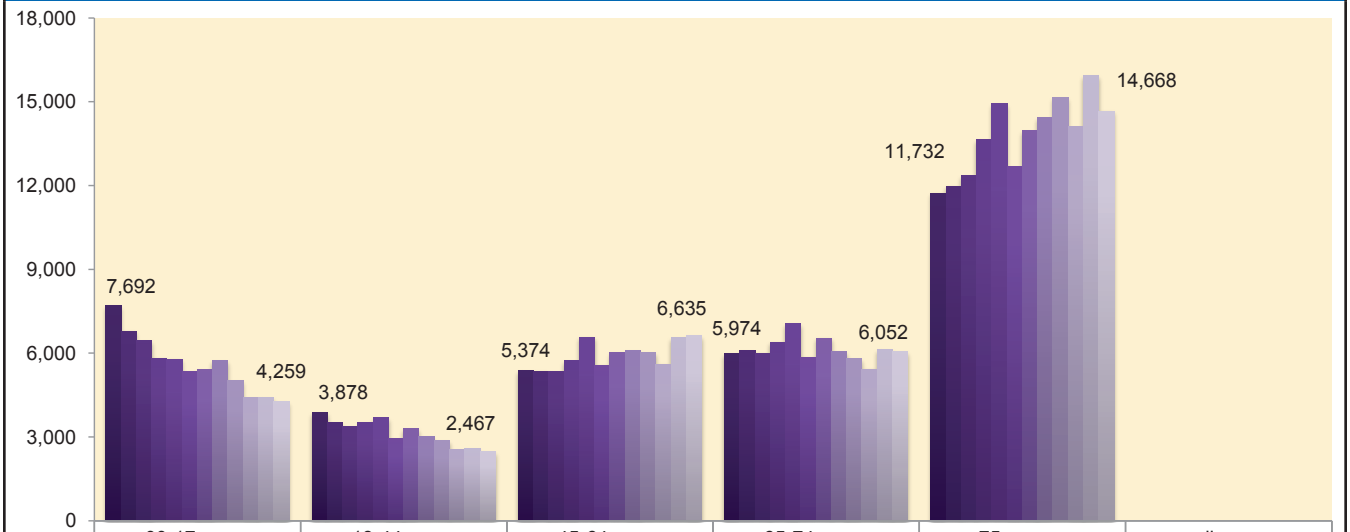
*Respiratory disease comprised 7% of all discharges.

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: all respiratory (122-134), COPD (127), asthma (128) and pneumonia/influenza (122-123).

In 2006:

- Respiratory diseases accounted for 7% of all hospital discharges (34,081 of 345,072) (Figure 5.28).
- Chronic obstructive pulmonary disease (COPD) accounted for 17% of all respiratory-related discharges (5,789 of 34,081) and 4% of all hospitalizations.
- Asthma accounted for 6% of all respiratory discharges (2,082 of 43,081) and 1% of all discharges.
- Pneumonia and influenza, non-chronic conditions, made up almost half of all respiratory admissions.
- Iowans less than 44 years of age accounted for about 19% of all respiratory-related discharges, while Iowans 45 to 74 years of age accounted for 37% of all respiratory discharges.
- Iowans 75 and older accounted for 43% of COPD discharges, 16% of asthma discharges and 43% of all respiratory.
- Age-adjusted rates of hospitalizations from all respiratory conditions were higher among children (60/10,000 population birth to 17 years of age) than among young adults (23/10,000 population 18 to 44 years of age).
- Among adults, rates increased steadily and dramatically with age. The rate of discharge for respiratory conditions for those age 75 years and older (637/10,000 population) was 28 times that of Iowans 18 to 44 years of age.
- Overall, 48% of respiratory discharges were of males. However, males comprised just 33% of all discharges for asthma.

Figure 5.29 Number of Inpatient Hospitalizations from All Respiratory Diseases, Principal Discharge Diagnosis, Trends by Age, Iowa Residents, 1995-2006

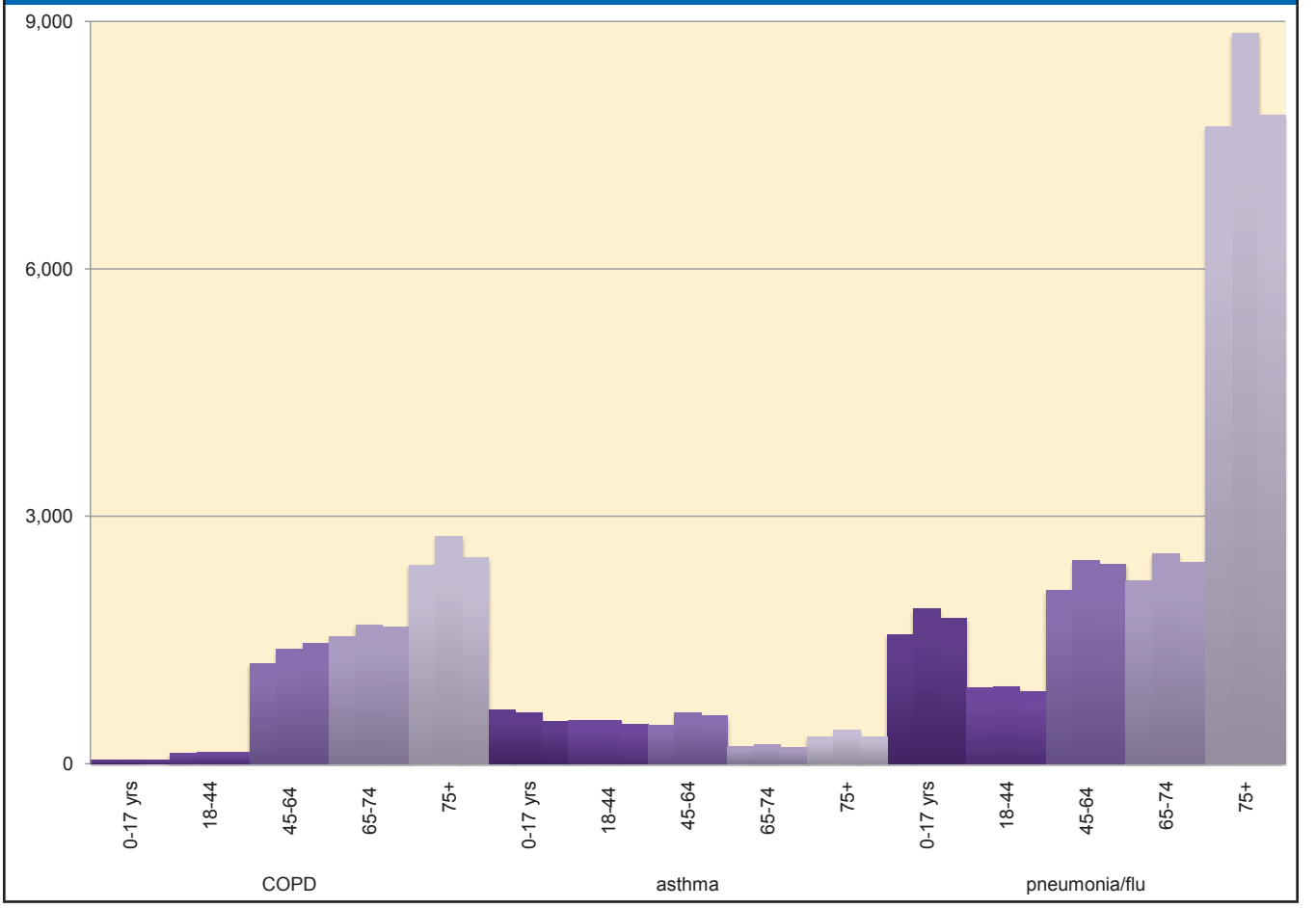


all respiratory

	00-17 years	18-44 years	45-64 years	65-74 years	75+ years	all ages
1995	7,692	3,878	5,374	5,974	11,732	34,650
1996	6,787	3,511	5,361	6,085	11,980	33,724
1997	6,445	3,359	5,358	5,997	12,364	33,523
1998	5,821	3,526	5,745	6,392	13,646	35,130
1999	5,790	3,682	6,575	7,048	14,943	38,038
2000	5,348	2,956	5,566	5,859	12,680	32,409
2001	5,407	3,299	6,033	6,541	13,960	35,240
2002	5,736	3,001	6,093	6,045	14,437	35,312
2003	5,018	2,868	6,034	5,813	15,152	34,885
2004	4,412	2,557	5,601	5,432	14,111	32,113
2005	4,405	2,573	6,544	6,145	15,947	35,614
2006	4,259	2,467	6,635	6,052	14,668	34,081

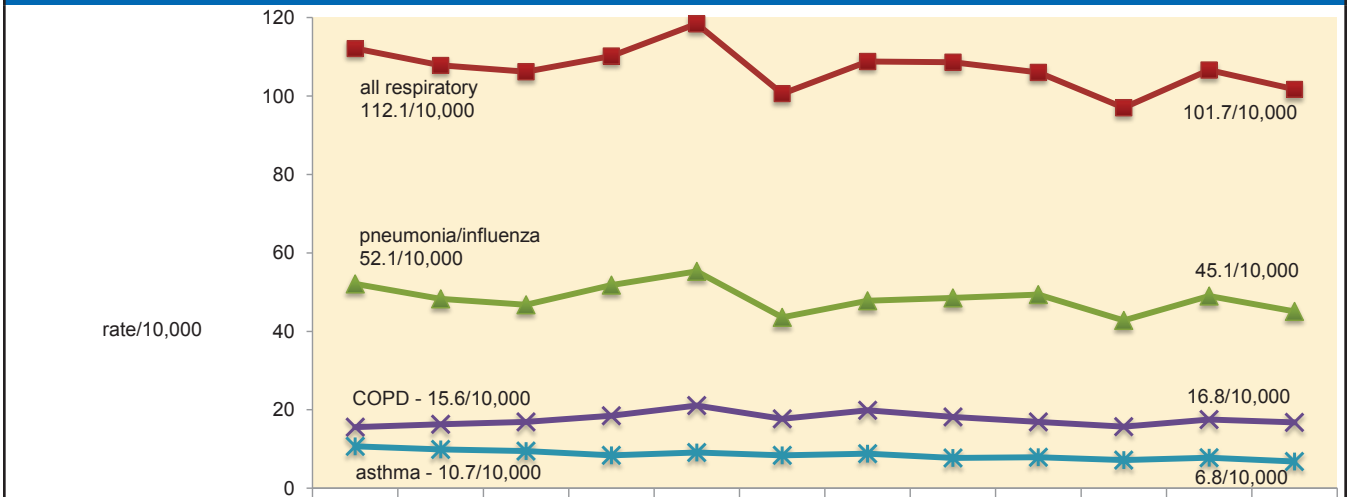
Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: all respiratory (122-134).

Figure 5.30 Number of All Respiratory-Related Inpatient Hospitalizations, Trends by Age, Iowa Residents, 2004-2006



For each year 2004 until 2006, Figure 5.30 shows the count of discharges by age for COPD, asthma and pneumonia and influenza. The count of COPD discharges increased with age for all years 2004 to 2006. The count of asthma discharges were similar across age groups birth to 74 years of age, but were relatively lower for Iowans 65 years of age and older compared to the young and middle aged, possibly because of other chronic respiratory disease diagnoses.

Figure 5.31 Inpatient Hospitalization from All Respiratory Diseases, COPD, Asthma and Pneumonia/Influenza, Trends in the Age-Adjusted Rate, Iowa Residents, 1995-2006

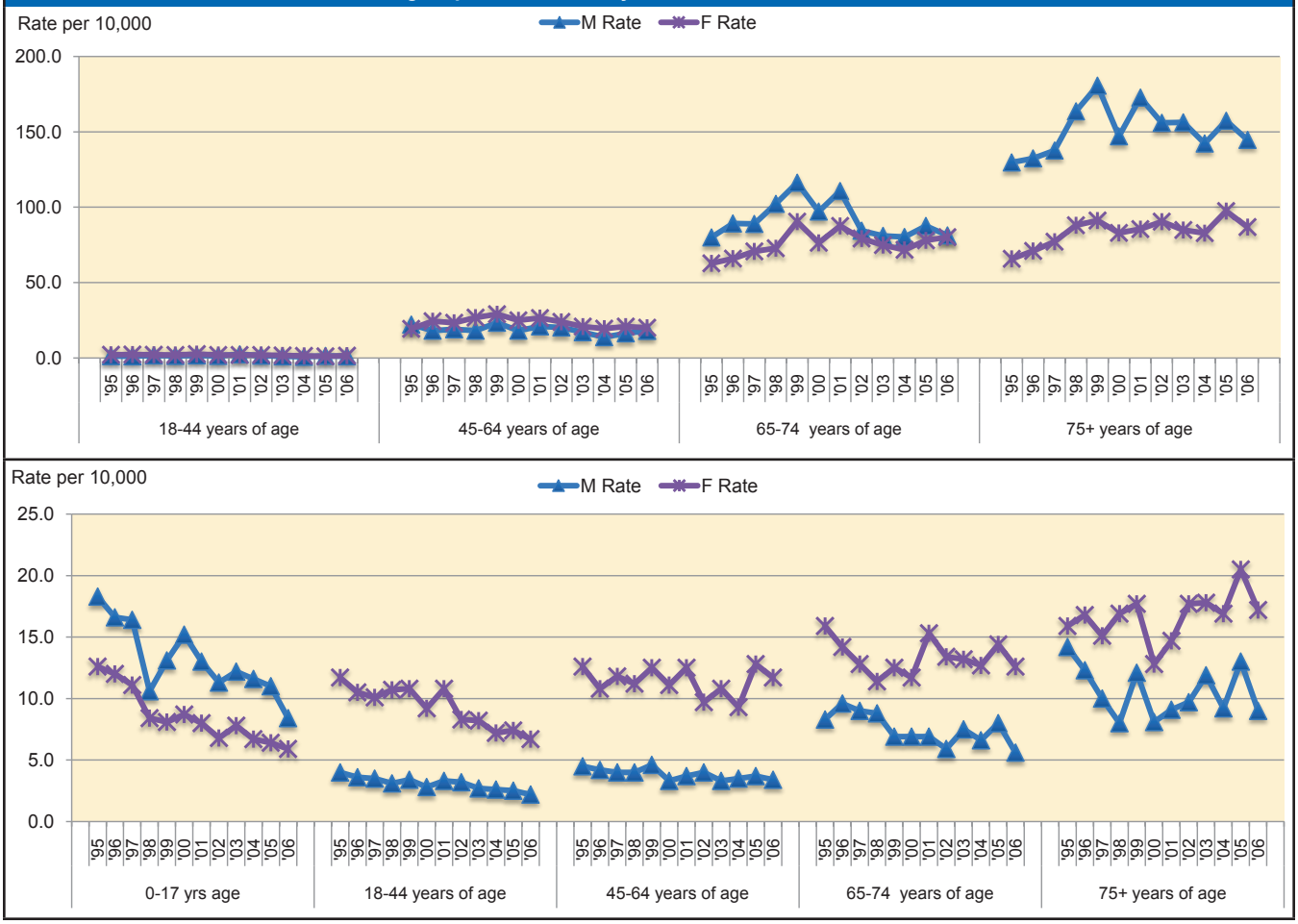


	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
all respiratory number	34,650	33,724	33,523	35,130	38,038	32,409	35,240	35,312	34,885	32,113	35,614	34,081
all respiratory adjusted rate	112.1	107.8	106.2	110.2	118.4	100.6	108.8	108.6	106	97	106.6	101.7
pneumonia/flu adjusted rate	52.1	48.3	46.8	51.8	55.3	43.6	47.8	48.5	49.4	42.8	49	45.1
COPD adjusted rate	15.6	16.3	16.9	18.5	21.1	17.7	19.9	18.2	16.9	15.7	17.5	16.8
asthma adjusted rate	10.7	9.9	9.5	8.4	9.1	8.4	8.8	7.7	7.9	7.2	7.8	6.8
pneumonia/flu number	16,414	15,385	15,089	16,805	18,095	14,402	15,840	16,118	16,590	14,517	16,677	15,360
COPD number	4,963	5,246	5,480	6,069	6,919	5,848	6,602	6,073	5,706	5,342	6,017	5,789
asthma number	3,113	2,884	2,782	2,468	2,691	2,472	2,619	2,297	2,382	2,173	2,406	2,084

Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: all respiratory (122-134), COPD (127), asthma (128) and pneumonia/influenza (122-123). Age-adjusted rates weight age-specific rates in order to eliminate differences in the overall crude rate of hospitalization that might be caused solely by Iowa's population being slightly older or younger in 2006 than it was in 1995.

Between 1995 and 2006, the age-adjusted rate of hospitalization for all of the respiratory conditions shown declined slightly except the rate for COPD which increased slightly (Figure 5.31).

Figures 5.32 – 5.33 Inpatient Hospitalizations from COPD and Asthma, Trends in Age-Specific Rates, by Gender, Iowa Residents, 1995-2006



Source: Iowa SID, IDPH. Notes: Only principal discharge diagnosis included. Classifications based on single-digit clinical classification software codes: COPD (127) and asthma (128).

Before age 65, only minimal differences in the age-adjusted rate of discharges from COPD between females and males were seen. Among the elderly, 75 years and older, age-adjusted rates for men were substantially higher than for women for all years 1995 to 2006 (Figure 5.32).

However, among Iowans 65-74 years of age, the difference in gender-specific rates gradually disappeared across the years. By 2006, there was little difference between the rate for men and women ages 65 to 74 years, reflecting the increase in smoking prevalence among women throughout the mid-twentieth century. Since the t, smoking prevalence among both men and women has decreased. Nationally smoking prevalence among men peaked at about 54% and among women at 38% in 1965. However, the rate of decrease has been greater for men than for women. About 16% of women and 20% of men in the U.S. currently smoke cigarettes. In Iowa, between 17% to 21% of men and 12% to 17% of women were cigarette smokers in 2008. (Source: Iowa Adult Tobacco Survey, 2008, Iowa Behavioral Risk Factor Surveillance System, 2008.) Most cases of COPD can be linked to tobacco smoke exposure.

Rates of hospitalization from asthma were low relative to those for COPD. For children and youth less than 18 years of age, hospitalization rates were higher for boys than for girls. For all adult age groups, rates of hospitalization are higher in women than in men.

CHAPTER 6 • SUMMARY AND RECOMMENDATIONS

Summary

A *chronic disease* is defined as a disorder that is long-lasting or recurring. If not properly managed and controlled, a chronic disease can be complicated by the occurrence of additional, serious disorders and result in lingering disabilities that may have a profound impact on quality of life. Risky health behaviors (e.g., tobacco use, lack of physical activity, poor eating habits) contribute to the onset and progression of chronic disease. Primary and secondary prevention can often alleviate or modify the progression of chronic disease.

Chronic diseases are noncommunicable disorders that are lengthy in duration, do not resolve spontaneously, and are rarely cured completely. Examples of chronic diseases included in this report are heart disease, cancer, stroke, and diabetes. Chronic diseases account for almost seven of the 10 leading causes of death in Iowa. Across the U.S., it is estimated that at least 70% of health care costs are related to chronic diseases (http://www.cdc.gov/NCCdphp). Although more common among older adults, chronic diseases affect people in all age groups and represent the leading health concern across the U.S. (http://www.cdc.gov/NCCdphp).

Accumulating evidence suggests that a comprehensive approach to the prevention of chronic disease can alleviate needless suffering, as well as save tremendous costs. Four common behaviors that contribute to the occurrence of chronic disease but are modifiable include: tobacco use, insufficient physical activity, poor eating habits, and excessive alcohol use. These four behaviors are responsible for much of the illness, disability, and premature death related to chronic diseases.

Summarized below are the major findings from this report on the burden of chronic disease in Iowa.

- Among adult Iowans, the current tobacco use prevalence rate declined 15% between 1997 and 2007. Among younger Iowans, rates have declined even more—80% among middle school students and 31% among high school students between 2000 and 2008.
- Between 1997 and 2007, the prevalence of obesity among Iowa adults has increased 43%.
- Obesity is a risk factor for the first (i.e., heart disease), second (i.e., cancer), and fourth (i.e., stroke) leading causes of death among Iowans. Obesity is associated with Type 2 diabetes, atherosclerosis, gout, asthma, hypertension, and osteoarthritis.
- Between 1997 and 2007, almost one-third of Iowa adults did not participate in any leisure-time physical activity.
- Regular physical activity improves health by reducing the risk of dying prematurely, as well as the risk of developing diabetes, high blood pressure, or colon cancer. Regular physical activity helps to control weight, reduce high blood pressure, plus build and maintain healthy bones, muscles, and joints. It also promotes psychological well-being and reduces feelings of anxiety and depression.
- Physical activity may be classified as either moderate or vigorous. Vigorous activities cause large increases in breathing or heart rate while moderate activities cause small increases in breathing or heart rate. Nearly one-half of Iowa teens report not being vigorously active on a regular basis.
- A sedentary life style contributes to many chronic diseases, including cardiovascular disease and Type 2 diabetes.
- In 2008, 7% of Iowans had ever been told by a physician that they have diabetes (excluding women told only during pregnancy). The prevalence rate of diabetes has been reasonably constant for the past four years in Iowa.

- Recent attention has focused on pre- or borderline diabetes. It is believed that people who discover their diabetic condition before Type 2 diabetes has fully developed may avoid the diagnosis completely by making lifestyle changes. In 2008, 5% of non-diabetic Iowans who responded to the BRFSS were told they had pre-diabetes.
- Among all adult Iowans, 20% reported at least one alcohol binge episode in the last 30 days. This is a decrease from the 21% reported in 2006. The percentage in Iowa is above the median for other states across the U.S. For binge drinking, Iowa's rate of 20% is exceeded by only two states. The top four binge drinking states are all in the upper Midwest.
- According to the 2008 Iowa Youth Survey, the number of high school juniors that report binge drinking decreased to 27% (2008) from 41% in 1999.

According to recent statistics from the American Cancer Society, cancer incidence and mortality rates across the U.S. are declining. The steady decline of cancer-related mortality over the past 15 years means that approximately 650,000 deaths have been prevented or delayed. Cancer remains a leading cause of death, second only after cardiovascular disease. Significant findings from this report related to cancer include:

- Over the past decade, the proportion of Iowa women over 40 years of age receiving mammograms has increased by 17%.
- Over the last 30 years, the breast cancer mortality rate among Iowa women has declined 30%.
- Between 1997 and 2007, the percentage of Iowa women who had a Pap test increased from 81% to 86%. Over the last 30 years, the mortality rate for cervical cancer has declined 59%.
- There has been an upward trend in colon cancer screening rates. In 2007, 62% of Iowans 50 years or older reported having a sigmoidoscopy or colonoscopy screening test.
- Among Iowans, mortality rates for colon cancer have declined slightly since 1985.
- From 1997 until 2007, the prevalence of elevated serum cholesterol among Iowans who have been tested increased from 23% to 30%.
- The risk of coronary heart disease increases as the level of serum cholesterol increases.
- From 1997 to 2007, the prevalence of screened Iowa adults who reported physician-diagnosed hypertension increased from 22% to 25%. Not only does hypertension contribute to coronary heart disease, it also is a risk factor for stroke and other complications of atherosclerosis.
- From 1999 to 2008, the prevalence rate of diabetes among Iowa adults increased 35%—growing from 5.2% to 7%. Overweight, obesity and inactivity are related to an increased risk of diabetes.

The findings noted above, from the BRFSS, may not be completely reliable or valid. Selection bias due to the survey design impacts the validity of findings. Further, the institutionalized population is excluded from both adult and youth surveys. For BRFSS data, individuals without telephones or unlisted numbers are excluded from the survey and persons younger than 18 years of age are not included in BRFSS surveys.

Recommendations

Preventing tobacco use and obesity in children and adolescents should be a national priority supported by research, interventions, and program evaluation that include a focus on high-risk populations, nutrition and physical activity programs, surveillance and monitoring, assessment of federal tobacco control and nutrition assistance programs and agricultural policies. It is also recommended that obesity prevention activities focus on developing and evaluating pilot projects in nutrition assistance programs to promote healthy eating and physical activity.

For the success of public health tobacco use prevention and control efforts of the past ten years to continue and grow, interventions that prevent and discourage youth from starting to use tobacco and that help them stop once they have become addicted must continue. The multi-level interventions of enforcing strict public policy on youth access to tobacco, increased tobacco taxes, youth-led anti-tobacco campaigns, mass media counter-marketing, local community anti-tobacco campaigns, as well as the increased availability of cessation counseling and medications, all must continue if the successes of the past decade are not to be lost and goals to reduce further tobacco use among Iowa youth are to be met.

The food industry should develop and promote products, opportunities, and information to encourage children to eat a healthy diet and be physically active. Moreover, nutrition labeling should be clear and useful. The food industry should also develop marketing and advertising guidelines that minimize the risk of becoming obese among adults and children.

The U.S. Department of Health and Human Services should develop and evaluate a long-term national multi¬media and public relations campaign to prevent obesity among children and adults.

Community programs run by coalitions should encourage healthy eating and regular physical activity, especially for high-risk populations. In addition, local governments, developers, and community groups should increase opportunities for physical activity by providing areas such as playgrounds, sidewalks, and bike paths.

Health care workers and the health care industry should support obesity prevention efforts.

Schools should promote and foster healthy eating habits and regular physical activity. In addition, parents should encourage healthy eating habits and regular physical activity for their children (Institute of Medicine, 2004).

Strategies for public health priorities should be:

- Related to obesity, tobacco control and chronic disease prevention;
- Population-based;
- Evidence-based, theoretically sound, or recommended by nationally recognized authorities or experts;
- Have the potential to affect a large portion of the population; and
- Based on measurable objectives.

Chronic disease indicators should be reviewed periodically because of changes in the availability of data and public health priorities. Surveillance and evaluation data sources at the state level should be improved. Finally, the chronic disease epidemiologic capacity to collect, analyze and report on the data required for each indicator should be improved statewide.

According to the Institute of Medicine (2004), “Health and well being are affected by a dynamic interaction between biology, behavior, and the environment, an interaction that unfolds over the life course of individuals, families, and communities.” For this reason, policies should be developed to influence physical activity and nutrition environments in schools, workplaces, communities, and healthcare settings. Policies are defined formal or informal guidelines for decision-making aimed at achieving a desired outcome.

Obesity can be prevented if people would eat less and move more. However, often environmental factors prevent access to healthy foods and ways to be physically active. The work environment, for example, might not have healthy choices in vending machines. The community environment might have busy streets and no sidewalks, making it difficult for residents to walk.

Policies at the state, regional and local levels need to be made or revised so that healthy changes will endure and be sustained. An example of a policy change might be a school district no longer allowing students to purchase non-diet soda on school property.

Policies that support indoor air regulations, menu labeling, advertising restrictions, pricing strategies, and changes to the built environment create environments that promote and protect health. Preventing disease requires improving the health status of people at every stage of life. Improving health status is not possible at the level of the individual; rather, it can be achieved only by improving the social and physical environments (Institute of Medicine, 2004).

CHAPTER 7 • GLOSSARY

Adjustment A summarizing procedure for a statistical measure in which the effects of differences in composition of the populations being compared have been minimized by statistical methods (U.S. Dept. HHS).

Age-specific rate A rate for a specified age group. The numerator and denominator refer to same age group (U.S. Dept. HHS).

Behavioral risk factor A characteristic or behavior that is associated with increased probability of a specified outcome.

Body mass index (BMI) Weight in kilograms divided by the square of height in meters. This measure correlates closely with body density and skinfold thickness and is an indicator of excess weight for height.

Cancer Cancer consists of more than 100 different diseases. These diseases are characterized by uncontrolled growth and spread of abnormal cells. Cancer can arise in many sites and behave differently depending on its organ of origin.

Chronic disease A disease is considered chronic is it has been longer than 3 months induration (U.S. Dept. HHS).

Data A collection of items of information.

Database An organized set of data or collection of files that can be used for a specified purpose.

Epidemiology The study of the distribution and determinants of health-related states or events in specified populations and the application of this study to control of health problems.

Etiology The science of causes, causality; in common usage, cause.

Health A state of complete physical, mental, and social well-being; not merely the absence of disease or infirmity.

Health behavior The combination of knowledge, practices, and attitudes that together contribute to motivate the actions we take regarding health.

Hospitalization Hospitalization refers to hospital discharge, defined as the formal release of a hospital inpatient. It may be the result of death or transfer to a place of residence, nursing home, or another hospital. First-listed diagnosis is the coded diagnosis identified as the primary diagnosis or the diagnosis first listed on the face sheet of the hospital medical record. Hospital refers to non-Federal, general, or children's general hospitals, with 6 or more beds for inpatient use (U.S. Dept. HHS).

Incidence The number of new events in a defined population within a specified period of time.

Incidence rate The rate at which new events occur in a population.

International classification of diseases (ICD) The classification of specific conditions and groups of conditions determined by an internationally representative group of experts who advise the World Health Organization, which publishes the complete list in periodic revisions.

Life expectancy The average number of years an individual of a given age is expected to live, if current mortality rates continue to apply.

Lifestyle The set of habits and customs that is influenced, modified, encouraged, or constrained by the lifelong process of socialization.

Morbidity Morbidity refers to incidence, prevalence, hospitalizations, and physician office visits. 1

Mortality rate (death rate) An estimate of the proportion of a population that dies during a specified period.

Premature death A death that occurs before a person achieves life expectancy.

Prevalence The number of events in a given population at a designated time.

Prevalence rate The total number of all individuals who have an attribute or disease at a particular time, divided by the population at risk of having the disease at a specific point in time.

Risk The probability that an event will occur.

Risk factor An aspect of personal behavior or lifestyle, an environmental exposure, or an inherited characteristic, which, based on epidemiological evidence, is known to be associated with health-related conditions.

Screening The presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures that can be applied rapidly.

Surveillance Continuous analysis, interpretation, and feedback of systematically collected data, generally using methods distinguished by their practicality, uniformity, and rapidity, rather than by accuracy or completeness.

Trend A long-term movement in an ordered series. An essential feature is that the movement, while possibly irregular in the short term, shows movement consistently in the same direction over a long term.

Underlying cause of death The disease that initiated the chain of events leading directly to death.

REFERENCES

U.S. Department of Health and Human Services. *Morbidity & Mortality: 2007 Chart Book on Cardiovascular, Lung, and Blood Diseases*. National Institutes of Health National Heart, Lung, and Blood Institute, June 2007.