

# Cardiovascular Disease in **Utah**



## *Milestone Report 2002*

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# Acknowledgments

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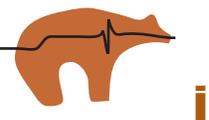
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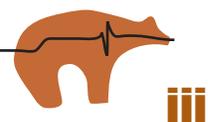
# Summary of Findings

This report examines the burden of cardiovascular disease in Utah. Risk factor, mortality, emergency department, and hospitalization data are presented for different sex, age, and in some cases, geographic groups. The report includes the most recent available data. A summary of the major findings is presented below:

- Smoking is a major risk factor for cardiovascular disease. In 2000, 13% of Utah adults 18 or older were smokers compared to 22% of U.S. adults. However, despite the low smoking prevalence in Utah, the Healthy People 2010 national objective to reduce smoking among adults to 12% has not yet been achieved. In 1999, 12% of Utah high school students reported current cigarette use compared to 35% nationally. Although Utah's adolescent smoking rate is among the lowest in the country, there were still more than 17,000 Utah teens who reported smoking cigarettes in 1999.
- Overall, only about one in four Utah adults reported engaging in regular physical activity. Physical inactivity was a problem for all demographic groups in Utah. In 2000, 58% of Utah adults who reported engaging in no physical activity were overweight or obese. Of note, Utah has the highest rate of vigorous physical activity among youth in the U.S. In 1999, 77% of Utah teens reported engaging in vigorous physical activity; however, Utah's rate is below the Healthy People 2010 national objective for youth of 85%.
- The proportion of Utah adults who were overweight or obese increased steadily from 36% in 1989 to 54% in 2000. The estimated number of overweight or obese Utah adults more than doubled from 388,500 persons in 1989 to 801,600 persons in 2000. In 1999, almost 15% of all Utah high school students were overweight or at risk of being overweight compared to 26% of U.S. students.
- According to recent statewide surveys, only 26% of Utah adults reported eating five servings of fruits and vegetables a day. While this percentage was higher than the 18% reported in 1994, the majority of Utah adults are missing the benefits of eating fruits and vegetables. Consumption of fruits and vegetables by Utah adolescents (25%) was similar to that seen for adults and remains well below the Healthy People 2010 national objectives (50% for consumption of three daily servings of vegetables and 75% for consumption of two daily servings of fruit).
- About 92% of Utah adults reported having had their blood pressure checked in the last two years. In 1999, 22% of Utah adults were told by a health professional that they had high blood pressure compared to 25% nationally. Cholesterol testing lags behind blood pressure measurement. In 1999, 64% of Utah adults reported having had their blood cholesterol level checked within the past five years compared to 71% of adults nation-

ally. About 19% of Utah adults had been told that their cholesterol level was high, which is slightly lower than the national average of 21%.

- Cardiovascular disease is the leading cause of death and disability for both women and men in Utah, accounting for approximately 4,000 deaths each year. Although the age-adjusted death rates were higher for Utah males, more Utah women than men died as a result of cardiovascular disease during the three-year period 1998 through 2000. The age-adjusted death rates have been decreasing for both genders in Utah and the U.S. since 1980. This decline is most likely due to improved medical treatment and greater emphasis on reducing the major controllable cardiovascular risk factors.
- The utilization of health care services to diagnose and treat coronary heart disease, the largest component of cardiovascular disease, is substantial both nationally and in Utah. An average of 6,465 cardiac catheterizations, 3,015 percutaneous transluminal coronary angioplasty procedures, and 1,674 coronary artery bypass graft procedures were performed on Utah residents each year during the three-year period 1998 through 2000.
- In 2000, there were a total of 7,971 discharges from Utah hospitals with a first-listed diagnosis of coronary heart disease—an increase of 15% since 1992. The average annual charge for such a hospitalization for Utahns 20 years or older was \$20,943 during 1998 through 2000. But hospital charges are only one part of the costs associated with this disease. There are also indirect costs to consider such as lost productivity due to missed work days and lost future earnings of persons who die from heart disease. The American Heart Association estimated the total direct and indirect costs of coronary heart disease for the nation to be \$100.8 billion dollars in 2001. Using similar methodology, the total direct and indirect costs of coronary heart disease in Utah were estimated to range from \$490 to \$542 million dollars in 2000.
- The rate of hospitalization for heart attack was consistently much higher for men than women during the time period 1992 through 2000. In fact, both emergency department visit and hospitalization rates for heart attack were higher for males than for females in every age group. During the period 1998 through 2000, 2,170 Utahns died as a result of heart attack. More than 900 of those deaths occurred in women.
- Congestive heart failure is an ambulatory care sensitive condition, meaning that hospitalizations may be prevented by appropriate outpatient medical and self care. The rate of hospitalization in Utah for congestive heart failure increased with increasing age for both men and women. The overall rate of hospitalization for this condition was slightly higher for women than men. The highest hospitalization rates were seen among persons 75 years or older and in Utah's frontier counties.





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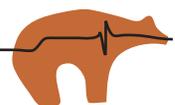
# Introduction

Cardiovascular disease is the leading cause of death for both men and women in Utah and the United States. Cardiovascular disease includes those diseases and conditions that affect the heart and blood vessels, including high blood pressure, heart disease, and stroke. Coronary heart disease is the largest component of cardiovascular disease and the one most responsive to risk reduction. Non-modifiable risk factors for coronary heart disease include increasing age, male gender, and a family history of premature coronary heart disease. Modifiable risk factors include use of tobacco, physical inactivity, obesity, improper nutrition, high blood pressure, high cholesterol level, and diabetes.

The Cardiovascular Health Program at the Utah Department of Health promotes heart-healthy messages, public awareness, and demand for healthy choices at school, at work, and in the community and advocates for health promotion in primary care. In addition, the Program advocates for environmental and policy changes to support these healthy choices, and provides data, education, and other resources to health care providers, teachers, and other partners involved in the prevention of cardiovascular disease and the promotion of health.

This report examines the burden of cardiovascular disease in Utah. The data presented in this report come from several sources including the Utah Behavioral Risk Factor Surveillance System, Utah Youth Risk Behavior Survey, Utah death certificates, and the Utah Hospital Discharge and Emergency Department Databases. Data are presented for different sex, age, and in some cases, geographic groups. Information about health behaviors that affect cardiovascular disease risk in Utah adults and youth is presented in Chapters one and two. Mortality data for all cardiovascular disease, including stroke, are provided in Chapter three. While not one of the specific conditions discussed in this report, stroke will be the subject of a future Cardiovascular Health Program report. Utah statistics for coronary heart disease, heart attack, and congestive heart failure are presented in Chapters four, five, and six.

This report is a companion to the *Cardiovascular Data Tables, Utah: 1980 - 1999* which are available on the Internet at the following address: [http://health.utah.gov/ibis-ph/opha\\_pubs.html](http://health.utah.gov/ibis-ph/opha_pubs.html). Additional information is also available at the Cardiovascular Health Program's web site: <http://www.hearthishighway.org/>.



# Health Behaviors of Adults: Smoking

## Why is it important?

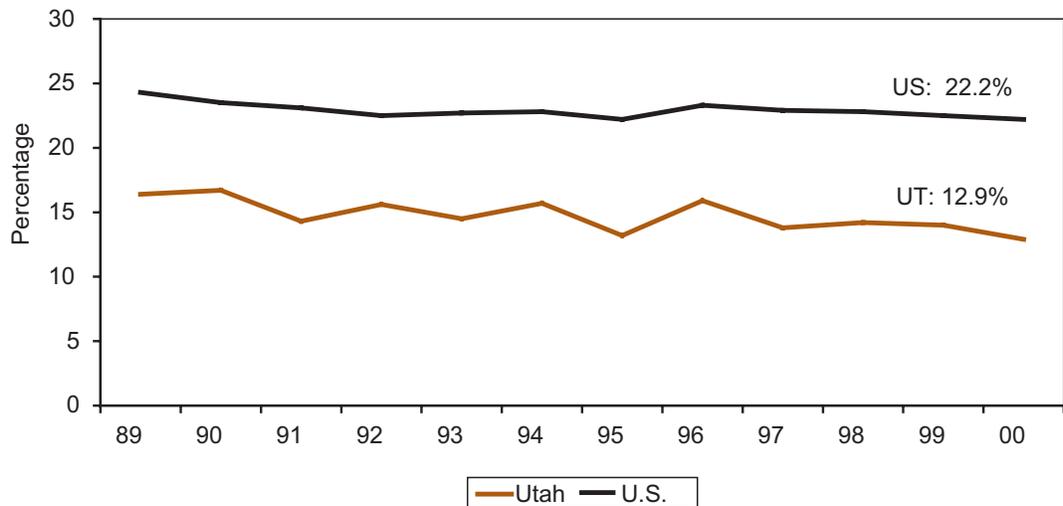
Smoking causes heart disease, lung cancer, emphysema and other chronic lung diseases, damages lung function, raises blood pressure and causes other diseases.<sup>1</sup> Women who smoke during pregnancy are at increased risk for miscarriage, preterm births, low birth weight babies, and infant deaths.<sup>2</sup> Cigarette smoking is the leading preventable cause of disease and death in the United States.<sup>3</sup> Each year, over 430,000 Americans die prematurely from smoking-related diseases.<sup>4</sup> Quitting smoking lowers a person's risk of heart disease even after many years of smoking.

## How big is the problem in Utah?

Currently, Utah has the lowest adult smoking rate in the country. Since 1989, the adult smoking rate in Utah has de-

creased by 21%, from 16.4% in 1989 to 12.9% in 2000. Nationally, the smoking rate has decreased by 9%, from 24.3% in 1989 to 22.2% in 2000. (Figure 1-1)

Figure 1-1: Cigarette Smoking  
Percentage of Adults Who Reported Being a Current Smoker  
Utah and US: 1989-2000



Current smoker is defined as someone who has smoked 100 cigarettes or more and currently smokes every day or some days.

Source: Behavioral Risk Factor Surveillance System.

### Who is at risk?

The smoking prevalence among adult males in Utah was higher than among adult females. (Figure 1-2) Utah adults younger than 65 years of age were more likely to be smokers. The lower smoking rates at older ages were in large measure due to deaths of smokers before they reached those ages. In addition, Utahns with fewer years of education had higher smoking rates.

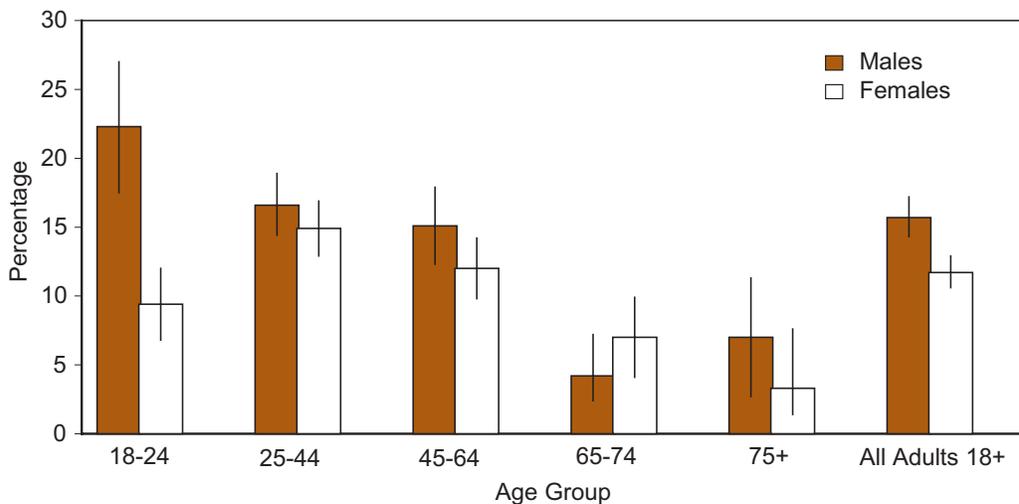
### How does Utah compare to the U.S. Other states? HP2010 targets?

In 2000, only 12.9% of the Utah adult population smoked compared to 22.2% in the United States and 20.5% in the region (Idaho, Wyoming, Colorado, New Mexico, Arizona, Nevada and Utah). Despite the low smoking prevalence in Utah, the Healthy People 2010 objective to reduce smoking by adults aged 18 years and older to 12% has not been achieved.<sup>5</sup>

### Did you know?

- In 2000, 12.9% of Utah adults were smokers, an estimated 190,300 individuals.
- About 22% of Utah men aged 18-24 reported being a current smoker compared to 9.4% of Utah women in the same age group.
- Utah adults with fewer years of education were more likely to smoke.

Figure 1-2: Cigarette Smoking  
Percentage of Adults Who Reported Being a Current Smoker  
by Age Group and Sex, Utah: 1998-2000



Current smoker is defined as someone who has smoked 100 cigarettes or more and currently smokes every day or some days

Source: Utah Behavioral Risk Factor Surveillance System



# Health Behaviors of Adults: Physical Activity

## Why is it important?

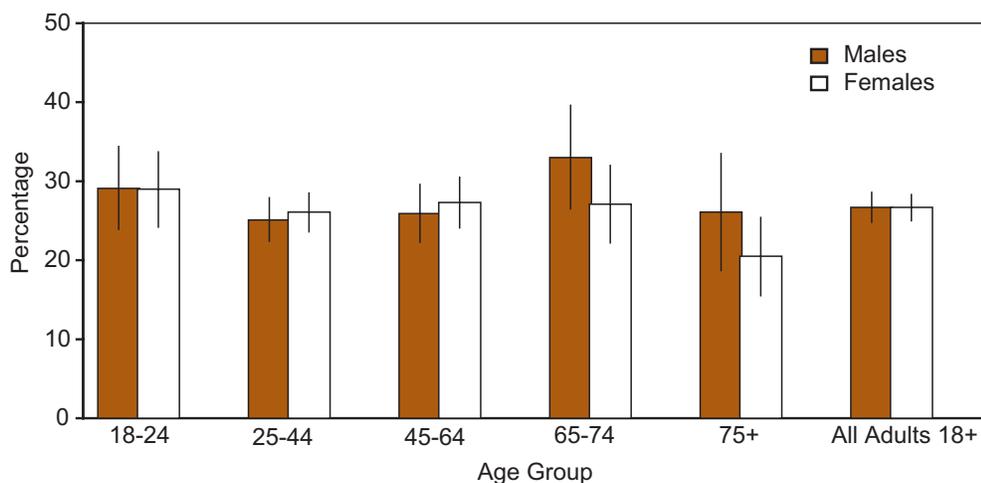
*Physical activity lowers the risk of cardiovascular disease. Regular physical activity provides benefits even at moderate levels of intensity that are possible for most people.<sup>6</sup> For this report, regular physical activity was defined as 30 minutes of physical activity per day on five or more days per week, regardless of intensity. Physical activity provides many health benefits, including decreased risk of death from heart disease, decreased risk of developing diabetes, prevention of high blood pressure, and weight control.<sup>3</sup>*

## How big is the problem in Utah?

Only one in four (26.7%) Utah adults reported engaging in regular physical activity during the period 1998 through 2000. (Figure 1-3) Physical activity levels of adult Utahns have not changed appreciably over the past ten years. (Figure 1-4)

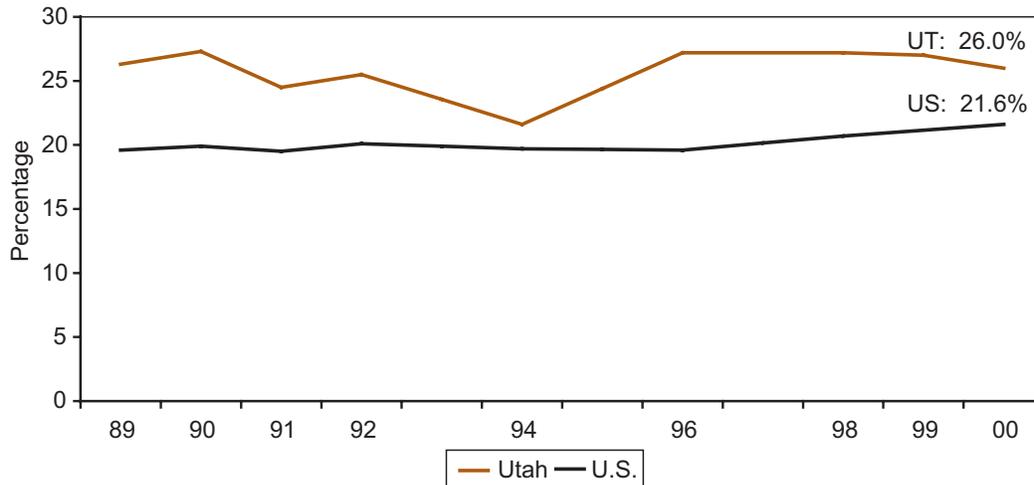
The number of Utah adults who reported no physical activity was estimated to be 229,800 persons (15.5%) in 2000.

Figure 1-3: Physical Activity  
Percentage of Adults Who Reported Regular Physical Activity by Age Group and Sex, Utah: 1998-2000



Regular physical activity is defined as 30 minutes 5 or more days/week  
Source: Utah Behavioral Risk Factor Surveillance System

Figure 1-4: Regular Physical Activity  
 Percentage of Adults Who Reported Regular Physical Activity  
 Utah and US: 1989-1992, 1994, 1996, 1998-2000



Regular physical activity is defined as 5+ times per week, 30+ minutes/session, regardless of intensity.

Source: Behavioral Risk Factor Surveillance System. Data were not available in 1993, 1995, 1997 (UT) and 1999 (US); therefore, data for contiguous years were averaged in order to construct data points for the missing years.

### Who is at risk?

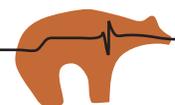
The percentage of persons who reported no physical activity during leisure time was higher among women, older adults, people who were overweight or obese, and those with less formal education and less income.<sup>3</sup> However, physical inactivity is a problem for all demographic groups in Utah.

### How does Utah compare to the U.S.? Other states? HP2010 targets?

In 2000, Utah had one of the highest levels of regular physical activity in the U.S. at 26.0%. The national average for physical activity was 21.6% in 2000. Utah's rate of physical activity also compares favorably with the regional percentage of 23.8% (region includes Idaho, Wyoming, Colorado, New Mexico, Arizona, Nevada, and Utah). The Healthy People 2010 objective addresses the need to increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day to 30%.<sup>5</sup>

### Did you know?

- More than two-thirds of Utah adults were not physically active on a regular basis.
- According to a 2000 statewide survey, 57.7% of Utah adults who reported no physical activity were overweight or obese.
- More than 300,000 premature deaths each year in the U.S. are attributable to the combined effects of physical inactivity and poor diet.<sup>7,8</sup>



# **Health Behaviors of Adults: Blood Pressure Measurement and Awareness of Hypertension**

## **Why is it important?**

*One in four U.S. adults has high blood pressure.<sup>9</sup> High blood pressure is a systolic blood pressure of 140 mmHg or greater or a diastolic pressure of 90 mmHg or greater. With high blood pressure, the heart has to work harder, resulting in an increased risk of a heart attack, stroke, heart failure, kidney and eye problems, and peripheral vascular disease.<sup>5</sup> Many adults with high blood pressure are unaware that they have it.<sup>10</sup> The only way to detect high blood pressure is through regular blood pressure measurement.*

## **How big is the problem in Utah?**

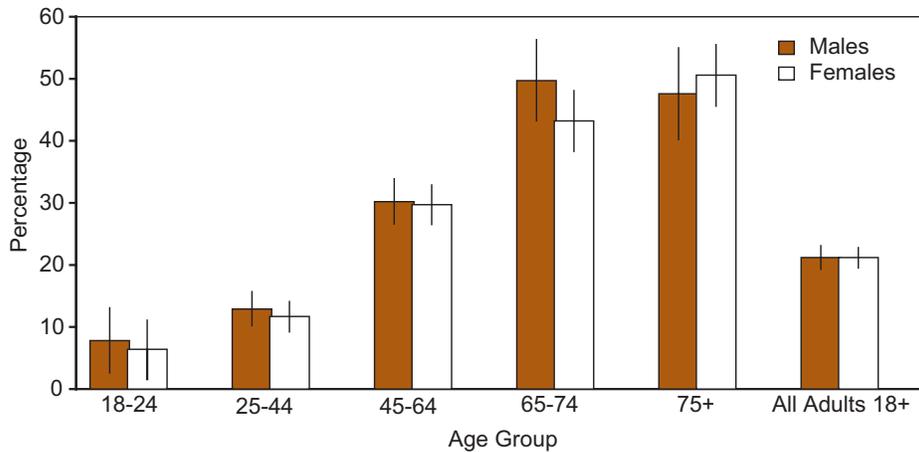
According to a recent statewide survey, 92.2% of adult Utahns reported having had their blood pressure checked within the last two years. In 1999, 21.5% of adult Utahns (306,600 persons) reported having been told by a health care professional that they had high blood pressure.

## **Who is at risk?**

The cause of high blood pressure is unknown in 90-95% of cases. Worldwide, African Americans have among the highest

rates of high blood pressure. People with lower income and education levels tend to have higher blood pressure.<sup>11</sup> Certain lifestyle factors such as lack of physical activity, a diet high in salt, excess body weight, and excessive alcohol intake also put a person at greater risk for developing high blood pressure.<sup>10</sup> High blood pressure becomes more common with increasing age, with men and women in Utah aged 65 or older at greatest risk. (Figure 1-5) Utah women were more likely than men to have had their blood pressure checked regularly.

**Figure 1-5: High Blood Pressure**  
 Percentage of Adults Who Had Ever Been Told by a Health Professional That They Had High Blood Pressure by Age Group and Sex, Utah: 1995, 1997, 1999



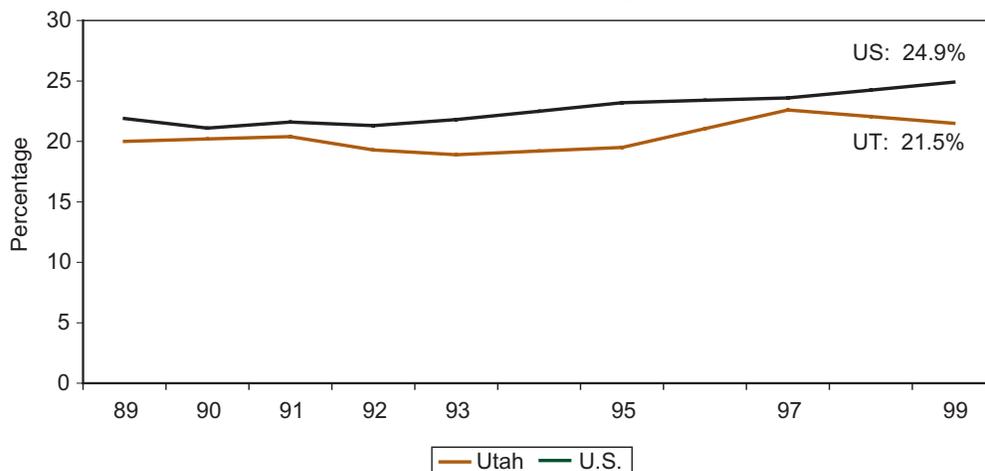
Source: Utah Behavioral Risk Factor Surveillance System

**How does Utah compare to the U.S.?  
 Other states? HP2010 targets?**

In 1999, 92.4% of Utah adults had their blood pressure checked within the last two years compared to 94.0% nationally. The Healthy People 2010 objective is to increase the proportion of adults who have

had their blood pressure measured within the preceding two years to 95%.<sup>5</sup> In 1999, 21.5% of Utah adults were told by a health professional that they had high blood pressure compared to the national percentage of 24.9%. (Figure 1-6)

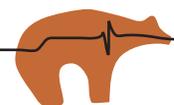
**Figure 1-6: High Blood Pressure**  
 Percentage of Adults Who Had Ever Been Told by a Health Professional That They Had High Blood Pressure Utah and US: 1989-1993, 1995, 1997, 1999



Source: Behavioral Risk Factor Surveillance System. Data were not available in 1994, 1996, 1998; therefore, data for contiguous years were averaged in order to construct data points for the missing years.

**Did you know?**

- Almost half of all Utahns 65 or older have been told they have high blood pressure.
- Almost 58% of Utah adults with diabetes have been told they have high blood pressure. High blood pressure is even more serious in persons with diabetes.
- Approximately 69% of Utah adults who reported having high blood pressure were also overweight or obese.



# Health Behaviors of Adults: Cholesterol Testing and Awareness of High Cholesterol

## Why is it important?

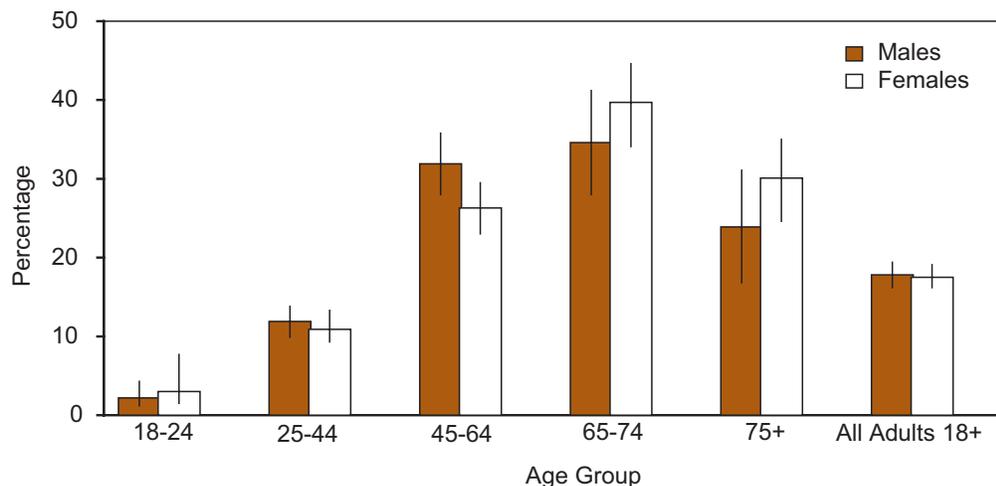
*High levels of cholesterol and triglycerides increase a person's risk for heart disease. The National Heart, Blood and Lung Institute defines "high" blood cholesterol as greater than 240 mg/dl, and "borderline" cholesterol as 200-239 mg/dl. However, risk categories for cholesterol levels vary depending on factors such as age, gender, family history and general health conditions.*

## How big is the problem in Utah?

Older Utahns were more likely to have had their cholesterol levels checked. The percentage of Utah adults who had their levels checked increased from 50.3% in 1989 to 63.6% in 1999. According to

combined data from several recent statewide surveys, 17.7% of Utah adults (239,600 persons) had been told by a health care professional that their cholesterol level was high. This percentage increased with age. Only 2.6% of 18 to

Figure 1-7: Elevated Cholesterol Level  
Percentage of Adults Who Had Ever Been Told by a Health Professional  
That Their Cholesterol Level Was High by Age Group and Sex,  
Utah: 1995, 1997, 1999



Source: Utah Behavioral Risk Factor Surveillance System

24 years olds in Utah were told they had high cholesterol compared to 37.4% of Utahns aged 65-74 years. (Figure 1-7) Variation in rates of high cholesterol awareness can either be due to differences in the prevalence of high cholesterol or to different rates of testing for high cholesterol levels.

### Who is at risk?

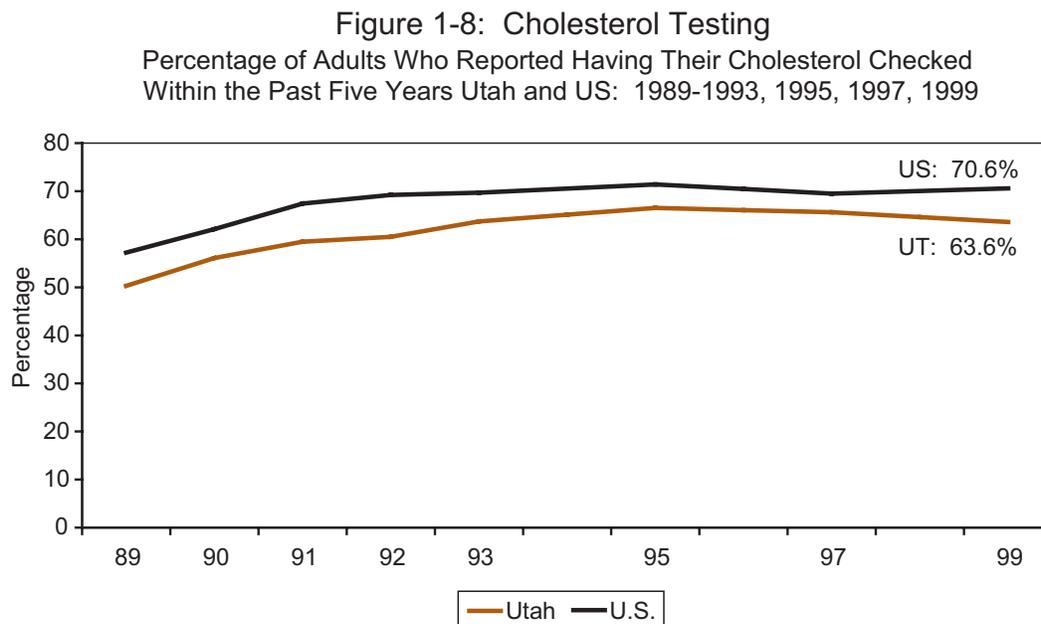
Diets high in saturated fat or cholesterol contribute to high levels of blood cholesterol. Obesity is another risk factor for high blood cholesterol. Also, high blood cholesterol is sometimes familial.<sup>12</sup> Utah adults with fewer years of formal education or lower income were less likely to have had their cholesterol level checked.

### How does Utah compare to the U.S.? Other states? HP2010 targets?

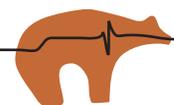
In 1999, only 63.6% of Utah adults had their cholesterol level checked within the past five years, lower than the 1999 national average of 70.6%. (Figure 1-8) Utah's rate was also lower than the 1999 regional average of 68.4%. The Healthy People 2010 objective is to increase to 80% the proportion of adults who have had their blood cholesterol checked within the preceding five years.<sup>5</sup> In 1999, 19.3% of Utah adults had been told that their cholesterol level was high. This was slightly lower than the national average of 21.4% but similar to the regional average of 19.6%.

### Did you know?

- Only 63.6% of Utah adults have had their cholesterol level checked compared to 70.6% nationally.
- Nearly 40% of Utah females and 35% of Utah males aged 65 to 74 have been told that their cholesterol level is high.
- Approximately 42% of Utah adults with diabetes have been told they have high cholesterol.
- In 1999, 68.1% of Utah adults who were aware that they had a high cholesterol level were also overweight or obese.



Source: Behavioral Risk Factor Surveillance System. Data were not available in 1994, 1996 and 1998; therefore, data for contiguous years were averaged in order to construct data points for the missing years.



## Health Behaviors of Adults: Overweight/Obesity

### Why is it important?

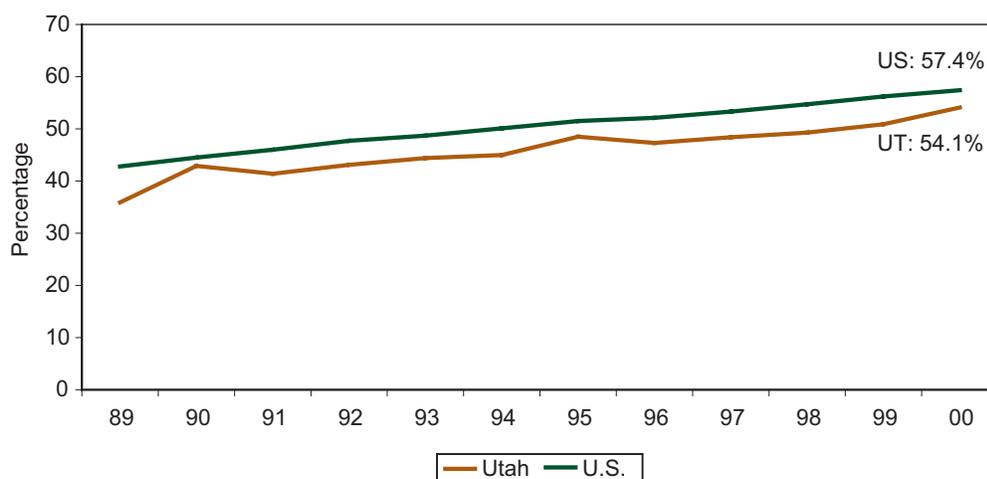
*Obesity is the second leading cause of preventable death in the United States.<sup>13</sup> Only smoking exceeds obesity in contributing to total U.S. mortality rates.<sup>7</sup> The number and percentage of overweight or obese persons in Utah and the U.S. has increased dramatically over the past 10 years.<sup>14</sup> Adults who are overweight or obese are also at increased risk for morbidity from hypertension, high cholesterol, type 2 diabetes, coronary heart disease, stroke, osteoarthritis, sleep apnea, respiratory problems, and endometrial, breast, prostate and colon cancers.<sup>15</sup>*

### How big is the problem in Utah?

The proportion of Utahns aged 18 or older who were overweight or obese increased steadily from 35.9% in 1989 to

54.1% in 2000. (Figure 1-9) In fact, the number of overweight or obese Utah adults has more than doubled since 1989 from an estimated 388,500 persons to an estimated 801,600 persons in 2000.

Figure 1-9: Overweight or Obese  
Percentage of Adults Classified as Overweight or Obese  
Utah and US: 1989-2000



Note: Overweight is defined as having a body mass index (BMI) of 25 to 29 and obese is defined as a BMI of 30 or greater.

Source: Behavioral Risk Factor Surveillance System.

People tend to overestimate height and underestimate weight, so the true obesity prevalence may be even higher than reported here.

### Who is at risk?

Genetic or familial factors may increase the risk of overweight/obesity for some people, but anyone whose calorie intake exceeds the number of calories they burn is at risk. Physical activity and a healthy diet are both important for maintaining a healthy weight.<sup>5</sup> Dietary and activity habits formed during childhood and adolescence may be difficult to change as an adult. More Utah men than women were overweight or obese and this trend was seen across all age groups. (Figure 1-10)

However, from 1989 to 2000, there was a 63% increase in the percentage of overweight or obese females compared to a 42% increase among males during the same time period.

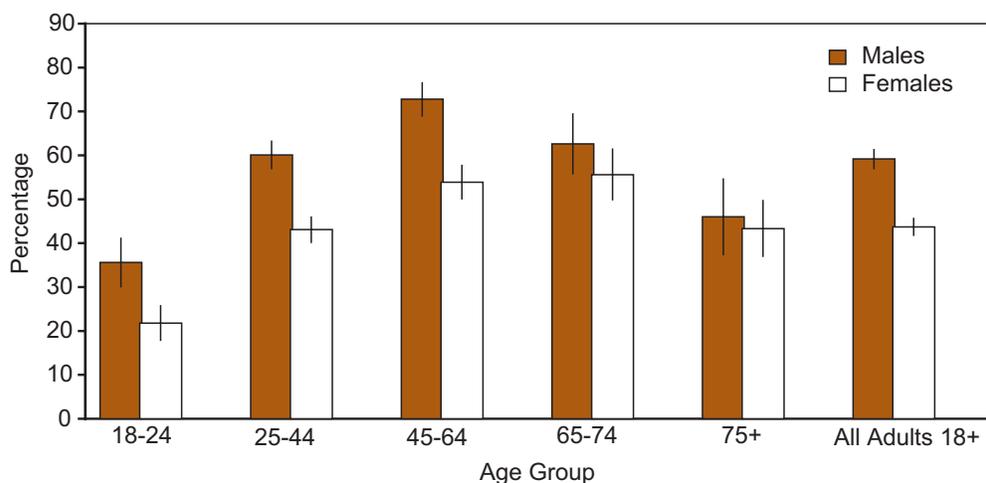
### How does Utah compare to the U.S.? Other states? HP2010 targets?

In 2000, approximately 54% of Utah adults were overweight or obese. In the United States, the overall overweight/obesity prevalence in 2000 was 57.4%, and 53.3% regionally (Idaho, Wyoming, Colorado New Mexico, Arizona, Nevada, and Utah). The Healthy People 2010 goal is to increase the proportion of adults who are at a healthy weight to 60%.<sup>5</sup> As of 2000, Utah was below this goal at 45.9%.

## Did you know?

- As of 2000, over half of all Utah adults were overweight or obese.
- In 2000, 65.8% of Utah adults who reported fair or poor health were overweight or obese.
- In 2000, approximately 77% of Utah adults with diabetes were overweight or obese.
- More than 68% of Utah adults who were aware they had high blood pressure or high cholesterol in 1999 were also overweight or obese.
- In 2000, 57.7% of Utah adults who reported engaging in no physical activity were overweight or obese.

Figure 1-10: Overweight or Obese  
Percentage of Adults Classified as Overweight or Obese  
by Age Group and Sex, Utah: 1998-2000



Note: Overweight is defined as a body mass index (BMI) of 25 to 29 and obese is defined as a BMI of 30 or greater  
Source: Utah Behavioral Risk Factor Surveillance System



# Health Behaviors of Adults: Consumption of Fruits and Vegetables

## Why is it important?

*A diet of five or more servings of fruits and vegetables per day is associated with a reduced risk of coronary heart disease, some types of cancer, diabetes, and other chronic diseases. Additionally, fruits and vegetables reduce blood pressure, improve eyesight, are high in vitamins, minerals and fiber, are low in calories and fat, and taste good. Dietary habits established during youth may extend into adulthood and affect the prevalence and burden of future chronic diseases.*

## How big is the problem in Utah?

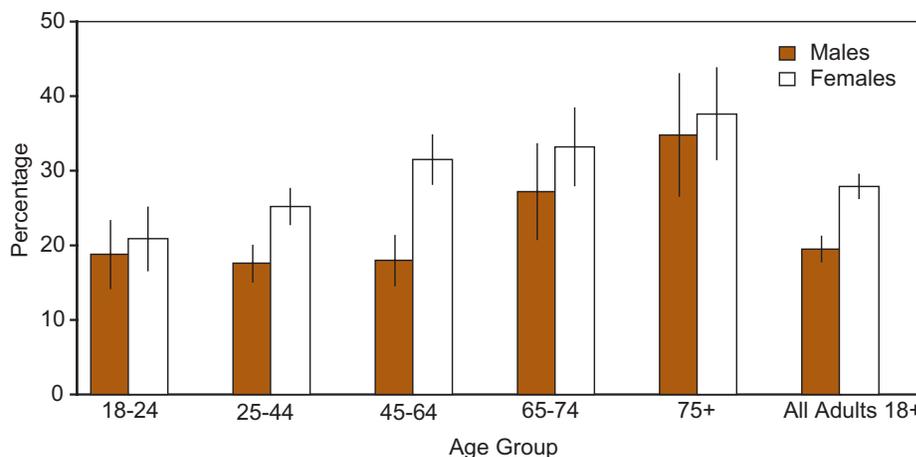
In 2000, only 20.6% of Utah adults reported eating five servings of fruits and vegetables a day. This percentage was higher than the 18.0% reported in 1994. However, the remaining 79.4% of Utah adults are missing the benefits of eating

five servings of fruits and vegetables per day.

## Who is at risk?

Utah women were more likely than Utah men to eat five servings of fruits and vegetables each day. (Figure 1-11)

Figure 1-11: Consumption of Fruits and Vegetables  
Percentage of Adults Who Reported Eating Five Daily Servings of Fruits and Vegetables by Age Group and Sex, Utah: 1998-2000



Source: Utah Behavioral Risk Factor Surveillance System

Overall, younger adults consumed fewer fruits and vegetables. In fact, adults 75 years of age or older were most likely to eat five servings of fruits and vegetables per day (36.5%). Individuals with fewer years of education also reported eating fewer servings of fruits and vegetables per day.

### How does Utah compare to the U.S.? Other states? HP2010 targets?

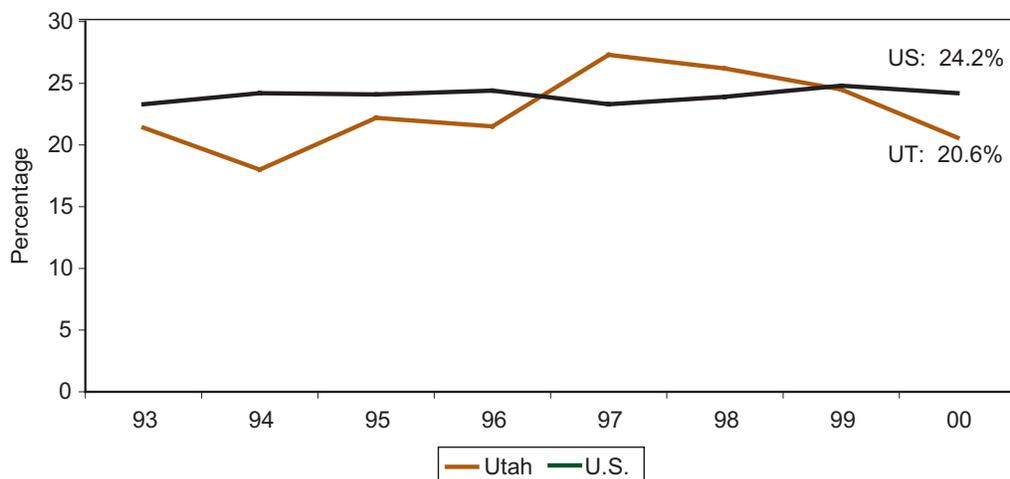
In 2000, 20.6% of Utah adults consumed five servings of fruits and vegetables per day compared to 24.2% in the United States (Figure 1-12) and 26.3% in the region, including Idaho, Wyoming, Colo-

rado, New Mexico, Arizona, Nevada, and Utah. The Healthy People 2010 target is to increase the proportion of persons aged two years and older who consume at least two daily servings of fruit to 75%.<sup>5</sup> According to recent statewide surveys, only 35.1% of Utah adults were eating two or more servings of fruit per day.<sup>16</sup> The Healthy People 2010 target is to increase the proportion of persons aged two years and older who consume at least three daily servings of vegetables, with at least one-third being dark green or deep yellow vegetables to 50%.<sup>5</sup> Only 22.5% of Utah adults were eating three or more servings of vegetables a day.<sup>16</sup>

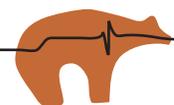
### Did you know?

- In 2000, only 20.6% of Utah adults reported eating five servings of fruits and vegetables each day.
- More adult women than men in Utah ate five servings of fruits and vegetables each day (27.9% compared to 19.5%).
- Older Utahns were more likely to eat five servings of fruits and vegetables each day than younger Utahns.

Figure 1-12: Consumption of Fruits and Vegetables  
Percentage of Adults Who Reported Eating Five Daily Servings  
of Fruits and Vegetables, Utah and US: 1993-2000



Source: Behavioral Risk Factor Surveillance System.



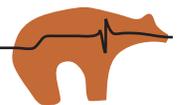
## Cardiovascular Disease in Utah: Chapter 1

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### References:

1. Office of the Executive Director. (2000). Utah Public Health Outcome Measures Report. Salt Lake City, UT: Utah Department of Health.
2. Office of Public Health Assessment. (1999). Utah Behavioral Risk Factor Surveillance System, Local Health District Report. Salt Lake City, UT: Utah Department of Health.
3. Division of Community and Family Health Services. (2000). CFHS Division Plan and Report, 2001. Salt Lake City, UT: Utah Department of Health.
4. Center for Health Data. (2000, December). Utah BRFSS Brief. Salt Lake City, UT: Utah Department of Health.
5. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010 (2nd ed. with Understanding and Improving Health and Objectives for Improving Health, 2 vols). Washington, DC: U.S. Government Printing Office.
6. U.S. Department of Health and Human Services. (1996). Physical Activity and Health: A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
7. Allison, D. B., Fontaine, K. R., Manson, J. E., et.al. (1999, October 27). Annual death attributable to obesity in the United States. Journal of the American Medical Association (JAMA), 292, 1530-1538.
8. McGinnis, J. M., Foege, W. H. (1993, November 10). Actual causes of death in the United States. Journal of the American Medical Association (JAMA), 270 (18), 2207-12.
9. American Heart Association. High Blood Pressure. (n.d.). Retrieved April 10, 2002 from <http://www.americanheart.org>. Dallas, Texas: American Heart Association.
10. The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. (1997). Archives of Internal Medicine, 157, 2413-2446.
11. American Heart Association. (2002). 2002 Heart and Stroke Statistical Update. Dallas, TX: Author.
12. National Cholesterol Education Program. (1993). Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol In Adults. (NIH Publication 93-3095). Washington, DC: U.S. Department of Health and Human Services.
13. Mokdad, A. H., Serdula, M. K., Dietz, W. H., et.al. (1999). The spread of the obesity epidemic in the United States, 1991-1998. Journal of the American Medical Association (JAMA), 282 (16), 1519-1522.

14. Centers for Disease Control and Prevention. (2000). Preventing Cardiovascular Disease: Addressing the Nation's Leading Killer. At A Glance, 2000. Atlanta, GA.
15. National Institutes of Health, National Heart, Lung and Blood Institute. (1998, June). Clinical Guidelines on the identification evaluation and treatment of overweight and obesity in adults. HHS, Public Health Service.
16. Utah Department of Health. (1998-2000). BRFSS, Utah 1998-2000 fruit and vegetable calculations. Unpublished data.



## Health Behaviors of Youth: Smoking

### Why is it important?

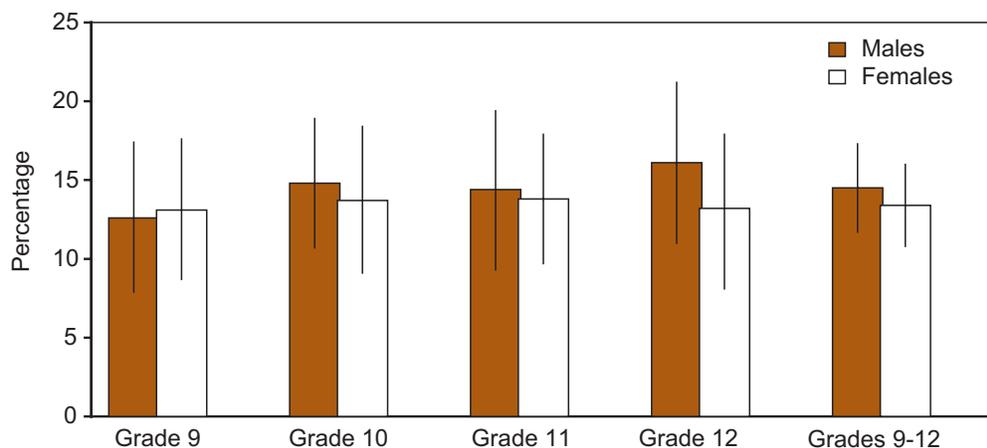
*Cigarette smoking causes heart disease, chronic lung disease, several kinds of cancer, and other diseases.<sup>1</sup> It is the single most preventable cause of disease and death in the United States.<sup>2</sup> Approximately 80% of tobacco users started using before they were 18 years old.<sup>3</sup> If current tobacco use patterns persist, approximately 5 million persons who are now under age 18 years will die prematurely from a smoking-related disease in the United States.<sup>1</sup>*

### How big is the problem in Utah?

At 11.9%, Utah's adolescent smoking rate in 1999 was among the lowest in the United States. According to combined data from surveys conducted in 1997 and 1999, current cigarette use by Utah students increased from 12.9% in the 9th

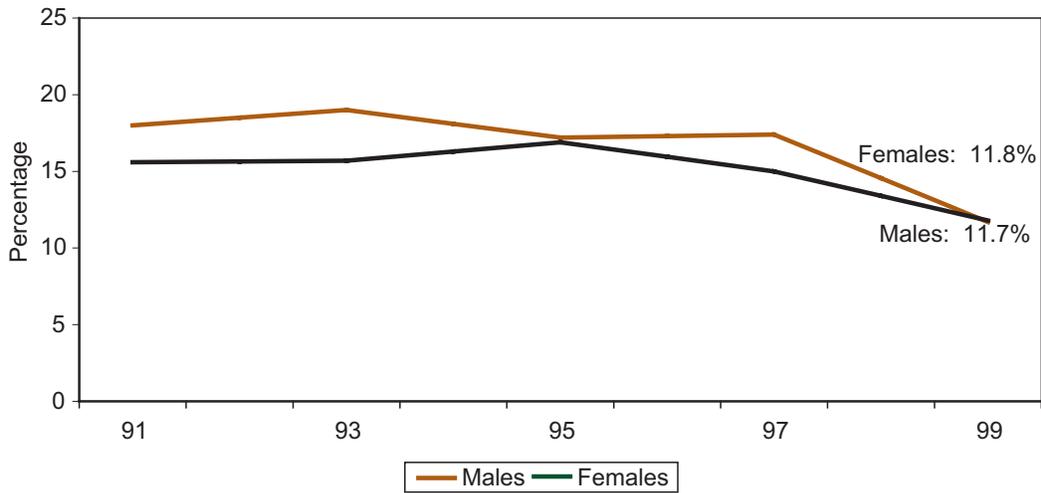
grade to 15.2% in the 12th grade. (Figure 2-1) In 1991, 18.0% of Utah male adolescents reported current cigarette use whereas only 15.6% of females reported current cigarette use. By 1999, the percentage of males and females reporting current cigarette use was approximately the same. (Figure 2-2)

Figure 2-1: Current Cigarette Use  
Percentage of High School Students Who Reported Current Cigarette Use\* by Grade and Sex, Utah: 1997, 1999



\* Defined as having smoked cigarettes on one or more of the 30 days preceding the survey  
Source: Utah Youth Risk Behavior Survey conducted every other year in Utah

Figure 2-2: Current Cigarette Use  
 Percentage of High School Students Who Reported Current  
 Cigarette Use\* by Sex and Year, Utah: 1991, 1993, 1995, 1997, 1999



\* Defined as having smoked cigarettes on one or more of the 30 days preceding the survey

Source: Utah Youth Risk Behavior Survey conducted every other year in Utah. Data were not available in 1992, 1994, 1996 and 1998; therefore, data for contiguous years were averaged in order to construct data points for the missing years.

### Who is at risk?

Risk factors for tobacco use among adolescents include lower socioeconomic status, parental and sibling usage, peer usage and pressure, lack of parental involvement, and low self-esteem.<sup>1</sup>

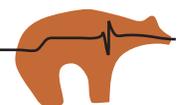
### How does Utah compare to the U.S.? Other states? HP2010 targets?

In 1999, U.S. high school students reporting current cigarette use was 34.8% compared to 11.9% in Utah.<sup>4</sup> Utah's rate is well below the national average and lower than the Healthy People 2010 target of 16%.<sup>1</sup>

### Did you know?

- An estimated 17,600 Utah high school students reported current cigarette use in 1999.
- In 1999, teenage girls in Utah were as likely to smoke as teenage boys (11.8% compared to 11.7%).
- Current cigarette use among Utah high school students increased from 12.9% in 9<sup>th</sup> grade to 15.2% in 12<sup>th</sup> grade.

\*Current cigarette use is defined as having smoked cigarettes on one or more of the 30 days preceding the survey.



# Health Behaviors of Youth: Physical Activity

## Why is it important?

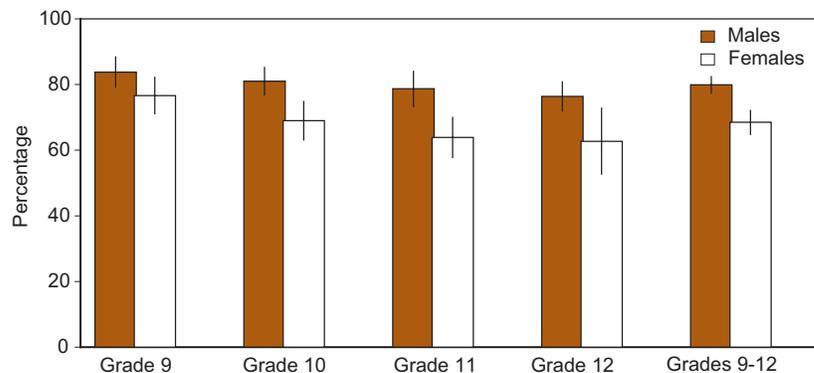
*Physical activity is associated with improved academic outcomes.<sup>5</sup> It promotes the development of healthy muscles, bones, and joints. Physical activity can improve psychological well being and help to manage stress. It also can prevent or ease symptoms of depression and anxiety. Physical activity also reduces the risk of developing heart disease, high blood pressure, diabetes, colon cancer, and obesity. For this report, vigorous physical activity was defined as any activity that caused sweating or hard breathing for 20 or more minutes on three or more of the seven days preceding the survey.*

## How big is the problem in Utah?

Most Utah youth reported participating in vigorous physical activity, but the percentage decreased in the upper grades of high school. Eighty percent of 9th grade students reported participating in vigorous

physical activity while only 70.0% of high school seniors reported doing so. At every grade level, more boys than girls reported participating in vigorous physical activity. (Figure 2-3) The percentage of students who attended physical education class on one or more days a week also decreased

Figure 2-3: Vigorous Physical Activity  
Percentage of High School Students Who Reported Participating in Vigorous Physical Activity\* by Grade and Sex, Utah: 1997, 1999



\* Defined as activities that caused sweating or hard breathing for 20 or more minutes on 3 or more of the 7 days preceding the survey

Source: Utah Youth Risk Behavior Survey conducted every other year in Utah

as teens became older. Two-thirds of 9<sup>th</sup> grade students reported attending physical education class at least once each week compared to only 43.8% of students in the 12<sup>th</sup> grade. This decline was more dramatic for females, whose physical education class attendance declined from 63.2% to 34.4% between 9<sup>th</sup> and 12<sup>th</sup> grades.

### Who is at risk?

Senior high school girls were consistently at greatest risk for physical inactivity. In fact, only 34.4% of senior females attended physical education class and only 62.7% participated in vigorous physical activity. The greatest decline in vigorous physical activity among both males and females occurred between the 9<sup>th</sup> and 10<sup>th</sup> grades.

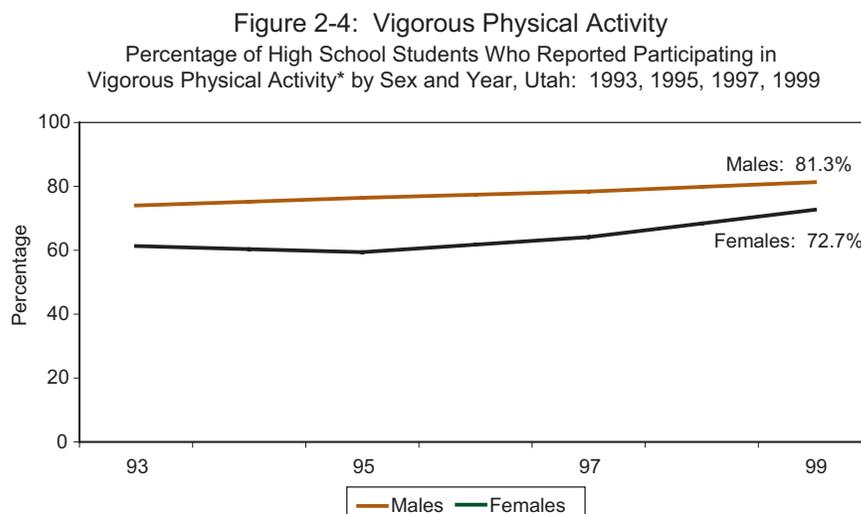
### How does Utah compare to the U.S? Other states? HP2010 targets?

The percentage of female youth in Utah who reported participating in vigorous

physical activity was 72.7% in a recent statewide survey compared to 57.1% in a national survey.<sup>4</sup> Among male youth in Utah, the percentage was 81.3% compared to 72.3% nationally.<sup>4</sup> Utah teens were more likely to attend at least one physical education class per week than teens nationally (59.8% compared to 56.1%).<sup>4</sup> Utah teens may have a higher rate of physical activity because they watch less TV. The percentage of students who report watching two hours or less of TV per day is much higher than the national average. For example, 80.7% of Utah students watch two hours or less of TV each day compared to 57.2% of students nationwide.<sup>4</sup> Physical activity trends among Utah adolescents have improved over time, especially among girls. (Figure 2-4) In 1993, 67.6% of Utah teens reported engaging in vigorous physical activity. This percentage increased to 77.0% in 1999. Despite this increase, Utah teens have yet to reach the Healthy People 2010 objective of 85%.<sup>1</sup>

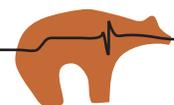
## Did you know?

- Utah has the highest rate of vigorous physical activity among youth in the U.S.<sup>4</sup>
- The level of vigorous physical activity decreased for both boys and girls from the 9<sup>th</sup> to the 12<sup>th</sup> grade.
- The percentage of teens who attended physical education class decreased from 66.4% in the 9<sup>th</sup> grade to 43.8% in the 12<sup>th</sup> grade.
- Only 51.3% of girls and 61.4% of boys attended physical education class on one or more days in an average school week.



\* Defined as activities that caused sweating or hard breathing for 20 or more minutes on 3 or more of the 7 days preceding the survey

Source: Utah Youth Risk Behavior Survey conducted every other year in Utah. Data were not available in 1992, 1994, 1996 and 1998; therefore, data for contiguous years were averaged in order to construct data points for the missing years.



# Health Behaviors of Youth: Overweight and Weight Control

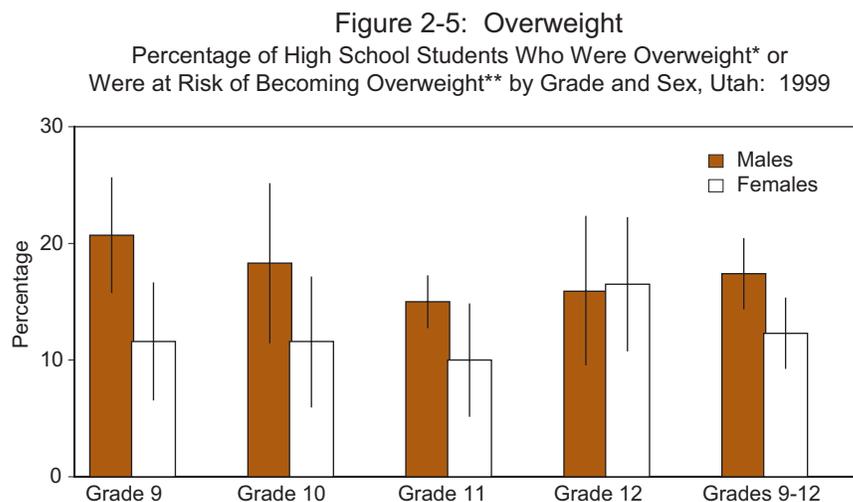
## Why is it important?

The prevalence of overweight youth aged 6 to 17 years in the U.S. has more than doubled in the past 30 years.<sup>6</sup> More than a quarter of the nation's high school students were overweight\* or at risk of becoming overweight\*\* in 1999.<sup>4</sup> Overweight children and adolescents are at increased risk of becoming overweight or obese adults.<sup>7</sup> Obesity in youth is related to elevated blood cholesterol levels and high blood pressure.<sup>8</sup> Fortunately, this population may be the easiest to target with prevention strategies.

## How big is the problem in Utah?

According to data collected by a recent statewide survey, about 15% of Utah students were overweight or at risk of being overweight in 1999. (Figure 2-5) A higher percentage of males were overweight or at risk of being overweight compared to females, 17.4% compared to 12.3%. However, females were more

likely to engage in exercising, dieting or both to lose weight compared to their male peers. Efforts to lose weight through exercise and dieting have increased over time among Utah high school students. In 1997, 23.7% of high school students reported engaging in weight control activities. This percentage increased to 34.2% in 1999.



Source: Utah Youth Risk Behavior Survey conducted every other year in Utah

\* Overweight is defined as greater than or equal to the 95<sup>th</sup> percentile for body mass index by age and sex based on reference data from the National Health and Nutrition Examination Survey I.

\*\* At risk of becoming overweight is defined as greater than or equal to the 85<sup>th</sup> percentile but less than the 95<sup>th</sup> percentile for body mass index by age and sex based on reference data from the National Health and Nutrition Examination Survey I.

Utah students were also asked to describe their weight as very underweight, slightly underweight, about the right weight, slightly overweight, or very overweight. Of note, 25.4% of Utah high school students perceived that they were overweight. (Figure 2-6) This perception did not match the actual percentage of students who were overweight or at risk of becoming overweight as determined by reported height and weight. Utah female teens were more likely than male teens to perceive that they were overweight.

### Who is at risk?

Environmental and behavioral factors are important contributors to overweight and obesity.<sup>7</sup> Children and adolescents who do not get adequate levels of physical activity and/or consume more calories than they burn are at increased risk for overweight. Dietary and activity habits formed during childhood and adolescence may be difficult to change as an adult. Of overweight children aged 5 to 10 years, 60.0% already have one or more additional cardiovascular

disease risk factors and 25.0% have two or more.<sup>9</sup> Doctors are also diagnosing more type 2 diabetes among adolescents.<sup>7</sup>

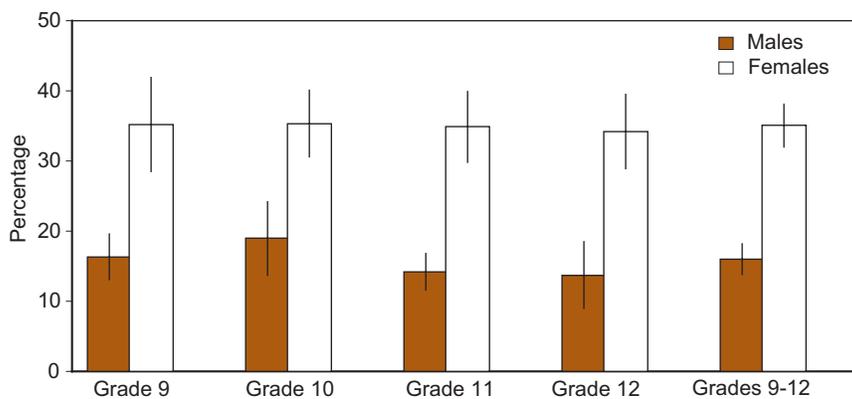
### How does Utah compare to the U.S.? Other states? HP2010 targets?

In 1999, 14.9% of Utah high school students were overweight or were at risk for becoming overweight compared to 25.9% nationwide.<sup>4</sup> The Healthy People 2010 objective is to reduce the proportion of children and adolescents who are overweight or obese to 5%.<sup>1</sup> Nationwide, 30.0% of students thought they were overweight compared to 25.4% in Utah.<sup>4</sup> As in Utah, female high school students in the U.S. were also more likely to perceive they were overweight compared to males, but were less likely to be at risk of being overweight.<sup>4</sup> In 1999, 57.7% of Utah high school students exercised to lose weight or avoid weight gain compared to 58.4% nationwide.<sup>4</sup> Nationwide, 40.4% of high school students dieted to control their weight compared to 36.6% of Utah high school students.<sup>4</sup>

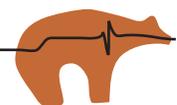
## Did you know?

- Almost 15% of Utah high school students were at risk for being overweight or were overweight in 1999.
- Exercise is the most popular method of weight control among Utah high school students.
- Approximately 25% of Utah high school students perceive themselves as being overweight.

Figure 2-6: Perceived Overweight  
Percentage of High School Students Who Perceived They Were Overweight by Grade and Sex, Utah: 1997, 1999



Source: Utah Youth Risk Behavior Survey conducted every other year in Utah



# Health Behaviors of Youth: Consumption of Fruits and Vegetables

## Why is it important?

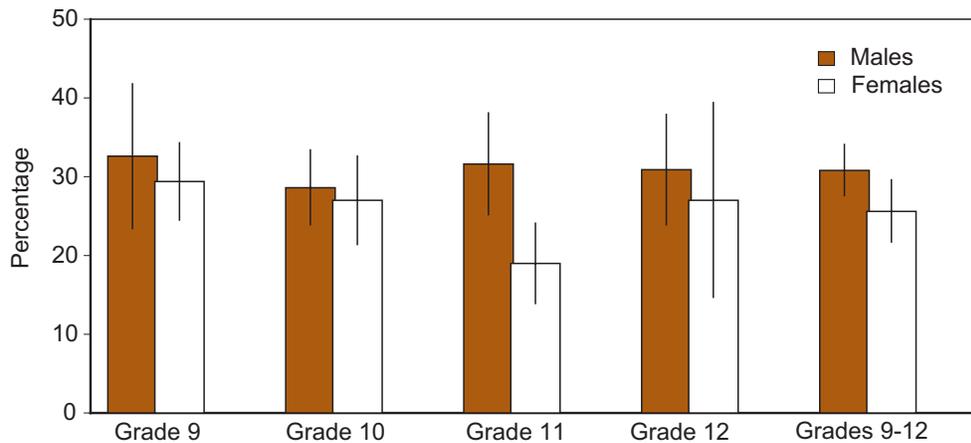
*People who eat few fruits and vegetables are at higher risk for developing several types of cancer, heart disease, stroke, and other chronic diseases. It is recommended that people eat at least two servings of fruit and three servings of vegetables each day to receive the minimum levels of vitamins and minerals that prevent disease. Encouraging children to develop a habit of eating fruits and vegetables can potentially improve the health of all Americans.<sup>10</sup>*

## How big is the problem in Utah?

According to combined data from surveys conducted in 1997 and 1999, only 28.2% of Utah high school students reported eating five daily servings of fruits and vegetables. (Figure 2-7) This percentage

has not changed appreciably over time. Adolescents see thousands of food advertisements each year on television. These advertisements are most often for energy-dense, nutrient-poor foods, often available in school vending machines.

Figure 2-7: Consumption of Fruits and Vegetables  
Percentage of High School Students Who Reported Eating Five Daily Servings of Fruits and Vegetables by Grade and Sex, Utah: 1997, 1999



Source: Utah Youth Risk Behavior Survey conducted every other year in Utah

### Who is at risk?

Adolescents who eat more fruits and vegetables are likely to also eat more of them as adults.<sup>10</sup> Female adolescents in Utah were less likely to consume five servings of fruits and vegetables compared to male adolescents. (Figure 2-8)

### How does Utah compare to the U.S.? Other states? HP2010 targets?

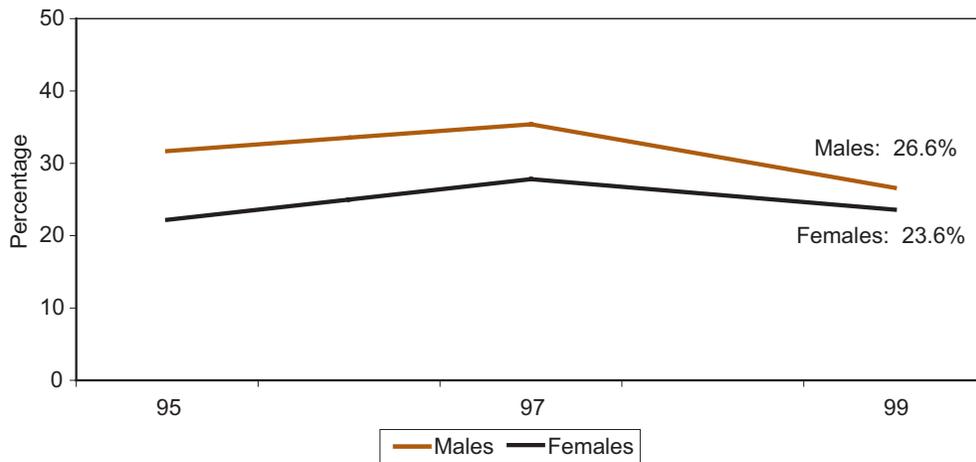
In 1999, 23.9% of U.S. adolescents reported eating five servings of fruits and vegetables a day compared to 25.1% of Utah adolescents.<sup>4</sup> The Healthy People

2010 target for fruit is to increase the proportion of persons aged two years and older who consume at least two daily servings of fruit to 75%.<sup>1</sup> The target for vegetables is to increase the proportion of persons aged two years and older who consume at least three daily servings of vegetables, with at least one-third being dark green or deep yellow vegetables to 50 percent.<sup>1</sup> Consumption of 5 A Day by Utah adolescents remains well below the Healthy People 2010 targets.

### Did you know?

- One-fourth of Utah adolescents reported eating 5 A Day in 1999.
- Utah boys were more likely than girls to eat five daily servings of fruits and vegetables.
- People who form the habit of eating fruits and vegetables early in life are likely to maintain the behavior as adults.<sup>10</sup>

Figure 2-8: Consumption of Fruits and Vegetables  
Percentage of High School Students Who Reported Eating Five Daily Servings of Fruits and Vegetables by Sex and Year, Utah: 1995, 1997, 1999



Source: Utah Youth Risk Behavior Survey conducted every other year in Utah. Data were not available in 1996 and 1998; therefore, data for contiguous years were averaged in order to construct data points for the missing years

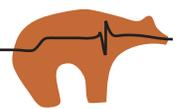


## Cardiovascular Disease in Utah: Chapter 2

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### References:

1. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010 (2nd ed. with Understanding and Improving Health and Objectives for Improving Health. 2 vols.). Washington, DC: U.S. Government Printing Office.
2. Division of Community and Family Health Services. (2000). CFHS Division Plan and Report, 2001. Salt Lake City, UT: Utah Department of Health.
3. Centers for Disease Control and Prevention. (2001). Youth Tobacco Surveillance — United States. Morbidity and Mortality Weekly Report Surveillance Summaries 50(SS04);1-84.
4. Centers for Disease Control and Prevention. (2000). Youth Risk Behavior Surveillance - United States. Morbidity and Mortality Weekly Report Surveillance Summaries 49(SS05);1-96.
5. Symons, C. W., Cinelli, B. (1997). Bridging student health risks and academic achievement through comprehensive school health programs. Journal of School Health, 67(6), 220-227.
6. National Center for Health Statistics, Center for Disease Control and Prevention. (1999). Prevalence of overweight among children and adolescents: United States, 1999. Hyattsville, MD: NCHS. Retrieved April 10, 2002, from NCHC, CDC Web site: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/over99fig1.htm>
7. U.S. Department of Health and Human Services. (2001). The Surgeon General's call to action to prevent and decrease overweight and obesity. Washington, DC: U.S. Government Printing Office.
8. Dietz, W. H. (1998). Health consequences of obesity in youth: childhood predictors of adult disease. Pediatrics, 101(3), 518-525.
9. Centers for Disease Prevention and Control. (2000). Preventing Obesity Among Children. Chronic Disease Notes and Reports, 13, 1:1-3.
10. National Cancer Institute. (1991). 5 A Day for Better Health Program. 5 A Day Baseline Study of America's Fruit and Vegetable Consumption. Rockville, MD.



# Cardiovascular Disease: Focus on Mortality

### Why is it important?

*Cardiovascular disease (CVD) is the leading killer among both men and women and across all racial and ethnic groups in the U.S.<sup>1</sup> CVD includes those diseases and conditions that affect the heart and blood vessels such as high blood pressure, heart disease, and stroke. Approximately 960,000 Americans die of cardiovascular disease each year which accounts for more than 40% of all deaths in this country.<sup>1</sup> And mortality is only part of the picture. Heart disease is a leading cause of disability among U.S. adults.<sup>2</sup> Almost one-fourth of Americans live with some form of cardiovascular disease.<sup>1</sup>*

### How big is the problem in Utah?

CVD is the leading cause of death and disability for both men and women in Utah, accounting for approximately 4,000 deaths each year. The number and age-adjusted death rates due to all CVD, coronary heart disease (CHD), acute myocardial infarction (AMI), and congestive heart failure (CHF) for the three-year period 1998 through 2000 are provided in Table 3-1.

Utah men had higher age-adjusted mortality rates for CVD than women during this time period. Utah men also died from

coronary heart disease and acute myocardial infarction (a subset condition of CHD) at a higher rate than Utah women. The age-adjusted mortality rate for CHF was slightly higher among females than among males.

### Who is at risk?

Individuals who smoke, have high blood pressure, elevated blood cholesterol, diabetes, poor nutrition or a family history of heart disease or who are overweight or physically inactive are at greater risk of developing cardiovascular disease.

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CVD defined here as ICD-10 codes I00-I78 in order to compare with U.S. data.

## How does Utah compare to the U.S.? Other states? HP2010 targets?

During the period 1996 through 1998, Utah's age-adjusted mortality rate for total cardiovascular disease was the second lowest in the nation.<sup>3</sup> Utah's 1999 CVD mortality rate of 271.9 per 100,000 population (age-adjusted to the U.S. 2000 standard population) was 22% lower than the corresponding U.S. rate of 348.5 per 100,000.\*<sup>4,5</sup> Healthy People 2010 objective 12-1 addresses the need to reduce coronary heart disease deaths, a subset of cardiovascular deaths, to 166 deaths per 100,000 population.<sup>6</sup> The U.S. baseline in 1998 was 208 coronary heart disease deaths per 100,000 population (age-adjusted to the U.S. 2000 standard population). While Utah has already met this objective with an age-adjusted rate of 133.9 deaths per 100,000 population in 1998, the Cardiovascular Health Program and partners are working to decrease this rate even further.<sup>4</sup>

Table 3-1: Number and Age-adjusted\* Death Rates Due to Cardiovascular Disease by Condition and Sex, Utah: 1998-2000

Condition	Males		Females		Both	
	Number	AA Rate*	Number	AA Rate*	Number	AA Rate*
<b>CVD</b>	<b>5,764</b>	<b>318.9</b>	<b>6,197</b>	<b>239.8</b>	<b>11,961</b>	<b>275.6</b>
↳ <b>CHD</b>	<b>3,093</b>	<b>168.5</b>	<b>2,337</b>	<b>90.7</b>	<b>5,430</b>	<b>124.5</b>
↳ <b>AMI</b>	<b>1,212</b>	<b>65.0</b>	<b>958</b>	<b>37.4</b>	<b>2,170</b>	<b>49.5</b>
↳ <b>CHF</b>	<b>421</b>	<b>26.8</b>	<b>759</b>	<b>29.4</b>	<b>1,180</b>	<b>28.4</b>

\* Rates per 100,000 population per year, age-adjusted to the U.S. 2000 population; crude rates available upon request.

Source: Utah death certificate data; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED Model, published January 2000.

### \*\* Conditions:

Cardiovascular Disease (CVD) was defined as ICD-9 codes 390-448 and ICD-10 codes I00-I78, G45. CVD deaths include deaths listed for CHD, AMI and CHF among other conditions.

Coronary Heart Disease (CHD) was defined as ICD-9 codes 402, 410-414, 429.2 and ICD-10 codes I11, I20-I25.

Acute Myocardial Infarction (AMI) was defined as ICD-9 code 410 and ICD-10 I21 and I22.

Congestive Heart Failure (CHF) was defined as ICD-9 codes 428.0, 428.1, 428.9 and ICD-10 codes I500, I501, I509.

Note: According to guidelines governing the writing of cause-of-death statements, congestive heart failure should not be listed as an underlying cause of death on the death certificate and, therefore, these data should be interpreted with caution.

## Did you know?

- Cardiovascular disease (CVD) is the leading cause of death in Utah for both women and men.
- In 2000, a total of 4,148 Utahns died as a result of CVD.
- Eliminating CVD would increase life expectancy by about 10 years.<sup>1</sup>
- Many CVD deaths can be prevented by abstaining from smoking, controlling high blood pressure, high cholesterol and diabetes, adopting a healthy diet and becoming physically active.

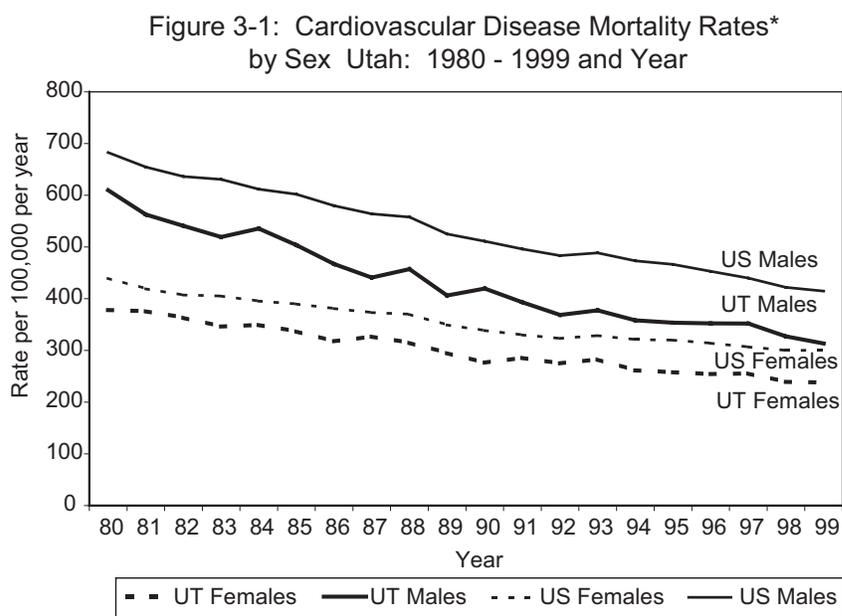
\* CVD defined here as ICD-10 codes I00-I78 in order to compare with U.S. data.



## Cardiovascular Disease in Utah: Chapter 3

Age-adjusted death rates for CVD have been decreasing over time for both males and females in Utah and the U.S. (Figure 3-1). This decline is most likely due to improved medical treatment and greater emphasis on reducing the major controllable cardiovascular risk factors.<sup>3</sup> CVD mortality rates in Utah have been consistently below U.S. rates.

CVD is an important health problem for both men and women. In fact, more Utah women than men died as a result of CVD during the time period 1998 through 2000. The percentage of all deaths due to CVD was higher for women than men (35% compared to 31%) during this time period and increased for both men and women with increasing age. Men experienced a dramatic increase after age 44 while the increase among women was more gradual. CVD exacts a much higher toll at younger ages for men. For example, 39% of male CVD deaths occurred under age 75 compared to only 20% of female CVD deaths.

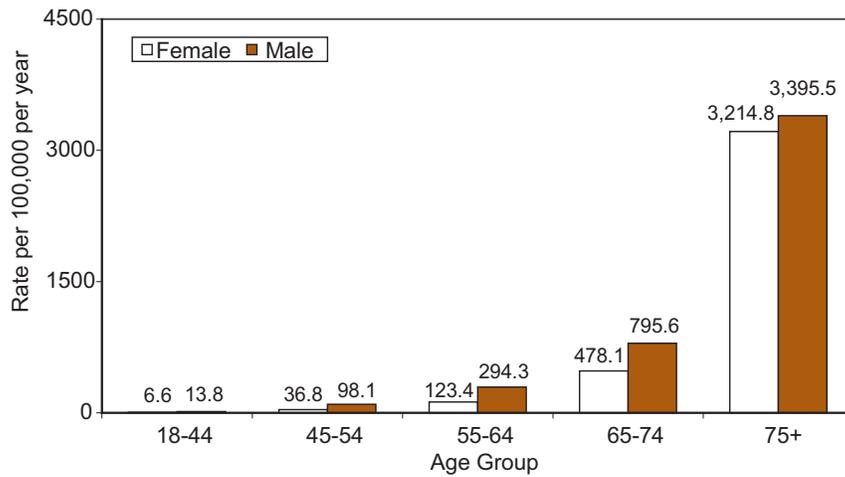


\* Age-adjusted to the U.S. 2000 population. ICD-9 codes for 1980-1998: 390-448; ICD-10 codes for 1999: I00-I78, G45 (UT) and I00-I78 (US)

Source: Utah death certificate data; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED model, published January 2000; U.S. data from CDC WONDER

CVD mortality rates also increased with increasing age for both men and women (Figure 3-2). Mortality rates were higher for men in every age group. There was a marked increase in CVD death rates for Utahns 75 years of age or older.

Figure 3-2: Cardiovascular Disease Mortality Rates by Age Group and Sex, Utah: 1998 - 2000

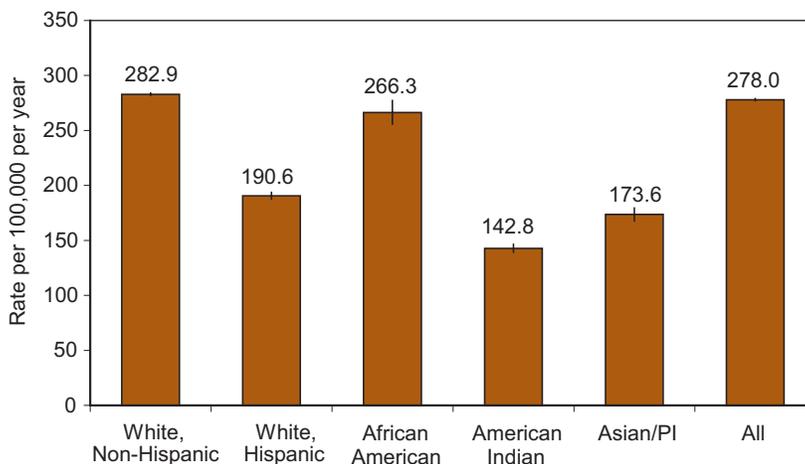


ICD-9 codes: 390-448, ICD-10 codes: I00-I78, G45

Source: Utah death certificate data; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED model, published January 2000

Mortality rates also differed by race and ethnicity. Utahns who described themselves as White and non-Hispanic had the highest CVD mortality rates, followed by African Americans. American Indians had the lowest CVD mortality rate (Figure 3-3). Nationally, mortality rates for heart disease have been consistently higher in the African American population compared to the White population.<sup>6</sup> The lower rate for African Americans in Utah may represent a true difference or may be due to the relatively small population of African Americans living here.

Figure 3-3: Cardiovascular Disease Mortality Rates\* by Race/Ethnicity, Utah: 1997 - 1999



\* Rates have been age-adjusted to the 2000 U.S. population

ICD-9 codes: 390-448, ICD-10 codes: I00-I78, G45

Source: Utah death certificate data; Utah population estimates projected from the 1990 U.S. Census by the U.S. Census Bureau

Note: Mortality data may underestimate death rates for ethnic minorities, especially American Indians

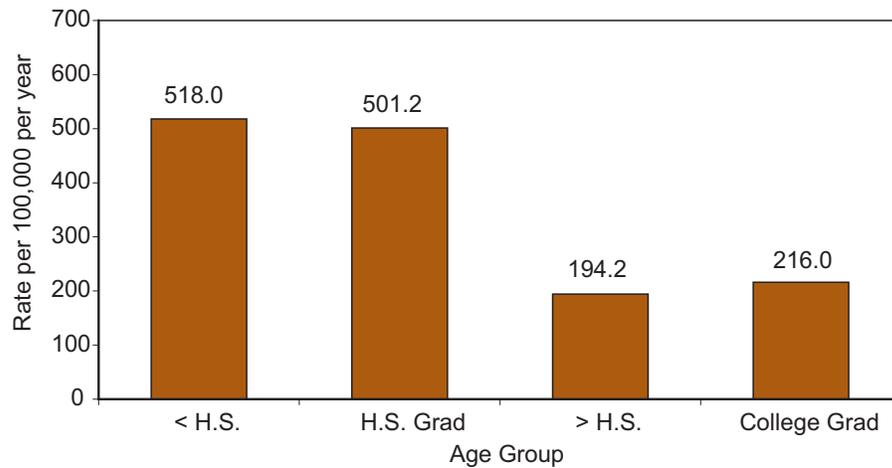


## Cardiovascular Disease in Utah: Chapter 3

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Individuals who did not graduate from high school had the highest death rates from cardiovascular disease (Figure 3-4). CVD mortality rates decreased somewhat for high school graduates and decreased markedly for those with education beyond high school. The contribution of socioeconomic status to risk factors for CVD was examined by Winkleby et al.<sup>7</sup> In that study, education was significantly associated with cigarette smoking, blood pressure, and cholesterol levels, with higher risk associated with lower levels of education. While education level is known to be strongly related to health status, it is likely that some other factor(s), such as higher income, self-determination, mental health, or quality of social and family support, leads to both higher education levels and better health.<sup>8</sup>

Figure 3-4: Cardiovascular Disease Mortality Rates for Utahns 25 Years of Age or Older by Education Level  
Utah: 1998 - 2000

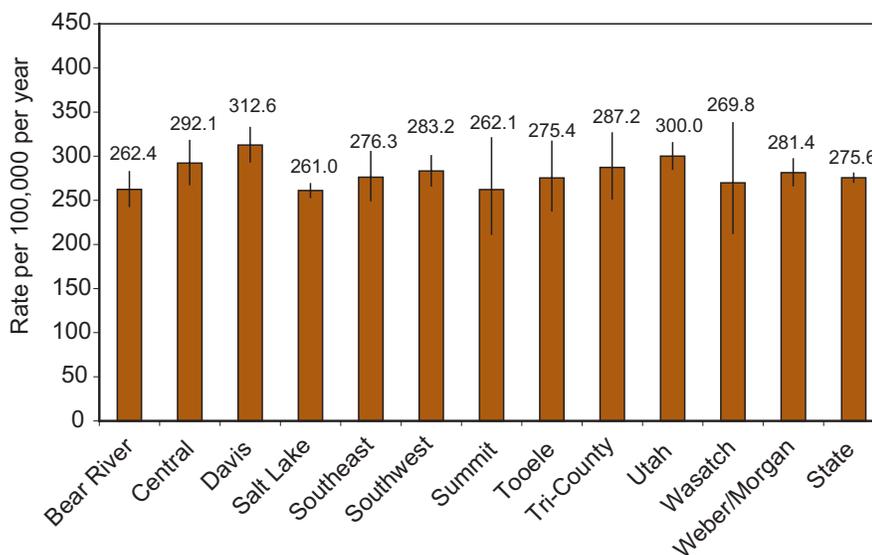


ICD-9 codes: 390-448, ICD-10 codes: I00-I78, G45

Data Source: Death certificate data; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000; educational attainment based on proportions from the 1990 Census

Seven of Utah's 12 local health districts had CVD death rates which were the same or somewhat higher than that for the state as a whole (Figure 3-5). Differences in CVD death rates by geographic area may be related to variation in the prevalence of risk factors such as family history of heart disease or lifestyle behaviors such as use of tobacco, level of physical activity, and diet. For example, the percentage of adults classified as overweight or obese, a risk factor for CVD, exceeded the overall state percentage in Davis, Southeast, Southwest, and Tri-County Health Districts.<sup>9</sup> Other possibilities to consider include differences in health insurance status which affects access to preventive health care. According to the 2001 Utah Health Status Survey, the percentage of adults who reported having no health insurance was highest for residents living in rural\* and frontier\* areas of the state.<sup>10</sup> The delivery of emergency medical services also differs by geographic area. For example, the average time in minutes from dispatch to arrival at the scene increases as the population density decreases.<sup>11</sup> Regional differences may also exist for the availability of high quality medical and surgical care for CVD.

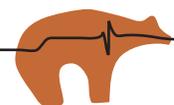
Figure 3-5: Cardiovascular Disease Mortality Rates\* by Local Health District, Utah: 1998 - 2000



\* Rates have been age-adjusted to the U.S. 2000 population. ICD-9 codes: 390-448; ICD-10 codes: I00-I78, G45

Source: Utah death certificate data; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED model, published January 2000; U.S. data from CDC WONDER

\* Please see Appendix F for a listing of urban, rural and frontier counties in Utah.

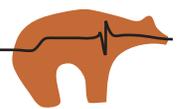


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### References:

1. Centers for Disease Control and Prevention. (2000). Preventing cardiovascular disease: Addressing the nation's leading killer. At-A-Glance 2000. Atlanta, GA: author.
2. Centers for Disease Control and Prevention. (2001). Prevalence of disabilities and associated health conditions among adults—United States, 1999. Morbidity and Mortality Weekly Report, 50 (7),120-125. Atlanta, GA: author.
3. American Heart Association. (2001). 2002 Heart and Stroke Statistical Update. Dallas, TX: author.
4. Utah Department of Health. (n.d.) Mortality Database. IBIS-Q query system. Accessed April 10, 2002 at <http://health.utah.gov/ibis-ph/>.
5. Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System. (September 21, 2001). Deaths: Final Data for 1999, 49 (8).
6. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010. With understanding and improving health and objectives for improving health. 2 vols. (2nd ed.). Washington, DC: U.S. Government Printing Office.
7. Winkleby, M.A., Jatulis, D.E., Frank, E., Fortmann, S.P. (1992). Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. American Journal of Public Health, 82(6), 816-820.
8. Office of the Executive Director. (2001). Utah Public Health Outcome Measures Report. Salt Lake City, UT: Utah Department of Health.
9. Center for Health Data. (2001). Cardiovascular Disease and Risk Factor Data Tables for Utah. Salt Lake City, UT: Utah Department of Health.
10. Office of Public Health Assessment. (2002). Overview of the 2001 Utah Health Status Survey Report. Salt Lake City, UT: Utah Department of Health.
11. Bureau of Emergency Medical Services. (July, 2001). Utah Prehospital EMS Incident Profile Statewide Summary Report 1998. Salt Lake City, UT: Utah Department of Health.



# Coronary Heart Disease: Focus on Interventions

### Why is it important?

*Coronary heart disease (CHD) is a condition in which atherosclerosis develops in the coronary arteries which supply blood to heart muscle. When blood flow through these arteries is reduced, the heart muscle does not receive sufficient oxygen leading to angina (chest pain), heart attack, or other complications.<sup>1</sup> An estimated 12 million Americans have CHD.<sup>2</sup> According to the American Heart Association, approximately 220,000 fatal CHD events occur suddenly each year among unhospitalized individuals.<sup>3</sup> Prevention of CHD is key to reducing mortality from this condition.<sup>4</sup> CHD is the largest component of cardiovascular disease and the one that is most responsive to risk reduction.*

### How big is the problem in Utah?

The utilization of health care services to diagnose and treat CHD is substantial both nationally and in Utah. In the United States, an estimated 1,291,000 inpatient cardiac catheterizations, 539,000 percutaneous transluminal coronary angioplasty (PTCA) procedures and 553,000 coronary artery bypass graft (CABG) surgeries were performed in 1998.<sup>3</sup> An average of 6,465 cardiac catheterization/coronary arteriography procedures, 3,015 PTCA procedures and 1,674 CABG surgeries were performed on Utah residents each year during the three-year period 1998 through 2000.<sup>5</sup>

### Who is at risk?

Individuals who smoke, have high blood pressure, elevated cholesterol, diabetes, poor nutrition, a family history of heart disease and/or who are overweight or physically inactive are at greater risk of developing coronary heart disease.

### How does Utah compare to the U.S.? Other states? HP2010 targets?

The percentage of hospital discharges in 1999 for Utahns aged 45 years or older with a first-listed diagnosis of CHD§ was 8.7%\* compared to 10.9%\* nationally.<sup>5,6</sup> The Healthy People 2010 objective 12-3 addresses the need to increase the percentage of eligible patients with heart

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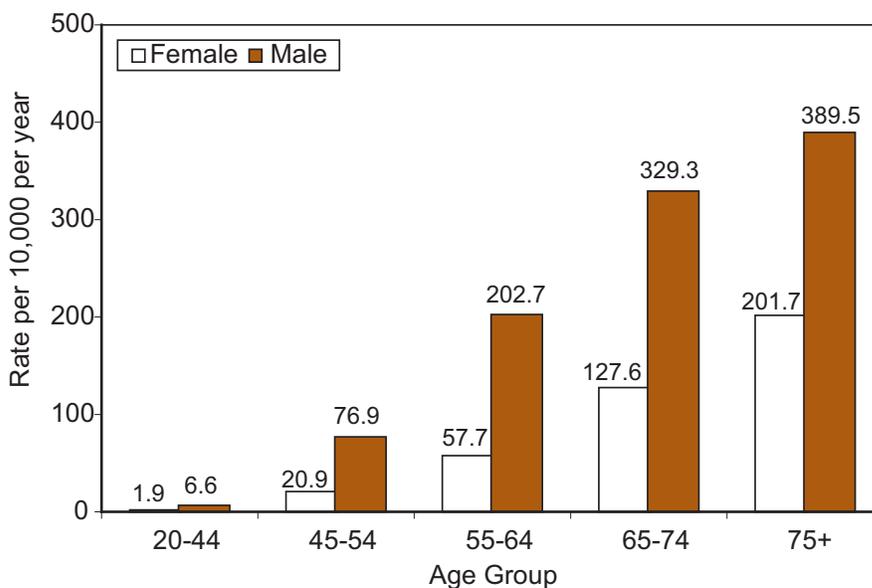
§CHD defined here as ICD-9 codes 410, 411-413, 414.0, 414.1-414.9 in order to compare with U.S. data.  
\* First-listed (U.S.) and first- and second-listed (UT) diagnoses for females with deliveries (ICD-9 code V27) were excluded from the denominators (total number of hospital discharges) when calculating percentages.

attacks who receive artery-opening therapy within an hour of symptom onset.<sup>1</sup> Utah data for this objective are not currently available.

The rate of hospitalization for CHD by age group and sex for the time period 1998

through 2000 is provided in Figure 4-1. The highest rates were seen among individuals aged 75 years or older. The hospitalization rate for CHD was higher for males than for females in every age group.

Figure 4-1: Rate of Hospitalization for Coronary Heart Disease by Age Group and Sex, Utah: 1998 - 2000

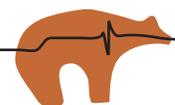


ICD-9 codes: 402, 410-414, 429.2

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED model, published January 2000

## Did you know?

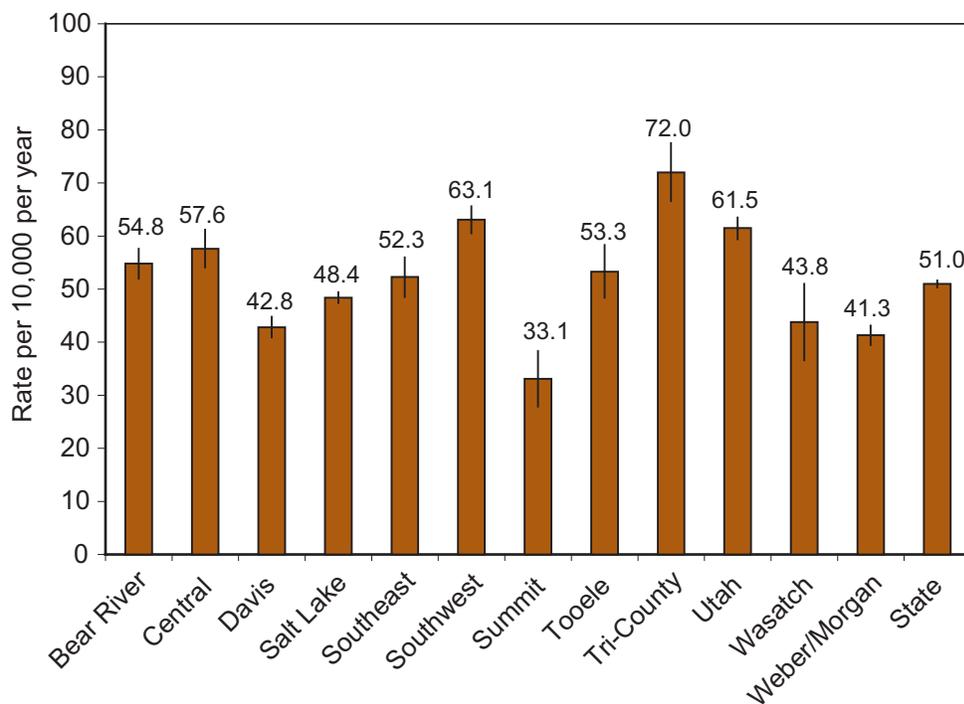
- In 2000, there were a total of 7,971 discharges from Utah hospitals with a first-listed diagnosis of CHD.
- An average of 6,465 cardiac catheterizations, 3,015 PTCA procedures and 1,674 CABG surgeries were performed on Utah residents each year during the three-year period 1998 through 2000.
- The average annual charge for a CHD hospitalization among Utah residents aged 20 or older in the time period 1998 through 2000 was \$20,943.



## Cardiovascular Disease in Utah: Chapter 4

The rate of hospitalization for CHD varied by local health district (Figure 4-2). The overall state rate was 51.0 CHD hospitalizations per 10,000 hospital discharges. Seven local health districts had rates higher than the state rate. The highest age-adjusted rates were seen in Tri-County and Southwest Health Districts while Summit Health District had the lowest rate of hospitalization for this condition. Differences in CHD hospitalization rates by geographic area may be related to variation in lifestyle behaviors, socio-economic status, health insurance access, or delivery of emergency medical services among other factors.

Figure 4-2: Rate\* of Hospitalization for Coronary Heart Disease by Local Health District, Utah: 1998 - 2000



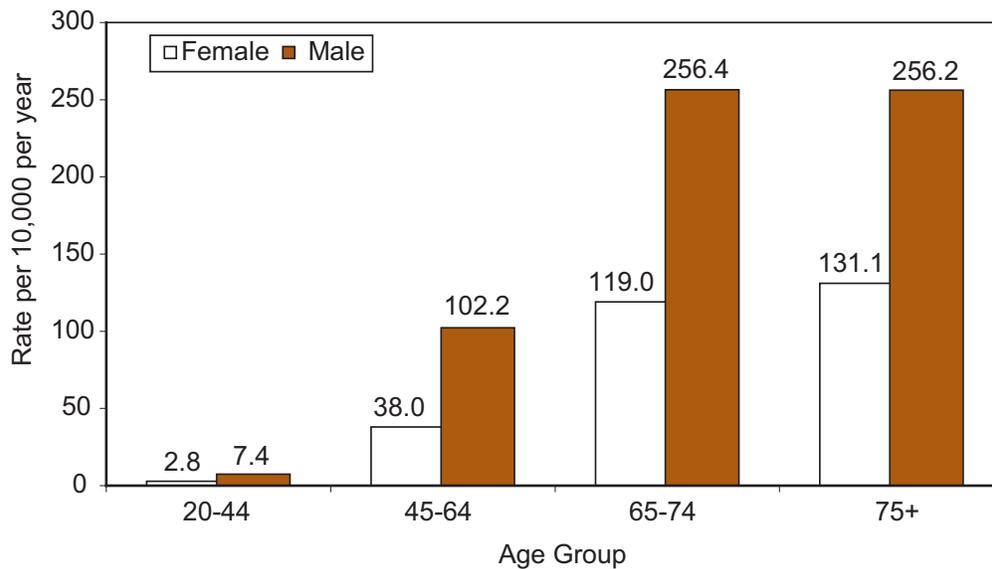
\* Rates have been age-adjusted to the U.S. 2000 population. ICD-9 codes: 402, 410-414, 429.2

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget UPED model, published January 2000

Note: cases of hospitalization were assigned to a local health district based on patient's county of residence

Coronary arteriography is a procedure used to detect diseases of the heart's blood vessels. X-rays of the heart are taken after the blood vessels are injected with dye, allowing them to be seen on film. The rate of hospital discharge for coronary arteriography for the time period 1998 through 2000 is shown in Figure 4-3. The rate was higher for males compared to females in every age group and increased with increasing age for both genders through age 74.

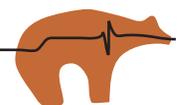
Figure 4-3: Rate of Hospital Discharges for Coronary Arteriography by Age Group and Sex, Utah: 1998 - 2000



CCS code: P-47

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget,

UPED model published January 2000

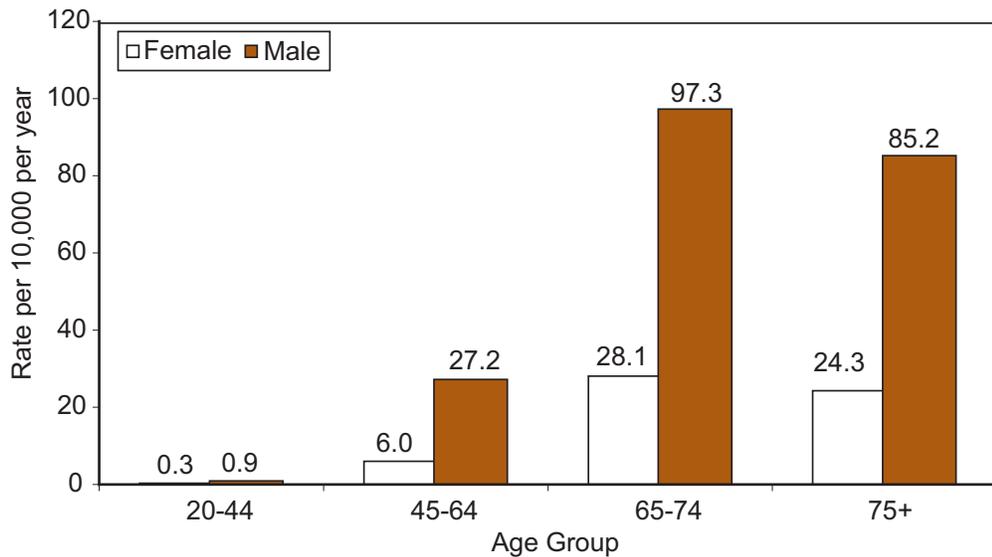


## Cardiovascular Disease in Utah: Chapter 4

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During the time period 1998 through 2000, the overall CABG hospitalization rates for Utah males and females were 11.7 and 3.6 per 10,000 hospital discharges respectively (Figure 4-4). The rate of hospital discharge for CABG was substantially higher for males than females in every age group. The rate increased with increasing age among both men and women through 74 years of age and then decreased slightly for those 75 years of age or older.

Figure 4-4: Rate of Hospital Discharges  
for Coronary Artery Bypass Graft by Age Group and Sex  
Utah: 1998 - 2000



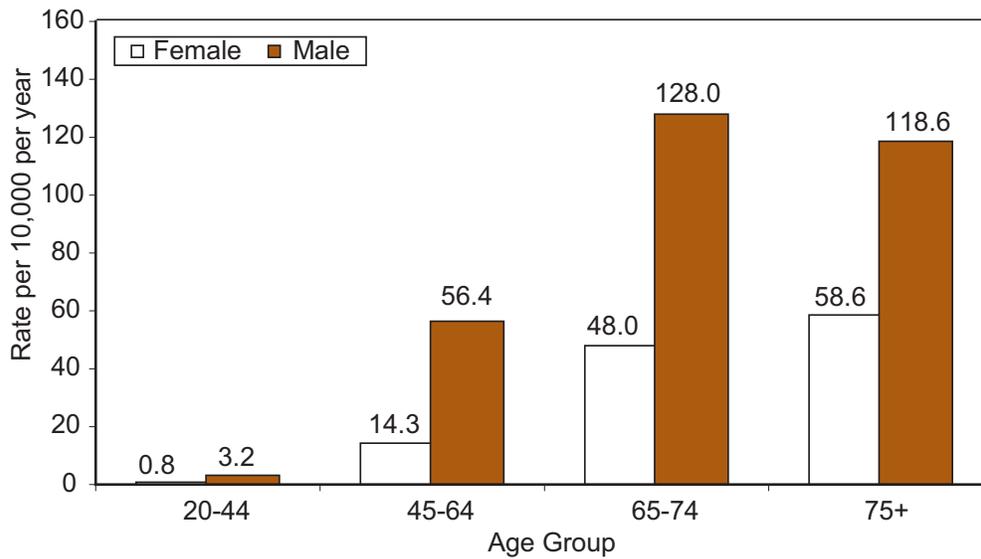
CCS code: P-44

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget,

UPED model published January 2000

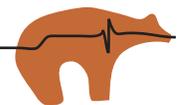
The rate of hospital discharges for PTCA by age group and sex is shown in Figure 4-5. More Utah males than females underwent PTCA in every age group. According to a recent study, women in the U.S. are less likely than men to undergo tertiary care interventions such as cardiac catheterization, angioplasty, thrombolytic therapy and bypass surgery.<sup>7</sup>

Figure 4-5: Rate of Hospital Discharges for Percutaneous Transluminal Coronary Angioplasty by Age Group and Sex  
Utah: 1998 - 2000



CCS code: P-45

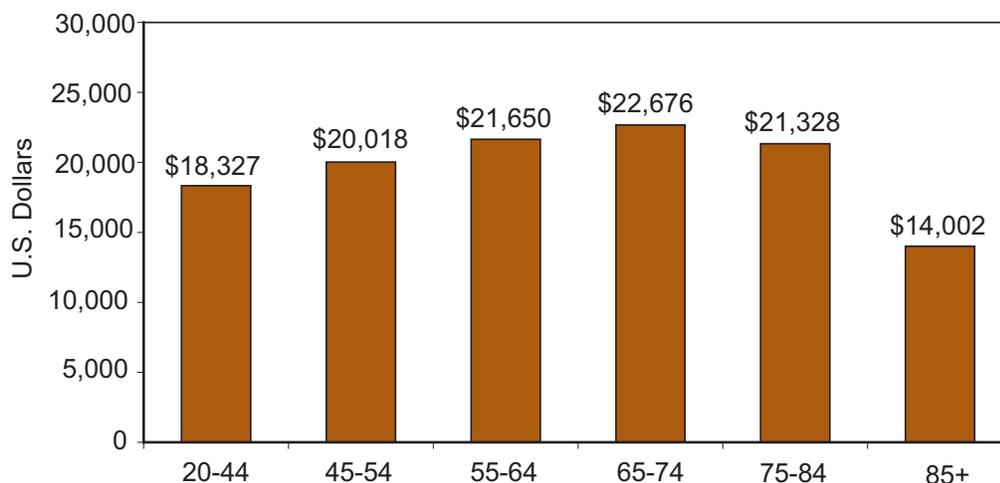
Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Office of Planning and Budget, UPED model published January 2000



The average annual charges for coronary heart disease hospitalizations in Utah by age group are shown in Figure 4-6. The highest average annual charge was accrued by individuals aged 65 to 74 years (\$22,676). The average length of stay was 4.1 days.<sup>5</sup>

Hospital charges are only one part of the direct costs associated with CHD. Other components include physician and other health care professional charges and costs associated with nursing home care, home health care, and drugs and other medical durables. In addition, there are indirect costs to be considered such as lost productivity due to missed work days and lost future earnings of persons who die due to CHD.

Figure 4-6: Average Annual Charges for Coronary Heart Disease Hospitalizations by Age Group  
Utah: 1998 - 2000



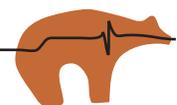
ICD-9 codes: 402, 410-414, 429.2

Data Source: Utah Hospital Discharge Database

The American Heart Association estimated that the total direct and indirect costs of coronary heart disease for the nation were \$100.8 billion dollars in 2001.<sup>3</sup> This figure is slightly more than one-third of the total cost of all cardiovascular disease that year and almost two-thirds of the estimated overall cost of cancer, the second leading cause of death in the U.S.<sup>3,8</sup> Expenditures for direct medical costs of CHD included \$1.3 billion for home health care, \$5.0 billion for drugs and other medical durables, \$8.0 billion for physician and other health care professional charges, and \$39.1 billion for hospital and nursing home costs. Indirect costs associated with lost productivity, including lost future earnings of individuals who were estimated to die in 2001 due to CHD totaled \$47.4 billion dollars. Using similar methodology, the total direct and indirect costs of CHD in Utah in 2000 have been estimated to range from \$489.7 to \$541.8 million dollars.<sup>3, 9, 10</sup>

## References:

1. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010. With understanding and improving health and objectives for improving health. 2 vols. (2nd ed.). Washington, DC: U.S. Government Printing Office.
2. Cooper, R., Cutler, J., Desvigne-Nickens, P. et al. (2000). Trends and disparities in coronary heart disease, stroke, and other cardiovascular diseases in the United States. Findings of the National Conference on Cardiovascular Disease Prevention. Circulation, 02, 3137-3147.
3. American Heart Association. (2000). 2001 Heart and Stroke Statistical Update. Dallas, TX: author.
4. Centers for Disease Control and Prevention. (2001). Mortality from coronary heart disease and acute myocardial infarction-United States, 1998. Morbidity and Mortality Weekly Report, 50, 90-93. Atlanta, GA: author.
5. Utah Department of Health. (n.d.) Hospital Discharge Database. IBIS-Q query system. Accessed April 10, 2002 at <http://health.utah.gov/ibis-ph/>.
6. Popovic, J.R., Hall, M.J. (2001). National Hospital Discharge Survey, 1999. Advance data from Vital and Health Statistics, 319. Hyattsville, MD: National Center for Health Statistics.
7. Giardina, E-G. V. (2000). Heart disease in women. Int J Fertil, 45 (6), 350-357.
8. American Cancer Society. (2002). Cancer Facts & Figures 2002. Atlanta, GA: author.
9. Personal communication with Thomas Thom at the National Heart Lung and Blood Institute. April 6, 2001.
10. Hodgson, T., Kopstein, A. (1984). Health care expenditures for major diseases in 1980. Health Care Financing Review/Summer 1984, 5 (4), 1-12.



## **Acute Myocardial Infarction: Focus on Gender Difference**

### **Why is it important?**

*A heart attack or acute myocardial infarction (AMI) occurs when blood flow to the heart muscle is prevented by blockage in a coronary artery. The blockage is usually due to the buildup of plaque. The plaque can tear or rupture, causing a blood clot to form that blocks the artery. As a result of reduced blood flow and oxygen delivery, the heart muscle dies, resulting in disability or even death.<sup>1</sup> Today drugs that dissolve blood clots or emergency procedures such as PTCA can stop some heart attacks, reducing disability and saving lives. To be effective, these treatments must be provided soon after heart attack symptoms first appear.<sup>2</sup>*

### **How big is the problem in Utah?**

Heart attack or AMI is one of the most common reasons for hospitalization in Utah.<sup>3</sup> In fact, there were 3,089 discharges from Utah hospitals with a first-listed diagnosis of AMI in 2000. Approximately 85% of Utah cases of AMI hospitalization were initially evaluated in the emergency department. The rate of emergency department visits for AMI in Utah by age group and sex for the time period 1998 through 1999 is provided in Figure 5-1. The rate increased with increasing age and was higher for males than females in every age group.

### **Who is at risk?**

Individuals who smoke, have high blood pressure, elevated cholesterol, diabetes, poor nutrition, a family history of heart disease and/or who are overweight or physically inactive are at greater risk of developing coronary heart disease and having a heart attack. Warning signs include chest discomfort as well as discomfort in one or both arms, the back, neck, jaw or stomach, shortness of breath, sweating, nausea or lightheadedness.<sup>2</sup> Certain symptoms of heart attack, such as shortness of breath, nausea/vomiting and back or jaw pain, occur somewhat more commonly in women than men.<sup>4</sup> About 35% of heart attacks in women are thought to go unnoticed or unreported.<sup>5</sup>

### How does Utah compare to the U.S.? Other states? HP2010 targets?

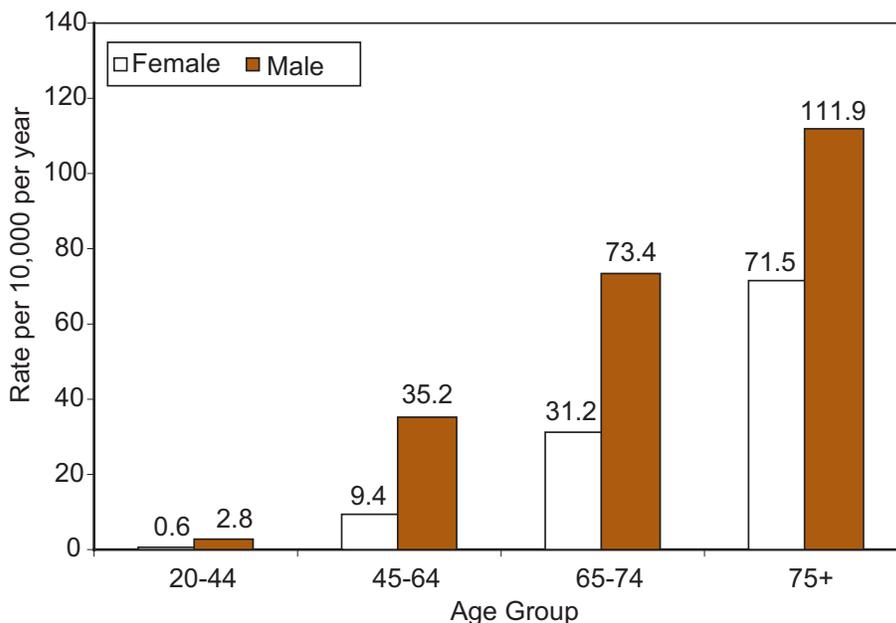
Nationally, 4.0%\* of all hospital discharges for individuals aged 45 years or older were associated with a first-listed diagnosis of AMI in 1999. <sup>6</sup> In Utah, the percentage was 3.4%\*. <sup>7</sup> The Healthy People 2010 objective 12-2 addresses the need to increase the proportion of adults aged 20 years or older who are aware of the early warning symptoms and signs of a heart attack and the importance

of accessing rapid emergency care by calling 911. <sup>8</sup> Preliminary data from the 2001 Utah BRFSS indicate that almost 96% of adults recognized chest pain to be a symptom of heart attack. Recognition of heart attack symptoms did not differ greatly between men and women. Eighty-four percent of Utahns reported that the first thing they would do if they thought someone else was having a heart attack (or stroke) was call 911.

### Did you know?

- In 2000, there were a total of 3,089 discharges from Utah hospitals with a first-listed diagnosis of AMI.
- Hospitalization for AMI in 2000 was more than twice as common among Utah men than women: 18.9 per 10,000 males compared to 8.6 per 10,000 females.
- There were 399 deaths among Utah men and 297 deaths among Utah women from AMI in 2000.

Figure 5-1: Rate of Emergency Department Visits for Acute Myocardial Infarction by Age Group and Sex  
Utah: 1998 - 1999

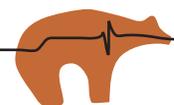


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Data Source: Utah Emergency Department Database; Utah population estimates from the Utah Governor's Office of Planning and Budget,

UPED model published January 2000

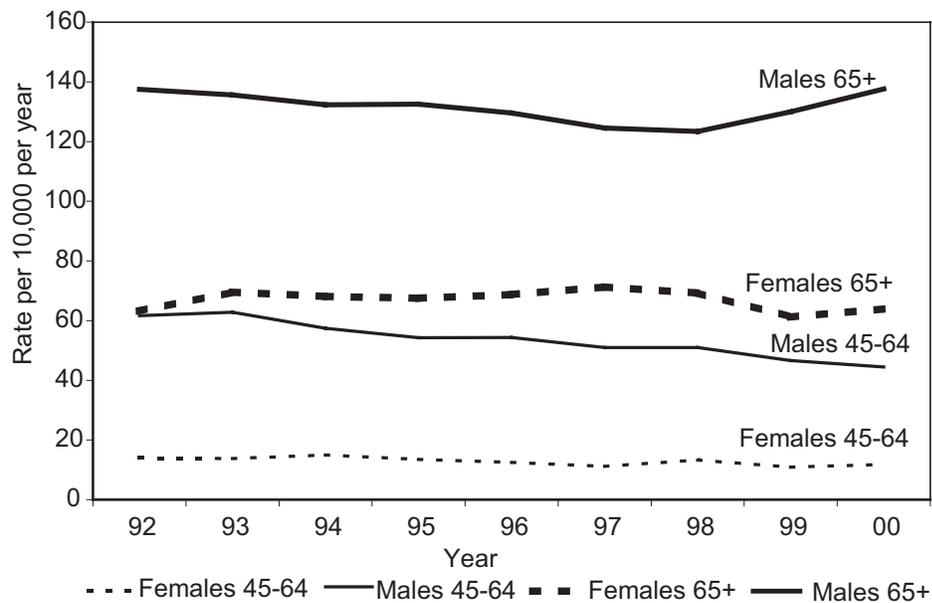
\* First-listed (U.S.) and first- and second-listed (UT) diagnoses for females with deliveries (ICD-9 code V27) were excluded from the denominators (total number of hospital discharges) when calculating percentages.



## Cardiovascular Disease in Utah: Chapter 5

The rate of hospitalization for AMI by sex and year for two age groups, 45 to 64 years and 65 years or older, for the time period 1992 through 2000, is provided in Figure 5-2. The rate of hospitalization for AMI were consistently higher for men than women in both age groups. There was a substantial difference in the rate of hospitalization by gender for older Utahns, with the rates for men often double those for women. Overall, hospitalization rates were higher for older compared to younger persons (Figure 5-2).

Figure 5-2: Rate of Hospitalization for Acute Myocardial Infarction by Age Group, Sex and Year Utah: 1992 - 2000

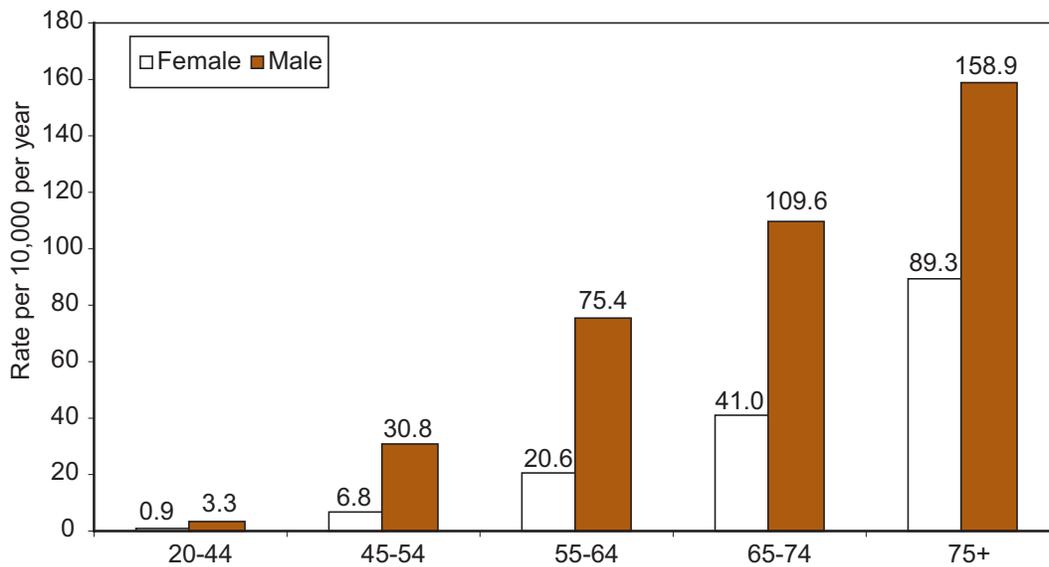


CCS code: D-100

Data Source: Utah Emergency Department Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

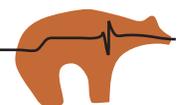
The rate of hospitalization for AMI by age group and sex for the time period 1998 through 2000 is provided in Figure 5-3. The rate increased with increasing age for both males and females. The highest rates were seen among individuals 75 years of age or older. The hospitalization rate for AMI was higher for males than for females in every age group.

Figure 5-3: Rate of Hospitalization for Acute Myocardial Infarction by Age Group and Sex, Utah: 1998 - 2000



CCS code: D-100

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

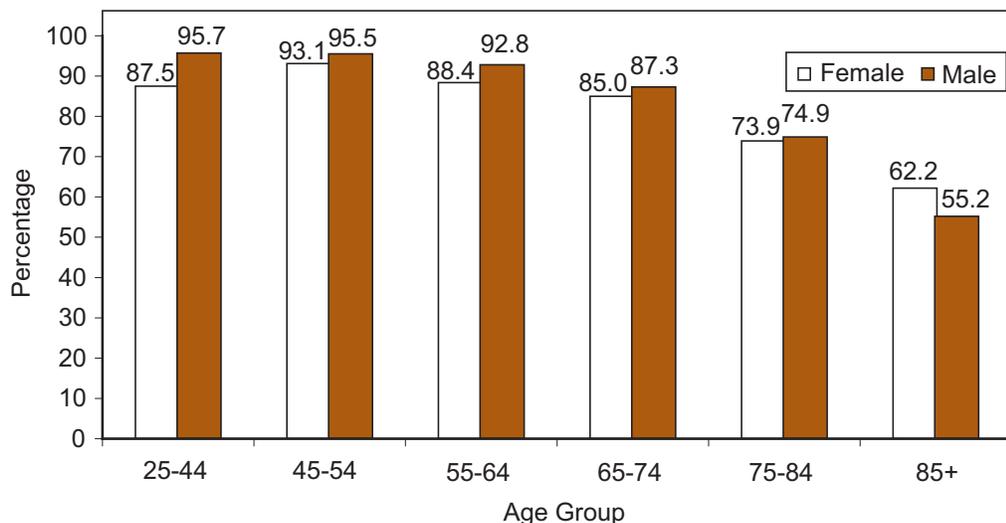


## Cardiovascular Disease in Utah: Chapter 5

The percent survival (meaning that individuals were still alive by December 1998), after hospitalization of Utahns with acute MI (any listed diagnosis) in 1997 is shown in Figure 5-4. The percentage of individuals who survived decreased with increasing age. A higher percentage of males under the age of 85 were still alive in December 1998 compared to their female peers. Survival among elderly females 85+ was somewhat higher than that for elderly males, probably reflecting a higher death rate for males from other causes.

Women appear to have a worse prognosis and die more often than men after a heart attack or bypass surgery.<sup>9</sup> This gender gap in mortality may be due to several factors. One reason may be the lower likelihood of women to receive invasive evaluations and treatments for cardiac diseases compared to men with symptoms of similar or lesser severity.<sup>10</sup> Another may be the older age of women at the time of heart attack, making it more likely that they will also have other conditions such as diabetes, high blood pressure or congestive heart failure.<sup>4</sup> Women may also be less likely to believe they are having a heart attack and, therefore, delay seeking emergency treatment.<sup>4</sup> In addition, women also enroll in and complete cardiac rehabilitation less often than men.<sup>9</sup>

Figure 5-4: Percent Survival\* after Hospitalization in 1997 for Acute Myocardial Infarction\*\* by Age Group and Sex: Utah



\* Still alive by December 1998

\*\* Acute MI as any listed diagnosis; ICD-9 code 410

Data Source: Linked death certificate data 1997-98; Utah Hospital Discharge Database; Utah population estimates provided by the Utah Governor's Office of Planning and Budget

Certain medications can reduce mortality from AMI. A meta-analysis of several myocardial infarction trials found that antiplatelet treatment including aspirin alone, aspirin and dipyridamole, or sulfinpyrazone reduced the risk of vascular death by 13 percent.<sup>11</sup> Results of a meta-analysis of 16 randomized trials showed that beta blockers (drugs that decrease the work load on the heart) were associated with an overall mortality risk reduction of 23% in patients with coronary artery disease.<sup>12</sup> Angiotensin-converting enzyme or ACE inhibitors (drugs that improve the pumping function of the heart) were associated with a 25% overall mortality risk reduction in patients 65 years of age or older who had had an AMI.<sup>13</sup>

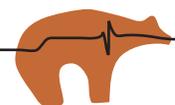
Data collected by the Centers for Medicare and Medicaid Services (CMS) and analyzed by HealthInsight<sup>14</sup> demonstrate an overall increase over time in the prescription of these drugs at the time of hospital discharge to post-AMI Utah Medicare patients who were ideal candidates to receive these medications (Table 5-1). Prescription of aspirin at the time of discharge increased over baseline for both males and females. Prescription of a beta blocker at discharge increased substantially from baseline to the follow-up period for male patients; a smaller increase was seen for female patients over the same time period. However, while the prescription of an ACE inhibitor decreased over time for males, a large increase was seen for females.

Table 5-1: Post Acute Myocardial Infarction Discharge Medications for Hospitalized Utah Medicare Patients Who Were Ideal Candidates to Receive These Medications at Baseline (4/98 - 9/98) and Follow-up Period (7/00 - 12/00) by Sex

Inpatient Quality Indicators	Baseline (4/98 - 9/98)		Follow-up period (7/00 - 12/00)	
	Male Ideal Candidates	Female Ideal Candidates	Male Ideal Candidates	Female Ideal Candidates
AMI: aspirin at discharge	91.4%	88.4%	94.1%	92.4%
AMI: beta blocker at discharge	63.6%	73.0%	88.5%	87.8%
AMI: ACE Inhibitor at discharge	89.7%	63.2%	76.9%	80.0%

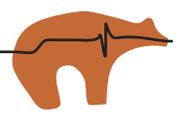
Source: The Centers for Medicare and Medicaid Services (CMS)

Note: An ideal candidate was an individual with the disease state in question for whom the drug was not contraindicated or for whom there was no documentation of reasons for drug contraindication.



### References:

1. American Heart Association. (2000). Heart Attack. Dallas, TX: author. Accessed April 10, 2002 at <http://www.americanheart.org>.
2. American Heart Association. (1998). Heart Attack Symptoms/Warning Signs. Dallas, TX: author. Accessed April 10, 2002 at <http://www.americanheart.org>.
3. Utah Health Data Committee. (2001). Inpatient hospitalizations of Utahns for Most Common Procedures and Diagnoses in 1996-1998. Salt Lake City, UT: Utah Department of Health.
4. National Heart Lung and Blood Institute, National Institutes of Health. (n.d.). Women and Heart Attack. Accessed April 10, 2002 at <http://www.nhlbi.nih.gov>.
5. Giardina EG. Heart disease in women. (2000). Int J Fertil 45(6), 350-357.
6. Popovic, J.R., Hall, M.J. (2001). National Hospital Discharge Survey, 1999. Advance data from Vital and Health Statistics, 319. Hyattsville, MD: National Center for Health Statistics.
7. Utah Department of Health. (n.d.) Hospital Discharge Database. IBIS-Q query system. Accessed April 10, 2002 at <http://health.utah.gov/ibis-ph/>.
8. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010. With understanding and improving health and objectives for improving health. 2 vols. (2nd ed.). Washington, DC: U.S. Government Printing Office.
9. American Heart Association. (1997). Cardiovascular disease in women: A statement for healthcare professionals from the American Heart Association. Circulation, 96, 2468-2482.
10. Wenger, N.K., Speroff, L., Packard, B. (1993). Cardiovascular health and disease in women. New England Journal of Medicine, 329, 247-256.
11. Antiplatelet Trialists' Collaboration. (1988). Secondary prevention of vascular disease by prolonged antiplatelet treatment. BMJ Clin Res Ed., 296, 320-331.
12. Yusuf, S., Peto, R., Lewis, J., Collins, R., Sleight, P. (1985). Beta blockade during and after myocardial infarction: an overview of the randomized trials. Prog Cardiovasc Dis., 27, 335-371.
13. Pfeffer, M.A., Braunwald, E., Moye, L.A. et al. (1992). Effect of captopril on mortality and morbidity in patients with left ventricular dysfunction after myocardial infarction. Results of the Survival and Ventricular Enlargement Trial. New England Journal of Medicine, 327, 669-677.
14. Personal communication with Stormy Sweitzer at HealthInsight, Utah's Quality Improvement Organization. October 2001 and June 2002.



# Congestive Heart Failure: Focus on Hospitalization

### Why is it important?

*Congestive heart failure (CHF) is a chronic condition in which the heart cannot pump enough blood to meet the needs of the body's other organs.<sup>1</sup> CHF occurs when heart muscle is damaged by a heart attack, chronic high blood pressure, or other causes. The incidence of heart failure in the U.S. approaches 10 per 1,000 population after age 65.<sup>2</sup> CHF is an avoidable hospital condition.<sup>3</sup> These conditions, also called ambulatory care sensitive conditions, lead to hospitalization more often for persons with reduced access to outpatient health care. Several new treatments are available to treat persons with CHF. Appropriate outpatient medical care can improve quality of life and prevent unnecessary hospitalizations.*

### How big is the problem in Utah?

In contrast to other types of heart disease, hospitalization rates for CHF were similar for men and women. The rates of hospitalization for CHF by sex and year for two age groups, Utahns 45 to 64 years and Utahns 65 years or older, for the time period 1992 through 2000 are provided in Figure 6-1. Rates for CHF hospitalization in Utah were somewhat higher for men in both age groups. The rates for Utahns age 65 or older were substantially higher than the rates for Utahns under the age of 65.

### Who is at risk?

Individuals who have had a heart attack or have chronic high blood pressure are at risk for developing CHF.

### How does Utah compare to the U.S.? Other states? HP2010 targets?

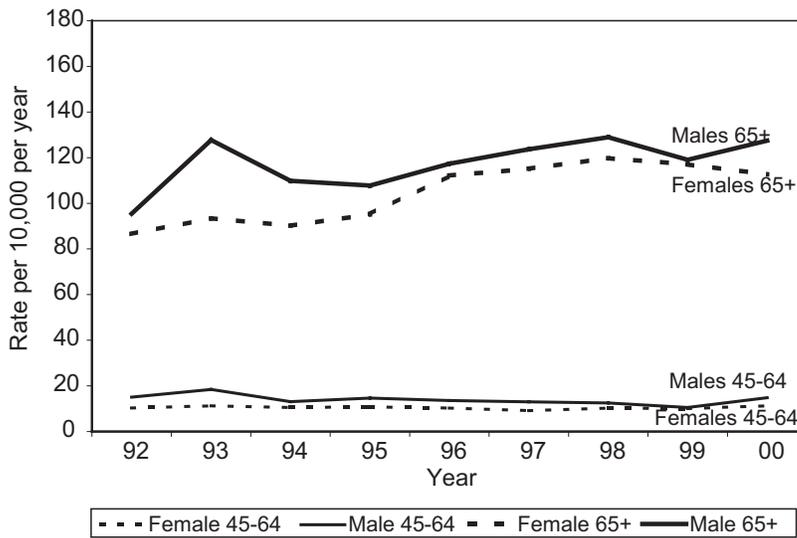
In 1999, the percentage of hospital discharges for Utahns aged 45 years or older with a first-listed diagnosis of CHF§ was 3.0%\* compared to 4.8%\* nationally.<sup>4,5</sup> The Healthy People 2010 objective 12-6 addresses the need to reduce hospitalization of older adults with CHF as the principal diagnosis.<sup>1</sup> The U.S. 1997 baseline was 13.2 per 1,000 population aged 65 to 74 years, 26.7 per 1,000 population aged 75 to 84 years, and 52.7 per 1,000 population for adults aged 85 years or older.<sup>1</sup> CHF hospitalization rates in Utah in 1999 were 6.1 per 1,000 population for adults aged 65 to 74 years, 15.4 per 1,000 population for adults aged 75 to 84 years, and 30.8 per

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§ CHF defined as ICD-9 code 428.0 in order to compare with U.S. data.

\* First-listed (U.S.) and first- and second-listed (UT) diagnoses for females with deliveries (ICD-9 code V2) were excluded from the denominators (total number of hospital discharges) when calculating percentages.

Figure 6-1: Rate of Hospitalization for Congestive Heart Failure by Age Group, Sex and Year, Utah: 1992 - 2000



CCS code: D-108, congestive heart failure, not hypertensive

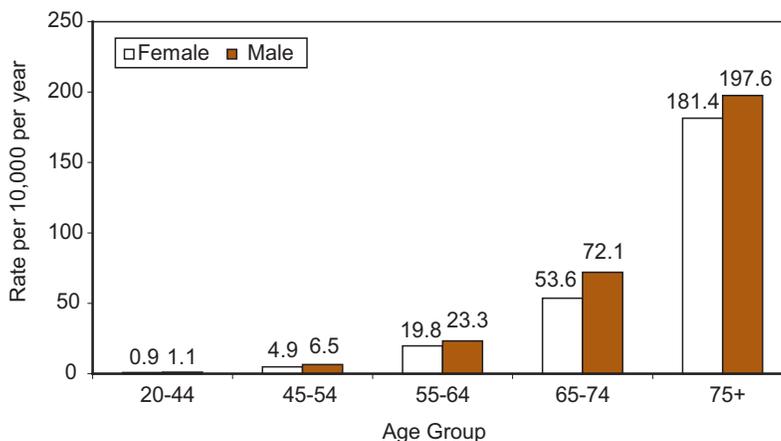
Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

1,000 population for adults aged 85 years or older.<sup>4</sup>

The rates of hospitalization for CHF by age group and sex for the time period 1998 through 2000 are provided in Figure

6-2. The rates increased with increasing age for both males and females. The highest rates were seen among individuals aged 75 years or older. The hospitalization rate for CHF was slightly higher for males than for females in every age group.

Figure 6-2: Rate of Hospitalization for Congestive Heart Failure by Age Group and Sex, Utah: 1998 - 2000

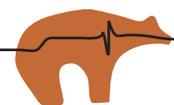


CCS code: D-108, congestive heart failure, not hypertensive

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

## Did you know?

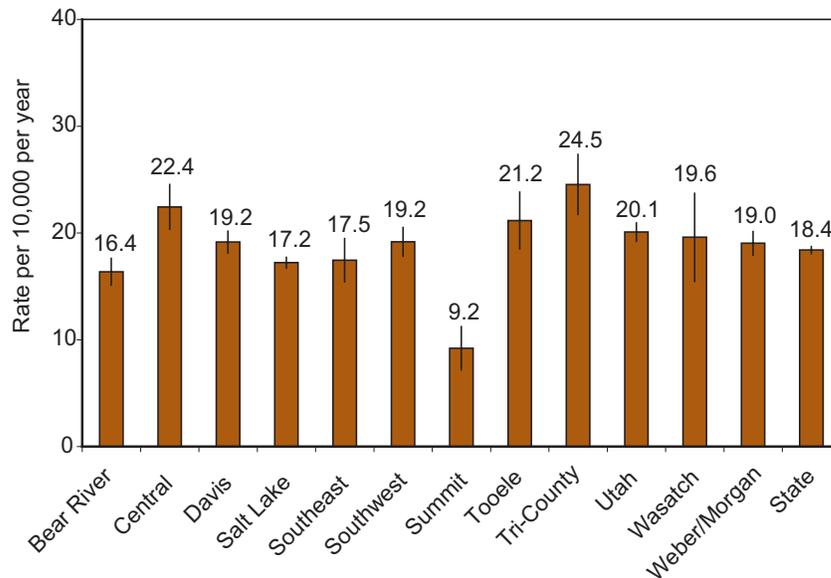
- CHF is an ambulatory care sensitive condition. Many hospitalizations for CHF can be prevented by appropriate outpatient medical care and self management.
- In 2000, there were a total of 2,883 discharges from Utah hospitals with a first-listed diagnosis of CHF.
- The average charge for a CHF hospitalization for Utah residents was \$11,880 in 2000.



## Cardiovascular Disease in Utah: Chapter 6

Eight of Utah's 12 local health districts had CHF hospitalization rates that were higher than the rate for the state (Figure 6-3). Tri-County Health District had the highest rate (24.5 per 10,000 hospitalizations) and Summit Health District had the lowest (9.2 per 10,000 hospitalizations). Hospitalization rates for CHF may reflect variation in access to outpatient health care as well as variation in patterns of care by geographic area. Of note, Tri-County Health District reported the highest percentage of persons without health insurance in the state (13.7%) while Summit Health District reported one of the lowest (7.5%).<sup>6</sup>

Figure 6-3: Rate\* of Hospitalization for Congestive Heart Failure by Local Health District, Utah: 1998 - 2000



\* Rates have been age-adjusted to the U.S. 2000 population

CCS code: D-108, congestive heart failure, not hypertensive

Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

Note: Cases of hospitalization were assigned to a local health district based on patient's county of residence

Table 6-1: Use of ACE Inhibitor in Heart Failure Patients with Low Ventricular Ejection Fraction for Hospitalized Medicare Patients in Utah Who Were Ideal Candidates to Receive an ACE Inhibitor at Baseline and at Three Follow-up Periods by Sex

**Use of ACE Inhibitor**

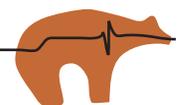
	<b>Baseline:</b> <b>4/98 - 9/98</b>	<b>Follow-up period 1</b> <b>6/99 - 12/99</b>	<b>Follow-up period 2</b> <b>1/00 - 6/00</b>	<b>Follow-up period 3</b> <b>7/00-12/00</b>
Male Ideal Candidates	78.4%	79.6%	79.0%	83.8%
Female Ideal Candidates	78.0%	81.1%	84.0%	83.2%

Source: Centers for Medicare and Medicaid Services (CMS)

Note: An ideal candidate was an individual with the disease state in question for whom the drug was not contraindicated or for whom there was no documentation of reasons for drug contraindication.

CHF is often the end stage of cardiac disease. In fact, historically half of the patients diagnosed with CHF died within five years.<sup>2</sup> Angiotensin-converting enzyme or ACE inhibitors have been shown to lower mortality rates in patients with left ventricular dysfunction or heart failure.<sup>7</sup> A review of the literature indicates that use of an ACE inhibitor to treat heart failure is approximately 75% in the U.S.<sup>8</sup> Recent data collected by the Centers for Medicare and Medicaid Services (CMS) and analyzed by HealthInsight suggest some improvement over time in the use of ACE inhibitors to treat Utah Medicare patients who were ideal candidates for such treatment.<sup>9</sup> (Table 6-1)

Once thought to be contraindicated in patients with CHF, beta blockers have also been found to improve cardiac function, reduce mortality, and prevent hospitalizations in this patient population. These recent improvements in care, when translated into practice, promise to improve and extend life in many patients with CHF.<sup>10</sup>

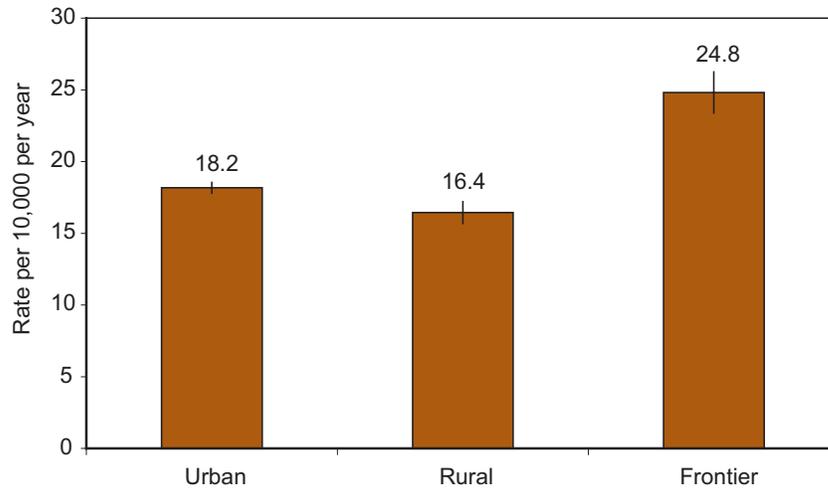


## Cardiovascular Disease in Utah: Chapter 6

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The rate of hospitalization for CHF by urban, rural and frontier counties\* is shown in Figure 6-4 for the time period 1998 through 2000. The hospitalization rate for frontier counties was higher than the rate for both urban and rural areas, perhaps reflecting reduced access to outpatient health care in these areas.

Figure 6-4: Rate\* of Hospitalization for Congestive Heart Failure by Urban, Rural and Frontier Counties Utah: 1998 - 2000



\* Rates have been age-adjusted to the U.S. 2000 population

CCS code: D-108, congestive heart failure, not hypertensive

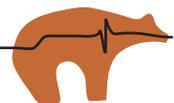
Data Source: Utah Hospital Discharge Database; Utah population estimates from the Utah Governor's Office of Planning and Budget, UPED model published January 2000

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\*Please see Appendix F for a listing of urban, rural, and frontier counties in Utah.

## References:

1. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, D.C.: U.S. Government Printing Office.
2. National Heart Lung and Blood Institute. (n.d.) National Institutes of Health. Congestive Heart Failure Data Fact Sheet. Accessed April 10, 2002 at <http://www.nhlbi.nih.gov>.
3. Weissman JS, Gauziness C, Epstein AM. (1992). Rates of avoidable hospitalizations by insurance status in Massachusetts and Maryland. Journal of American Medical Association (JAMA), 268, 2388-2394.
4. Utah Department of Health. (n.d.) Hospital Discharge Database. IBIS-Q query system. Accessed at <http://health.utah.gov/ibis-ph/>.
5. Popovic, J. R., Hall, M. J. (2001). National Hospital Discharge Survey, 1999. Advance data from Vital and Health Statistics, no 319. Hyattsville, Maryland: National Center for Health Statistics.
6. Office of Public Health Assessment. (2002). Overview of the 2001 Utah Health Status Survey Report. Salt Lake City, UT: Utah Department of Health.
7. Flather, M. D., et al. (2000, May 6). Long-term ACE-inhibitor therapy in patients with heart failure or left-ventricular dysfunction: a systematic overview of data from individual patients. ACE-Inhibitor Myocardial Infarction Collaborative Group. Lancet, 355(9215):1575-1581.
8. Delaney, R., National Heart Failure Clinical Area Team. (n.d.) Targeting Heart Failure Interventions. Accessed April 10, 2002 at <http://www.hcfa.gov>.
9. Personal communication with Stormy Sweitzer at HealthInsight, Utah's Quality Improvement Organization. October 3, 2001.
10. Foody, J.M., Fanell, M.H., Krumholz, H.M. (2002). Beta-blocker therapy in heart failure. Scientific review. Journal of the American Medical Association, 287:883-889.



### Recommendations:

Detailed goals and objectives for cardiovascular health promotion and disease prevention are not included in this report. The *Alliance for Cardiovascular Health in Utah* has developed a plan to prevent or delay onset of heart disease and stroke and promote heart health. This plan will be published in October, 2002, and will be available upon request from the Cardiovascular Health Program at the Utah Department of Health.

Recommendations for state and community strategies to promote health and reduce death and disability due to heart disease include:

- Develop, coordinate, and maintain partnerships at the state, local, and community levels among providers, agencies, institutions, and the private sector to maximize resources and efforts to promote cardiovascular health.
- Develop and maintain the scientific capacity to measure and report the burden of cardiovascular disease in Utah.
- Develop, implement, and maintain policies and incentives for environmental conditions that support and provide opportunities for healthy choices in all aspects of life:
  - Schools
  - Work sites
  - Communities
  - Health care systems.
- Enhance the knowledge, skills, and resources of policy makers, health care providers, and other community partners to develop and sustain policy and environmental change.
- Assure that providers, patients, and the public have the knowledge and skills to seek and provide effective interventions to reduce risk and treat cardiovascular disease.

# Appendix A: Classification of Diseases and Conditions

The International Classification of Diseases, Ninth and Tenth Revisions, Clinical Modification (ICD-9-CM and ICD-10 CM) were used to identify the specific disease categories in this report. The following ICD-9 or ICD-10 codes have been grouped together to determine rates for the specific conditions included in this report. CCS groupings were used to develop emergency department and hospitalization rates for specific conditions.

Condition/Procedure	Type of Data	ICD-9 Codes	ICD-10 Codes	CCS Codes
Cardiovascular Disease	Mortality	390-448	I00-I78, G45	
Coronary Heart Disease	Mortality	402, 410-414, 429.2	I11, I20-I25	
	Hospital Discharge Data	402, 410-414, 429.2		
Acute Myocardial Infarction	Mortality	410	I21-I22	
	Hospital Discharge Data	410		D-100
Congestive Heart Failure	Mortality*	428.0, 428.1, 428.9**	I500, I501, I509	
	Hospital Discharge Data	428.0, 428.1, 428.9, 398.91		D-108
Coronary Artery Bypass Graft (CABG)	Hospital Discharge Data	361.0, 361.1, 361.2, 361.3, 361.4, 361.5, 361.6, 361.7, 361.9, 362, 363, 363.1, 363.2, 363.9		P-45
Percutaneous Transluminal Coronary Angioplasty (PTCA)	Hospital Discharge Data	360.1, 360.2, 360.5		P-45
Diagnostic Cardiac Catheterization, Coronary Arteriography	Hospital Discharge Data	372.1, 372.2, 372.3, 885.2, 885.3, 885.4, 885.5, 885.6, 885.7		P-47

Notes:

\* According to guidelines governing the writing of cause-of-death statements, congestive heart failure should not be listed as an underlying cause of death and, therefore, these data should be interpreted with caution.

\*\* Mortality data were not coded to the fifth digit and, therefore, ICD-9 code 398.91 was not included in the definition of congestive heart failure when analyzing mortality data.



## **Appendix B: Cost of Coronary Heart Disease**

### **Estimated Direct and Indirect Costs of Coronary Heart Disease United States 2001 and Utah 2000**

	U.S. (In Billions of Dollars)	Utah (In Millions of Dollars)
<b>Direct Costs</b>		
Hospital/Nursing Home*	\$39.1	Range: \$167.9 to \$206.0 <sup>a</sup>
Physicians/ Other Professionals	8.0	34.4 - 42.2 <sup>b</sup>
Drugs/Other Medical Durables	5.0	21.5 - 26.3 <sup>c</sup>
Home Health Care	1.3	5.6 - 6.8 <sup>d</sup>
<b>Total**</b>	<b>\$53.4</b>	<b>\$229.3 - \$281.4</b>
<b>Indirect Costs</b>		
Lost Productivity/Morbidity	7.4	40.7 <sup>e</sup>
Lost Productivity/Mortality***	40.0	219.7 <sup>f</sup>
<b>Total**</b>	<b>\$47.4</b>	<b>\$260.4</b>
<b>Grand Total**</b>	<b>\$100.8</b>	<b>Range: \$489.7 to \$541.8</b>

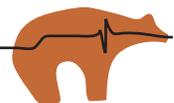
\* Includes inpatient, outpatient and emergency department stays for U.S. and inpatient and emergency department stays for Utah.

\*\* Totals may not add up due to rounding and overlap.

\*\*\* Lost future earnings of persons estimated to die as a result of coronary heart disease in 2001 (U.S.) or who died in 2000 (Utah) discounted at 4%.

Note: From the economist's perspective, the arithmetic sum of lifetime earnings overstates the present value of an individual. Therefore the correct way to measure economic value over a period of time is to determine the present value of an individual's future earnings stream. Discounting accomplishes this by converting a stream of earnings into its present value. A higher discount rate is associated with a lower present value of a given earnings stream.<sup>5</sup>

- (a) The cost of nursing home care was estimated to be 20.5% of hospital care expenditures for all medical conditions and 47.8% of hospital care expenditures for diseases of the circulatory system (see reference #2 on page 60). Both national estimates were used to calculate nursing home costs for Utah. These estimated costs were then added to the hospital charges, producing the range of values listed in the table.
  
- (b) National costs associated with physicians and other professionals (\$8 billion dollars) were 20.5% of national hospital/nursing home costs associated with coronary heart disease (\$39.1 billion). This percentage was applied to the range of estimated hospital/nursing home costs in Utah in order to estimate a range of physicians/other professionals costs for Utah.
  
- (c) National costs associated with drugs and other medical durables (\$5 billion dollars) were 12.8% of national hospital/nursing home costs associated with coronary heart disease (\$39.1 billion). This percentage was applied to the range of estimated hospital/nursing home costs in Utah in order to estimate a range of costs for drugs/other medical durables for Utah.
  
- (d) National costs associated with home health care (\$1.3 billion dollars) were 3.3% of national hospital/nursing home costs associated with coronary heart disease (\$39.1 billion). This percentage was applied to the range of estimated hospital/nursing home costs in Utah in order to estimate a range of home health care costs for Utah.
  
- (e) National costs associated with lost productivity/morbidity (\$7.4 billion dollars) were 18.5% of national lost productivity/mortality costs associated with coronary heart disease (\$40 billion). This percentage was applied to the lost productivity/mortality costs for Utah in order to estimate lost productivity/morbidity costs for Utah.
  
- (f) The lost productivity/mortality costs were calculated for Utah by multiplying the total present value of lifetime earnings and housekeeping services, discounted at 4%, by the number of deaths from coronary heart disease in Utah by age group and gender for the year 2000.



## Cardiovascular Disease in Utah: Appendices

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### References:

1. American Heart Association. (2001). Estimated direct and indirect costs (in billions of dollars) of cardiovascular diseases and stroke, United States: 2001. Heart and Stroke 2000 Statistical Update. Dallas, TX: author.
2. Hodgson, T.A., Kopstein, A.N. (1984). Health care expenditures for major diseases in 1980. Health Care Financing Review/Summer 1984, 5 (4), 1-2.
3. Unpublished estimates of “The Present Value of Lifetime Earnings by Age and Sex, U.S., 1997”. Wendy Max, University of California at San Francisco.
4. Personal communication with Thomas Thom, National Heart, Lung and Blood Institute. April 6, 2001.
5. Rice, D.P., Hodgson, T.A., Kopstein, A.N. (1985). The economic costs of illness: A replication and update. Health Care Finance Rev 1985 Fall, 7 (1), 61-80.
6. Utah Department of Health. (n.d.) Mortality data from IBIS-Q query system. Accessed at <http://health.utah.gov/ibis-ph/>.

# Appendix C: Data Sources

## Mortality Data Base

Vital statistics certificates filed with the state Office of Vital Records and Statistics are the primary source of data presented in the mortality tables. Centralized vital statistics registration was established in Utah in 1905. Those records include certificates of live birth, death and fetal death. The death certificate includes demographic information and the cause and circumstances of death. It is based on the national standard death certificate. The current certificate has been in use since 1989. Mortality data were analyzed for the state and local health districts. Death data are available to health programs, health care providers, businesses, researchers, educational institutions and the Utah public. Data are used to improve service delivery, evaluate health care systems, and monitor the health of all Utahns. More information is available at <http://www.health.utah.gov/bvr>.

## Emergency Department Data Base

The Emergency Department Encounter Data Base is maintained by the Utah Department of Health, Office of Health Care Statistics. All licensed hospitals in Utah are mandated to report information on emergency department patient encounters. The database contains the consolidated information on complete billing, medical codes, and personal characteristics describing a patient, the services received, and charges billed for each encounter. Each of the 40 eligible hospitals submitted data in every calendar quarter (3-month period) in 1998.

## Hospital Discharge Data Base

The Hospital Discharge Data Base (HDDB) currently contains hospital inpatient data only. Fifty-five Utah hospitals have submitted data to Utah Health Data Committee since 1992, including nine psychiatric facilities, seven specialty hospitals, and the Veterans Administration Medical Center. Shriners Hospital, a charity hospital, and Utah State Hospital are exempt from reporting requirements. All hospitals report “discharge data” for each inpatient served. “Discharge data” means the consolidation of complete billing, medical, and personal information describing a patient, the services received, and charges billed for each inpatient hospital stay. The data base includes demographic data (age, sex, residence, zip code), diagnoses recorded at discharge, total hospital charges, length of stay and other information. More information is available at <http://hlunix.hl.state.ut.us/hda/>.

## Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing surveillance program developed and partially funded by the Centers for Disease Control and Prevention (CDC). It is designed to estimate the prevalence of risk factors for the major causes of death and disability in the United States. Behavioral risk factor surveys



## Cardiovascular Disease in Utah: Appendices

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have been conducted since the early 1980s to provide state-specific estimates of the proportion of adults aged 18 and older reporting health risk behaviors. The program has grown to include 50 states and several U.S. territories. The BRFSS is conducted as a random telephone survey of the non-institutionalized adult population. Utah's sample has grown in size from 612 respondents in 1984 to 2,891 respondents in 2000. Each state performs the survey in every month of the calendar year. After data collection is complete for the year, the individual responses are weighted to be representative of the state's adult population. The Utah BRFSS has proven to be an important tool for monitoring the health behaviors of Utah adults. The BRFSS has been used to support risk reduction and disease prevention activities by directing program planning, assessing trends, and targeting relevant population groups. More information is available at <http://www.cdc.gov/brfss/>.

### Youth Risk Behavior Survey

The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of priority health-risk behaviors among youth and young adults — behaviors that contribute to unintentional and intentional injuries; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases (STDs) (including human immunodeficiency virus infection); unhealthy dietary behaviors; and physical inactivity. The YRBSS includes a national school-based survey conducted by the CDC as well as state, territorial, and local school-based surveys conducted by education and health agencies. The survey employs a two-stage cluster sample design to produce representative samples of students in grades 9-12. The first stage sampling frame includes all regular public schools teaching any of grades 9, 10, 11 or 12. At the second sampling stage, intact classes of a required subject or a required period are randomly selected. All students in selected classes with active parental consent are eligible to participate in the Utah survey. The Youth Risk Behavior Survey was conducted in Utah public schools in 1990 and 1991. Since 1991, the survey has been conducted in Utah every other year. Data collected by this survey has been used for program planning, assessing trends, and targeting relevant population groups for risk reduction/disease prevention.

When interpreting findings from the Youth Risk Behavior Survey, it is important to note that after 1997, Utah school survey laws changed, requiring active rather than passive consent. Passive consent laws had allowed all students to participate in a survey unless their parents confirmed in writing that they were opposed to their children's participation. New active consent laws require parents to sign consent forms before students are allowed to participate in a survey. Following this change from passive to active consent, the Youth Risk Behavior Survey response rate declined from approximately 80% (1991 through 1997) to less than 70% in 1999. Research shows that students who receive active permission to participate in a survey may be less likely to smoke cigarettes and use marijuana, more likely to do well in school, more likely to be white, and more likely to come from intact homes. As a result, the survey may underestimate the number of youth practicing risk behaviors. More information is available at <http://www.cdc.gov/nccdphp/dash/yrebs/>.

# Appendix D: Technical Notes

## Age-adjustment:

Some of the rates presented in the following tables are age-adjusted, that is, they are stated in terms of an age-standardized value. Age-adjusted rates control for age effects, allowing better comparability of rates across areas and time. When comparing across geographic areas, such as comparing a state to the entire United States, or one state to another, age-adjusting controls for area-to-area differences in health events that can be explained by differences in the age structures of the populations being compared.

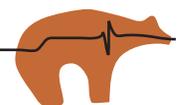
For example, a state with an older population will have higher death rates for cancer even though its exposure levels and cancer rates for specific age groups are the same as those of other states. Utah has a young population, causing our crude death rates to be lower than the U.S. rates. By using age-standardized rates, Utah and U.S. rates may be meaningfully compared. Age-adjusting is also used to compare death rates across time, as the age distributions of populations vary over different time periods. For the following tables, age-adjustment was performed using the year 2000 U.S. standard population published by the National Center for Health Statistics (source: Anderson RN, Rosenberg, HM. Age Standardization of Death Rates: Implementation of the Year 2000 Standard. National Vital Statistics Reports; Volume 47, Number 3. Hyattsville, Maryland: NCHS. 1998).

## Cause of Death:

Cause of death statistics are derived from the medical certification information required by law to be reported on the death or fetal death certificate by the attending physician or medical examiner. The medical certification item on certificates of death and fetal death has a provision for reporting three causes of death—immediate, intervening, and underlying, as well as additional information related to the cause of death. The cause of death selected for coding and tabulating mortality statistics is the “underlying cause of death”, which is generally defined as the disease or injury which initiated the sequence of morbid events leading directly to death.

## Clinical Classification Software:

Clinical Classification Software (CCS) is a tool for clustering patient diagnoses and procedures into a manageable number of clinically meaningful categories developed at the Agency for Healthcare Research and Quality (AHRQ). CCS is used for grouping conditions and procedures making it easier to understand patterns of diagnoses and procedures so that health plans, policymakers, and researchers can analyze costs, utilization, and outcomes associated with particular illnesses and procedures. The CCS groupings were used to develop the emergency department and hospitalization data



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tables. (See Appendix A for a listing of the CCS codes used to define the conditions and procedures included in this report.) Information about CCS can be found at <http://www.ahrq.gov/data/hcup/ccsfact.htm>.

### ICD-9 and ICD-10 codes:

The Eighth Revision of the International Classification of Diseases was used to code the underlying cause of death on Utah's death certificates for data years 1968 through 1978. The Ninth Revision of the International Classification of Diseases (ICD-9) was used to code the underlying cause of death in Utah for data years 1979 through 1998, and the Tenth Revision of the International Classification of Diseases was used to code the underlying cause of death in Utah for 1999 and will be used in future years. Comparability ratios between revisions are computed by the National Center for Health Statistics. These ratios for some cause of death codes show extreme variations and utmost caution should be taken in interpreting any cause of death trends that span the Eighth and Ninth Revisions or the Ninth and Tenth Revisions of the International Classification of Diseases. The ICD-9 and ICD-10 codes which were grouped together to determine rates for the specific conditions included in this report are listed in Appendix A.

### Percentage Estimates for the BRFSS and YRBS Data Tables:

Percentage estimates were calculated using SAS and SUDAAN data analysis software programs. Missing values (e.g., "don't know" and "refused to answer" categories) were excluded from the denominator before the percentages were calculated.

### Population Count Estimates:

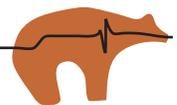
Percentage estimates were applied to population counts to derive an estimate for the total number of persons in Utah to whom the behavior applies. For example, the survey estimate of the *percentage* of persons who smoked was applied to the total adult population of Utah to derive an estimate of the total *number* of smokers in Utah. The population estimates used in the BRFSS, mortality, emergency department and hospitalization data tables were prepared by the Governor's Office of Planning and Budget. Population estimates for the mortality data tables by race and ethnicity were obtained from the U.S. Census. The data source for the enrollment numbers used in the YRBS tables was the Utah State Office of Education.

### **Sampling Error:**

Sampling error refers to random variation that occurs because only a subset of the entire population is sampled and used to estimate the finding for the entire population. It is often called “margin of error” in popular use and is expressed as the “plus or minus” term. In this report, sampling error has been expressed as *confidence interval bounds*. The 95% confidence interval (calculated as 1.96 times the standard error of a statistic) indicates the range of values within which the statistic would fall 95% of the time if the researcher were to calculate the statistic (e.g., a percentage) from an infinite number of samples of the same size drawn from the same base population.

### **Weighting:**

The results presented in the BRFSS data tables were weighted to more closely reflect the actual distribution of Utahns with respect to their age, sex, number of adults in the household, the number of telephone lines in the household, and the region of the state where they reside. The YRBS data were weighted to reflect the actual distribution of Utah students in grades 9-12 in public schools. Therefore the data can be generalized to all public school students in grades 9-12 in Utah.



### Appendix E: Glossary

**ACE (angiotension converting enzyme) inhibitors** - A type of heart failure medication that works by preventing the body from creating angiotensin, a substance in the blood that causes vessels to tighten and raises blood pressure. In large-scale studies, ACE inhibitors have been proven to slow the progression of heart failure.

**Angiography** - An X-ray test used to detect diseases of the blood vessels, such as weakening of the vessel walls and the narrowing or blocking of vessels. The X-ray is taken after the vessels have been injected with a substance that allows them to be seen on film.

**Angioplasty** - A nonsurgical procedure used to treat blockages in blood vessels, particularly the coronary arteries that feed the heart. Also known as percutaneous transluminal coronary angioplasty (PTCA). An inflatable balloon or other device on a thin tube (catheter), fed through blood vessels to the point of blockage, is used to open the artery.

**Anticoagulants** - Drugs that delay the clotting (coagulation) of blood. When a blood vessel is plugged up by a clot and an anticoagulant is given, it tends to prevent new clots from forming or the existing clot from enlarging. An anticoagulant does not dissolve an existing blood clot.

**Arteriography** - X-rays of arteries after injection of a radioopaque dye.

**Atherosclerosis** - A type of hardening of the arteries in which cholesterol and other substances in the blood are deposited in the walls of arteries, including the coronary arteries that supply blood to the heart. In time, narrowing of the coronary arteries by atherosclerosis may reduce the flow of oxygen-rich blood to the heart.

**Beta blockers** - Medications that reduce the heart's tendency to beat faster by blocking specific receptors ("beta receptors") located on the cells that make up the heart.

**Blood pressure** - The force of the blood pushing against the walls of arteries. Blood pressure is given as two numbers that measure systolic pressure (the first number, which measures the pressure while the heart is contracting) and diastolic pressure (the second number, which measures the pressure when the heart is resting between beats). Blood pressures of 140/90 mmHg or above are considered high, while blood pressures in the range of 130-139/85-89 are high normal. Less than 130/85 mmHg is normal and less than 120/80 mmHg is optimal.

**Blood thinners** - Medications that are used to prevent blood clotting, such as warfarin and heparin. Some people with heart failure are prescribed blood thinners to reduce the risk of stroke.

**Body mass index (BMI)** - A mathematical formula to assess body weight relative to height. The measure correlates highly with body fat. Calculated as weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). Because it is readily calculated, BMI is the measurement of choice as an indicator of healthy weight, overweight, and obesity. Overweight is defined as a BMI of 25-29, and obese is defined as a BMI of 30 or greater.

**Cardiovascular disease (CVD)** - Includes a variety of diseases of the heart and blood vessels, coronary heart disease (coronary artery disease, ischemic heart disease), stroke (brain attack), high blood pressure (hypertension), rheumatic heart disease, congestive heart failure, and peripheral artery disease.

**Cholesterol** - A waxy substance that circulates in the bloodstream. When the level of cholesterol in the blood is too high, some of the cholesterol is deposited in the walls of the blood vessels. Over time, these deposits can build up until they narrow the blood vessels, causing atherosclerosis, which reduces the blood flow. The higher the blood cholesterol level, the greater is the risk of getting heart disease. Blood cholesterol levels of less than 200 mg/dl are considered desirable. Levels of 240 mg/dl or above are considered high and require further testing and possible intervention. Levels of 200-239 mg/dl are considered borderline. Lowering blood cholesterol reduces the risk of heart disease.

**HDL (high-density lipoprotein) cholesterol** - The so-called good cholesterol. Cholesterol travels in the blood combined with protein in packages called lipoproteins. HDL is thought to carry cholesterol away from other parts of the body back to the liver for removal from the body. A low level of HDL increases the risk for CHD, whereas a high HDL level helps protect against CHD.

**LDL (low-density lipoprotein)** - The so-called bad cholesterol. LDL contains most of the cholesterol in the blood and carries it to the tissues and organs of the body, including the arteries. Cholesterol from LDL is the main source of damaging buildup and blockage in the arteries. The higher the level of LDL in the blood, the greater is the risk for CHD.

**Congestive heart failure (or heart failure)** - A condition in which the heart cannot pump enough blood to meet the needs of the body's other organs. Heart failure can result from narrowed arteries that supply blood to the heart muscle and from other



factors. As the flow of blood out of the heart slows, blood returning to the heart through the veins backs up, causing congestion in the tissues. Often swelling (edema) results, most commonly in the legs and ankles, but possibly in other parts of the body as well. Sometimes fluid collects in the lungs and interferes with breathing, causing shortness of breath, especially when a person is lying down.

**Coronary artery bypass** - A procedure used to reroute the blood supply around a blocked section of a coronary artery. Surgeons remove healthy blood vessels from another part of the body, such as the leg or chest wall. Then the surgeons surgically attach the vessels to the diseased artery in such a way that the blood can flow around the blocked section.

**Coronary heart disease (CHD)** - A condition in which the flow of blood to the heart muscle is reduced. Like any muscle, the heart needs a constant supply of oxygen and nutrients that are carried to it by the blood in the coronary arteries. When the coronary arteries become narrowed or clogged, they cannot supply enough blood to the heart. If not enough oxygen-carrying blood reaches the heart, the heart may respond with pain called angina. The pain usually is felt in the chest or sometimes in the left arm or shoulder. When the blood supply is cut off completely, the result is a heart attack. The part of the heart muscle that does not receive oxygen begins to die, and some of the heart muscle is permanently damaged.

**Diabetes** - A condition in which the body doesn't produce the right amount of insulin, the hormone that allows cells to absorb glucose (sugar) from the bloodstream. Some people with diabetes must inject themselves with insulin every day to maintain a healthy glucose level. Others are able to control the condition with pills or a special diet.

**Type 1 diabetes** (previously called insulin-dependent diabetes mellitus or juvenile-onset diabetes) represents clinically about 5 percent of all persons with diagnosed diabetes. Its clinical onset is typically at ages under 30 years. Most often this type of diabetes represents an autoimmune destructive disease in beta (insulin-producing) cells of the pancreas in genetically susceptible individuals. Insulin therapy always is required to sustain life and maintain diabetes control.

**Type 2 diabetes** (previously called non-insulin-dependent diabetes mellitus or adult-onset diabetes) is the most common form of diabetes in the United States and the world, especially in certain racial and ethnic groups and in elderly persons. In the United States, approximately 95 percent of persons with diagnosed diabetes (10.5 million) and almost 100 percent of all persons with undiagnosed (5.5 million) diabetes probably have type 2 diabetes.

**Direct costs** - Costs associated with an illness that can be attributed to a medical service, procedure, medication, etc. Examples include payment for an x-ray; pharmaceutical drugs, for example, insulin; surgery; or a clinic visit.

**Disability** - The general term used to represent the interactions between individuals with a health condition and barriers in their environment. The term disability is operationalized as self-reported activity limitations or use of assistive devices or equipment related to an activity limitation.

**Emphysema** - Abnormal permanent enlargement of airspaces in the lungs accompanied by coughing and difficulty breathing.

**Healthy People 2010 (HP2010)** – A comprehensive, nationwide health promotion and disease prevention agenda, coordinated by the U.S. Department of Health and Human Services. The HP2010 goals and objectives for improving health were created by a broad coalition of experts from many sectors. The two overarching goals of HP2010 are to increase the quality and years of healthy life and to eliminate health disparities.

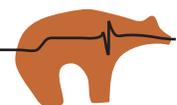
**Heart attack** (also called acute myocardial infarction) - Occurs when a coronary artery becomes completely blocked, usually by a blood clot (thrombus), resulting in lack of blood flow to the heart muscle and therefore loss of needed oxygen. As a result, part of the heart muscle dies (infarcts). The blood clot usually forms over the site of a cholesterol rich narrowing (or plaque) that has burst or ruptured.

**Heart disease** - The leading cause of death and a common cause of illness and disability in the United States. Coronary heart disease and ischemic heart disease are specific names for the principal form of heart disease, which is the result of atherosclerosis, or the buildup of cholesterol deposits in the coronary arteries that feed the heart.

**High blood pressure (hypertension)** - A systolic blood pressure of 140 mmHg or greater or a diastolic pressure of 90mmHg or greater. With high blood pressure, the heart has to work harder, resulting in an increased risk of a heart attack, stroke, heart failure, kidney and eye problems, and peripheral vascular disease.

**Hospital discharges** - The number of inpatients discharged from short-stay hospitals where some type of disease was the first listed diagnosis. Discharges include people both living and dead.

**Incidence** - The number of new cases of disease that develops in a population during a specified period of time, such as a year.



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**Indirect costs** - Those costs associated with an illness that occur because an individual cannot work at his or her usual job due to premature death, sickness, or disability (for example, amputation).

**Ischemic heart disease** - Includes heart attack and related heart problems caused by narrowing of the coronary arteries and therefore a decreased supply of blood and oxygen to the heart. Also called coronary artery disease and coronary heart disease.

**Land area** – Defined as a county’s population density and categorized in Utah as follows: a frontier county has six or fewer persons per square mile; a rural county has more than six but less than 100 persons per square mile; and an urban county has 100 or more persons per square mile.

**Menopause** - A natural event, the time in a woman’s life when she stops having menstrual periods - specifically, when she has gone 12 consecutive months with no period. Menopause marks the end of the reproductive years that began in puberty.

**Morbidity** - Incidence and prevalence rates are both measures of morbidity, that is, measures of various effects of disease on a population.

**Mortality** - The total number of deaths from a given disease in a population during a specific interval of time, usually a year.

**Myocardial infarction** – (see heart attack)

**Obstructive sleep apnea (OSA)** - An illness characterized by snoring, partial or complete cessation of breathing during sleep, reductions in blood oxygen levels, severe sleep disruptions, and excessive daytime sleepiness. OSA is a chronic breathing problem with serious effects on individual health and productivity, including an inheritable risk of sudden infant deaths, behavior and learning disturbances, injury from accidents, and reduced quality of life.

**Osteoarthritis** - A slowly progressive, degenerative joint disease that results from the breakdown of cartilage and leads to pain and stiffness; usually affects the knees, hips, and hands; the most common form of arthritis.

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

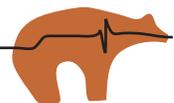
**Moderate physical activity** - Activities that use large muscle groups and are at least equivalent to brisk walking. In addition to walking, activities may include swimming, cycling, dancing, gardening and yardwork, and various domestic and occupational activities.

**Vigorous physical activity** - Rhythmic, repetitive physical activities that use large muscle groups at 70 percent or more of maximum heart rate for age. An exercise heart rate of 70 percent of maximum heart rate for age is about 60 percent of maximal cardiorespiratory capacity and is sufficient for cardiorespiratory conditioning. Maximum heart rate equals roughly 220 beats per minute minus age. Examples of vigorous physical activities include jogging/running, lap swimming, cycling, aerobic dancing, skating, rowing, jumping rope, cross-country skiing, hiking/backpacking, racquet sports, and competitive group sports (for example, soccer and basketball).

**Prevalence** - The total number of cases of disease existing in a population at a specific point in time.

**Rate** – The basic measure of disease occurrence that expresses probability or risk of disease in a defined population over a specified period of time.

**Stroke** - A form of cerebrovascular disease that affects the arteries of the central nervous system. A stroke occurs when blood vessels bringing oxygen and nutrients to the brain burst or become clogged by a blood clot or some other particle. Because of this rupture or blockage, part of the brain does not get the flow of blood it needs. Deprived of oxygen, nerve cells in the affected area of the brain cannot function and die within minutes. When nerve cells cannot function, the part of the body controlled by these cells cannot function either.



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### References:

1. U.S. Department of Health and Human Services. (2000, November). Healthy People 2010. 2<sup>nd</sup> ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, D.C.: U.S. Government Printing Office.
2. American Heart Association. Glossary (nd). Dallas, Texas: author. Retrieved February 28, 2002 from <http://www.americanheart.org>
3. The American College of Obstetricians and Gynecologists. Spotlight on Women's Health (nd). Washington, D.C.: author. Retrieved February 28, 2002 from <http://www.acog.org>
4. Mausner, J.S., Kramer, S. (1985). Mausner and Bahn, Epidemiology – An Introductory Text (2<sup>nd</sup> ed.). Philadelphia: W.B. Saunders Company.

# Appendix F: Population density by land area

Land area and county	Area in square miles	Estimated population July 1, 2001	Population density per sq mi
<b>Total</b>	<b>82,142</b>	<b>2,295,971</b>	<b>28.0</b>
Frontier*	57,281	162,686	2.8
Garfield	5,174	4,630	0.9
Wayne	2,460	2,509	1.0
Daggett	698	944	1.4
Kane	3,992	6,037	1.5
San Juan	7,820	14,063	1.8
Millard	6,589	12,326	1.9
Piute	758	1,404	1.9
Rich	1,029	1,983	1.9
Grand	3,682	8,423	2.3
Beaver	2,590	6,198	2.4
Emery	4,452	10,473	2.4
Juab	3,392	8,570	2.5
Duchesne	3,238	14,646	4.5
Uintah	4,477	26,049	5.8
Tooele	6,930	44,431	6.4
Rural**	21,246	383,901	18.1
Box Elder	5,723	43,245	7.6
Sevier	1,910	19,180	10.0
Iron	3,298	34,920	10.6
Morgan	609	7,297	12.0
Carbon	1,478	19,858	13.4
Wasatch	1,177	15,947	13.5
Sanpete	1,588	23,219	14.6
Summit	1,871	31,279	16.7
Washington	2,427	95,584	39.4
Cache	1,165	93,372	80.1
Urban***	3,615	1,749,383	483.9
Utah County	1,998	385,692	193.0
Weber	576	200,567	348.2
Davis	304	244,845	805.4
Salt Lake	737	918,279	1246.0

Source for Land Area: Demographic and Economic Analysis in the Governor's Office of Planning and Budget; Census 2000 Rank by Land Area.

Source for populations: Demographic and Economic Analysis, Governor's Office of Planning and Budget; Table: Utah Population Estimates Committee Utah Population Estimates by County, Utah Data Guide, Winter 2002.

\*Six or fewer persons per square mile.

\*\*Six but less than 100 persons per square mile.

\*\*\*One hundred or more persons per square mile.



## **Appendix G: Additional Resources**

### **General**

American Heart Association  
[www.americanheart.org](http://www.americanheart.org)

Centers for Disease Control and Prevention (CDC)  
[www.cdc.gov](http://www.cdc.gov)

CDC's Cardiovascular Health Branch  
[www.cdc.gov/nccdphp/cvd](http://www.cdc.gov/nccdphp/cvd)

Healthy People 2010  
[www.health.gov/healthypeople](http://www.health.gov/healthypeople)

National Heart Lung and Blood Institute  
[www.nhlbi.nih.gov](http://www.nhlbi.nih.gov)

Utah Cardiovascular Health Program  
[www.hearhighway.org](http://www.hearhighway.org)

### **Data**

BRFSS Data  
[www.cdc.gov/brfss](http://www.cdc.gov/brfss)

Indicator Based Information System for Public Health (single point of access to Utah health data)  
<http://health.utah.gov/ibis-ph>

Utah Cardiovascular Data Tables 1980-1999  
[www.health.state.ut.us/action2000/opha\\_pubs.html](http://www.health.state.ut.us/action2000/opha_pubs.html)

YRBSS Data  
[www.cdc.gov/yrbs](http://www.cdc.gov/yrbs)

### **Tobacco Cessation**

American Lung Association  
[www.lungusa.org](http://www.lungusa.org)

Utah Tobacco Control Program  
[www.tobaccofreeutah.org](http://www.tobaccofreeutah.org)

## **Physical Activity**

American Alliance for Health Physical Education Recreation and Dance  
[www.aahperd.org](http://www.aahperd.org)

CDC's Division of Nutrition and Physical Activity  
[www.cdc.gov/nccdphp/dnpa](http://www.cdc.gov/nccdphp/dnpa)

## **Blood Pressure**

National High Blood Pressure Education Program  
[www.nhlbi.nih.gov/about/nhbpep/index.htm](http://www.nhlbi.nih.gov/about/nhbpep/index.htm)

## **Cholesterol**

National Cholesterol Education Program  
[www.nhlbi.nih.gov/about/ncep/index.htm](http://www.nhlbi.nih.gov/about/ncep/index.htm)

## **Obesity**

NHLBI Obesity Education Initiative  
[www.nhlbi.nih.gov/about/oei/index.htm](http://www.nhlbi.nih.gov/about/oei/index.htm)

The Surgeon General's Call to Action to Prevent and Decrease Overweight & Obesity  
[www.surgeongeneral.gov/topics/obesity](http://www.surgeongeneral.gov/topics/obesity)

CDC Health Topic: Obesity/Overweight  
[www.cdc.gov/health/obesity.htm](http://www.cdc.gov/health/obesity.htm)

## **5 A Day/Nutrition**

American Dietetic Association  
[www.eatright.org](http://www.eatright.org)

National Cancer Institute, Eat 5 A Day for Better Health  
[www.5aDay.gov](http://www.5aDay.gov)

## **Heart Attack**

National Heart Attack Alert Program  
[www.nhlbi.nih.gov/about/nhaap/index.htm](http://www.nhlbi.nih.gov/about/nhaap/index.htm)





# Appendix H: 2002 Cardiovascular Disease in Utah Report - Feedback Form

We welcome your opinions of this report. Please help us by completing this page and returning it to:  
*Cardiovascular Health Program, Bureau of Health Promotion, Utah Department of Health*  
*P O Box 142107, Salt Lake City, UT 84114-2107*  
*phone: (801) 538-6142 fax: (801) 538-9495*

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1. Why were you interested in this report? (*CHECK ALL THAT APPLY*)
  - POLICY SETTING AND STRATEGIC PLANNING (ALLOCATION OF RESOURCES, SETTING PRIORITIES, ETC.)
  - PROGRAM PLANNING AND MONITORING (TRACKING PROGRESS ON PROGRAM OBJECTIVES, ETC.)
  - BACKGROUND INFORMATION FOR RESEARCH, FUNDING PROPOSALS, ETC.
  - ADVOCACY FOR SPECIAL POPULATION GROUP(S)
  - SATISFYING REQUESTS FOR INFORMATION FROM OTHERS WHO CONTACT YOU
  - OTHER (SPECIFY): \_\_\_\_\_
  
2. For what specific activities did you use the information in this report?
  
3. Which information in this report did you find most useful?
  
4. What could we have done to make the information more useful?
  
5. a. Was the purpose clearly stated?  YES  NO  
b. Was it organized so that you could find information easily?  YES  NO  
c. Was it presented in a way that was clear and understandable?  YES  NO  
d. Were the graphs easy to understand?  YES  NO  
e. Did it have a professional appearance?  YES  NO  
f. Did the report contain the right amount of information?  YES  NO  
g. Please clarify your answers to Questions #5a-f if necessary:
  
6. What other topics would you like to see covered in future reports?
  
7. Is there anything else you can tell us that could help us with future reports of this type?

**Thank you.** If you'd like, you may provide your name, address and phone number. We may want to call to discuss your ideas with you further. (OPTIONAL):

name: \_\_\_\_\_ address: \_\_\_\_\_  
phone: \_\_\_\_\_ fax: \_\_\_\_\_

