



The Burden of Heart Disease and Stroke in New Hampshire

2013



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Introduction

According to the Centers for Disease Control and Prevention (CDC), more than 1 in 3 (83 million) U.S. adults currently live with one or more types of cardiovascular disease, and more than one-third (33.6%) of all U.S. deaths are due to cardiovascular diseases.^[1] Common types of cardiovascular disease include coronary heart disease (CHD), congestive heart failure (CHF), stroke, and high blood pressure (HBP). In 2008, heart disease and stroke were the first and fourth leading causes of death in the United States, with 616,828 and 134,148, deaths, respectively, that year.^[2]

In New Hampshire, heart disease and stroke were the second and fourth leading causes of death in 2009, accounting for 2,268 and 499 deaths, respectively. The number of deaths from heart disease and stroke exceeded the number of deaths from chronic lower respiratory disease, unintentional injury, Alzheimer's disease, diabetes mellitus, influenza pneumonia, suicide, and nephritis combined (Table 1).^[3]

The estimated cost for cardiovascular disease and stroke in 2009 in the U.S. was \$312.6 billion. This figure included health expenditures (direct costs) and loss of productivity resulting from morbidity and mortality (indirect costs). From that number, \$195.2 billion were for heart disease and \$38.6 billion for stroke. The remaining was for hypertensive disease and other circulatory conditions.^[4]

CHD and CHF deaths represented nearly 80% of all heart disease deaths in New Hampshire in 2009,^[3] therefore, we only include CHD, CHF, and stroke deaths in the disease data section of this report (Graph 1). This report also presents data on the following risk factors: HBP, high cholesterol, cigarette smoking, diabetes, physical inactivity, overweight, and obesity.

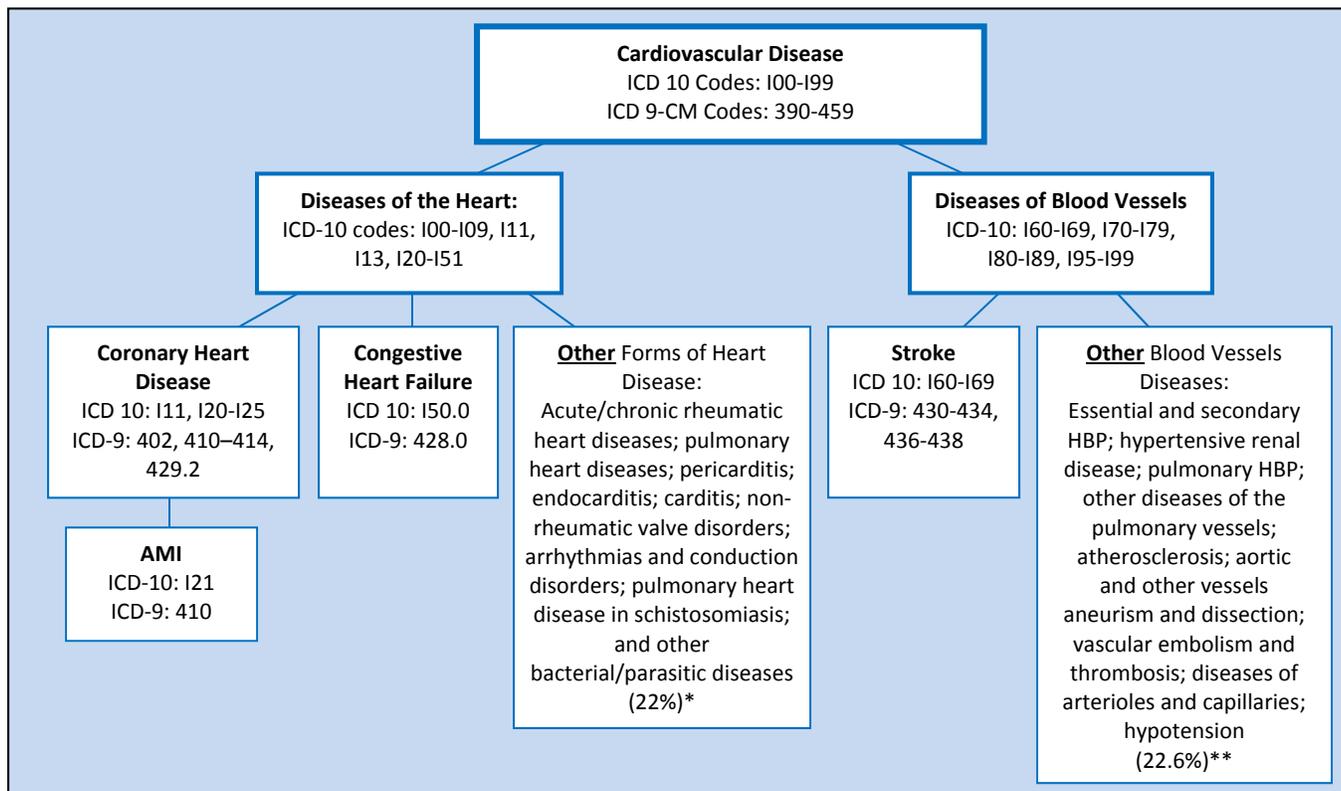
Table 1. Top 10 Leading Causes of Death in New Hampshire, 2009

<i>Causes of Deaths</i>	<i>Deaths</i>	<i>Age-Adjusted Death Rates per 100,000</i>	<i>Percentage of Total Deaths</i>
1- Malignant Neoplasms	2562	170.4	25.4
2- Heart Disease	2268	150.1	22.5
3- Chronic Lower Resp. Disease	652	44.5	6.5
4- Cerebrovascular Disease	499	33.3	4.9
5- Unintentional Injury	482	34.3	4.8
6- Alzheimer's Disease	367	24.3	3.6
7- Diabetes Mellitus	276	18.3	2.7
8- Influenza Pneumonia	194	12.8	1.9
9- Suicide	166	11.7	1.6
10- Nephritis	165	11.1	1.6
All Others Causes	2469		24.4

Adapted From: Web-based Injury Statistics Query and Reporting System (WISQARS), Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System

Figure 1. Diseases and Corresponding ICD Codes Discussed in This Report



* Percentage of total deaths for diseases of the heart in NH in 2009

** Percentage of total deaths for diseases of blood vessels

AMI: Acute Myocardial Infarction (Heart Attack)

ICD: International Classification of Diseases

Summary

In New Hampshire, heart disease and stroke are the second and fourth leading causes of death, accounting for about 2,250 and 500 deaths in 2009, respectively. About 80% of deaths from diseases of the heart and of blood vessels in New Hampshire are from coronary heart disease, heart attack, congestive heart failure, and stroke.

Coronary Heart Disease

According to the 2010 Behavioral Risk Factor Surveillance System (BRFSS) survey, 4.4% of New Hampshire adults (6% of males and 2.9% of females) indicated that they were told by a health professional that they had angina or coronary heart disease (CHD). Age-adjusted hospitalization rates for CHD in New Hampshire decreased by 43%, from 65.1 in 2000 to 37.3 per 10,000 population in 2008. More hospitalizations for CHD were found among men than among women during each year of that period, and over half of the CHD patients hospitalized had Medicare as their primary insurer.

From 2000 to 2009, New Hampshire age-adjusted death rates for CHD decreased by 47%, from 193.7 deaths to 102.3 deaths per 100,000 population. However, more males and more people aged 75 and older died from CHD than females and people younger than 75. At the county level, Coos County registered the highest age-adjusted death rates per 100,000 for the period 2005-2009 combined, whereas Hillsborough County experienced the highest actual number of deaths.

Heart Attack

In 2010, 4% of adults (5.7% of males and 2.3% of females) indicated that they were told they had had a heart attack. The prevalence also increased with age but was inversely related to income and education. Regarding hospitalizations for heart attack, the age-adjusted rates decreased by 29%, from 26.1 in 2000 to 18.6 per 10,000 population in 2008, and there were more hospitalizations among men.

Adjusted death rates for heart attack decreased by 52%, from 58.8 deaths per 100,000 population in 2000 to 28.1 deaths in 2009. As for CHD, people aged 75 and older and males were more affected. For 2005-2008 combined data, Coos County again had the highest age-adjusted death rates, whereas Hillsborough and Rockingham Counties shared the highest number of deaths for that period. At the city level, Manchester had the highest number of deaths for heart attack of any New Hampshire city.

Congestive Heart Failure

The New Hampshire BRFSS survey does not have a question to estimate congestive heart failure (CHF) in the population; therefore, this report includes the incidence of hospitalization for CHF in New Hampshire instead of its prevalence. Age-adjusted hospitalization rates for CHF decreased by 29%. The CHF rate went from 25.4 in 2000 to 18.0 per 10,000 population in 2007 with more males being hospitalized than females for CHF.

Age-adjusted death rates for CHF increased by 46%, from 8.1 in 2000 to 15 deaths per 100,000 population in 2009, and there was no significant difference by sex. At the county level, Hillsborough and Rockingham Counties had both the highest age-adjusted death rates and the highest number of deaths for the period 2005-2009 combined.

Stroke

About 2% of adults (2.3% of males and 2.0% of females) indicated that they were told they had had a stroke in 2010. As with the other diseases above, stroke prevalence increased with age but was inversely related to income and education.

Age-adjusted hospitalization rates for stroke decreased by 18%, from 21.7 in 2000 to 17.9 per 10,000 population in 2008, with again more males affected than females. For combined stroke data (2005-2008) at the county level, Strafford, Rockingham, and Hillsborough Counties had a significantly higher adjusted hospitalization rate than the other seven counties, whereas Hillsborough followed by Rockingham County had the highest number of stroke hospitalizations for that period.

Finally, age-adjusted death rates from stroke decreased by 41%, from 56.4 deaths in 2000 to 33.3 deaths per 100,000 population in 2009. There was no significant difference by sex, but the number of stroke deaths increased with age as with the previously reported diseases. At the county level, Merrimack County's death rate was significantly higher than that of the State and of Coos, Grafton, Hillsborough, and Rockingham Counties for 2005-2008 combined. However, Hillsborough, followed by Rockingham County, had the highest number of stroke deaths for the same period. At the city level, Manchester had the highest number of deaths from stroke for the same period.

Risk Factors Data

According to the New Hampshire 2009 BRFSS survey, over one in four adults (28.6%) reported a high blood pressure (HBP) diagnosis (31.3% of men and 26.1% of women). About four in five (82.8%) New Hampshire adults reported being screened for high blood cholesterol level within the past five years (80.4% of men and 85.1% of women), and 38.6% of those screened had high blood cholesterol. Regarding fruit and vegetable consumption, the survey indicated that 27% of New Hampshire adults (22.4% of men and 33.2% of women) reported consuming fruits and vegetables five or more times per day. Finally, the estimated proportion of adults in 2009 who considered themselves physically inactive was 21.2%, and among those who reported being active (78.8%), 53.4% engaged in moderate or vigorous activities.

The 2010 BRFSS survey indicated that 7.9% of adults in New Hampshire reported having been told that they had diabetes (9.7% of men and 6.1% of women), and 16.9% were current smokers (18% of men and 15.8% of women). Furthermore, 37.6% were found to be overweight and 25.5% obese.

At the county level, Coos County had a significantly higher proportion than the State for HBP (36.9%), high blood cholesterol (48.0%), and obesity (35.9%), whereas Grafton County had a significantly lower proportion than the State for obesity (19.9%).

Methods

Various data sources, such as vital statistics, New Hampshire inpatient hospitalization data and Behavioral Risk Factor Surveillance System (BRFSS) data, were used to compute descriptive statistics presented in this burden report. *Indicators for Chronic Disease Surveillance*^[5] from the Centers for Disease Control and Prevention (CDC) were used to select individual cardiovascular disease indicators.

When appropriate, data are presented with 95% confidence intervals. The confidence interval reflects the degree of uncertainty for each estimate. For example, in 2010, 4.4% of New Hampshire adults reported that they had been told they had angina or coronary heart disease with a 95% confidence interval 3.9%-4.9%. This can be interpreted to mean that our best estimate is 4.4%, but the range that is likely to capture the true value 95% of the time could be as low as 3.9% or as high as 4.9%.

Disease Definitions

In this report, the International Classification of Diseases (ICD) codes are used to calculate rates. Deaths (mortality) are coded with ICD-10 codes (from the 10th Revision), while hospital discharges (morbidity) are coded with ICD-9-CM codes (from the 9th Revision, Clinical Modification). The ICD codes used include:

Coronary Heart Disease (CHD) including Acute Myocardial Infarction (AMI):

Deaths (mortality): ICD-10 codes: I11, I20-I25 – which include: hypertensive heart disease, ischemic heart diseases such as angina pectoris, acute myocardial infarction, subsequent myocardial infarction and other acute ischemic diseases, and chronic ischemic diseases.

Discharges (morbidity): ICD-9-CM codes: 402, 410–414, 429.2 – which include: ischemic and hypertensive diseases and ICD-9-CM code 410 for acute myocardial infarction.

Congestive Heart Failure:

Deaths (mortality): ICD-10 code: I50.0 – congestive heart failure

Discharges (morbidity): ICD-9 code: 428.0 – congestive heart failure, unspecified

Cerebrovascular Disease (Stroke):

Deaths (mortality): ICD-10 code: I60-I69 – which include: subarachnoid hemorrhage, intracerebral hemorrhage, other nontraumatic intracranial hemorrhage, cerebral infarction, stroke not specified as hemorrhage or infarction, sequelae of cerebrovascular diseases, and other cerebrovascular disease.

Discharges (morbidity): ICD-9 codes: 430-434, 436-438 – which include: subarachnoid hemorrhage, intracerebral hemorrhage, other and unspecified intracranial hemorrhage, occlusion and stenosis of precerebral arteries, occlusion of cerebral arteries, acute but ill-defined cerebrovascular disease, other and ill-defined cerebrovascular disease, and late effects of cerebrovascular disease. Transient ischemic attack (TIA), ICD-9-CM code 435 is not included as a cerebrovascular disease in this report.

Data Sources

Death Data

New Hampshire death data, which are a part of the vital statistics, are collected by the State Registrar in the Division of Vital Records Administration of the Department of State. They are then transmitted to the National Center for Health Statistics (NCHS) and finally loaded to CDC WONDER (the Wide-ranging Online Data for Epidemiologic Research system). It is an easy-to-use Internet system that makes the information resources of CDC available to public health professionals and the public at large. It provides access to a wide array of public health information. For this report, numeric data sets about deaths were queried via "fill-in-the blank" web pages. CDC WONDER is available at: <http://wonder.cdc.gov/welcome.html>.

Hospital Discharge Data

The New Hampshire hospital discharge data up to 2010 were prepared by a Department of Health and Human Services (DHHS) contractor and then processed by the DHHS Office of Medicaid Business and Policy. The 26 acute-care, non-federal, inpatient facilities in the State report all discharges to this data set, which also includes out-of-state hospitalizations of New Hampshire residents. The Health Statistics and Data Management Section oversees the analysis of this data set. Additional information about New Hampshire hospital discharge data is available on-line at: <http://www.dhhs.nh.gov/dphs/hsdm/hospital/index.htm>. In this report, the data are used to compute hospitalizations for coronary heart disease, heart attack (myocardial infarction), congestive heart failure, and stroke.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is a population-based, random-digit dialed telephone survey of civilian, non-institutionalized adults aged 18 years and older. The survey is coordinated by CDC and is conducted annually by all states. In New Hampshire, the Bureau of Health Statistics and Data Management of the Division of Public Health Services (DPHS) at DHHS is responsible for the survey. The BRFSS includes questions on the prevalence of heart attack, angina or coronary heart disease, and stroke as well as questions on health behavior risk factors such as high blood pressure, high cholesterol, cigarette smoking, diabetes, physical inactivity, overweight, obesity, and inadequate fruits and vegetables consumption. The data are weighted to more accurately reflect the population by accounting for age, sex, and probability of selection. The national estimates are a calculation of the middle value (median) of all the state estimates. In New

Hampshire, 6,046 interviews were completed in 2010. New Hampshire BRFSS data up to 2010 should not be compared with future data years because of a change in the weighting methodology (called ranking) and the addition of cell phone respondents beginning with 2011 data. Therefore, even though 2011 data were available at the time of the writing of this report, they are not included here to avoid any confusion. Some New Hampshire and national data can be accessed on line at: <http://www.cdc.gov/brfss/>.

In this report, BRFSS data are used to compute specific cardiovascular disease prevalence and related risk factors in the New Hampshire population. However, readers should keep in mind the following limits of the BRFSS survey which may underestimate the true prevalence of heart disease and stroke and certain risk factors:

- Because answers to the survey are self-reported, some respondents may not be aware of some of their conditions, such as coronary heart disease, which may have a long preclinical phase.^[6, 7]
- About 15% of people who have a stroke die shortly afterward, and 10% require a nursing home or other long-term care facility.^[8] Those groups are not targeted by those surveys that covered only non-institutionalized adults.
- People with silent heart attacks, or heart attack patients living in institutions, long-term care facilities, nursing homes, and correctional institutions, are also excluded from the surveys.

Population Data (Denominators)

Population data used in this report come from population estimates from the U.S. Census Bureau. The Census Bureau produces estimates of the population for the U.S., states, counties, and cities, as well as for the Commonwealth of Puerto Rico. These estimates are produced with the general assumption that recent state-specific trends in births, mortality, domestic migration, and international migration will continue in the same direction.^[9]

Disease Data

Coronary Heart Disease

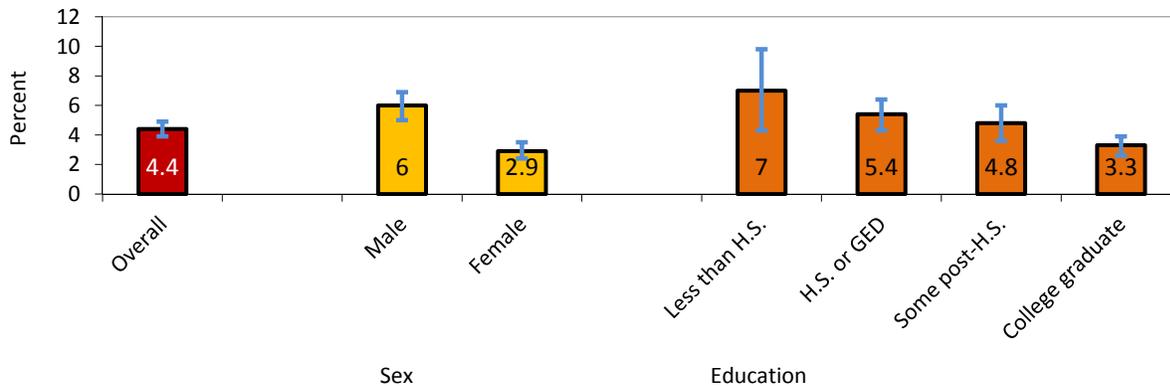
Coronary heart disease (CHD), also called coronary artery disease, is the most common type of heart disease.^[10] It occurs when a substance called plaque – usually made up of cholesterol, calcium and other substances – builds up in the arteries (called coronary arteries) that supply blood to the heart muscle.^[11] Over time, the buildup can decrease the flow of blood to the heart muscle causing chest pain or angina. In addition, an area of the plaque can eventually break open causing a blood clot to form on the surface of the plaque. If the clot becomes large enough, it can mostly or completely block blood flow through a coronary artery leading to a heart attack.^[12]

Prevalence of coronary heart disease

To estimate the prevalence of CHD in New Hampshire, respondents to the 2010 BRFSS survey were asked the question, “*Has a doctor, nurse, or other health professional EVER told you that you had angina or coronary heart disease?*”

From the survey, 4.4% of adults (6% of males and 2.9% of females) indicated that they were told by a health professional that they had angina or coronary heart disease. The prevalence varied by age group and education. First, CHD prevalence increased with age; individuals 65 and older reported the highest prevalence (14.7%) followed by the age group 55 through 64 (6.5%). The oldest group had a prevalence that was nearly 50 times higher than that of the 25 through 34 age group. Second, educational achievement was inversely related to the prevalence of CHD. Individuals with less than a high school diploma had more than twice the prevalence of those who graduated from college (Figure 2 and Table 2).

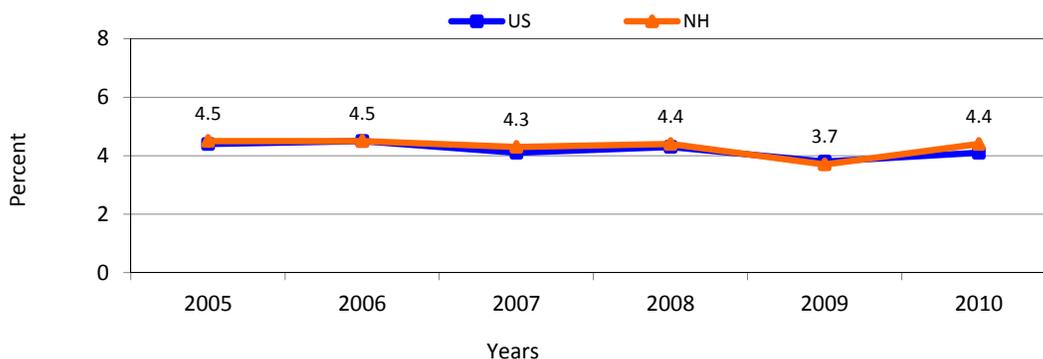
Figure 2. Self-Reported Prevalence of Angina or Coronary Heart Disease among New Hampshire Adults,* by Sex, and Education, 2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 *Ages 18 and older

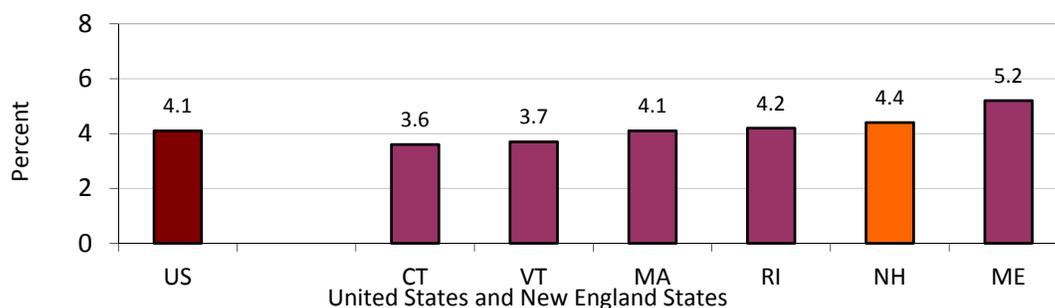
In terms of income, the same pattern is seen as for educational achievement: the higher the income, the lower the prevalence of CHD. People who reported income less than \$25,000 a year had five times the rate of those who reported over \$50,000 annually (Table 2). From 2005 to 2010, coronary heart disease prevalence in New Hampshire remained almost the same, which followed the same pattern as the median U.S. population (Figure 3 and Table 3). Finally, in 2010, New Hampshire was the second highest among the New England States for coronary heart disease (Figure 4).

Figure 3. Self-Reported Prevalence of Angina or Coronary Heart Disease in New Hampshire and the United States, 2005-2010



Data Source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2005-2010
 The percentages shown are for New Hampshire

Figure 4. Self-Reported Prevalence of Angina or Coronary Heart Disease among Persons in New England States, 2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010

CT: Connecticut; VT: Vermont; RI: Rhode Island

MA: Massachusetts; ME: Maine; NH: New Hampshire

US: United States

Table 2. Self-Reported Prevalence of Angina or Coronary Heart Disease by Sex, Age,* Income, and Education in New Hampshire, 2010

Sociodemographic Characteristic	Percentage	95% CI
Total	4.4	3.9-4.9
Sex		
Male	6.0	5.0-6.9
Female	2.9	2.4-3.5
Age		
18-24	NA	NA
25-34	0.3	0.0-0.8
35-44	0.6	0.0-1.2
45-54	2.9	1.7-4.0
55-64	6.5	5.0-8.0
65+	14.7	12.8-16.5
Income		
<15,000	9.0	5.6-12.3
15,000-24,999	10.6	8.1-13.1
25,000-34,999	5.6	3.7-7.5
35,000-49,999	4.3	2.9-5.7
50,000+	2.7	2.1-3.3
Education		
Less than H.S.	7.0	4.3-9.8
H.S. or G.E.D.	5.4	4.3-6.4
Some post-H.S.	4.8	3.6-6.0
College graduate	3.3	2.6-3.9

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

*Ages 18 and older

Table 3. Prevalence and Trends of Self-Reported Coronary Heart Disease in New Hampshire, 2005-2010

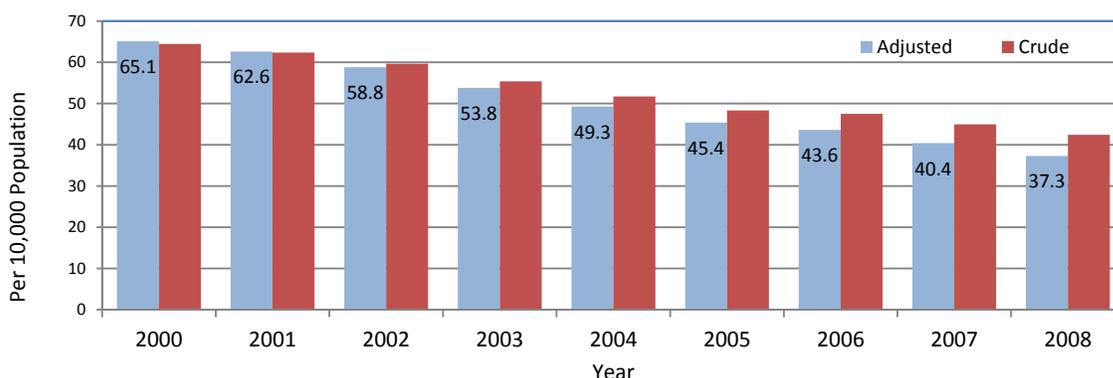
		2005	2006	2007	2008	2009	2010
NH	Mean Prevalence (%)	4.5	4.5	4.3	4.4	3.7	4.4
	95% CI	3.9-5.1	4.0-5.0	3.7-4.9	3.9-5.0	3.1-4.2	3.9-4.9
U.S.	Median Prevalence (%)	4.4	4.5	4.1	4.3	3.8	4.1

Data source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2005-2010

Hospitalizations for coronary heart disease

Age-adjusted hospitalization rates for coronary heart disease in New Hampshire decreased from 65.1 per 10,000 population in the year 2000 to 37.3 per 10,000 in 2008. This represents a 43% reduction in CHD hospitalizations from 2000 to 2008 (Figure 5 and Table 4). The crude rates also followed the same pattern. As with the self-reported prevalence for CHD, hospitalizations were affected by sex. More hospitalizations occurred among males for CHD than females during that same time period (Figure 6).

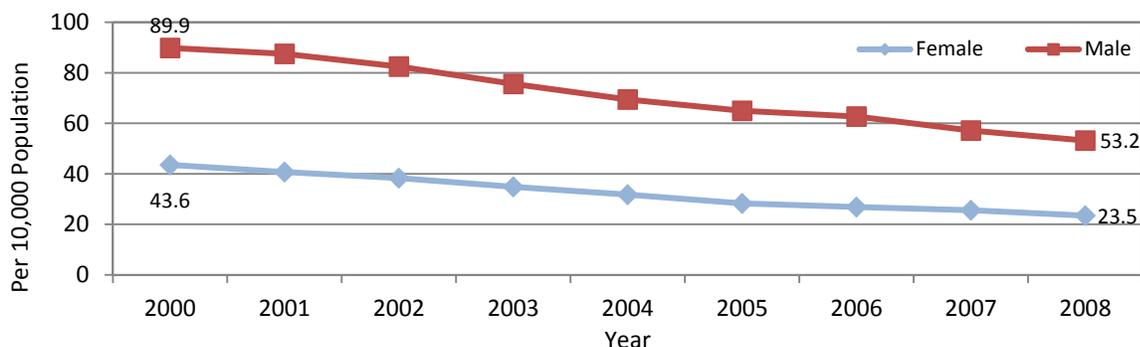
Figure 5. Hospitalizations Rates* for Coronary Heart Disease in New Hampshire, 2000-2008



*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data. ICD-9 Codes 402, 410–414, 429.2, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

Figure 6. Hospitalization Rates* by Sex for Coronary Heart Disease in New Hampshire, 2000-2008

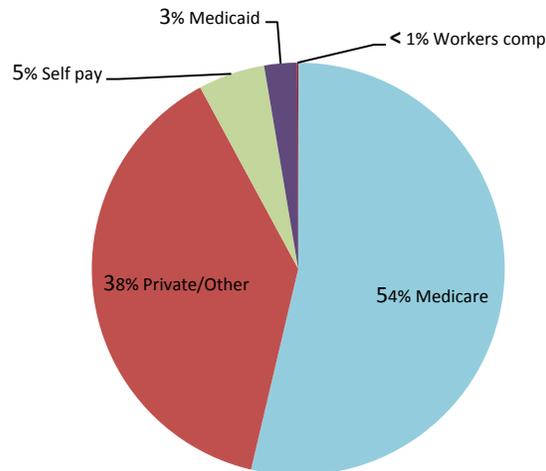


*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data – NH Population Projection from US Census Bureau, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

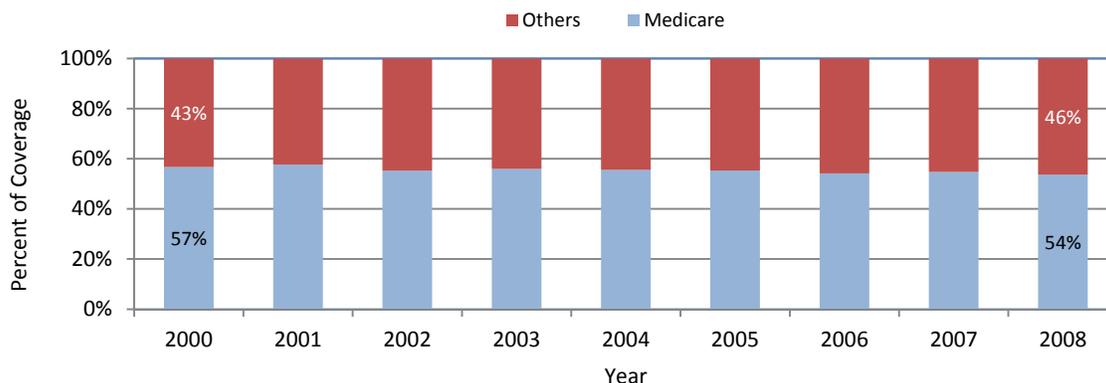
In 2008, over half (54%) of hospitalizations for CHD had Medicare as their primary insurer (Figure 7). From 2000 to 2008, Medicare coverage for CHD hospitalizations decreased from 57% to 54% (Figure 8). The total net charge for hospitalizations for CHD in New Hampshire in 2008 was near \$256.4 million, and the average net charge per case was \$45,925 (Table 5 and Figure 9).

Figure 7. Proportion of Hospitalization Coverage for Coronary Heart Disease by Payor in New Hampshire, 2008

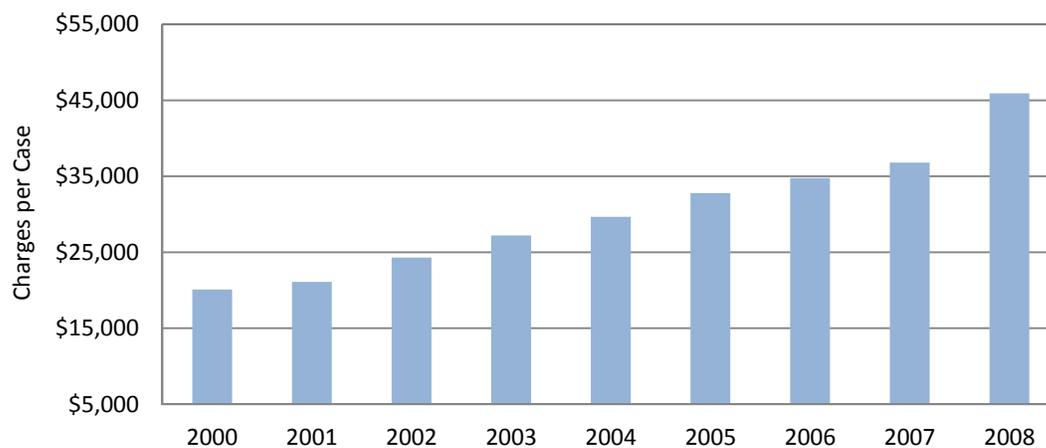


Data Sources: New Hampshire Hospital Discharge Data 2008
ICD-9 Codes 402, 410–414, 429.2

Figure 8. Hospitalizations for Coronary Heart Disease That Were Paid for by Medicare in New Hampshire, 2000-2008



Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 402, 410–414, 429.2

Figure 9. Average Net Charges for Coronary Heart Disease Hospitalizations in New Hampshire, 2000-2008

Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 402, 410-414, 429.2

Table 4. Hospitalizations and Hospitalization Rates for Coronary Heart Disease in New Hampshire, 2000-2008

Year	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
2000	7,966	64.5	63.0-65.9	65.1	63.6-66.5
2001	7,832	62.4	61.0-63.8	62.6	61.2-64.0
2002	7,570	59.6	58.3-61.0	58.8	57.5-60.2
2003	7,088	55.4	54.1-56.7	53.8	52.6-55.1
2004	6,672	51.7	50.5-53.0	49.3	48.1-50.5
2005	6,275	48.3	47.1-49.5	45.4	44.2-46.5
2006	6,217	47.5	46.3-48.7	43.6	42.5-44.7
2007	5,900	45.0	43.8-46.1	40.4	39.4-41.4
2008	5,583	42.4	41.3-43.5	37.3	36.3-38.3

*Age-adjusted hospitalization rates per 10,000 population

Data sources: New Hampshire hospital discharge data - number of events - NH Population Projection from U.S. Census Bureau
Standard Population: U.S. 2000

Table 5. Net Charges for Coronary Heart Disease Hospitalizations in New Hampshire, 2000-2008

Years	Hospitalizations	Total Charges in Million*	Average Charges per Hospitalization
2000	7,966	\$ 160.0	\$ 20,090
2001	7,832	\$ 165.2	\$ 21,099
2002	7,570	\$ 183.9	\$ 24,295
2003	7,088	\$ 193.0	\$ 27,226
2004	6,672	\$ 197.9	\$ 29,662
2005	6,275	\$ 205.7	\$ 32,784
2006	6,217	\$ 216.2	\$ 34,770
2007	5,900	\$ 217.1	\$ 36,798
2008	5,583	\$ 256.4	\$ 45,925

Data source: New Hampshire hospital discharge data

* Total charges rounded up to the hundred thousandths

For CHD hospitalizations at the county level, four years of data were combined and analyzed (Table 6). The results showed that Coos County had the highest adjusted hospitalization rate (56.5 per 10,000) for the period 2005-2008 combined (Table 6 and Figure 10). However, for absolute hospitalization counts, Hillsborough County followed by Rockingham County had the highest number of CHD hospitalizations for the same period (Figure 11).

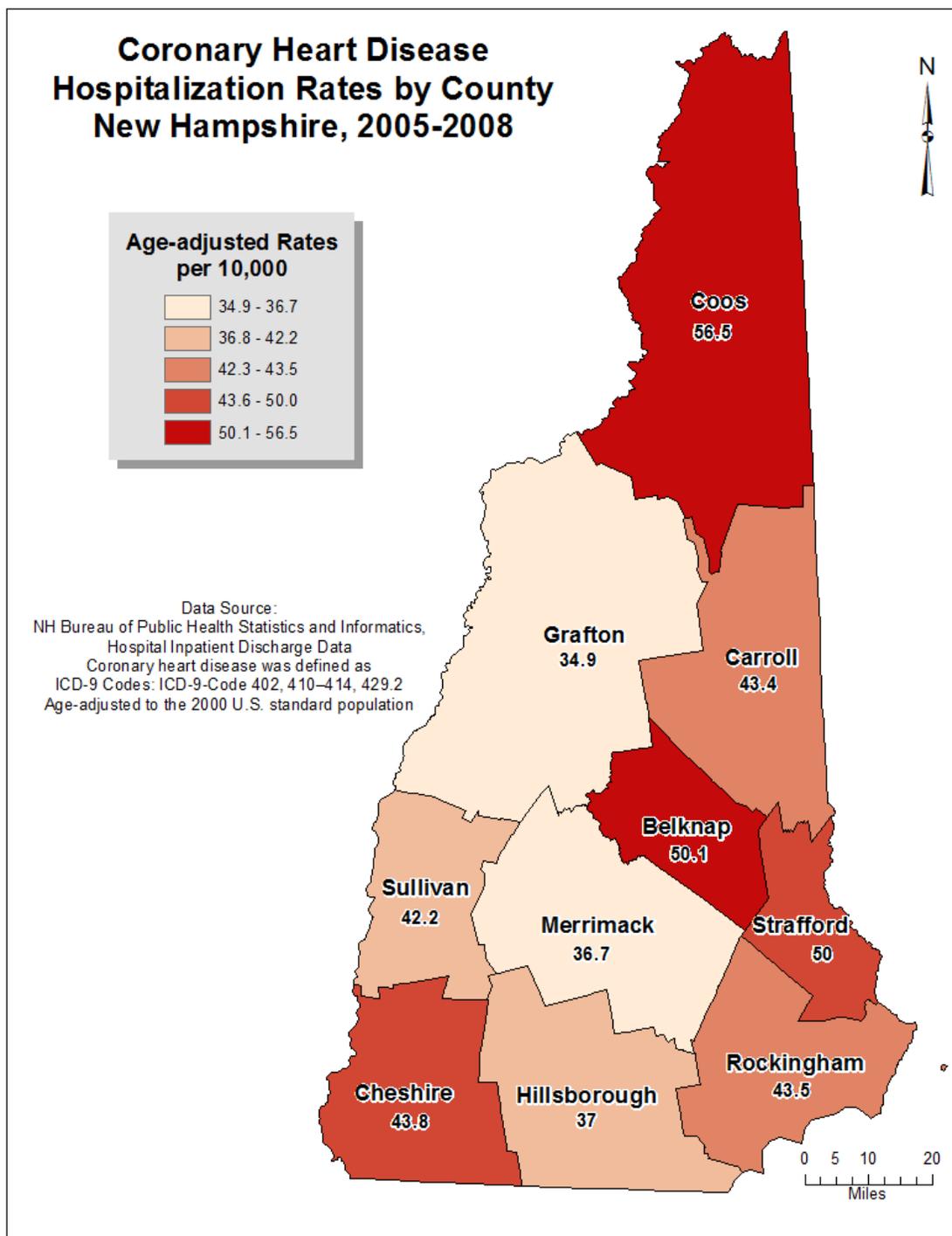
Table 6. Hospitalizations and Hospitalization Rates for Coronary Heart Disease by County in New Hampshire, Combined Data for 2005-2008

County	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
Belknap	1,556	64.6	61.4-67.8	50.1	47.6-52.7
Carroll	1,219	64.2	60.6-67.8	43.4	41.0-45.9
Cheshire	1,572	50.7	48.2-53.2	43.8	41.6-46.0
Coos	1,072	79.5	74.7-84.2	56.5	53.1-59.9
Grafton	1,446	41.3	39.2-43.4	34.9	33.1-36.7
Hillsborough	5,987	37.6	36.6-38.5	37.0	36.1-38.0
Merrimack	2,406	41.1	39.4-42.7	36.7	35.2-38.2
Rockingham	5,384	45.9	44.6-47.1	43.5	42.3-44.7
Strafford	2,405	49.8	47.8-51.8	50.0	48.0-52.0
Sullivan	928	53.4	50.0-56.9	42.2	39.5-45.0

*Age-adjusted hospitalization rates per 10,000 population

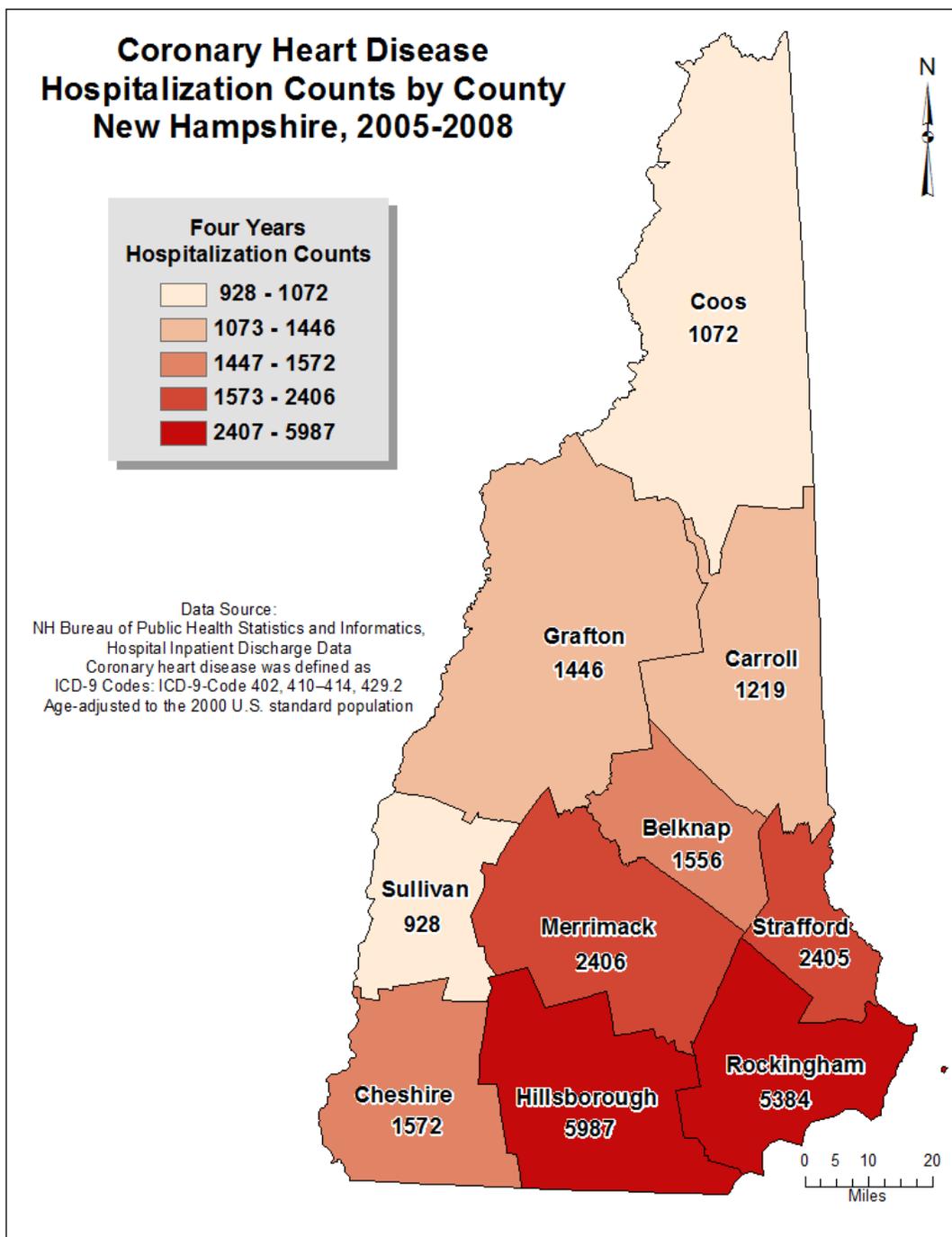
Data sources: New Hampshire hospital discharge data. ICD-9-Code 402, 410-414, 429.2, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

Figure 10. Coronary Heart Disease Hospitalization Rates by County in New Hampshire, 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 11. Coronary Heart Disease Hospitalization Counts by County in New Hampshire, Combined Data 2005-2008



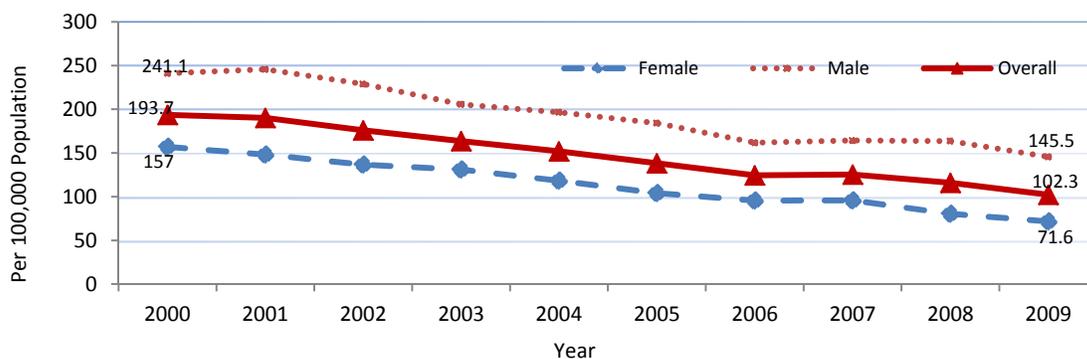
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Deaths from coronary heart disease

Overall, from 2000 to 2009, New Hampshire age-adjusted death rates for coronary heart disease decreased by 47%, from 193.7 deaths per 100,000 population to 102.3 deaths per 100,000 population. However, for any given year during that same period, the rates were higher in males than in females (Figure 12). In 2009 for example, death rates for males (145.5) were twice the rates for females (71.6).

The number of deaths due to CHD increased with age. The number of deaths for people aged 75 and older was about twice the number of deaths for all younger ages combined in 2009. Such disproportion was also observed in previous years (Figure).

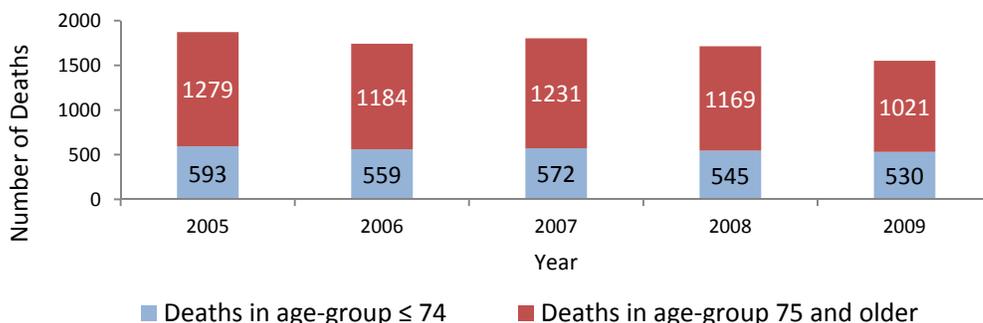
Figure 12. Age-Adjusted Death Rates* from Coronary Heart Disease in New Hampshire Overall and by Sex, 2000-2009



*Age-adjusted death rates per 100,000 population

Data Sources: CDC Wonder Compressed Mortality File 2000-2009. ICD-10 codes: I11, I20-I25, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

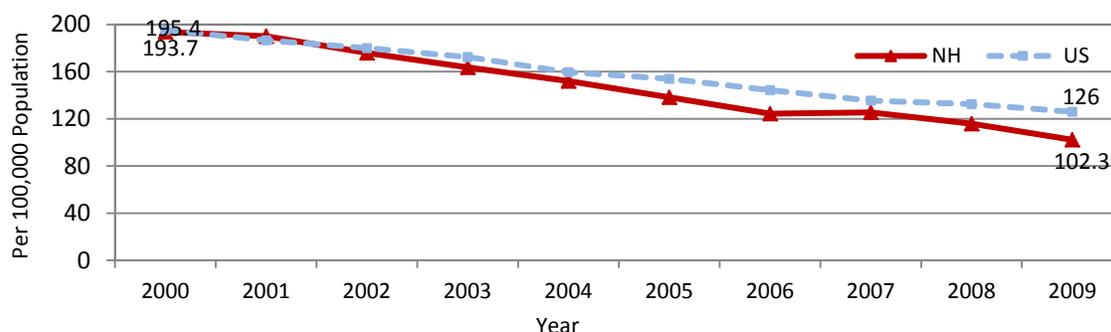
Figure 13. Number of Deaths from Coronary Heart Disease by Age Group and Year in New Hampshire, 2005-2009



Data Sources: CDC Wonder – Compressed Mortality File 2005-2009
ICD-10 codes: I11, I20-I25

When compared with the U.S., the data indicate that New Hampshire’s CHD adjusted death rates from 2000 to 2002 were not significantly different than those of the U.S. However, from 2003 to 2009, New Hampshire’s rates were lower than those of the U.S. For example, in 2009, New Hampshire’s rate was 19% lower than that of the U.S. (Figure 14). However, when compared with the U.S. white population, New Hampshire’s death rates were significantly lower only for years 2003 and 2005 through 2009 (Table 7).

Figure 14. Age-Adjusted Death Rates from Coronary Heart Disease in New Hampshire and the United States, 2000-2009



Data Sources: CDC Wonder Deaths Data - NH and U.S. Population Projection from US Census Bureau
ICD-10 codes: I11, I20-I25

Table 7. Deaths and Death Rates from Coronary Heart Disease in New Hampshire Compared with the United States Age-Adjusted Rates, 2000-2009

Years	Deaths	New Hampshire				U.S. All Races		U.S. Whites	
		Crude Rates	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI
2000	2,294	185.6	178.0 - 193.2	193.7	185.8 - 201.6	195.4	194.8 - 195.9	192.7	192.2 - 193.2
2001	2,314	184.1	176.6 - 191.6	190.1	182.3 - 197.8	186.5	186.0 - 187.0	183.8	183.2 - 184.3
2002	2,199	173.0	165.8 - 180.2	175.9	168.5 - 183.2	180.0	179.5 - 180.5	177.4	176.9 - 177.9
2003	2,093	163.3	156.3 - 170.3	163.6	156.6 - 170.6	172.4	171.9 - 172.9	169.7	169.2 - 170.2
2004	2,004	155.0	148.2 - 161.8	152.0	145.4 - 158.7	159.6	159.2 - 160.1	157.2	156.8 - 157.7
2005	1,872	143.8	137.3 - 150.4	138.3	132.0 - 144.6	153.9	153.4 - 154.3	151.7	151.3 - 152.2
2006	1,743	132.9	126.6 - 139.1	124.4	118.5 - 130.2	144.3	143.9 - 144.8	142.2	141.7 - 142.6
2007	1,803	136.9	130.5 - 143.2	125.4	119.6 - 131.2	135.5	135.1 - 135.9	133.5	133.1 - 134.0
2008	1,714	129.7	123.5 - 135.8	115.9	110.4 - 121.4	132.4	132.0 - 132.8	130.8	130.4 - 131.2
2009	1,551	117.1	111.3 - 122.9	102.3	97.2 - 107.4	126.0	125.6 - 126.4	124.0	123.6 - 124.4

*Adjusted to 2000 standard U.S. population, per 100,000 population

Data Sources: CDC Wonder Deaths Data - NH and U.S. Population Projection from US Census Bureau
ICD-10 codes: I11, I20-I25

For CHD deaths at the county level, five years of data were combined and analyzed (Table 8). The results showed that Coos County had the highest adjusted death rates (168.8 per 100,000) for the period 2005-2009 combined (Figure 15). However, for absolute death counts, Hillsborough County followed by Rockingham County had the highest number of CHD deaths for the same period (Figure).

Table 8. Deaths and Age-Adjusted Death Rates for Coronary Heart Disease by County in New Hampshire, Combined Data 2005-2009

County	Deaths	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
Belknap	627	205.2	189.2 - 221.3	161.0 [@]	148.3 - 173.7
Carroll	355	149.2	133.7 - 164.7	101.8 [#]	91.2 - 112.5
Cheshire	561	145.4	133.4 - 157.4	120.0	110.0 - 130.0
Coos	428	265.7	240.5 - 290.9	168.8 [@]	152.7 - 185.0
Grafton	625	146.0	134.5 - 157.4	115.7	106.5 - 124.8
Hillsborough	2,357	117.1	112.4 - 121.8	118.3	113.5 - 123.1
Merrimack	1,045	141.1	132.5 - 149.6	122.1	114.7 - 129.6
Rockingham	1,616	108.9	103.6 - 114.3	110.6 [#]	105.1 - 116.0
Strafford	680	111.8	103.4 - 120.2	113.3 [#]	104.7 - 121.8
Sullivan	389	182.5	164.3 - 200.6	140.2 [@]	126.1 - 154.2

*Adjusted to 2000 standard U.S. population, per 100,000 population

[@]Significantly higher than the state adjusted death rate

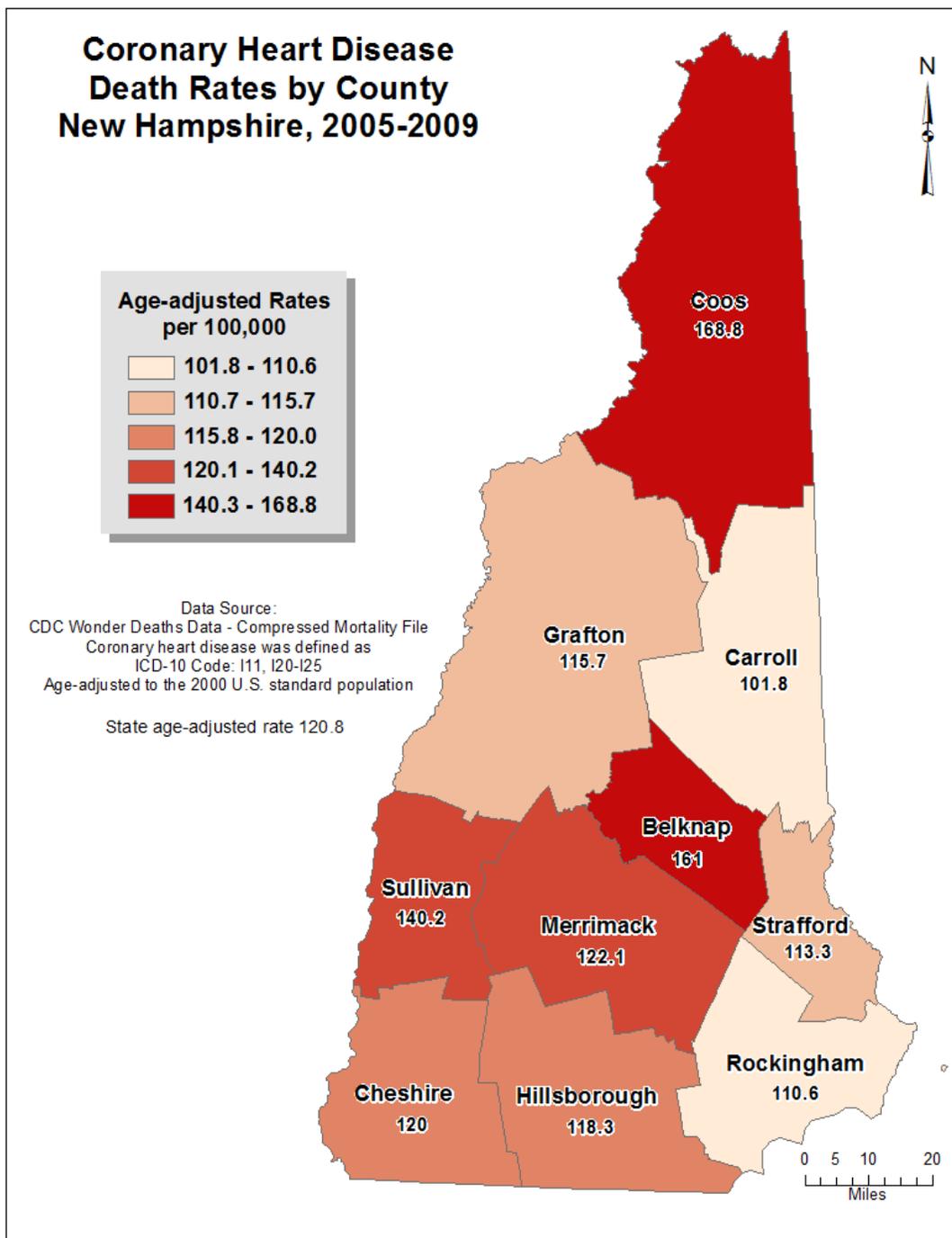
[#]Significantly lower than the state adjusted death rate

Data Sources: CDC Wonder Deaths Data - Compressed Mortality File. ICD-10 codes I11, I20-I25

State crude death rate: 132.0; CI: (129.2-134.8)

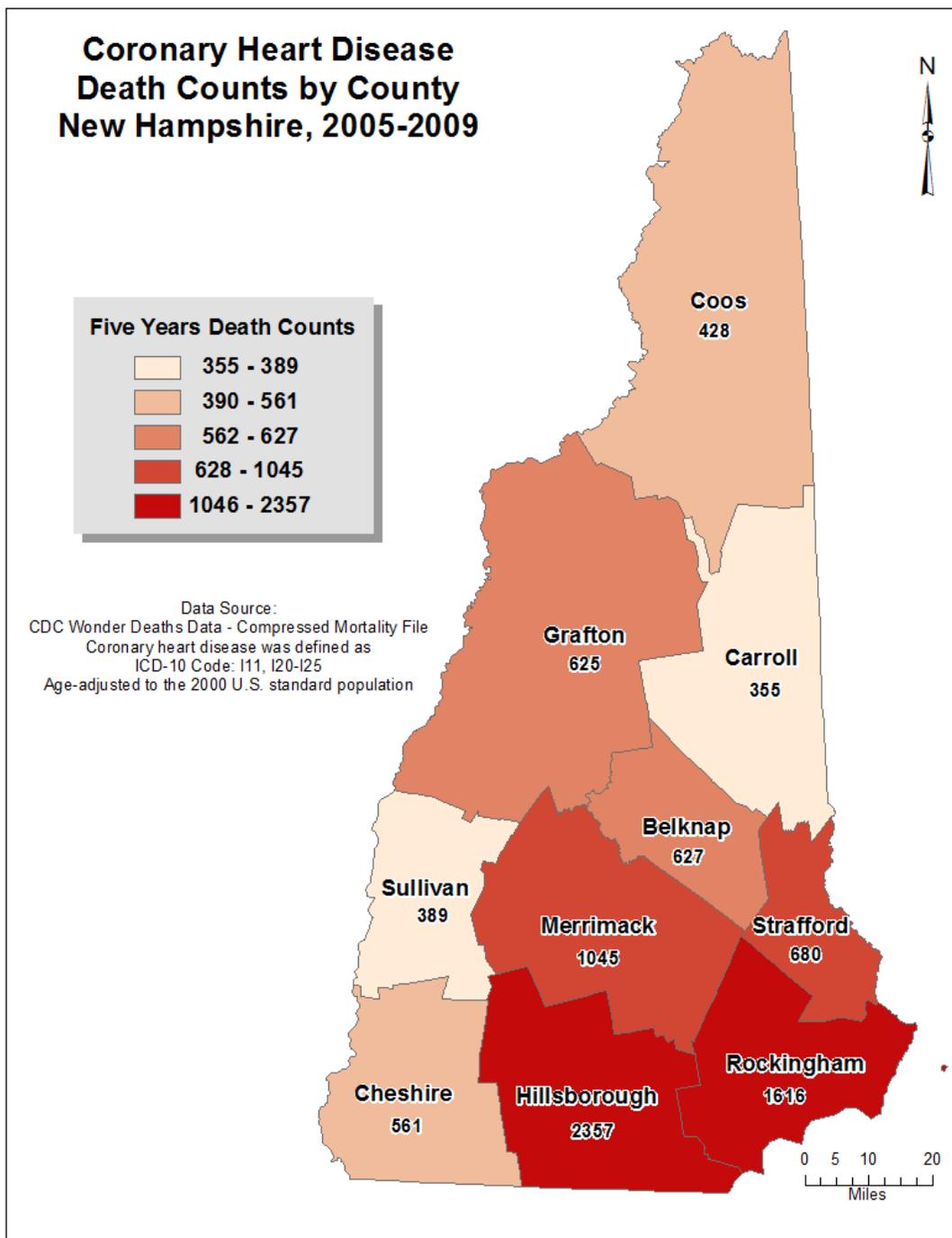
State age-adjusted death rate: 120.8; CI: (118.2-123.3)

Figure 15. Coronary Heart Disease Death Rates by County in New Hampshire, Combined Data 2005-2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 16. Coronary Heart Disease Death Counts by County in New Hampshire, Combined Data 2005-2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Heart Attack (Acute Myocardial Infarction)

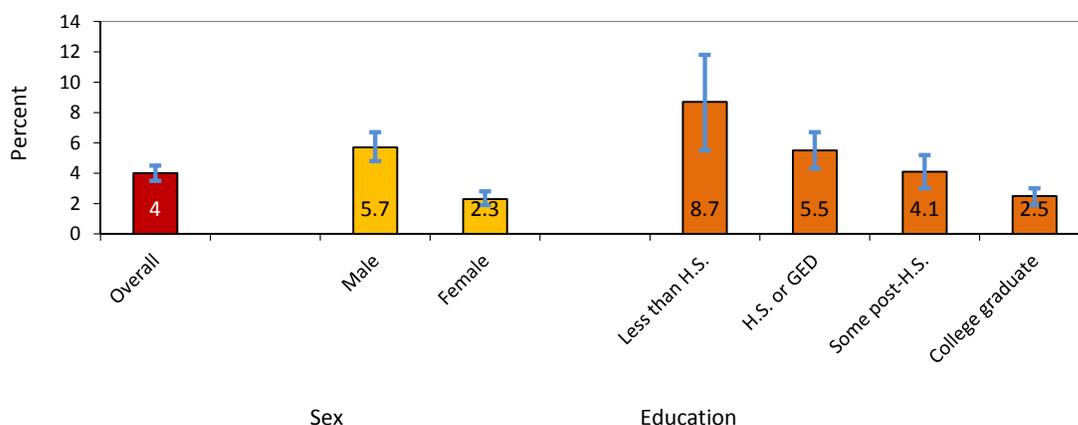
A heart attack occurs when an area of the heart muscle dies or becomes damaged because of decreased blood supply.^[13] Coronary heart disease is the most common cause of heart attack. Controllable risk factors such as diabetes mellitus, high blood pressure, high blood cholesterol, tobacco use, improper diet, physical inactivity, obesity, and alcohol use increase someone's chance of developing coronary heart disease and later heart attack.^[14]

Prevalence of heart attack

To determine the prevalence of heart attack in New Hampshire, respondents to the 2010 BRFSS survey were asked the question, "Has a doctor, nurse, or other health professional EVER told you that you had a heart attack, also called a myocardial infarction?"

From the survey, 4% of adults (5.7% of males and 2.3% of females) indicated that they were told by a health professional that they had a heart attack. The prevalence varied by age group and education. It increased with age but was inversely related to income and education. The higher the income or the educational achievement, the lower was the reported prevalence (Figure 17 and Table 9).

Figure 17. Self-Reported Prevalence of Heart Attack among New Hampshire Adults* by Sex and Education, 2010



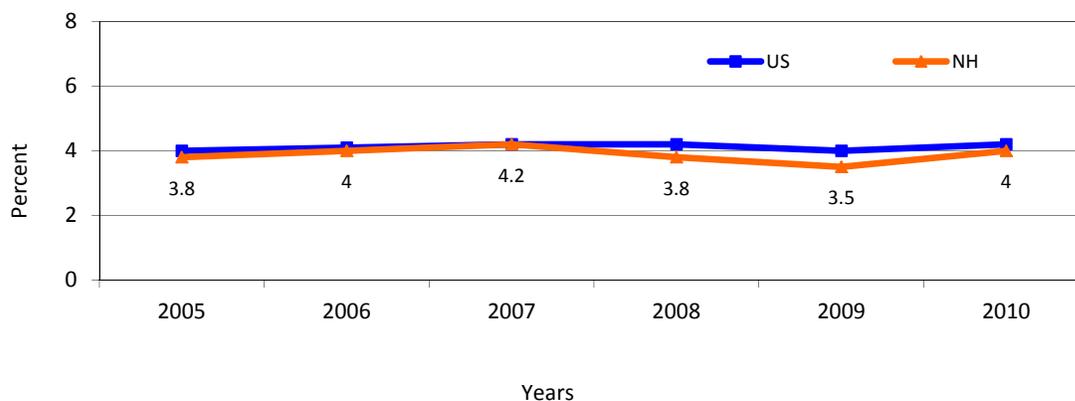
Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010

95% Confidence Intervals are also shown

*Ages 18 and older

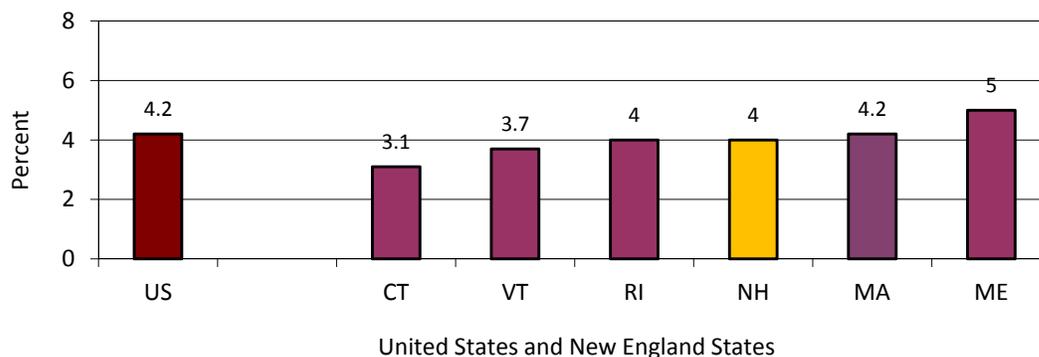
From 2005 to 2010, the prevalence of heart attack in New Hampshire remained steady, at around 4%, which followed the same pattern as the median U.S. population (Figure 1 and Table 10). Finally, in 2010, New Hampshire and Rhode Island had the third highest reported prevalence among the New England States for heart attack (Figure 9).

Figure 18. Self-Reported Prevalence of Heart Attack in New Hampshire, 2005-2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2005-2010
The percentages shown are for New Hampshire

Figure 19. Self-Reported Prevalence of Heart Attack among Persons in New England States, 2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
CT: Connecticut; VT: Vermont; RI: Rhode Island
MA: Massachusetts; ME: Maine; NH: New Hampshire
US: United States

Table 9. Self-Reported Prevalence of Heart Attack by Sex, Age, Income, and Education in New Hampshire, 2010

Sociodemographic Characteristic	Percentage	95% CI
Total	4.0	3.5-4.5
Sex		
Male	5.7	4.8-6.7
Female	2.3	1.9-2.8
Age		
18-24	N/A	N/A
25-34	0.4	0.0-1.3
35-44	0.7	0.1-1.4
45-54	2.3	1.3-3.3
55-64	5.5	4.1-6.8
65+	13.6	11.8-15.4
Income		
<15,000	8.9	5.7-12.0
15,000-24,999	11.2	8.6-13.8
25,000-34,999	5.7	3.7-7.6
35,000-49,999	4.4	2.8-6.0
50,000+	2.0	1.5-2.5
Education		
Less than H.S.	8.7	5.5-11.8
H.S. or G.E.D.	5.5	4.3-6.7
Some post-H.S.	4.1	3.0-5.2
College graduate	2.5	1.9-3.0

Data source: New Hampshire BRFSS, 2010 - Centers for Disease Control and Prevention, 2010

*Ages 18 and older

Table 10. Self-Reported Prevalence of Heart Attack in New Hampshire Compared with the United States, 2005-2010

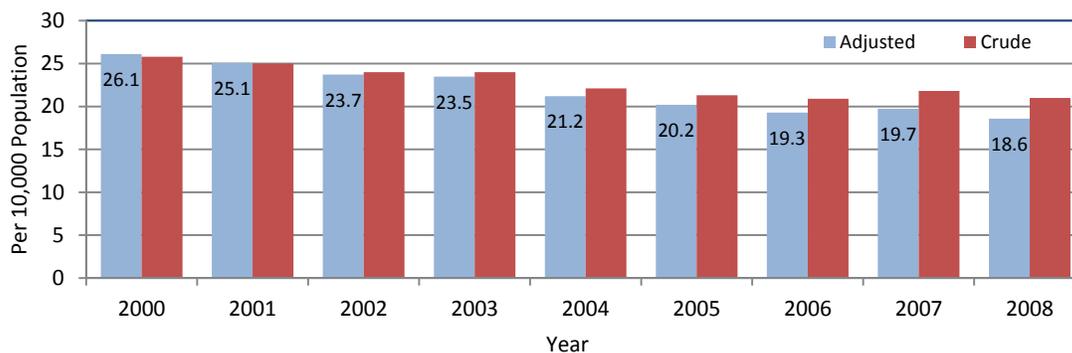
		2005	2006	2007	2008	2009	2010
NH	Mean Prevalence (%)	3.8	4.0	4.2	3.8	3.5	4.0
	95% CI	3.3-4.3	3.5-4.5	3.6-4.8	3.3-4.4	3.0-4.0	3.5-4.5
U.S.	Median Prevalence (%)	4.0	4.1	4.2	4.2	4.0	4.2

Data source: BRFSS, Centers for Disease Control and Prevention, 2005-2010

Hospitalization for heart attack

Age-adjusted hospitalization rates for heart attack decreased from 26.1 per 10,000 population in the year 2000 to 18.6 per 10,000 population in 2008 (Figure 20 and Table 11). This represents a 29% reduction in heart attack hospitalizations from 2000 to 2008. The crude rates also followed the same pattern. Hospitalizations were affected by sex. More hospitalizations for heart attack were reported by males than by females during that same period (Figure 21).

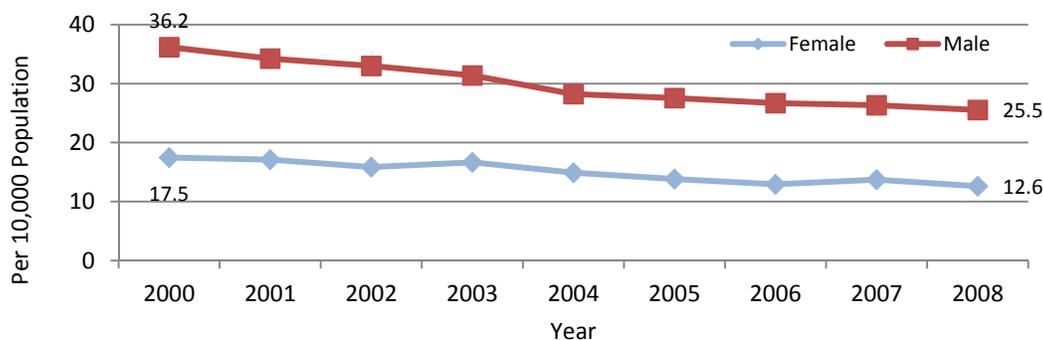
Figure 20. Hospitalization Rates* for Heart Attack, in New Hampshire, 2000-2008



*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data. ICD-9 Codes 410, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

Figure 21. Hospitalization Rates* for Heart Attack by Sex, in New Hampshire, 2000-2008

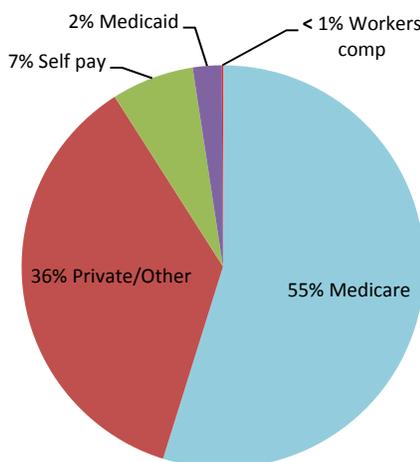


*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

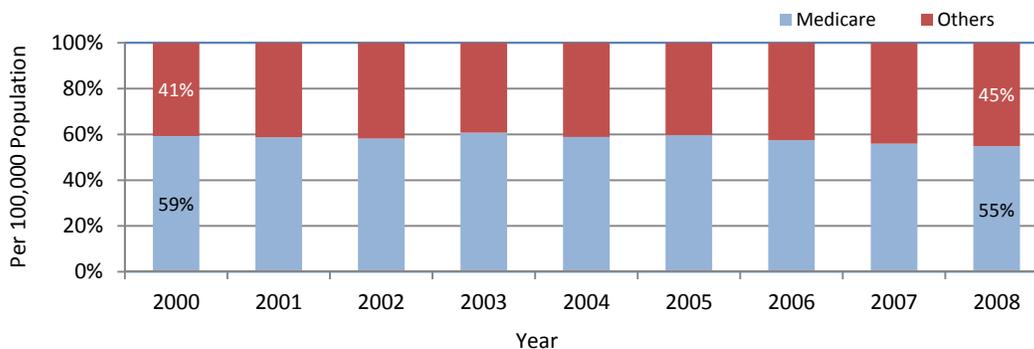
In 2008, over half (55%) of hospitalizations for heart attack had Medicare as the primary insurer (Figure 22). From 2000 to 2008, Medicare coverage for heart attack hospitalizations decreased from 59% to 55% (Figure 223). The total net charge for hospitalizations for heart attack in New Hampshire in 2008 was near \$128.9 million, and the average net charge per hospitalization was \$46,560 (Table 12 and Figure 24).

Figure 22. Hospitalizations for Heart Attack, by Payor in New Hampshire, 2008

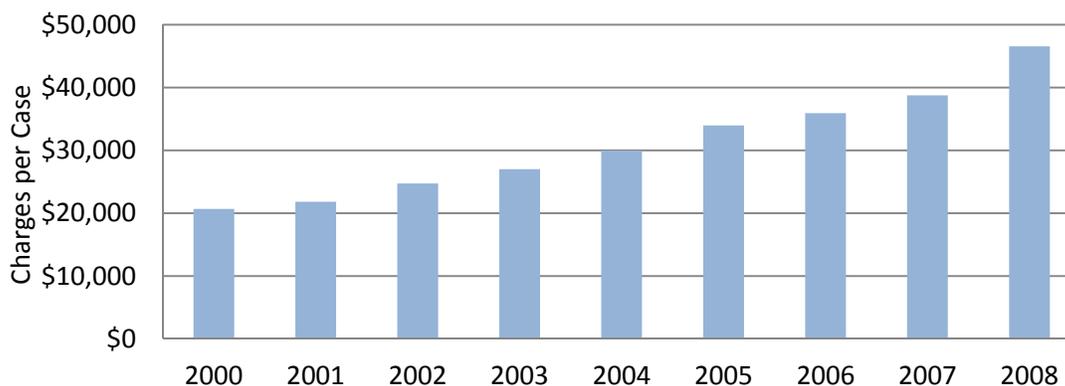


Data Sources: New Hampshire Hospital Discharge Data 2008
ICD-9 Codes 410

Figure 23. Medicare Coverage for Hospitalizations for Heart Attack, in New Hampshire, 2000-2008



Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 410

Figure 24. Average Net Charges for Heart Attack Hospitalizations in New Hampshire, 2000-2008

Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 410

Table 11. Hospitalizations and Hospitalization Rates* for Heart Attack in New Hampshire, 2000-2008

Year	Hospitalizations*	Crude Rate	95% CI	Age-Adjusted Rate**	95% CI
2000	3,185	25.8	24.9-26.7	26.1	25.2-27.0
2001	3,137	25.0	24.1-25.9	25.1	24.2-26.0
2002	3,041	24.0	23.1-24.8	23.7	22.9-24.6
2003	3,066	24.0	23.1-24.8	23.5	22.6-24.3
2004	2,845	22.1	21.2-22.9	21.2	20.4-22.0
2005	2,772	21.3	20.6-22.1	20.2	19.4-21.0
2006	2,734	20.9	20.1-21.7	19.3	18.6-20.0
2007	2,867	21.8	21.0-22.6	19.7	19.0-20.5
2008	2,769	21.0	20.3-21.8	18.6	17.9-19.3

* Adjusted to 2000 standard U.S. population, per 10,000 population.

Data sources: New Hampshire hospital discharge data - number of events - NH Population Projection from US Census Bureau
Standard Population: US 2000

Table 12. Net Charges for Heart Attack Hospitalizations in New Hampshire, 2000-2008

Years	Hospitalizations	Total Charges in Million	Average Charges per Hospitalization
2000	3,185	\$ 65.9	\$ 20,681
2001	3,137	\$ 68.5	\$ 21,829
2002	3,041	\$ 75.2	\$ 24,727
2003	3,066	\$ 82.8	\$ 27,013
2004	2,845	\$ 85.3	\$ 29,968
2005	2,772	\$ 94.2	\$ 33,989
2006	2,734	\$ 98.3	\$ 35,938
2007	2,867	\$ 111.1	\$ 38,766
2008	2,769	\$ 128.9	\$ 46,560

Data source: New Hampshire hospital discharge data

*Total charges rounded up to the hundred thousandths

For heart attack hospitalizations at the county level, four years of data were combined and analyzed (Table 13). The results showed that Coos and Sullivan Counties had the highest adjusted hospitalization rates (29.4 and 25.1 per 10,000) for the period 2005-2008 combined (Figure 25). However, for absolute hospitalization counts, Hillsborough County followed by Rockingham County had the highest number of heart attack hospitalizations for the same period (Figure 26).

Table 13. Hospitalizations and Age-Adjusted Rates for Heart Attack by County in New Hampshire, 2005-2008

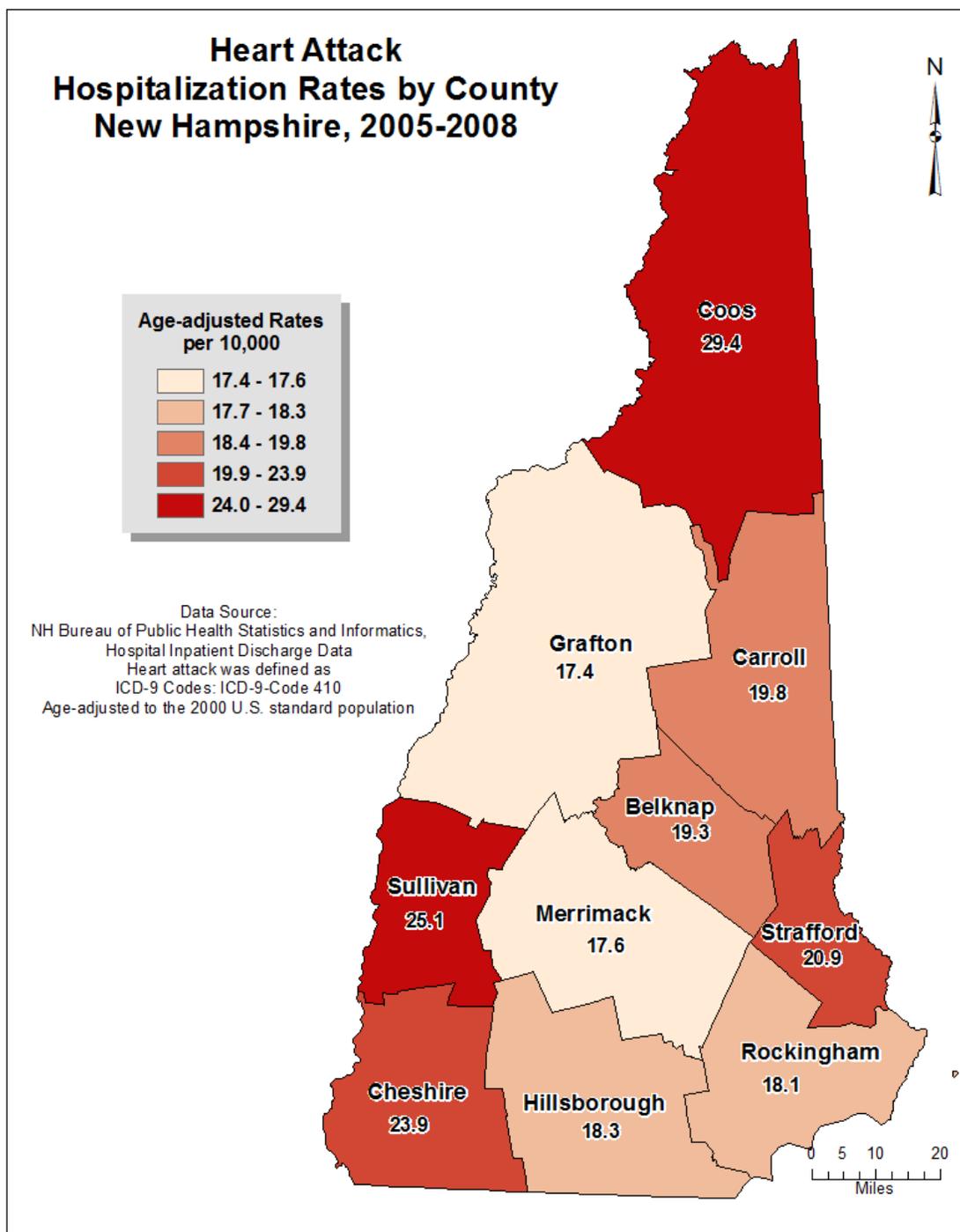
County	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate	95% CI
Belknap	593	24.6	22.6-26.6	19.3	17.8-20.9
Carroll	551	29.0	26.6-31.4	19.8	18.1-21.5
Cheshire	856	27.6	25.8-29.5	23.9	22.3-25.6
Coos	559	41.4	38.0-44.9	29.4	26.9-31.9
Grafton	725	20.7	19.2-22.2	17.4	16.1-18.7
Hillsborough	2,947	18.5	17.8-19.2	18.3	17.6-19.0
Merrimack	1,147	19.6	18.4-20.7	17.6	16.5-18.6
Rockingham	2,215	18.9	18.1-19.7	18.1	17.3-18.9
Strafford	1,000	20.7	19.4-22.0	20.9	19.5-22.2
Sullivan	549	31.6	29.9-34.3	25.1	23.0-27.2

*Age-adjusted hospitalization rates per 10,000 population

Data sources: New Hampshire hospital discharge data - number of events - NH Population Projection from US Census Bureau ICD-9-Code 410

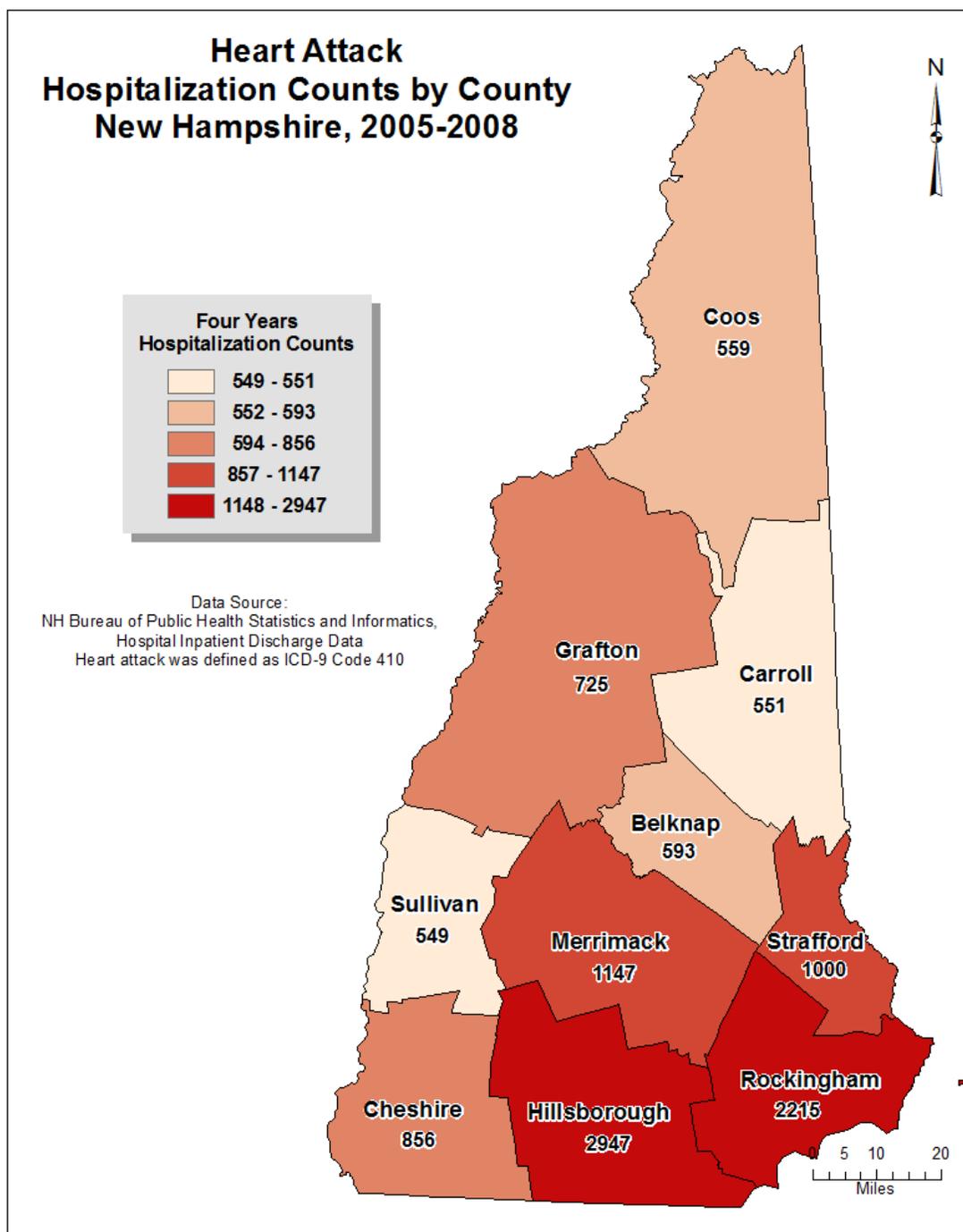
Standard Population: US 2000

Figure 25. Heart Attack Hospitalization Rates by County in New Hampshire, 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 26. Heart Attack Hospitalization Counts by County in New Hampshire, 2005-2008



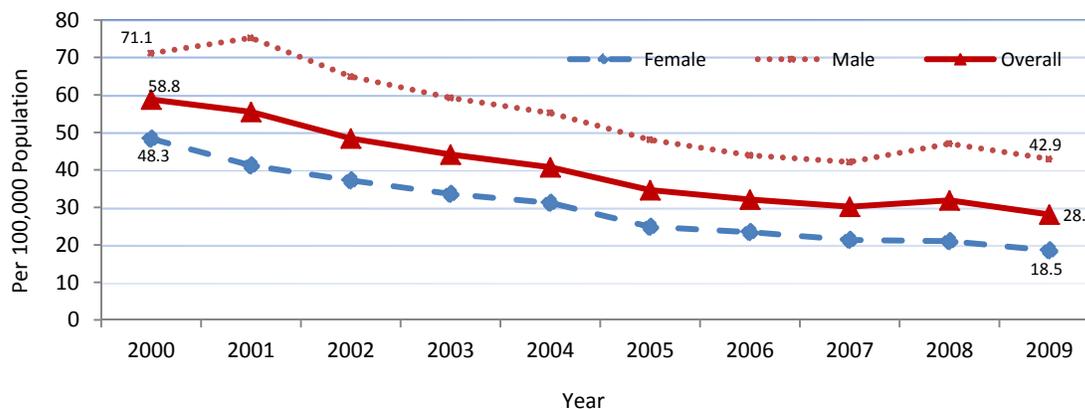
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Deaths from heart attack

Overall, from 2000 to 2009, New Hampshire age-adjusted death rates for heart attack decreased by 52%, from 58.8 deaths per 100,000 population to 28.1 deaths per 100,000 population. However, for any given year during that same period, the age-adjusted rates were higher in males than in females (Figure 27). Even though the male's rate seemed to increase from 2000 to 2001 and from 2007 to 2008, those increases were not significantly different than the preceding year. Age-adjusted death rates for males (42.9 per 100,000) were more than twice the rate for females (18.5 per 100,000) in 2009.

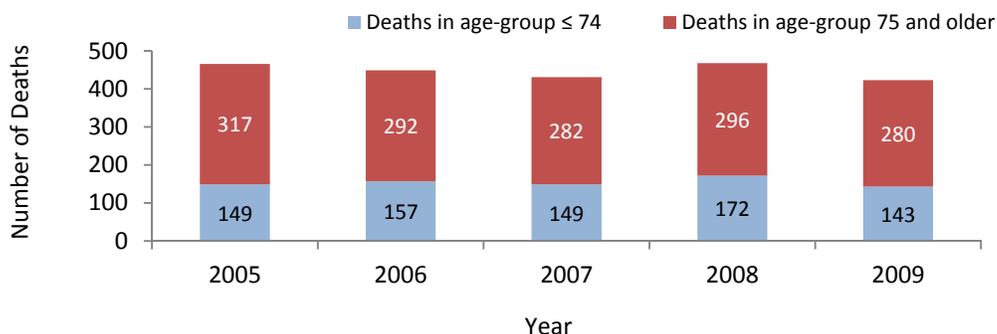
The number of deaths due to heart attack increased with age. The number of deaths for people aged 75 and older was about twice the number of deaths for all younger ages combined in 2009. Such disproportion was also observed in previous years (Figure 28).

Figure 27. Age-Adjusted Death Rates from Heart Attack in New Hampshire Overall and by Sex, 2000-2009



Data Sources: CDC Wonder Compressed Mortality File 2000-2008
Heart attack deaths defined as ICD-10 code I21
Standard Population: U.S. 2000

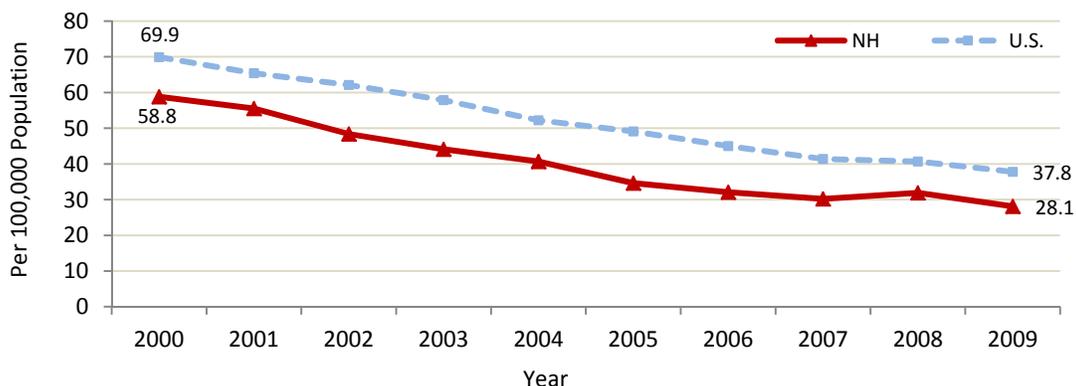
Figure 28. Number of Deaths from Heart Attack by Age Group and Year in New Hampshire, 2005-2009



Data Sources: CDC Wonder – Compressed Mortality File 2005-2009
ICD-10 code: I21

When compared with the U.S., New Hampshire’s age-adjusted heart attack death rates from 2000 through 2009 were lower than those seen in the U.S. In 2009, New Hampshire’s rate was 26% lower than that of the U.S. (Figure 29). New Hampshire’s rates were still significantly lower when U.S. white death rates were used for comparison (Table 14).

Figure 29. Age-Adjusted Death Rates from Heart Attack, in New Hampshire and the United States, 2000-2009



Data Sources: CDC Wonder Deaths Data - NH and US Population Projection from US Census Bureau
ICD-10 code: I21

Table 14. Deaths and Death Rates from Heart Attack in New Hampshire Compared with the United States Age-Adjusted Rates, 2000-2009

Years	New Hampshire					U.S. All Races		U.S. Whites	
	Deaths	Crude Rates	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI
2000	697	56.4	52.2 - 60.6	58.8	54.5 - 63.2	69.9	69.5 - 70.2	69.6	69.3 - 70.0
2001	674	53.6	49.6 - 57.7	55.5	51.3 - 59.7	65.4	65.1 - 65.7	65.2	64.8 - 65.5
2002	604	47.5	43.7 - 51.3	48.4	44.6 - 52.3	62.1	61.8 - 62.4	61.8	61.5 - 62.2
2003	564	44.0	40.4 - 47.6	44.1	40.5 - 47.8	57.9	57.6 - 58.2	57.7	57.5 - 58.0
2004	537	41.5	38.0 - 45.1	40.7	37.3 - 44.2	52.2	52.0 - 52.5	52.2	51.9 - 52.4
2005	466	35.8	32.6 - 39.1	34.6	31.5 - 37.8	49.1	48.8 - 49.3	49.0	48.8 - 49.3
2006	449	34.2	31.1 - 37.4	32.1	29.1 - 35.0	45.0	44.8 - 45.3	45.0	44.7 - 45.2
2007	431	32.7	29.6 - 35.8	30.2	27.4 - 33.1	41.4	41.2 - 41.6	41.3	41.1 - 41.6
2008	468	35.4	32.2 - 38.6	31.9	28.9 - 34.8	40.7	40.5 - 40.9	40.9	40.6 - 41.1
2009	423	31.9	28.9 - 35.0	28.1	25.4 - 30.7	37.8	37.6 - 38.0	37.8	37.5 - 38.0

*Adjusted to 2000 standard U.S. population, per 100,000 population

Data Sources: CDC Wonder Online Database, Compressed Mortality File - NH and U.S. Population Projection from U.S. Census Bureau ICD-10 codes I21

For heart attack deaths at the county level, four years of data were combined and analyzed (Table 15). The results showed that Coos County had the highest age-adjusted death rates (64.3 per 100,000) for the period 2005-2008 combined (Figure 30). Age-adjusted death rates for Belknap and Coos were significantly higher than the State's rate, whereas Hillsborough's rate was significantly lower than the State's. For absolute death counts, Hillsborough followed by Rockingham Counties had the highest number of heart attack deaths for the same period (Figure 31).

Finally, the city of Manchester had the highest number of deaths for heart attack for the same period than any other New Hampshire city. Nashua had the second highest number (Figure 32). For heart attack adjusted death rates by city, only four New Hampshire cities (Manchester, Nashua, Concord, and Salem) had reliable death rates for the combined five years. In addition, even though Manchester's death rate was higher, it was not significantly different than the other three cities .

Table 15. Deaths and Age-Adjusted Rates for Heart Attack by County in New Hampshire, Combined Data 2005-2008

County	Deaths	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
Belknap	170	69.6	59.2 - 80.1	55.5 [@]	47.1 - 63.8
Carroll	66	34.7	26.9 - 44.2	24.4	18.8 - 31.2
Cheshire	111	35.9	29.3 - 42.6	30.1	24.4 - 35.7
Coos	130	100.3	83.1 - 117.6	64.3 [@]	53.2 - 75.4
Grafton	152	44.5	37.4 - 51.5	36.1	30.3 - 41.9
Hillsborough	403	25.1	22.6 - 27.5	25.7 [#]	23.1 - 28.2
Merrimack	240	40.6	35.4 - 45.7	36.4	31.8 - 41.1
Rockingham	324	27.4	24.4 - 30.3	28.2	25.1 - 31.3
Strafford	128	26.4	21.8 - 31.0	26.6	21.9 - 31.2
Sullivan	90	52.8	42.4 - 64.9	40.5	32.5 - 49.8

*Adjusted to 2000 standard U.S. population, per 100,000 population

[@]Significantly higher than the state adjusted death rate

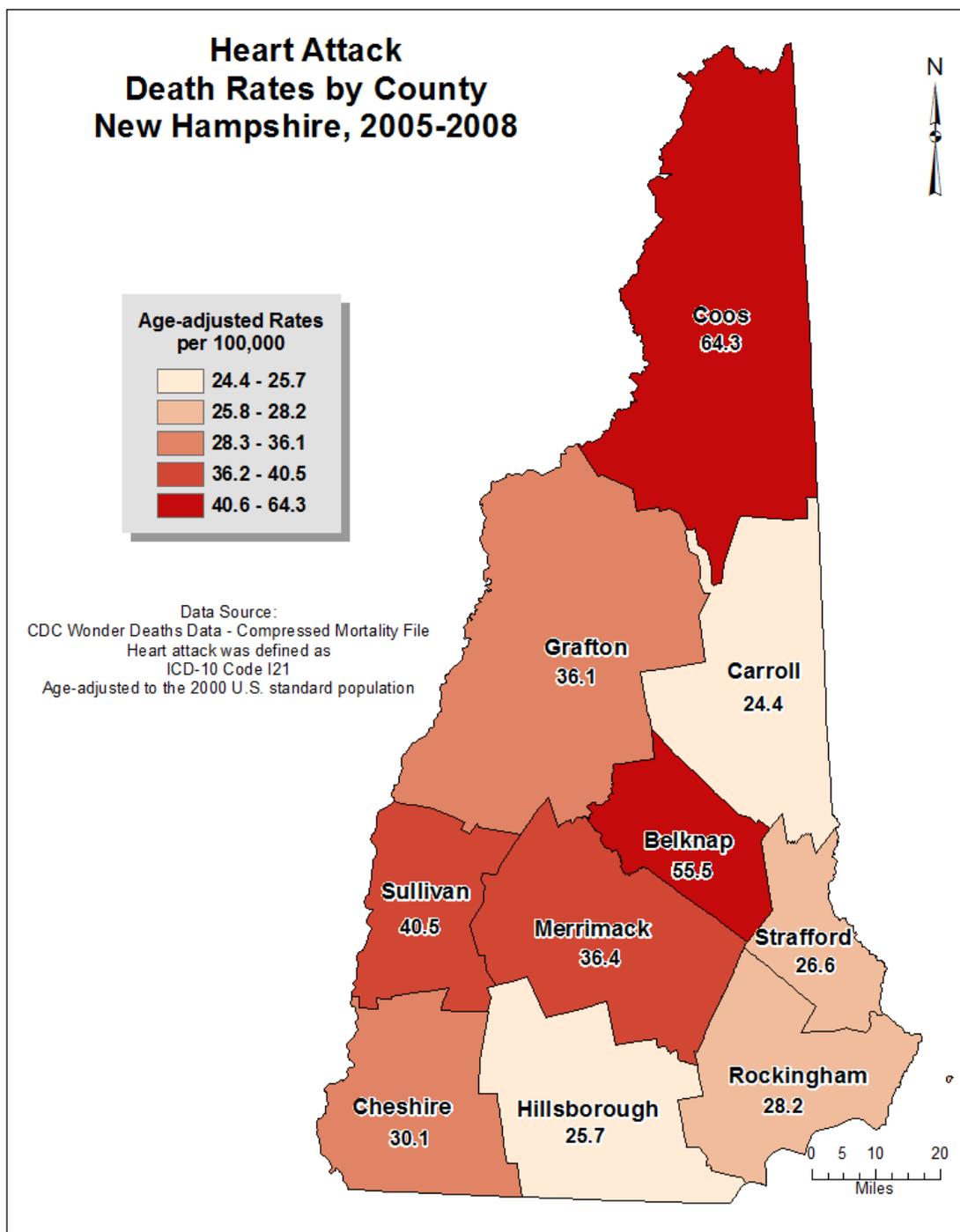
[#]Significantly lower than the state adjusted death rate

Data Sources: CDC Wonder Deaths Data. ICD-10 code: I21

State crude death rates: 34.5; CI: (32.9-36.1)

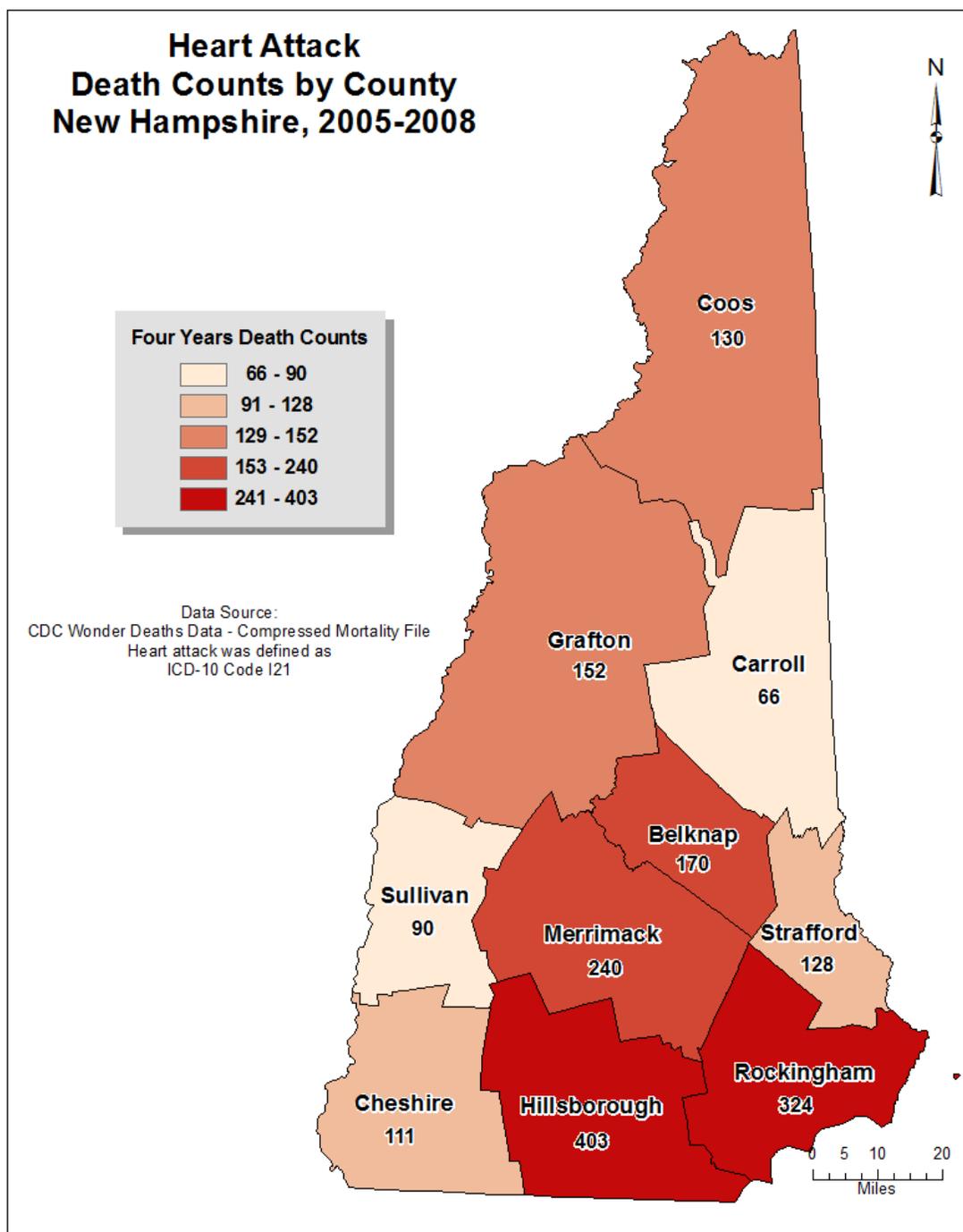
State adjusted death rate: 32.1; CI: (30.7-33.6)

Figure 30. Heart Attack Death Rates by County in New Hampshire, Combined Data 2005-2008



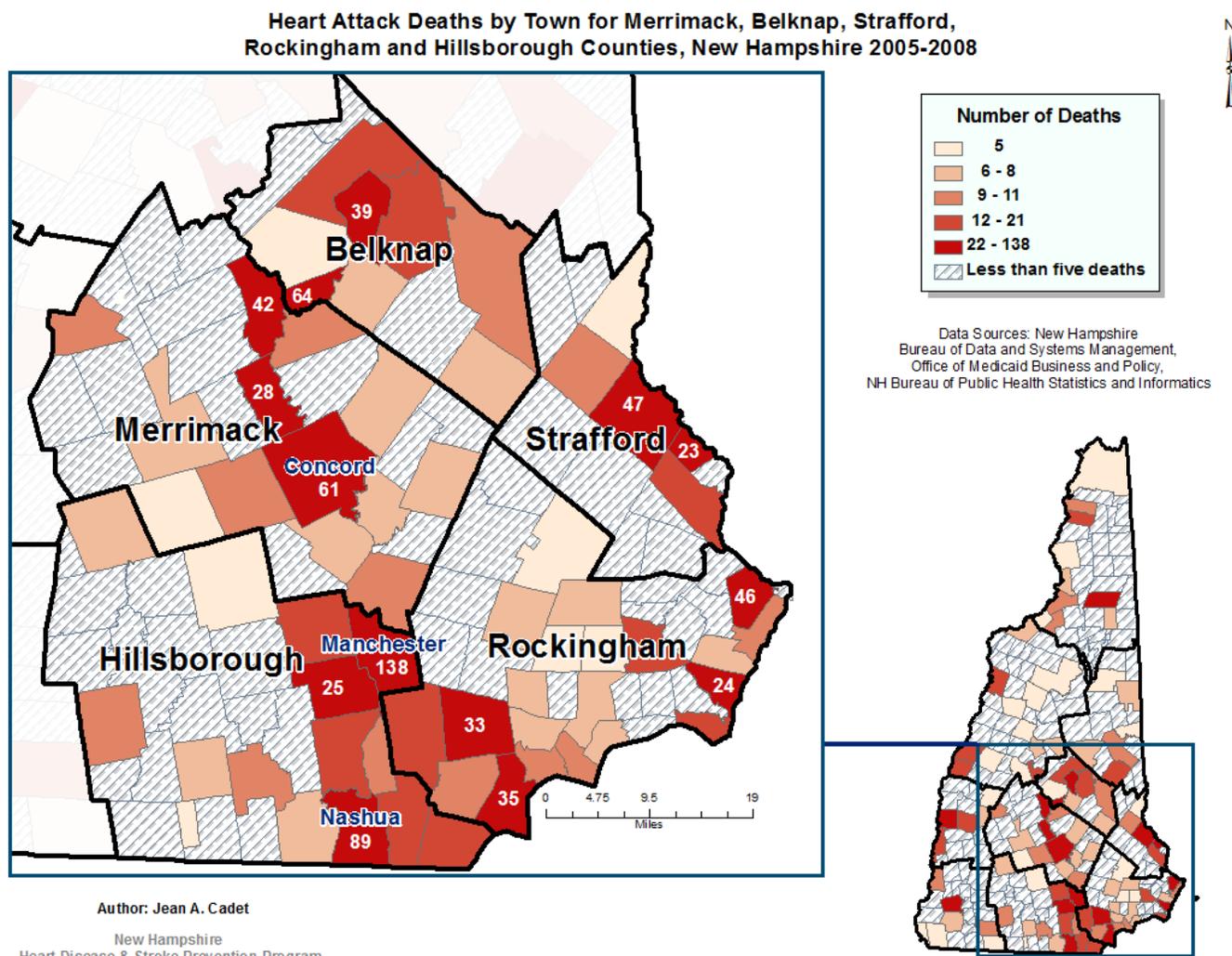
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 31. Heart Attack Death Counts by County in New Hampshire, Combined Data 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 32. Heart Attack Deaths by City for Selected Counties in New Hampshire, Combined Data 2005-2008



Congestive Heart Failure

Congestive heart failure (CHF) is a condition in which the heart can no longer pump an adequate amount of oxygen-rich blood out to the rest of the body.^[15, 16] One major controllable risk factor for CHF is HBP because approximately 75% of persons with CHF have antecedent HBP.^[17] Other risk factors for CHF include physical inactivity, cigarette smoking, overweight, and diabetes.^[18]

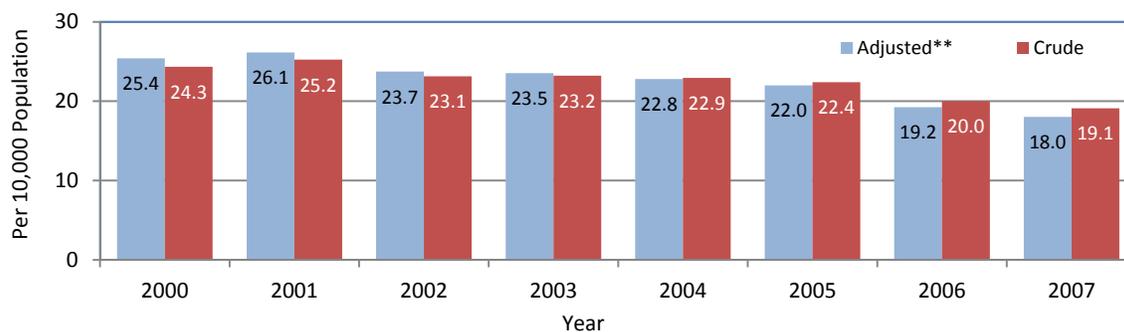
Prevalence of congestive heart failure

The actual prevalence of CHF is difficult to determine because years might pass before someone can experience major signs and symptoms that would lead to a diagnosis.^[17] In addition, the BRFSS does not have any questions in the survey to estimate CHF in the population; therefore, this report includes the incidence of hospitalization for CHF in New Hampshire instead of its prevalence.

Incidence of hospitalization for congestive heart failure

The age-adjusted hospitalization rates for CHF decreased with time. Overall, from 2000 through 2007, the rate decreased from 25.4 discharges per 10,000 population to 18 discharges per 10,000 population. This represents a 29% reduction in CHF hospitalizations from 2000 to 2007. The crude rates also decreased by 21% over that time period (Figure 33). Hospitalizations for CHF were different by sex. More hospitalizations occurred among males for CHF than females during that same time period (Figure 34).

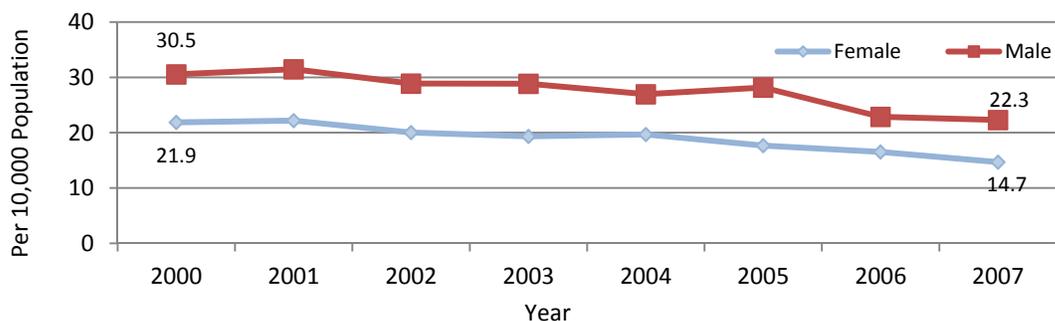
Figure 33. Hospitalization Rates* for Congestive Heart Failure in New Hampshire, 2000-2007



*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data. ICD-9: 428.0, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

Figure 34. Hospitalization Rates* for Congestive Heart Failure in New Hampshire, 2000-2007

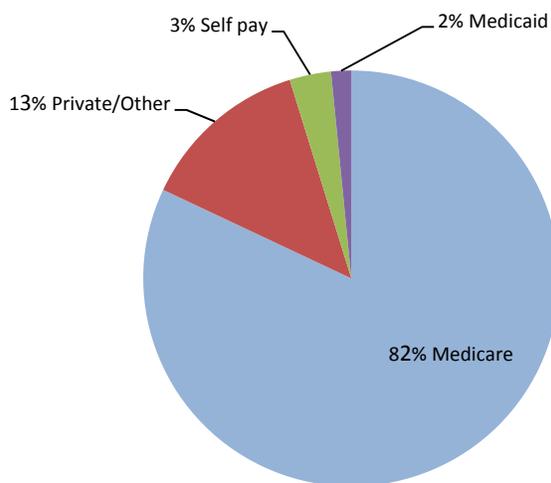


*Age-adjusted hospitalization rates per 10,000 population

Data Sources: New Hampshire Hospital Discharge Data. ICD-9: 428.0, U.S. Census Bureau, Population Estimates 2000 to 2010, Standard Population: U.S. 2000

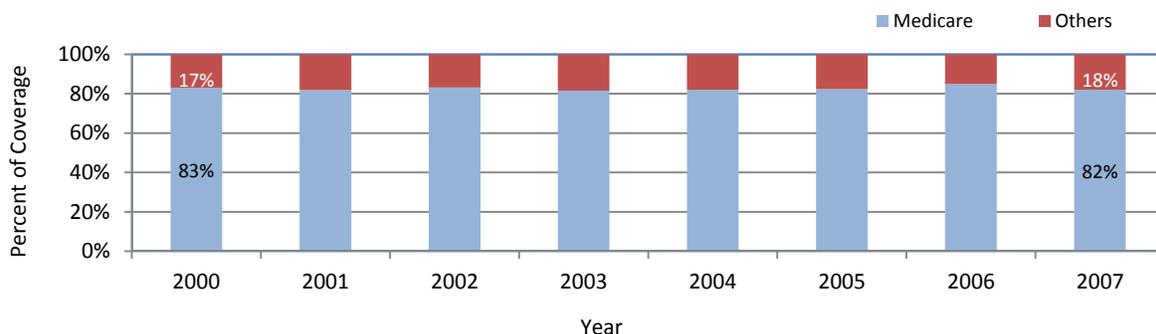
In 2007, 82% of those hospitalized for CHF had Medicare as their primary insurer (Figure 35), and from 2000 to 2007, Medicare coverage for CHF hospitalizations remained almost the same (Figure 36). The total net charge for hospitalizations for CHF in New Hampshire in 2007 was \$45.1 million, and the average net charge per hospitalization was \$17,975 (Table 17 and Figure 37).

Figure 35. Proportion of Hospitalizations for Congestive Heart Failure by Payor in New Hampshire, 2007



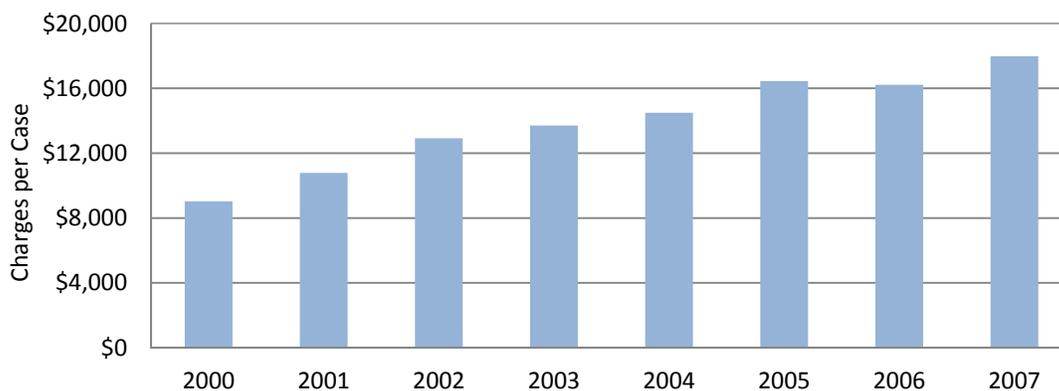
Data Sources: New Hampshire Hospital Discharge Data
 Percentage of NH Residents Discharged for Coronary heart disease 2000-2008
 ICD-9: 428.0

Figure 36. Medicare Coverage for Hospitalizations for Congestive Heart Failure in New Hampshire, 2000-2007



Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Code: 428.0

Figure 37. Average Net Charges per Patient for Congestive Heart Failure Hospitalizations in New Hampshire, 2000-2007



Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Code: 428.0

Table 16. Hospitalizations for Congestive Heart Failure in New Hampshire, 2000-2007

Year	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
2000	3,009	24.3	23.5-25.2	25.4	24.5-26.3
2001	3,170	25.2	24.4-26.1	26.1	25.2-27.1
2002	2,935	23.1	22.3-24.0	23.7	22.9-24.6
2003	2,972	23.2	22.4-24.1	23.5	22.7-24.4
2004	2,960	22.9	22.1-23.8	22.8	22.0-23.6
2005	2,907	22.4	21.6-23.2	22.0	21.2-22.8
2006	2,619	20.0	19.3-20.8	19.2	18.5-20.0
2007	2,508	19.1	18.4-19.9	18.0	17.3-18.7

* Adjusted to 2000 standard U.S. population, per 10,000 population.

Data sources: New Hampshire hospital discharge data - number of events - NH Population Projection from U.S. Census Bureau Standard Population: US 2000

Table 17. Net Charges for Congestive Heart Failure Hospitalizations in New Hampshire, 2000-2007

Years	Cases	Total Charges in Million*	Average Charges per Case
2000	3,009	\$27.2	\$9,031
2001	3,170	\$34.2	\$10,788
2002	2,935	\$37.9	\$12,927
2003	2,972	\$40.8	\$13,711
2004	2,960	\$42.9	\$14,492
2005	2,907	\$47.8	\$16,447
2006	2,619	\$42.5	\$16,220
2007	2,508	\$45.1	\$17,975

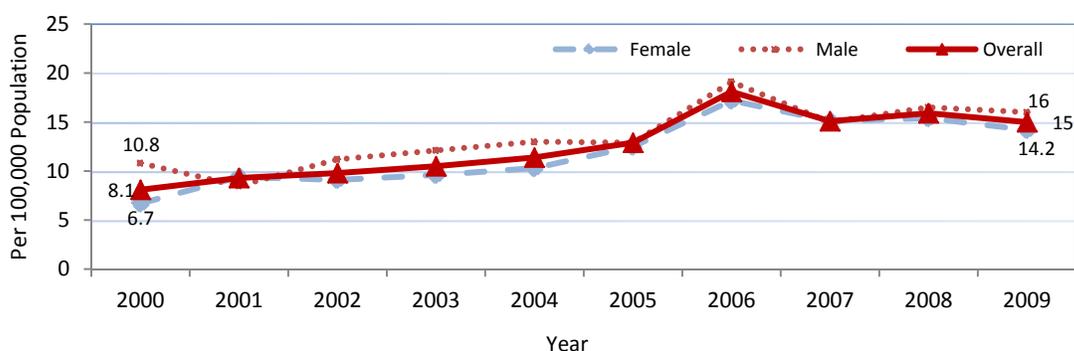
Data source: New Hampshire hospital discharge data

*Total charges rounded up to the hundred thousandths

Deaths from congestive heart failure

Overall, from 2000 through 2009, death rates for congestive heart failure nearly doubled, from 8.1 deaths per 100,000 population to 15 deaths per 100,000 populations. When stratified by sex, death rates were not significantly higher in males than in females (Figure 38). As with other heart diseases, the number of deaths due to CHF increased with age. The number of deaths for people aged 75 and older was over eight times the number of deaths for all younger ages combined in 2009. Such disproportion was also observed in previous years (Figure 39).

Figure 38. Age-Adjusted Death Rates* from Congestive Heart Failure Overall and by Sex in New Hampshire, 2000-2009

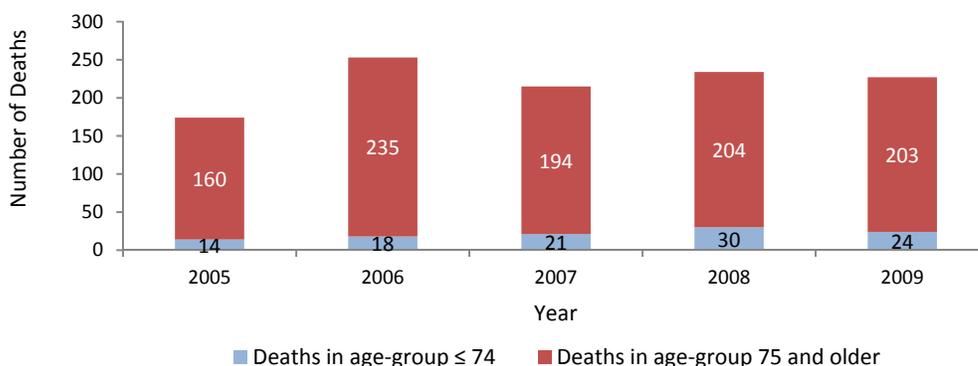


*Age-adjusted death rates per 100,000 population

Data Sources: CDC Wonder – Compressed Mortality File 2000-2009. ICD-10 code: I50.0

Standard Population: US 2000

Figure 39. Number of Deaths from Congestive Heart Failure by Age Group and Year in New Hampshire, 2005-2009

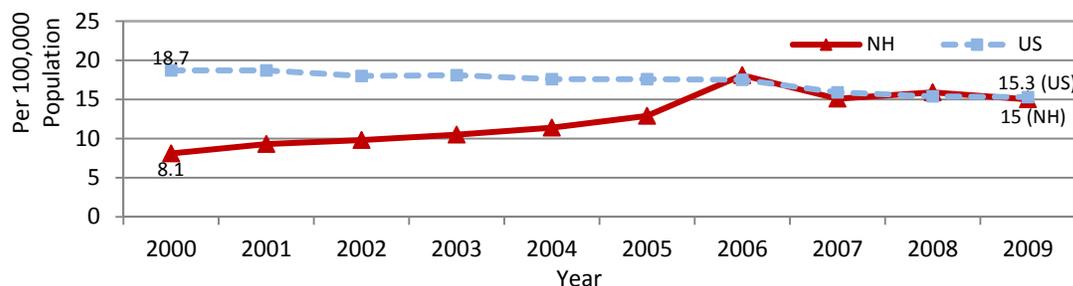


Data Sources: CDC Wonder – Compressed Mortality File 2005-2009

ICD-10 codes I50.0

When compared with the U.S. population, the data indicate that while New Hampshire’s death rates increased by almost 50% from 2000 to 2008, those of the United States decreased by 18% for the same period. From 2000 to 2005, New Hampshire's rates were statistically and significantly different than those of the U.S., but from 2006 to 2009, the rates were not significantly different (Figure 40). The same pattern was observed when New Hampshire's rates were compared with the white U.S. population (Table 18).

Figure 40. Age-Adjusted Death Rates from Congestive Heart Failure in New Hampshire and the United States, 2000-2009



Data Sources: CDC Wonder Deaths Data - NH and U.S. Census Bureau, Population Estimates 2000 to 2010
ICD-10 codes I50.0

Table 18. Deaths and Death Rates* from Congestive Heart Failure in New Hampshire Compared with Age-Adjusted Rates in the United States, 2000-2009

Years	Deaths	New Hampshire				U.S. All Races		U.S. Whites	
		Crude Rates	95% CI	Age-Adjusted Rates	95% CI	Age-Adjusted Rates	95% CI	Age-Adjusted Rates*	95% CI
2000	95	7.7	6.2 - 9.4	8.1	6.6 - 9.9	18.7	18.6 - 18.9	18.9	18.7 - 19.0
2001	112	8.9	7.3 - 10.6	9.3	7.6 - 11.0	18.7	18.5 - 18.9	18.9	18.7 - 19.0
2002	122	9.6	7.9 - 11.3	9.8	8.1 - 11.6	18.0	17.9 - 18.2	18.2	18.0 - 18.3
2003	133	10.4	8.6 - 12.1	10.5	8.6 - 12.3	18.1	17.9 - 18.2	18.2	18.1 - 18.4
2004	149	11.5	9.7 - 13.4	11.4	9.6 - 13.2	17.6	17.4 - 17.7	17.8	17.6 - 17.9
2005	174	13.4	11.4 - 15.4	12.9	11.0 - 14.8	17.6	17.4 - 17.7	17.7	17.6 - 17.9
2006	253	19.3	16.9 - 21.7	18.1	15.9 - 20.4	17.5	17.3 - 17.6	17.7	17.5 - 17.8
2007	215	16.4	14.2 - 18.6	15.1	13.1 - 17.1	15.9	15.7 - 16.0	16.0	15.9 - 16.2
2008	234	12.8	12.2 - 13.5	15.9	13.9 - 17.9	15.4	15.2 - 15.5	15.5	15.3 - 15.6
2009	227	17.1	14.9 - 19.4	15.0	13.1 - 17.0	15.3	15.1 - 15.4	15.4	15.2 - 15.5

*Adjusted to 2000 standard U.S. population, per 100,000 population

Data Sources: CDC Wonder Deaths Data - NH and U.S. Census Bureau, Population Estimates 2000 to 2010
ICD-10 codes I50.0

Standard Population: US 2000

For CHF deaths at the county level, five years of data were combined and analyzed (Table 19). The results showed that Hillsborough and Rockingham Counties had both the highest adjusted death rates (Figure 41) and the highest number of deaths for the period 2005-2009 combined (Figure 42). Their rates were significantly higher than the State's rate, whereas Cheshire, Grafton, and Strafford's rates were significantly lower.

Table 19. Deaths and Age-Adjusted Death Rates for Congestive Heart Failure by County in New Hampshire, Combined Data, 2005-2009

County	Deaths	Crude Rate	95% CI	Age-adjusted Rate*	95% CI
Belknap	67	21.9	17.0 - 27.9	17.2	13.4 - 21.9
Carroll	50	21.0	15.6 - 27.7	14.8	11.0 - 19.5
Cheshire	36	9.3	6.5 - 12.9	7.6 [#]	5.3 - 10.5
Coos	36	22.3	15.7 - 30.9	13.3	9.3 - 18.5
Grafton	52	12.1	9.1 - 15.9	9.1 [#]	6.8 - 11.9
Hillsborough	361	17.9	16.1 - 19.8	18.3 [@]	16.4 - 20.2
Merrimack	129	17.4	14.4 - 20.4	15.2	12.5 - 17.8
Rockingham	303	20.4	18.1 - 22.7	21.9 [@]	19.4 - 24.3
Strafford	52	8.5	6.4 - 11.2	8.7 [#]	6.5 - 11.4
Sullivan	17	8.0 (Unreliable)	4.6 - 12.8	6.1 (Unreliable)	3.5 - 9.8

*Adjusted to 2000 standard U.S. population, per 100,000 population

[@]Significantly higher than the state adjusted death rate

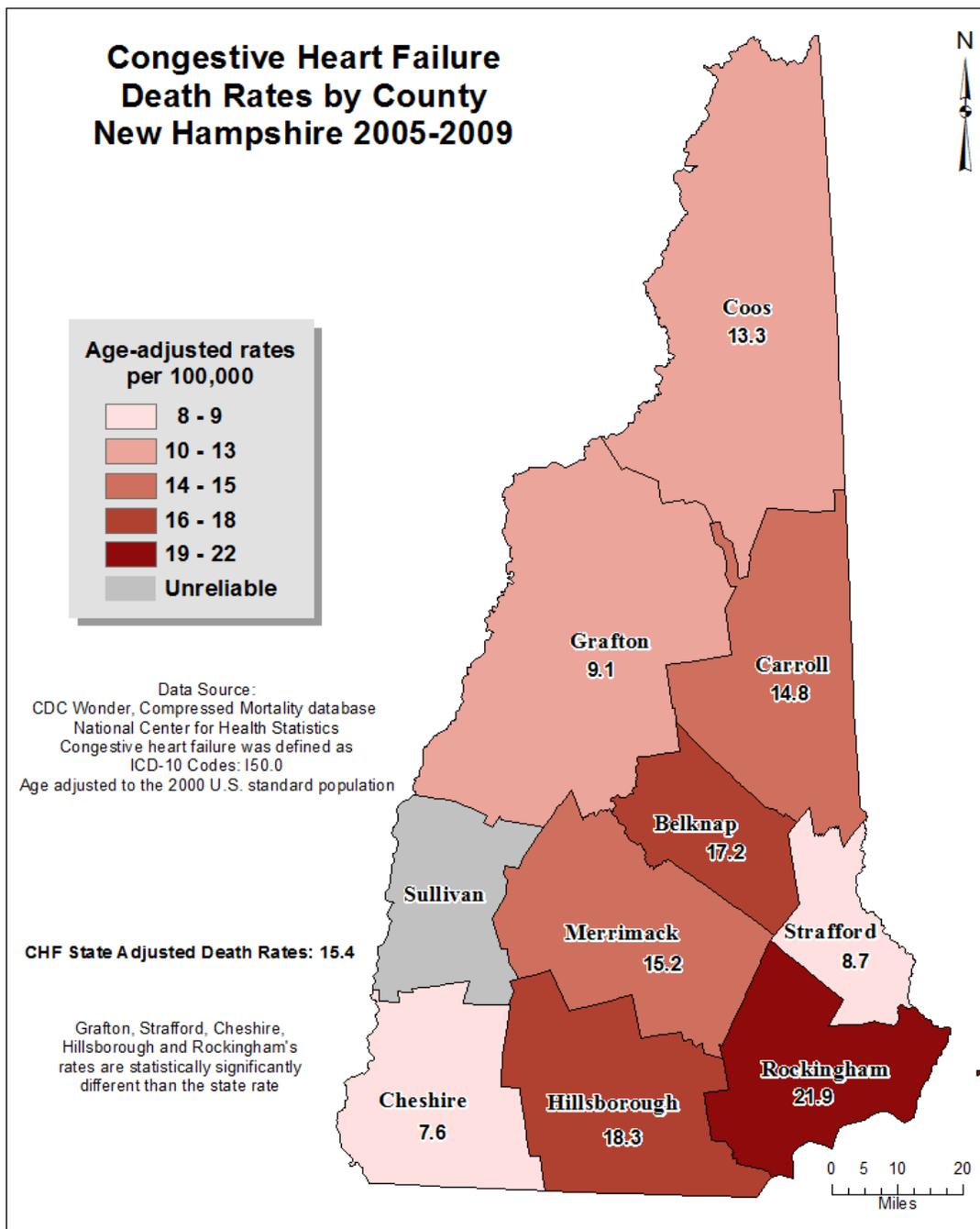
[#]Significantly lower than the state adjusted death rate

Data Sources: CDC Wonder Deaths Data - Compressed Mortality File. ICD-10 codes I50.0

State crude death rate: 16.8; CI: (15.8-17.8)

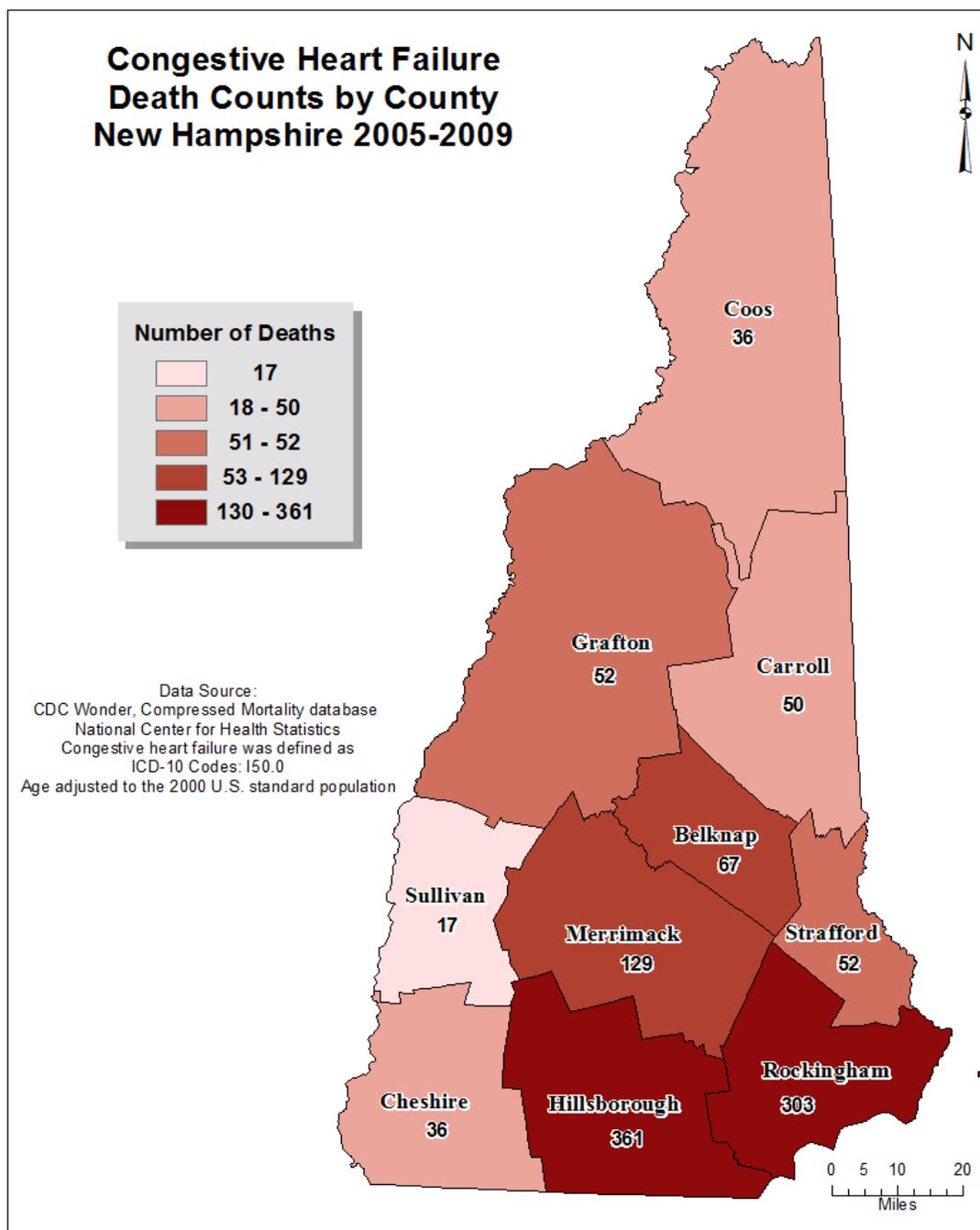
State age-adjusted death rate: 15.4; CI (14.5-16.3)

Figure 41. Congestive Heart Failure Death Rates by County in New Hampshire, Combined Data 2005-2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 42. Congestive Heart Failure Death Counts by County in New Hampshire, Combined Data 2005-2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Stroke

Stroke, also called brain attack or cerebrovascular disease, is the fourth leading cause of death in the United States. According to a report from the National Center for Health Statistics, 128,842 people died from stroke in the U.S. in 2009.^[19] A stroke occurs when blood flow to a part of the brain stops due to a blood clot or the bursting of a blood vessel in the brain.

Stroke is also a leading cause of serious long-term disability.^[20] People who survive stroke usually live with impairments that may include:

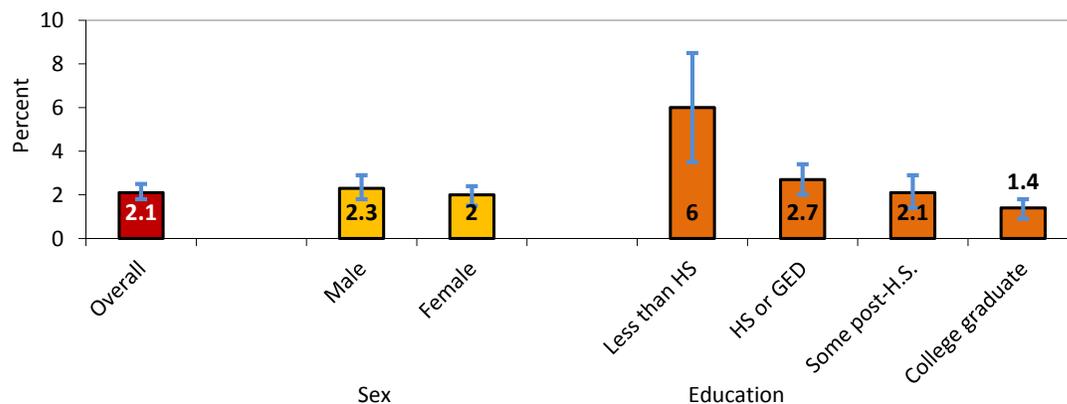
- Vision problems
- Paralysis or decreased strength on the left side, right side, or both sides of the body
- Speech/language problems
- Memory loss

Prevalence of stroke

To estimate the prevalence of stroke in New Hampshire, respondents to the 2010 BRFSS survey were asked the question, “*Has a doctor, nurse, or other health professional EVER told you that you had a stroke?*”

From the BRFSS survey, about 2% of adults (2.3% of males and 2.0% of females) indicated that they were told by a health professional that they had a stroke. The prevalence varied by age group and education. First, stroke prevalence increased with age; individuals 65 and older reported the highest prevalence (7.8%) followed by the group age 55 through 64 (2.3%). The oldest group had a prevalence that was twice that of all the younger age groups combined. Second, educational achievement was inversely related to the prevalence of stroke. Individuals with less than a high school diploma had more than three times the rate of those who graduated college (Figure 43 and Table 20).

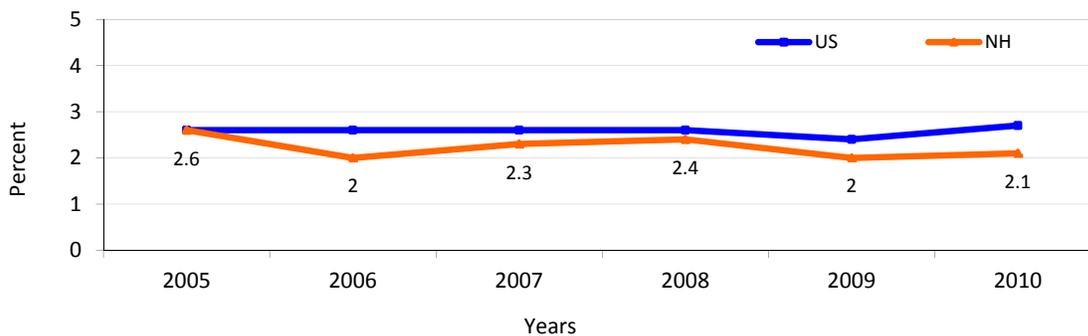
Figure 43. Self-Reported Prevalence of Stroke in New Hampshire Adults* by Sex and Education, 2010



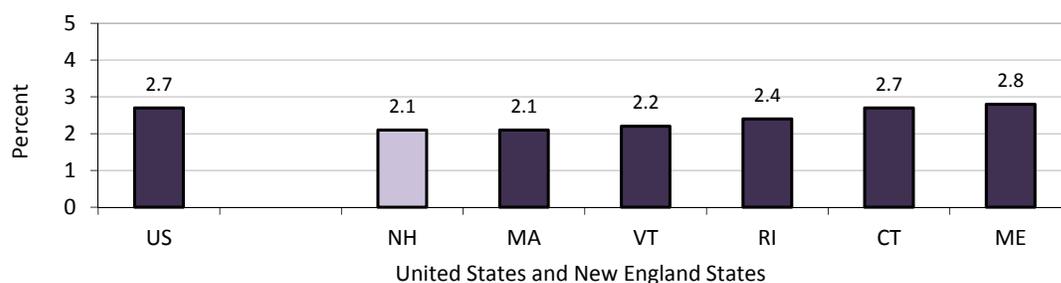
Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 *Ages 18 and older

In terms of income, the lowest income group reported a higher stroke rate than those who made \$50,000 or more a year (Table 20). From 2005 to 2010, stroke prevalence in New Hampshire did not change significantly and followed nearly the same pattern as the median U.S. population (Figure 44 and Table 21). Finally, in 2010, New Hampshire and Massachusetts had the lowest reported prevalence of stroke in New England (Figure 45).

Figure 44. Self-Reported Prevalence of Stroke in New Hampshire, 2005-2010



Data Source: BRFSS, Centers for Disease Control and Prevention, 2005-2010
 The percentages shown are for New Hampshire

Figure 45. Self-Reported Prevalence of Stroke among Persons in the New England States, 2010

Data Source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 CT: Connecticut; VT: Vermont; RI: Rhode Island
 MA: Massachusetts; ME: Maine; NH: New Hampshire
 US: United States

Table 20. Self-Reported Prevalence of Stroke by Sex, Age,* Income, and Education in New Hampshire, 2010

Sociodemographic Characteristic	Percentage	95% CI
Total	2.1	1.8-2.5
Sex		
Male	2.3	1.8-2.9
Female	2.0	1.5-2.4
Age		
18-24	NA	NA
25-34	NA	NA
35-44	0.8	0.2-1.4
45-54	1.1	0.4-1.8
55-64	2.3	1.5-3.2
65+	7.8	6.4-9.2
Income		
<15,000	4.8	3.0-6.6
15,000-24,999	4.8	3.3-6.3
25,000-34,999	1.8	0.8-2.8
35,000-49,999	3.2	1.8-4.6
50,000+	1.3	0.8-1.7
Education		
Less than H.S.	6.0	3.5-8.5
H.S. or G.E.D.	2.7	2.0-3.4
Some post-H.S.	2.1	1.4-2.9
College graduate	1.4	0.9-1.8

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

*Ages 18 and older

Table 21. Prevalence of Stroke in New Hampshire Compared with Median Prevalence in the United States, 2005-2010

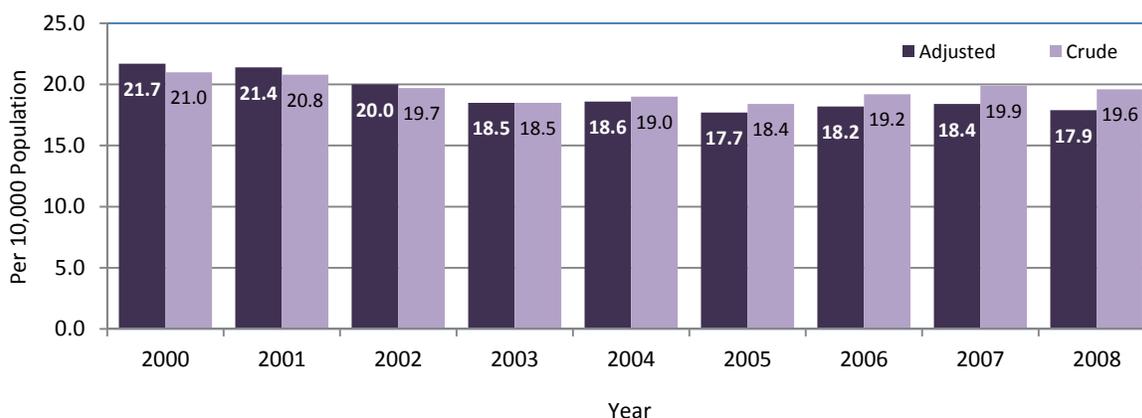
		2005	2006	2007	2008	2009	2010
NH	Mean Prevalence (%)	2.6	2.0	2.3	2.4	2.0	2.1
	95% CI	2.1-3.1	1.6-2.4	1.9-2.7	1.9-2.8	1.6-2.4	1.8-2.5
U.S.	Median Prevalence (%)	2.6	2.6	2.6	2.6	2.4	2.7

Data source: BRFSS, Centers for Disease Control and Prevention, 2005-2010

Hospitalization for stroke

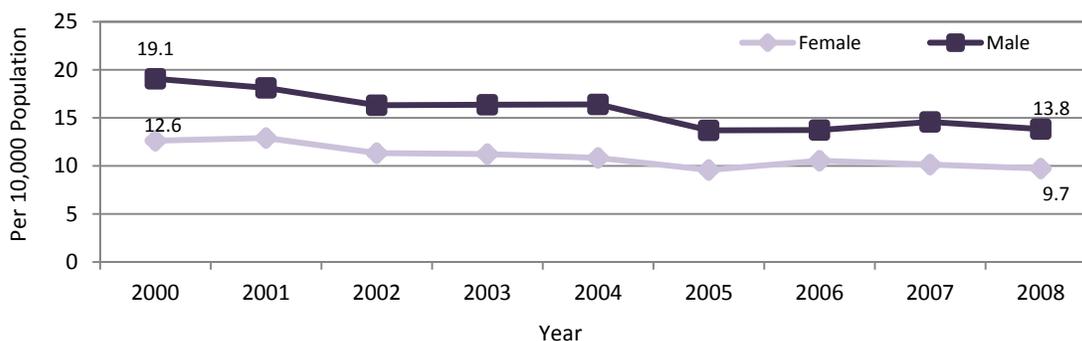
Age-adjusted hospitalization rates for stroke decreased from 21.7 in 2000 to 17.9 per 10,000 population in 2008. This represents an 18% reduction in stroke’s hospitalizations from 2000 to 2008 (Figure 46 and Table 22). The crude rates however decreased only by 7% for the same period from 21.0 hospitalizations to 19.6 hospitalizations per 10,000. As with self-reported prevalence for stroke, hospitalizations were also affected by sex. More males were hospitalized for stroke than females during the same time period (Figure 47).

Figure 46. Hospitalization Rates* for Stroke in New Hampshire, 2000-2008



*Age-adjusted hospitalization rates per 10,000 population
Data Sources: New Hampshire Hospital Discharge Data. ICD-9: 430-434, 436-438, U.S. Census Bureau, Population Estimates 2000 to 2010
Standard Population: US 2000

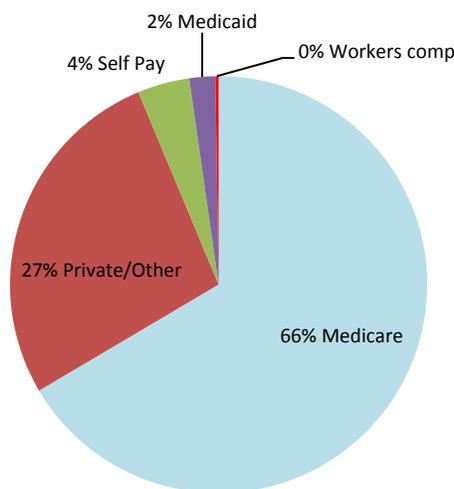
Figure 47. Hospitalization Rates* for Stroke by Sex in New Hampshire, 2000-2008



*Age-adjusted hospitalization rates per 10,000 population
Data Sources: New Hampshire Hospital Discharge Data. ICD-9 Codes: 430-434, 436-438, U.S. Census Bureau, Population Estimates 2000 to 2010
Standard Population: US 2000

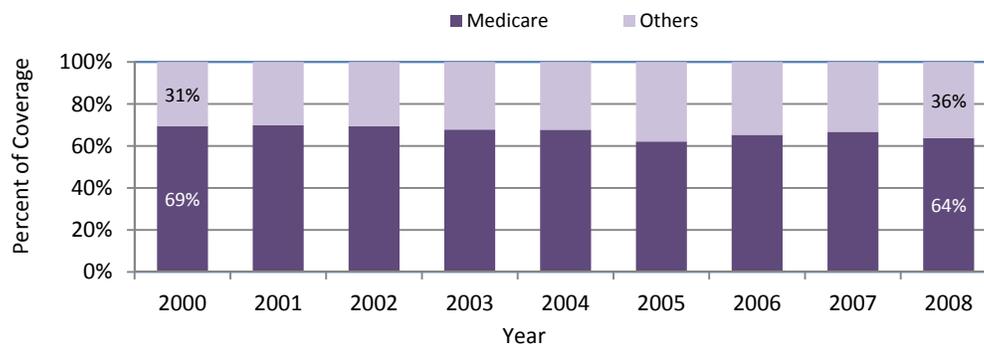
In 2008, over 66% of hospitalizations for stroke had Medicare as their primary insurer (Figure 48). From 2000 to 2008, Medicare coverage for stroke hospitalizations decreased from 72% to 66% (Figure 49). The total net charge for hospitalizations for stroke in New Hampshire in 2008 was over \$72.9 million, and the average net charge per hospitalization was \$28,355 (Table 23 and Figure 50).

Figure 48. Proportion of Hospitalization Coverage for Stroke by Payor in New Hampshire, 2008

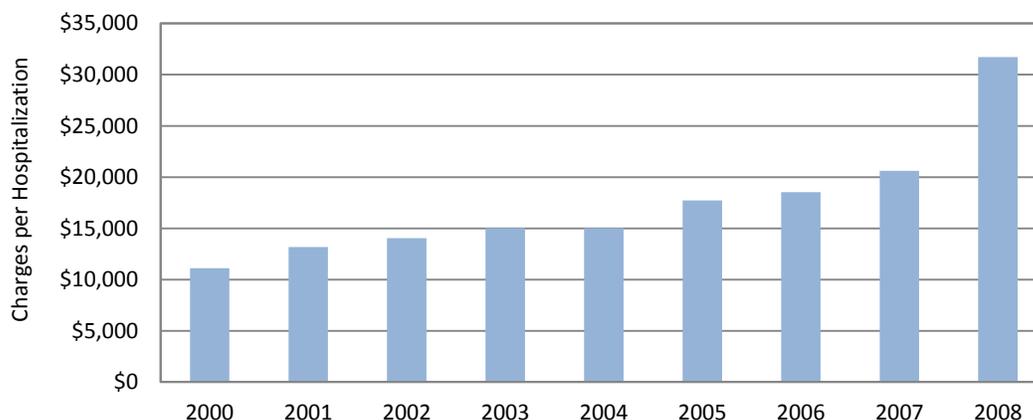


Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 430-434, 436-438

Figure 49. Medicare Coverage for Hospitalization for Stroke in New Hampshire, 2000-2008



Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes 430-434, 436-438

Figure 50. Average Net Charges per Hospitalization for Stroke in New Hampshire, 2000-2008

Data Sources: New Hampshire Hospital Discharge Data
ICD-9 Codes: 430-434, 436-438

Table 22. Hospitalizations for Stroke in New Hampshire, 2000-2008

Year	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
2000	2598	21.0	20.2-21.8	21.7	20.9-22.6
2001	2612	20.8	20.0-21.6	21.4	20.6-22.2
2002	2497	19.7	18.9-20.5	20.0	19.2-20.8
2003	2369	18.5	17.8-19.3	18.5	17.8-19.3
2004	2445	19.0	18.2-19.7	18.6	17.9-19.4
2005	2390	18.4	17.7-19.2	17.7	17.0-18.4
2006	2511	19.2	18.5-20.0	18.2	17.5-18.9
2007	2617	19.9	19.2-20.7	18.4	17.7-19.2
2008	2583	19.6	18.9-20.4	17.9	17.2-18.7

* Adjusted to 2000 standard U.S. population, per 10,000 population

Data sources: New Hampshire hospital discharge data. ICD-9-Codes: 430-434, 436-438, U.S. Census Bureau, Population Estimates 2000 to 2010

Standard Population: U.S. 2000

Table 23. Net Charges for Stroke Hospitalizations in New Hampshire, 2000-2008

Years	Hospitalizations	Total Charges in Million*	Average Charges per Hospitalization
2000	2,598	\$27.6	\$11,964
2001	2,612	\$32.9	\$14,180
2002	2,497	\$33.8	\$15,275
2003	2369	\$33.9	\$17,036
2004	2445	\$36.0	\$17,338
2005	2390	\$38.5	\$19,456
2006	2511	\$43.7	\$20,203
2007	2617	\$50.0	\$23,463
2008	2583	\$72.9	\$28,355

Data source: New Hampshire hospital discharge data

* Total charges rounded up to the hundred thousandths

For stroke hospitalizations at the county level, four years of data were combined and analyzed. The results showed that Strafford, Rockingham, and Hillsborough Counties had the highest adjusted hospitalization rate for the period 2005-2008 combined (Table 24 and Figure 51). However, for absolute hospitalization counts, Hillsborough County followed by Rockingham County had the highest number of stroke hospitalizations for the same period (Figure 52).

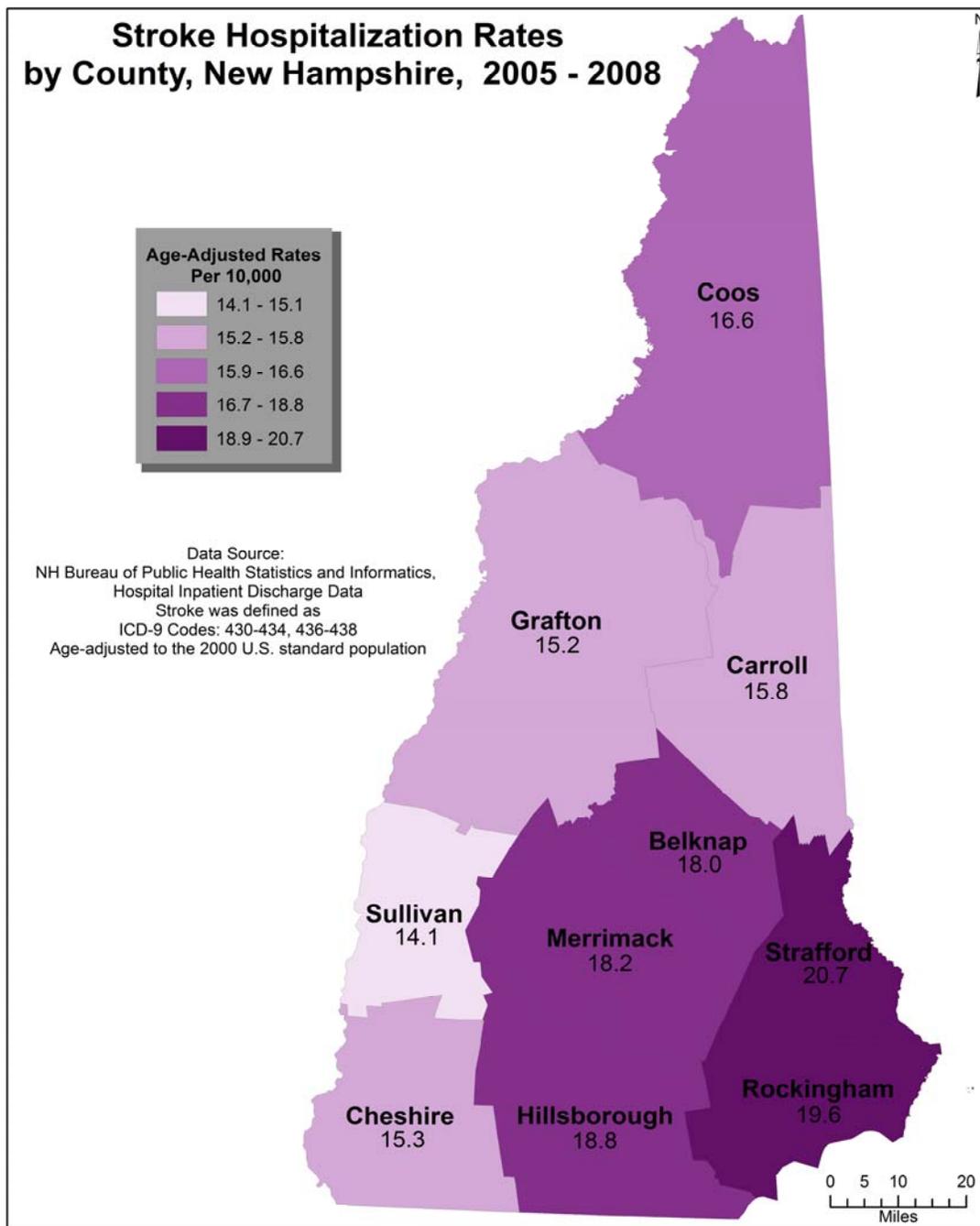
Table 24. Hospitalizations and Age-Adjusted Rates for Stroke by County in New Hampshire, Combined Data for 2005-2008

County	Hospitalizations	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
Belknap	548	22.8	20.9-24.7	18.0	16.5-19.6
Carroll	438	23.1	21.0-25.3	15.8	14.3-23.1
Cheshire	542	17.5	16.1-19.0	15.3	14.0-16.6
Coos	325	24.1	21.6-26.8	16.6	14.8-18.6
Grafton	632	18.1	16.7-19.5	15.2	14.0-16.4
Hillsborough	2915	18.3	17.6-19.0	18.8	18.1-19.5
Merrimack	1166	19.9	18.8-21.1	18.2	17.2-19.3
Rockingham	2264	19.3	18.5-20.1	19.6	18.8-20.4
Strafford	962	19.9	18.7-21.2	20.7	19.4-22.0
Sullivan	309	17.8	15.9-19.9	14.1	12.5-15.8

*Age-adjusted hospitalization rates per 10,000 population

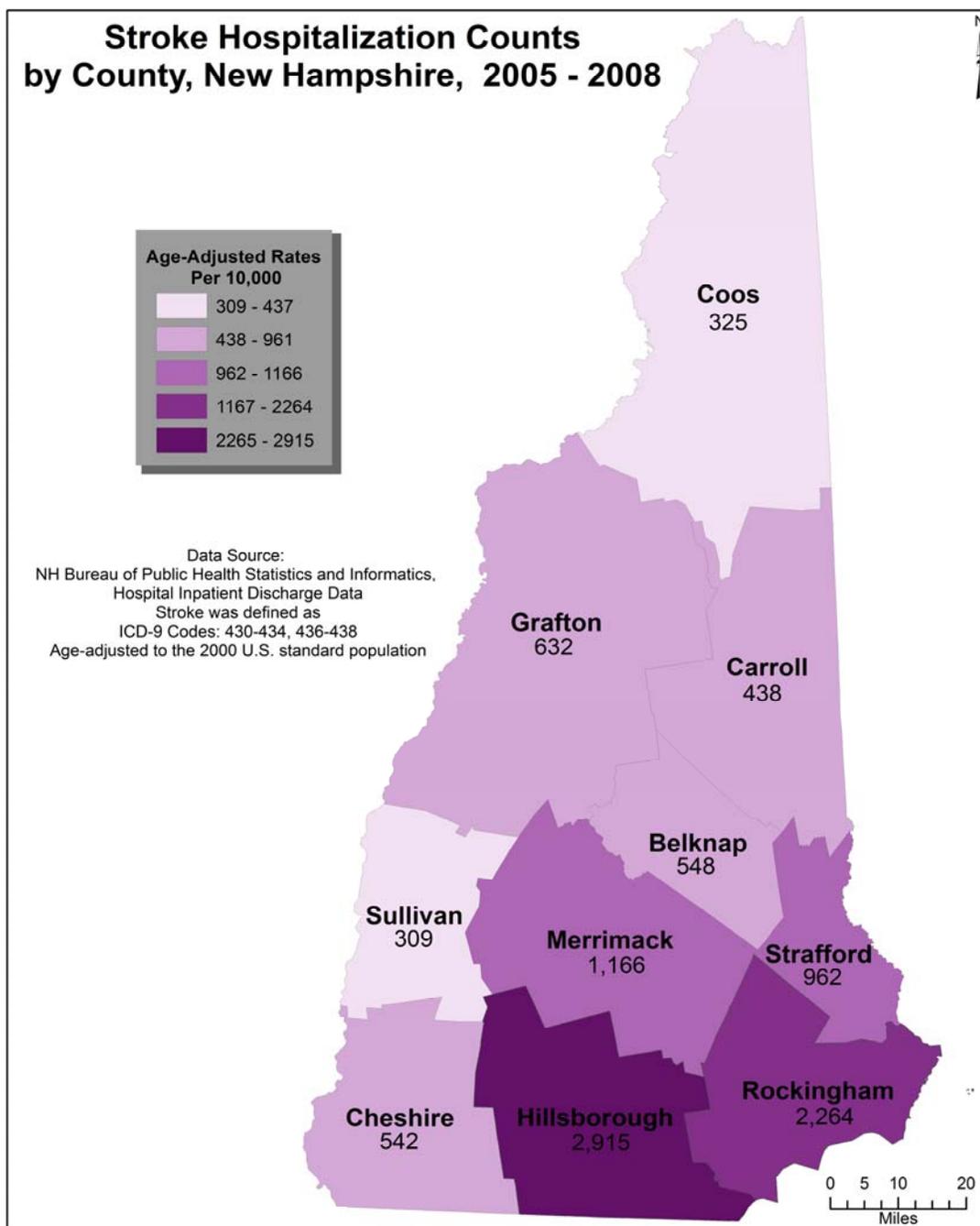
Data sources: New Hampshire hospital discharge data. ICD-9-Code 430-434, 436-438, U.S. Census Bureau, Population Estimates 2000 to 2010 Standard Population: U.S. 2000

Figure 51. Stroke Hospitalization Rates by County in New Hampshire, 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: www.dhhs.nh.gov/dphs/cdpc/hdsp.htm or call (603) 271-4931

Figure 52. Stroke Hospitalization Counts by County in New Hampshire, Combined Data 2005-2008

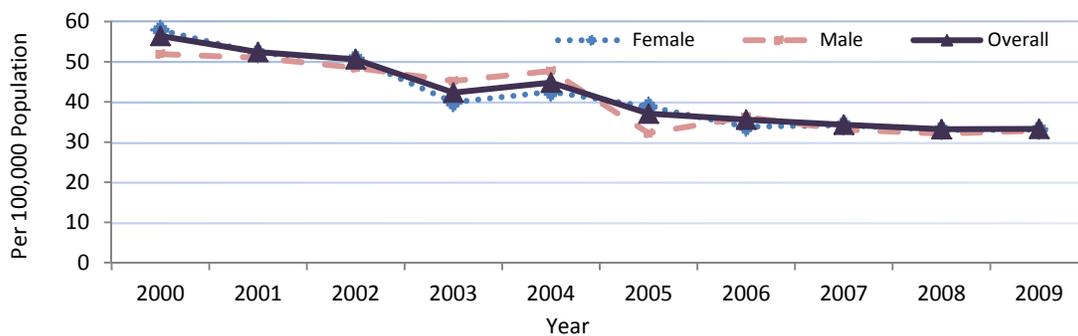


Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: www.dhhs.nh.gov/dphs/cdpc/hdsp.htm or call (603) 271-4931

Deaths from stroke

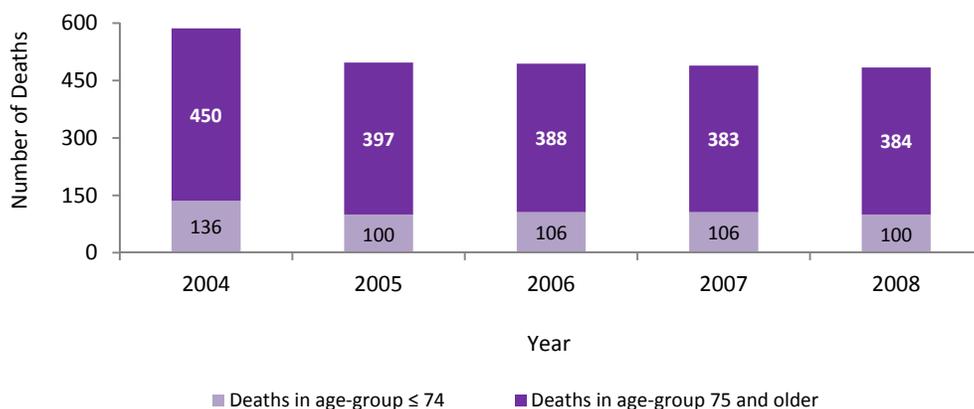
Overall, from 2000 to 2009, death rates for stroke decreased by 41%, from 56.4 deaths per 100,000 population to 33.3 deaths per 100,000 population. When stratified by sex, death rates were not significantly different between males and females (Figure 52). As with the previous reported diseases, the number of deaths due to stroke increased with age. The number of deaths for people aged 75 and older was over three times the number of deaths for all younger ages combined in 2009. Such disproportion was also observed in previous years (Figure 54).

Figure 52. Age-Adjusted Death Rates from Stroke Overall and by Sex in New Hampshire, 2000-2009



Data Sources: CDC Wonder Compressed Mortality File 2000-2008. ICD-10 codes: I60-I69, U.S. Census Bureau, Population Estimates 2000 to 2010
Standard Population: U.S. 2000

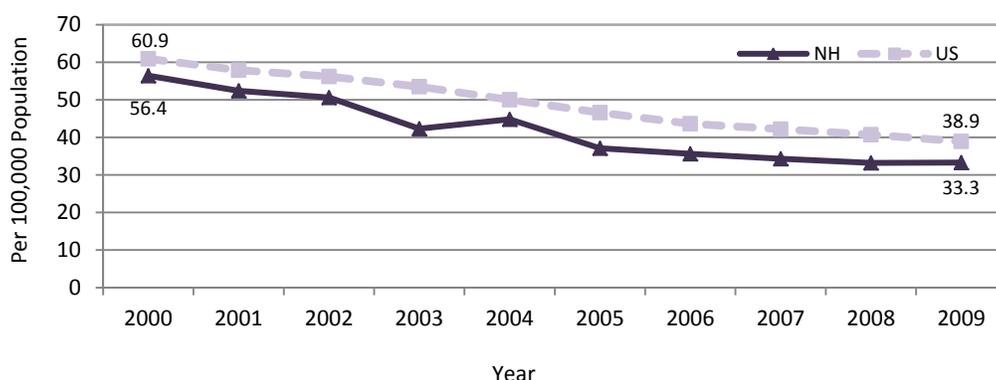
Figure 54. Number of Deaths from Stroke by Age Group and Year in New Hampshire, 2004-2008



Data Sources: CDC Wonder – Compressed Mortality File 2005-2009
ICD-10 codes: I60-I69

When compared with the U.S., the data indicate that New Hampshire’s stroke adjusted death rates from 2001 to 2009 were significantly lower than those of the U.S. (Figure 55). However, when compared with the white U.S. population, New Hampshire’s death rates were significantly lower only for years 2003 and 2005 through 2009 (Table 25).

Figure 55. Age-Adjusted Death Rates from Stroke in New Hampshire and the United States, 2000-2009



Data Sources: CDC Wonder Deaths Data - NH and U.S Census Bureau, Population Estimates 2000 to 2010. ICD-10 codes: I60-I69

Table 25. Deaths and Death Rates from Stroke in New Hampshire Compared with Age-Adjusted Rates in the United States, 2000-2009

Years	Deaths	New Hampshire				U.S. all Races		U.S. - Whites	
		Crude Rates	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI	Age-Adjusted Rates*	95% CI
2000	662	53.6	49.5 - 57.6	56.4	52.1 - 60.7	60.9	60.6 - 61.1	58.8	58.5 - 59.1
2001	633	50.4	46.4 - 54.3	52.4	48.4 - 56.5	57.9	57.6 - 58.2	55.8	55.5 - 56.1
2002	627	49.3	45.5 - 53.2	50.6	46.6 - 54.6	56.2	55.9 - 56.5	54.2	53.9 - 54.5
2003	536	41.8	38.3 - 45.4	42.3	38.7 - 45.8	53.5	53.2 - 53.8	51.4	51.2 - 51.7
2004	586	45.3	41.7 - 49.0	44.8	41.1 - 48.4	50.0	49.7 - 50.2	48.0	47.8 - 48.3
2005	497	38.2	34.8 - 41.5	37.1	33.9 - 40.4	46.6	46.3 - 46.8	44.7	44.5 - 45.0
2006	494	37.7	34.3 - 41.0	35.6	32.4 - 38.7	43.6	43.3 - 43.8	41.7	41.5 - 42.0
2007	489	37.1	33.8 - 40.4	34.3	31.2 - 37.3	42.2	42.0 - 42.5	40.5	40.2 - 40.7
2008	484	36.6	33.4 - 39.9	33.2	30.3 - 36.2	40.7	40.5 - 41.0	39.1	38.9 - 39.4
2009	499	37.7	34.4 - 41.0	33.3	30.4 - 36.3	38.9	38.7 - 39.1	37.4	37.2 - 37.6

*Adjusted to 2000 standard U.S. population, per 100,000 population

Data Sources: CDC Wonder Deaths Data - NH and U.S. Census Bureau, Population Estimates 2000 to 2010
ICD-10 codes I60-I69

For stroke deaths at the county level, four years of data were combined and analyzed. The results showed that Merrimack and Carroll Counties' adjusted death rates were significantly higher than that of the State; whereas Coos and Grafton's rates were significantly lower (Table 26 and Figure 56). However, for absolute death counts, Hillsborough County followed by Rockingham County had the highest number of stroke deaths for the same period (Figure 57).

Finally, the city of Manchester had the highest number of deaths from stroke for the same period than any other New Hampshire city. Nashua had the second highest number (Figure 58). For stroke adjusted death rates by city, only four New Hampshire cities (Manchester, Nashua, Concord, and Portsmouth) had reliable death rates for the combined four years. In addition, even though Concord's death rate was higher, it was not significantly different than the other three cities (Table 27).

Table 26. Deaths and Age-Adjusted Death Rates for Stroke by County in New Hampshire, Combined Data 2005-2008

County	Deaths	Crude Rate	95% CI	Age-Adjusted Rate*	95% CI
Belknap	103	42.2	34.0 - 50.3	33.6	27.1 - 40.1
Carroll	121	63.7	52.3 - 75.0	44.7 [@]	36.7 - 52.7
Cheshire	127	41.1	34.0 - 48.3	34.3	28.3 - 40.3
Coos	54	41.7	31.3 - 54.4	25.2 [#]	18.9 - 32.9
Grafton	124	36.3	29.9 - 42.7	28 [#]	23.1 - 33.0
Hillsborough	527	32.8	30.0 - 35.6	34.3	31.3 - 37.2
Merrimack	280	47.3	41.8 - 52.9	41.9 [@]	37.0 - 46.9
Rockingham	393	33.2	29.9 - 36.5	35.5	31.9 - 39.0
Strafford	159	32.8	27.7 - 37.9	33.9	28.6 - 39.2
Sullivan	76	44.6	35.1 - 55.8	34.7	27.3 - 43.4

*Adjusted to 2000 standard U.S. population, per 100,000 population

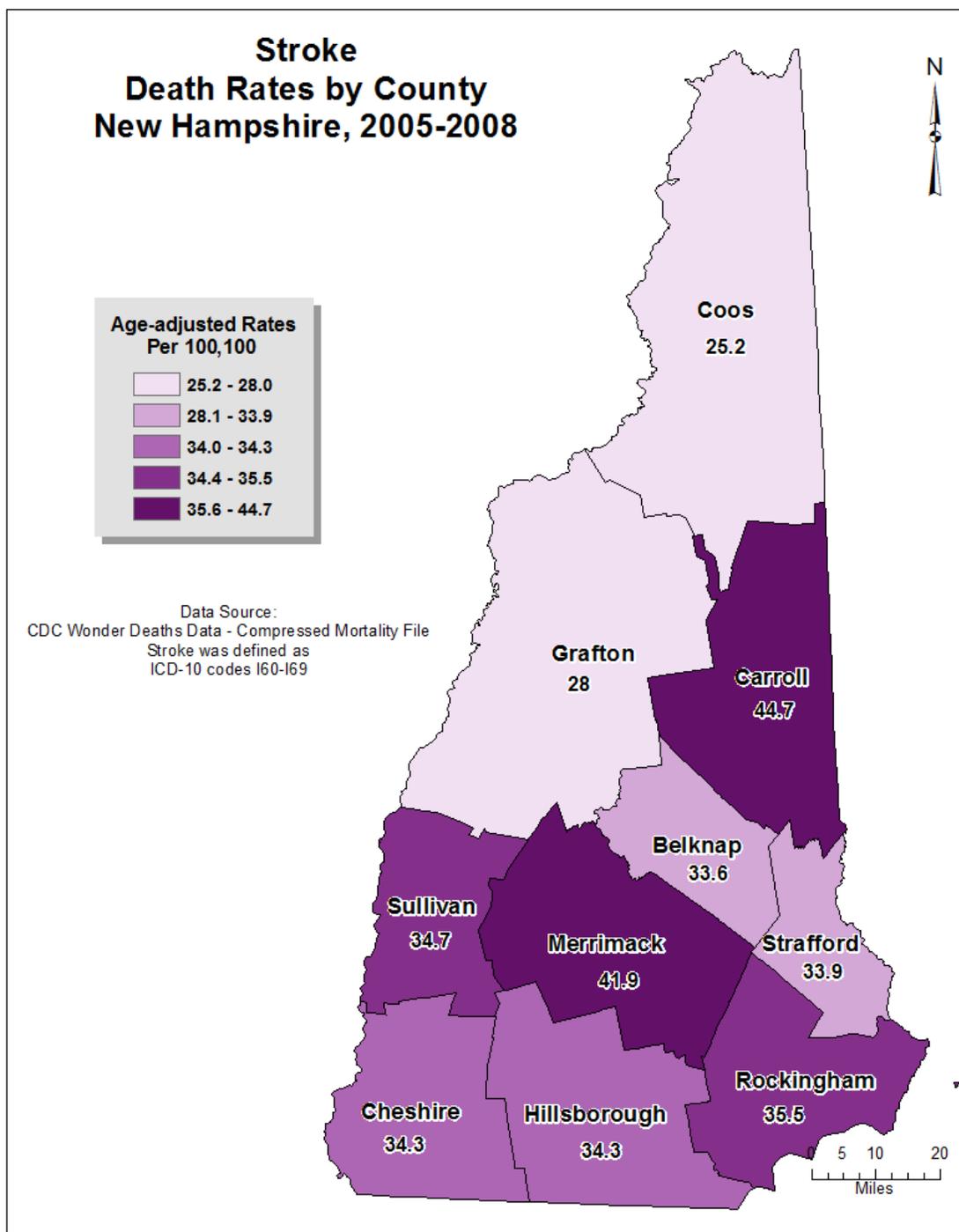
@Significantly higher than the state adjusted death rate

#Significantly lower than the state adjusted death rate

Data Sources: CDC Wonder Deaths Data - Compressed Mortality File. ICD-10 codes I60-I69

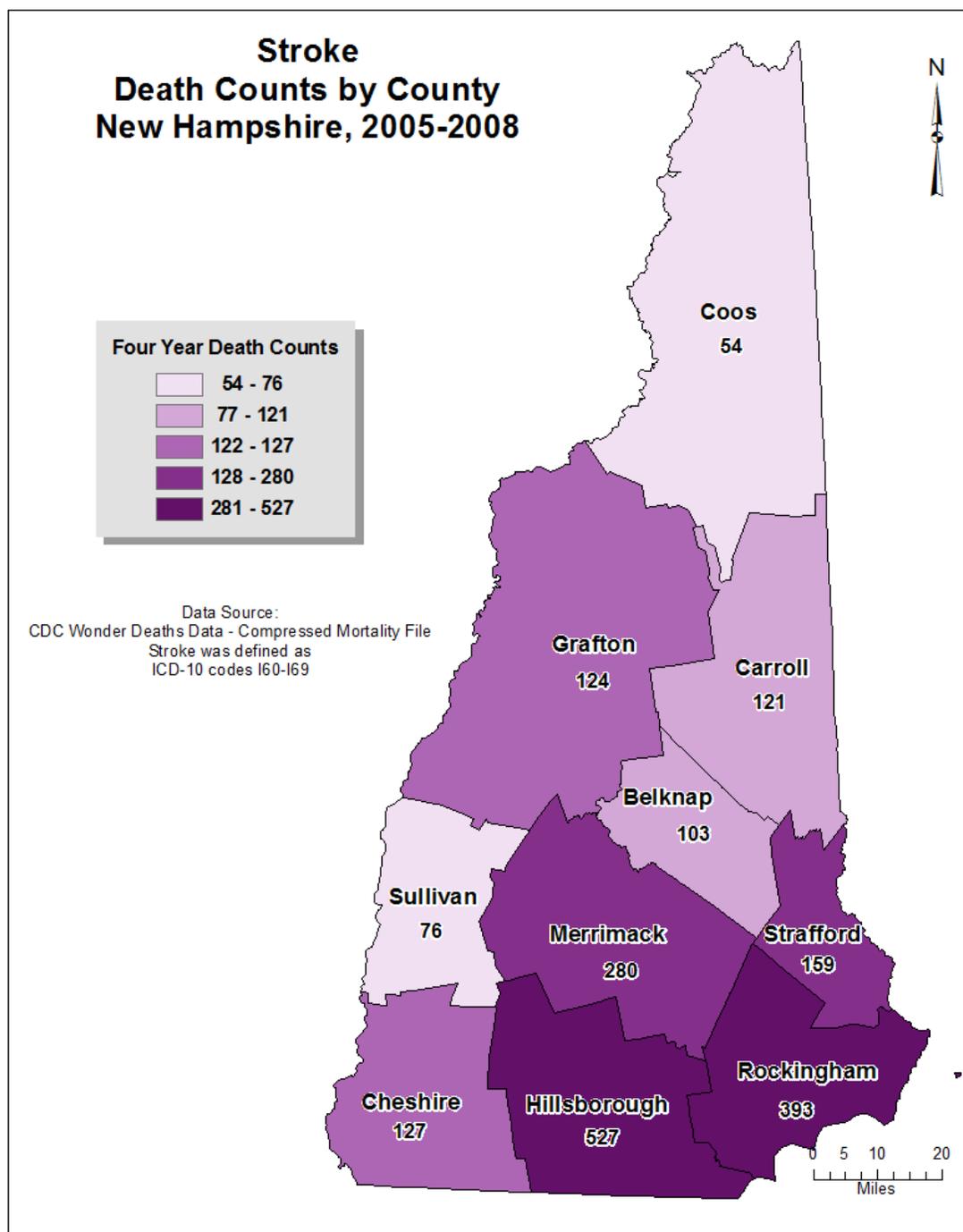
Overall State adjusted death rate for the same period: 35.0; 95% CI: (33.5-36.6)

Figure 56. Stroke Death Rates by County in New Hampshire, Combined Data 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 57. Stroke Death Counts by County in New Hampshire, Combined Data 2005-2008



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 58. Stroke Deaths by City for Selected Counties in New Hampshire, Combined Data 2005-2008

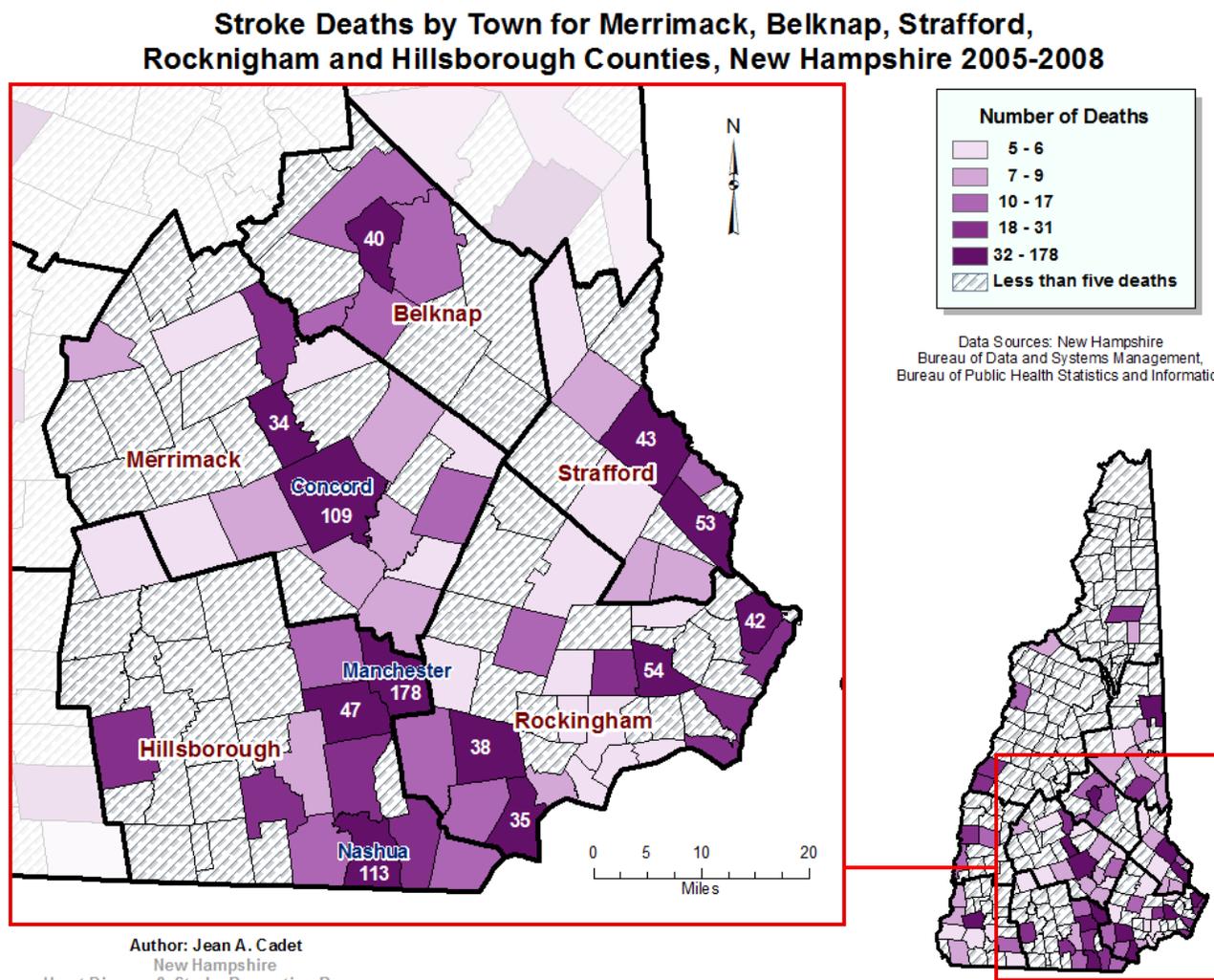


Table 27. Heart Attack and Stroke Age-Adjusted Death Rates by Selected Cities in New Hampshire, Combined Data 2005-2008

City	Heart Attack			Stroke		
	Deaths	Age-Adjusted Rate	95% CI	Deaths	Age-Adjusted Rate	95% CI
Concord	61	25.9	19.8 - 33.3	109	45.9	36.8 - 55.0
Manchester	138	27.8	23.1 - 32.4	178	34.8	29.6 - 40.0
Nashua	89	23.6	18.9 - 29.0	113	30.5	24.9 - 36.2
Portsmouth	46	-	-	42	31.7	22.8 - 42.8
Salem	35	28.3	19.7 - 39.4	35	-	-

*Adjusted to 2000 standard U.S. population, per 100,000 population

Data Source: New Hampshire deaths data 2005-2008, U.S. Census Bureau, Population Estimates 2000 to 2010

- Unreliable values

Risk Factors Data

High Blood Pressure

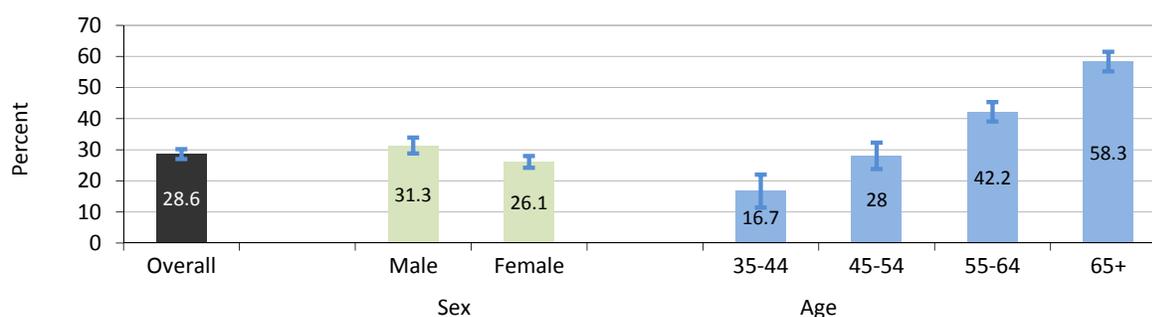
Blood pressure is the force of blood against the inside walls of arteries as the heart pumps blood through the body.^[21] When that pressure remains constantly elevated in the arteries, it is called high blood pressure.

High blood pressure (HBP) increases the risk of stroke, coronary heart disease, heart attack, and congestive heart failure.^[22] Behavioral risk factors for HBP include high sodium intake, excessive caloric intake, physical inactivity, excessive alcohol consumption, deficient potassium intake,^[23] and unhealthy diet – a diet that is high in saturated fat, trans fat, cholesterol, red meats, sweets, and sugared beverages and/or that is low in fruits, vegetables, whole grains, and nuts.^[24]

Data presented here are from the 2009 BRFSS survey. Adult respondents were asked the question, “Have you EVER been told by a doctor, nurse, or other health professional that you have high blood pressure?” Those who responded 'yes' to the question above were asked, “Are you currently taking medicine for your high blood pressure?”^[25] The data did not include females who were told they had HBP only when they were pregnant.

From the survey results, over one in four adults (28.6%) reported having been told that they have high blood pressure. The prevalence of high blood pressure was higher for men (31.3%) than for women (26.1%). With respect to age and education, the prevalence of HBP varied within each group. First, people 65 years of age and older reported the highest prevalence (58.3%), whereas those in the 18 through 24 years age group reported the lowest prevalence (6.7%). However, between age groups under 35, the differences in reported prevalence were not significant (Figure 59 and Table 28).

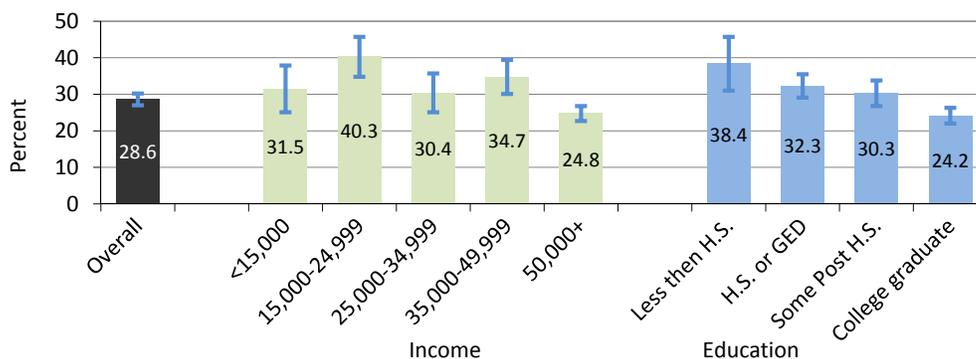
Figure 59. Prevalence of High Blood Pressure in New Hampshire by Sex and Age, 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009. 95% Confidence Intervals are also shown
 Numerator: All respondents who reported ever being told they had high blood pressure
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Second, people without a high school diploma reported significantly higher prevalence (38.4%) than those with a college degree (24.2%). Though not statistically significant across all education levels, the higher the education, the lower the reported prevalence for HBP. A similar trend was not observed with respect to income (Figure 60).

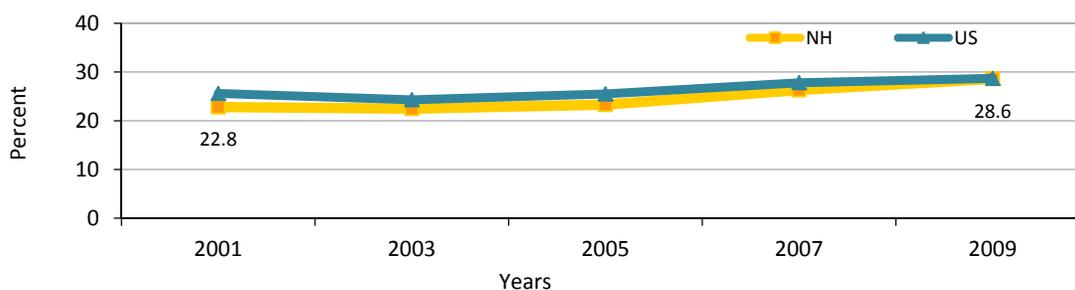
Figure 60. Prevalence of High Blood Pressure in New Hampshire* by Income and Education Level, 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009
 95% Confidence Intervals are also shown
 Numerator: All respondents who reported ever being told they had high blood pressure
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

As shown in Figure 61, the percentage of New Hampshire adults reporting that they have high blood pressure increased from 22.8% in 2003 to 28.6% in 2009. New Hampshire's trends in prevalence of HBP followed the same direction as the median for all U.S. states.

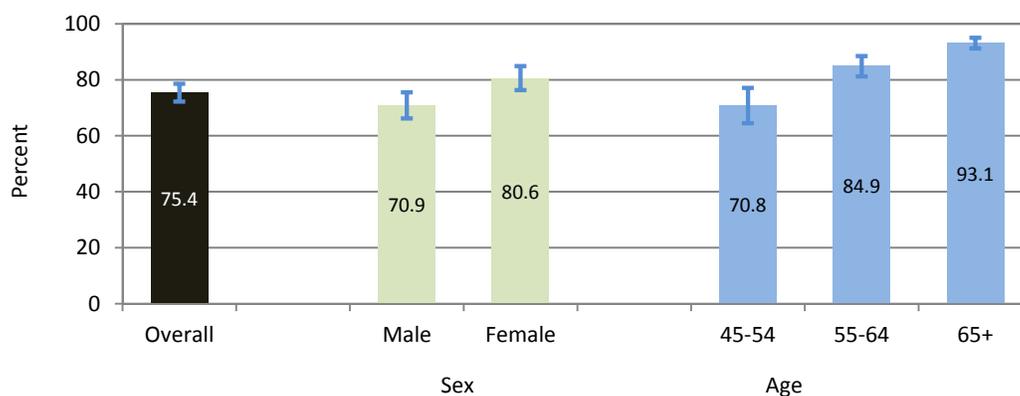
Figure 61. Prevalence of High Blood Pressure in New Hampshire and the United States,* 2001-2009



Data Source: BRFSS, Centers for Disease Control and Prevention, 2009
 Numerator: All respondents who reported ever being told they had high blood pressure
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Among respondents with high blood pressure, the proportion who reported taking medicine for their high blood pressure was 75.4%. In other words, nearly 25% of those who had HBP were not taking any medicine for it. Taking medicine for HBP varied by sex and by age. First, more women (80.6%) reported taking medicine for HBP than men (70.9%); second, the older the age group, the higher the reported prevalence of "taking medicine" among HBP patients (Figure 62).

Figure 62. Proportion of People with High Blood Pressure Who Reported That They Took High Blood Pressure Medications by Sex and Age in New Hampshire, 2009



Data Sources: New Hampshire BRFS, Centers for Disease Control and Prevention, 2009.
95% Confidence Intervals are also shown

Table 28. Self-Reported Prevalence of High Blood Pressure and Medication Compliance among Adults* in New Hampshire, 2009

Sociodemographic Characteristics	High Blood Pressure		HBP Medication Compliance	
	Percentage	95% CI	Percentage	95% CI
Total	28.6	27.0-30.2	75.4	72.2-78.6
Sex				
Male	31.3	28.8-33.9	70.9	66.2-75.5
Female	26.1	24.2-28.0	80.6	76.3-84.9
Age				
18-24	6.7	1.4-12.0	N/A	N/A
25-34	12.4	8.2-16.7	N/A	N/A
35-44	16.7	13.6-19.8	N/A	N/A
45-54	28	24.9-31.2	70.8	64.5-77.1
55-64	42.2	39.0-45.4	84.9	81.2-88.5
65+	58.3	55.6-61.1	93.1	91.2-95.0
Income				
<15,000	31.5	25.1-37.9	N/A	N/A
15,000-24,999	40.3	34.8-45.7	76.9	67.2-86.7
25,000-34,999	30.4	25.1-35.7	81.3	72.2-90.4
35,000-49,999	34.7	30.1-39.4	77.6	68.0-87.1
50,000+	24.8	22.7-26.8	73.9	69.5-78.4
Education				
Less than H.S.	38.4	31.0-45.7	N/A	N/A
H.S. or G.E.D.	32.3	29.1-35.5	71.7	65.5-78.0
Some post-H.S.	30.3	26.8-33.8	74.4	67.6-81.2
College graduate	24.2	22.0-26.3	78.9	74.4-83.4

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

Numerator: All respondents who reported ever being told they had high blood pressure or high blood pressure patients who took their medications

Denominator: All respondents or all high blood pressure respondents except those with missing, don't know, and refused answers

*Ages 18 and older

HBP: High blood pressure

High Blood Cholesterol

Cholesterol is a waxy, fat-like substance produced by one's body and is also found in some of the foods one eats. There are two types of cholesterol that are usually reported in routine cholesterol screening: 1) high density lipoprotein (HDL), also called "good cholesterol" and 2) low density lipoprotein (LDL) also called "bad cholesterol."^[26]

Cholesterol, especially LDL, can build up inside the walls of someone's blood vessels called arteries and thus increase the risk of developing coronary heart disease.^[26-28] When the level of cholesterol in the blood is too high, the condition is called high blood cholesterol.

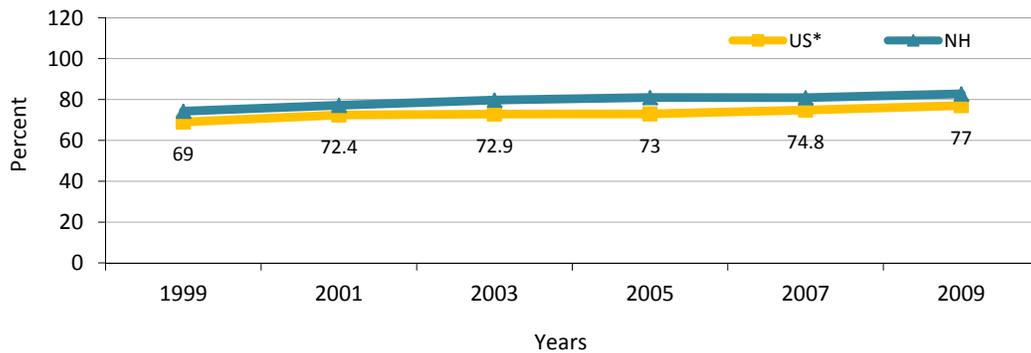
Most of the time, blood cholesterol becomes high due to an excessive consumption of foods that are rich in saturated fats, trans fats, dietary cholesterol, or triglycerides. However, in some cases, high blood cholesterol is due to excess internal production, independent of food consumption.^[29]

Screening for high blood cholesterol

To estimate cholesterol screening in New Hampshire, adult respondents from the 2009 BRFSS survey were asked the following questions: *"Have you EVER had your blood cholesterol checked?"* and *"How long has it been since you had your blood cholesterol checked?"* In addition, to estimate high blood cholesterol awareness, survey respondents were asked, *"Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is high?"*

The proportion of New Hampshire adults who reported checking their blood cholesterol level within the past five years increased from 74.3% in 1999 to 82.8% in 2009. In any given year, the proportion of screening was higher in New Hampshire than the median U.S. population level (Figure 63).

Figure 63. Cholesterol Screening in New Hampshire* Compared with the United States, 1999-2009

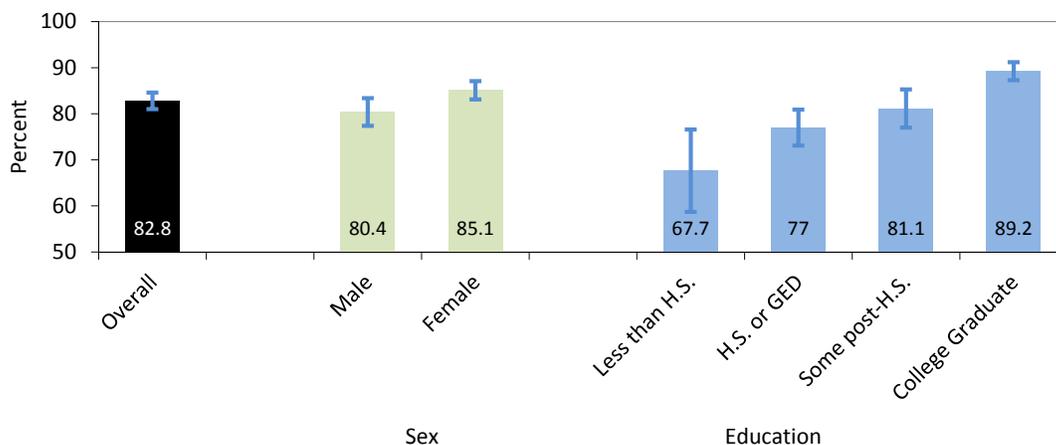


Data Sources: BRFSS, Centers for Disease Control and Prevention, 2010
 Numerator: All respondents who reported having had their blood cholesterol checked within the past five years
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

In 2009, the proportion of screening demonstrated a positive relationship with age. It was 69.8% in the 25 through 34 age group versus 95.7% in the 65 and older age group (

Table 29). In addition, screening was significantly lower for the less than high school group than the college graduates group (Figure 64).

Figure 64. Proportion of Self-Reported Blood Cholesterol Screening within the Last Five Years in New Hampshire* by Sex and Education, 2009

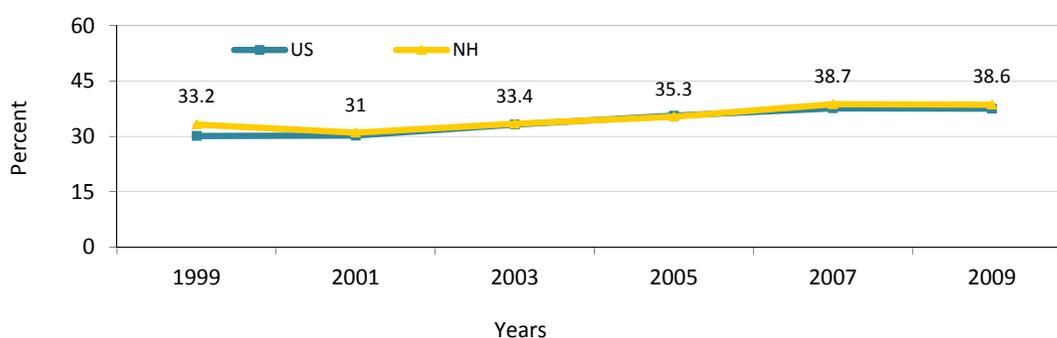


Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 Numerator: All respondents who reported ever being told they had checked their blood cholesterol within the past five years
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Prevalence of high blood cholesterol awareness

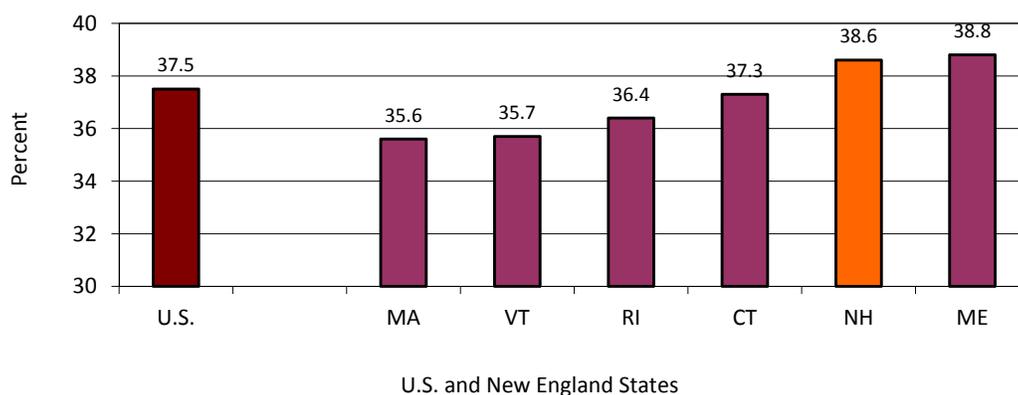
The prevalence of high blood cholesterol awareness among those screened in New Hampshire increased from 33.2% in 1999 to 38.6% in 2009. A similar pattern was observed with the median percentage of the U.S. population (Figure 65). When compared with the other New England states, New Hampshire and Maine reported the highest prevalence of high blood cholesterol awareness (Figure 66).

Figure 65. Self-Reported Prevalence of High Blood Cholesterol Awareness in New Hampshire Compared with the United States, 1999-2009



Data Sources: New Hampshire BRFSS, 2009
Only prevalence numbers for New Hampshire are shown

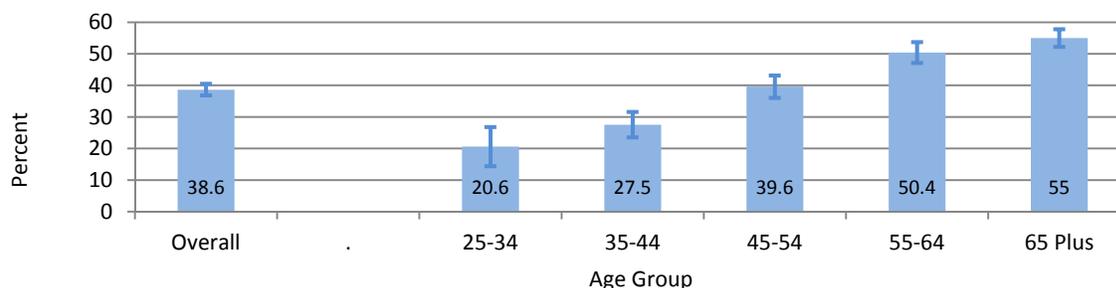
Figure 66. Self-Reported Prevalence of High Blood Cholesterol Awareness among Persons in New England States, 2009



Data Sources: New Hampshire BRFSS, 2009
CT: Connecticut; VT: Vermont; RI: Rhode Island; MA: Massachusetts; ME: Maine; NH: New Hampshire
U.S.: United States

In terms of sex, income, and education, no significant variations in high blood cholesterol awareness were observed in 2009. However, when it comes to age, people 65 and older reported a significantly higher prevalence of high blood cholesterol than those 54 and younger (Figure 67 and Table 30).

Figure 67. Self-Reported Prevalence of High Blood Cholesterol Awareness in New Hampshire by Age Group, 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009

95% Confidence Intervals are also shown

Numerator: All respondents who were told that their blood cholesterol was high

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

Table 29. Proportion of Self-Reported* Blood Cholesterol Screening within the Past Five Years in New Hampshire and the United States, 2009

Sociodemographic Characteristic	New Hampshire		United States
	Percent	95% CI	Median %
Total	82.8	81.0-84.6	77.0
Sex			
Male	80.4	77.4-83.4	74.4
Female	85.1	83.1-87.1	79.2
Age			
25-34	69.8	64.3-75.3	60.7
35-44	82.5	79.5-85.5	77.0
45-54	91.1	89.0-93.2	85.9
55-64	94.3	92.9-95.7	91.7
65+	95.7	94.7-96.8	94.3
Income			
<15,000	70.6	61.4-79.9	67.8
15,000-24,999	76.9	71.1-82.6	70.9
25,000-34,999	76.3	69.9-82.7	74.3
35,000-49,999	83.5	78.8-88.2	78.2
50,000+	88.0	86.0-90.1	83.7
Education			
Less than H.S.	67.7	58.7-76.6	67.0
H.S. or G.E.D.	77.0	73.1-80.9	72.7
Some post-H.S.	81.1	77.0-85.3	76.4
College graduate	89.2	87.3-91.2	85.5

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2009

Numerator: All respondents who reported ever being told they had their blood cholesterol checked over the past 5 years.

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

Table 30. Proportion of Self-Reported Prevalence of High Blood Cholesterol Awareness in New Hampshire and the United States, 2009

Sociodemographic Characteristic	New Hampshire		United States
	Percent	95% CI	Median %
Total	38.6	36.8-40.5	37.5
Sex			
Male	39.9	37.0-42.9	39.7
Female	37.4	35.2-39.7	36.2
Age			
25-34	20.6	14.4-26.8	19.0
35-44	27.5	23.5-31.6	27.7
45-54	39.6	36.0-43.1	39.0
55-64	50.4	47.1-53.7	50.8
65+	55.0	52.2-57.8	53.3
Income			
<15,000	44.8	36.9-52.8	45.5
15,000-24,999	49.9	43.9-55.9	41.9
25,000-34,999	38.6	32.4-44.8	40.5
35,000-49,999	44.1	39.3-48.9	38.6
50,000+	35.0	32.6-37.5	34.5
Education			
Less than H.S.	45.5	37.6-53.5	45.0
H.S. or G.E.D.	40.9	37.4-44.4	40.8
Some post-H.S.	41.1	37.0-45.1	36.7
College graduate	35.6	32.9-38.2	34.4

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2009

Numerator: All respondents who reported checking their blood cholesterol and being told that they had high blood cholesterol

Denominator: All respondents who checked their blood cholesterol except those with missing, don't know, and refused answers

*Ages 18 and older

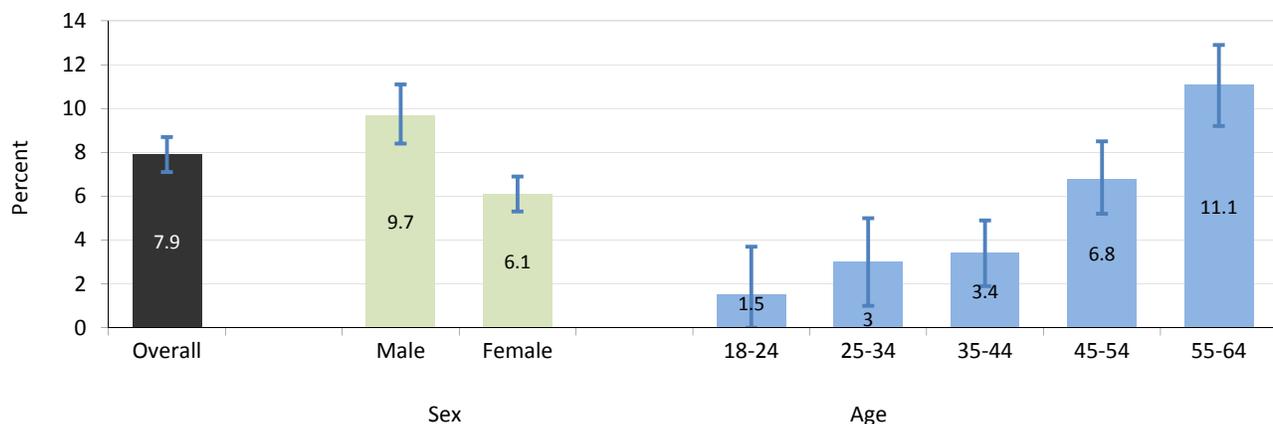
Diabetes

Diabetes is a disease characterized by a high level of blood sugar resulting from defects in the production and/or the action of a hormone in the body called insulin.^[30] Diabetes can lead to serious long-term complications including kidney failure, lower limb amputations, and blindness. In addition, diabetes increases the risk for heart disease, high blood pressure, and stroke.^[31]

Data presented here are from the 2010 BRFSS survey. Adult respondents were asked, “Have you EVER been told by a doctor that you have diabetes?” The results reported here did not include pregnancy-related diabetes or pre-diabetes.

The survey estimate indicated that 7.9% of adults in New Hampshire reported having been told that they had diabetes, and the prevalence was higher for men (9.7%) than for women (6.1%) (Figure 68). The prevalence also varied by age group, income, and education. First, individuals 65 and older had a prevalence that was 12 times higher than that of the 18 through 24 age group (Figure 68). Second, income and education achievement were inversely related to the prevalence of diabetes. Individuals with less than a high school diploma had more than twice the prevalence of those who graduated from college, and those who reported income less than \$15,000 a year had nearly three times the prevalence of those who reported over \$50,000 a year (Figure 69 and Table 31).

Figure 68. Prevalence of Diabetes in New Hampshire* by Sex and Age, 2010



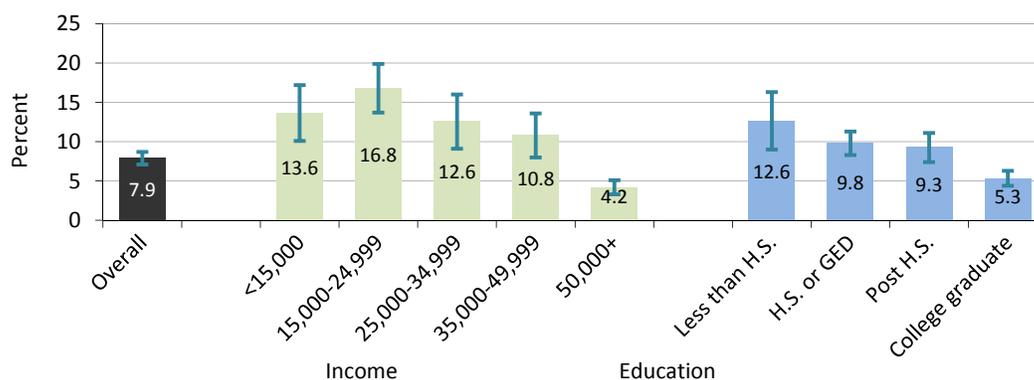
Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009

95% Confidence Intervals are also shown

Numerator: All respondents who reported ever being told they had diabetes

Denominator: All respondents except those with pre-diabetes, pregnancy related diabetes, missing, don't know, and refused answers

*Ages 18 and older

Figure 69. Prevalence of Diabetes in New Hampshire* by Income and Education Level, 2010

Data Source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009

95% Confidence Intervals are also shown

Numerator: All respondents who reported ever being told they had diabetes

Denominator: All respondents except those with pre-diabetes, pregnancy related diabetes, missing, don't know, and refused answers

*Ages 18 and older

Table 31. Self-Reported* Prevalence of Diabetes by Sex, Age, Income, and Education in New Hampshire, 2010

Sociodemographic Characteristic	Percentage	95% CI
Total	7.9	7.1-8.7
Sex		
Male	9.7	8.4-11.1
Female	6.1	5.3-6.9
Age		
18-24	1.5	0.0-3.7
25-34	3.0	1.0-5.0
35-44	3.4	1.9-4.9
45-54	6.8	5.2-8.5
55-64	11.1	9.2-12.9
65+	18.8	16.8-20.8
Income		
<15,000	13.6	10.1-17.2
15,000-24,999	16.8	13.7-19.9
25,000-34,999	12.6	9.1-16.0
35,000-49,999	10.8	8.0-13.6
50,000+	4.2	3.3-5.1
Education		
Less than H.S.	12.6	9.0-16.3
H.S. or G.E.D.	9.8	8.3-11.3
Some post-H.S.	9.3	7.4-11.1
College graduate	5.3	4.4-6.3

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

Numerator: All respondents who reported ever being told they had diabetes

Denominator: All respondents except those with missing, don't know, and refused answers

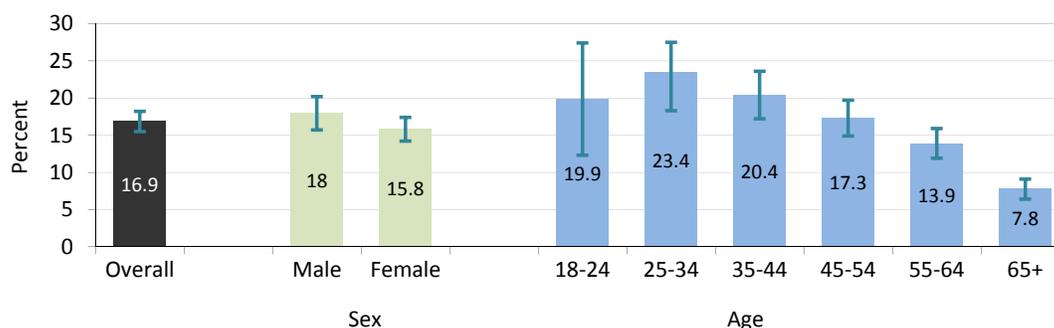
*Ages 18 and older

Tobacco Use

Smoking is considered a major risk factor for heart disease and stroke. In fact, smokers are two to four times more likely to develop coronary heart disease than nonsmokers, and smoking approximately doubles a person's risk for stroke.^[32] In the United States, over 19% of people 18 years and older smoke cigarettes, and it is more common in men than women.^[33]

Data presented here are from the 2010 BRFSS survey. Adults were asked about their smoking habits. From the survey results, 16.9% of adults were current smokers. Even though it was not significant, the prevalence of smoking was higher for men (18%) than for women (15.8%). In addition, younger people tend to smoke more than older people (Figure 70). With respect to income and education, the higher the income level or the education level, the lower the reported prevalence of smoking (Figure 71 and Table 32).

Figure 70. Self-Reported Prevalence of Smoking in New Hampshire by Sex and Age Group, 2010

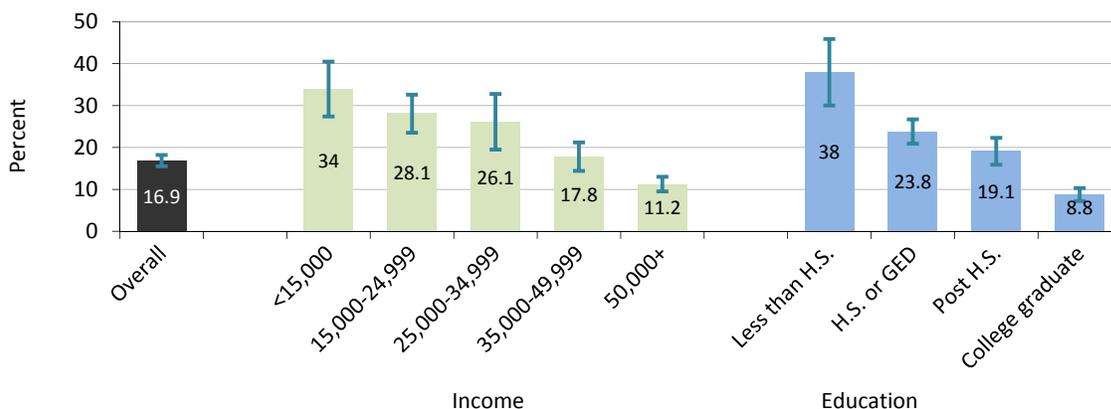


Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010

95% Confidence Intervals are also shown

*Ages 18 and older

Figure 71. Self-Reported Prevalence of Smoking in New Hampshire by Income and Education Level, 2010

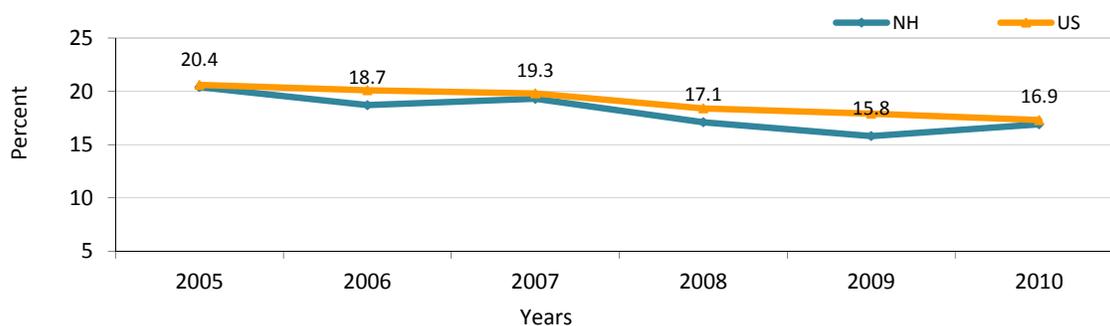


Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 *Ages 18 and older

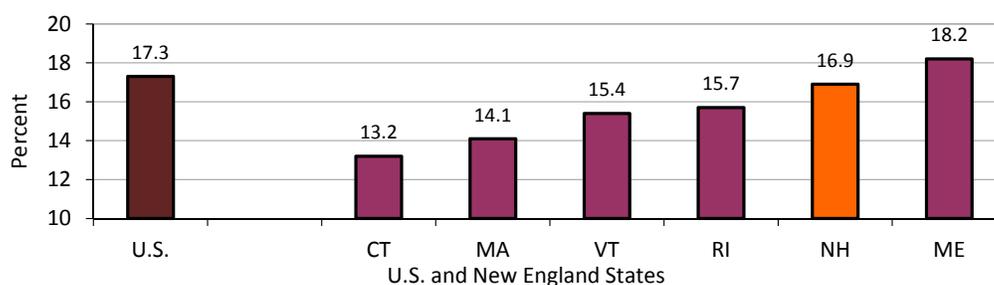
In New Hampshire, the proportion of adults who smoke decreased from 20.4% in 2005 to 16.9% in 2010. A similar pattern was observed with the median percentage of the U.S. population (Figure 72). Even though not significant, more men reported smoking than women in 2010. When compared with the other New England states, New Hampshire reported the second highest prevalence of smoking after Maine (Figure 73).

In terms of education, a significantly lower proportion of people who graduated from college reported smoking than those with less than a college degree. Finally, even though not significantly different, smoking appeared to be inversely related to age and income (Table 32).

Figure 72. Self-Reported Prevalence of Smoking in New Hampshire Compared with the United States, 2005-2010



Data Sources: New Hampshire BRFSS 2009, Centers for Disease Control and Prevention
 Only data labels for New Hampshire are shown

Figure 73. Self-Reported Prevalence of Smoking among Persons in the New England States, 2010

Data Sources: New Hampshire BRFSS, 2010

CT: Connecticut; VT: Vermont; RI: Rhode Island; MA: Massachusetts; ME: Maine; NH: New Hampshire

U.S.: United States

Table 32. Self-Reported Prevalence of Smoking in New Hampshire and the United States, 2010

Sociodemographic Characteristic	New Hampshire		United States
	Percent	95% CI	Median %
Total	16.9	15.5-18.2	17.3
Sex			
Male	18.0	15.7-20.2	18.5
Female	15.8	14.2-17.4	15.8
Age			
18-24	19.9	12.3-27.4	19.9
25-34	23.4	18.3-27.5	23.4
35-44	20.4	17.2-23.6	18.3
45-54	17.3	14.9-19.7	19.5
55-64	13.9	11.9-15.9	16.0
65+	7.8	6.4-9.1	8.4
Income			
<15,000	34.0	27.4-40.5	32.9
15,000-24,999	28.1	23.5-32.6	26.1
25,000-34,999	26.1	19.5-32.8	21.5
35,000-49,999	17.8	14.4-21.2	19.1
50,000+	11.2	9.5-13.0	11.4
Education			
Less than H.S.	38.0	30.0-45.9	32.4
H.S. or G.E.D.	23.8	20.9-26.7	24.0
Some post-H.S.	19.1	15.9-22.3	19.2
College graduate	8.8	7.2-10.3	7.8

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

Numerator: All respondents who reported being a current smoker

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

Overweight and Obesity

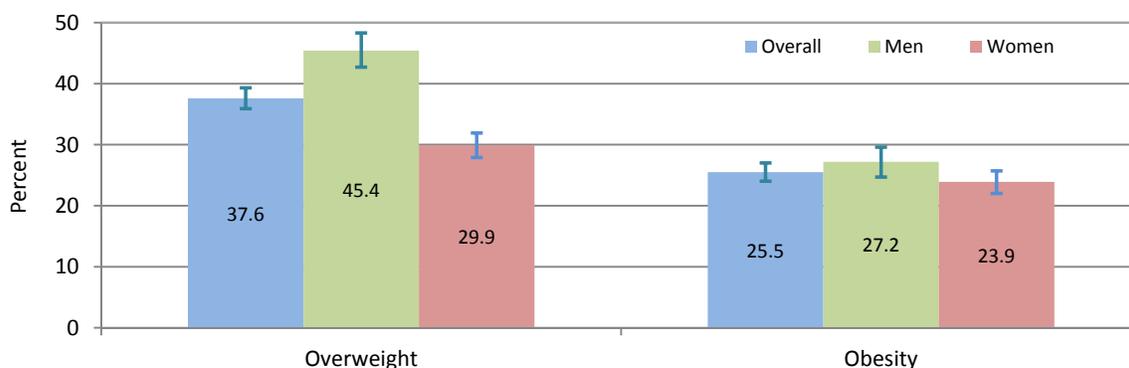
Overweight and obesity are the terms used to describe ranges of weight that are beyond what is generally regarded as healthy for a given height. In adults, these ranges are determined by using weight and height to calculate a number called body mass index (BMI). Overweight is defined as a BMI between 25 and 29.9 and obesity as a BMI of 30 or higher.^[34] Being overweight or obese increases the risk for many chronic conditions including heart disease, high blood pressure, stroke, type 2 diabetes, gallstones, breathing problems, and certain cancers.^[35]

Data presented here are from the 2010 BRFSS survey. Demographics were collected from survey respondents including height and weight, which were used to determine their BMI and categorize them as healthy weight, overweight, or obese.

From the results, over one third (37.6%) of respondents were found to be overweight based on their BMI score and one fourth (25.5%) were found to be obese. In 2010, the prevalence of overweight was higher for men (45.4%) than for women (29.9%) in New Hampshire. However, for obesity, no significant difference was found between men and women (Figure 74).

The prevalence of overweight showed few variations when stratified by age group. Only the 18 to 24 age group showed significant difference for overweight compared with the age groups above 35 in 2010. From age 35 and up, there was no significant difference in the prevalence of overweight. For obesity, no significant differences were found between age groups (Figure 75).

Figure 74. Prevalence of Overweight and Obesity by Sex in New Hampshire, 2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010

95% Confidence Intervals are also shown

Numerator: All respondents who had their BMI in the range of overweight or obese category

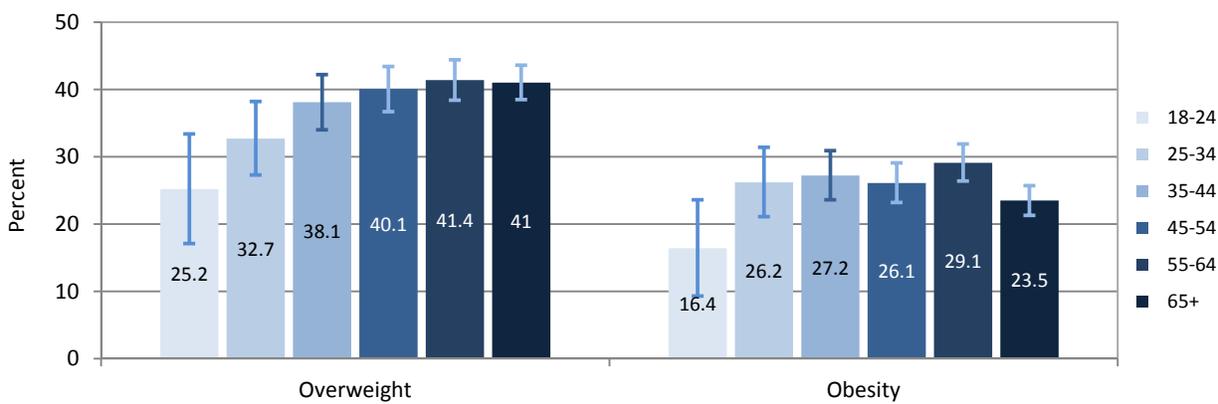
Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

College graduates were found to be more overweight than those who only graduated from high school; however, the contrary was observed for obesity, meaning that people who only graduated from high school were more obese than those who graduated from college (Figure 76 and 77).

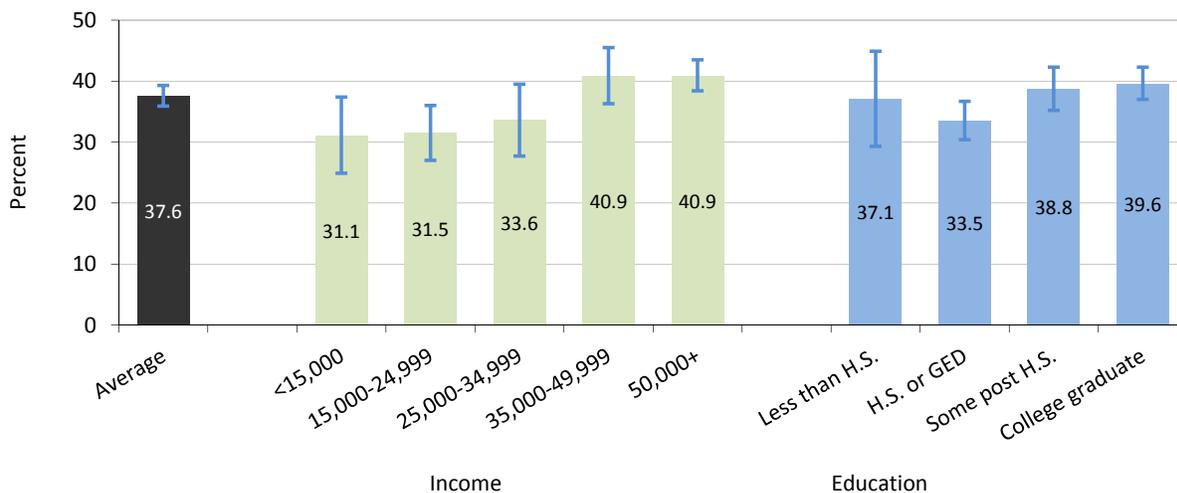
People who reported income between \$15,000 and \$24,999 a year were less overweight than those who reported income of \$35,000 or over; however, the contrary also was observed for obesity, meaning that those who reported income between \$15,000 and \$24,999 a year were more likely to be obese than those who reported income of \$35,000 or over (Table 33).

Figure 75. Prevalence of Overweight and Obesity by Age Group in New Hampshire, 2010



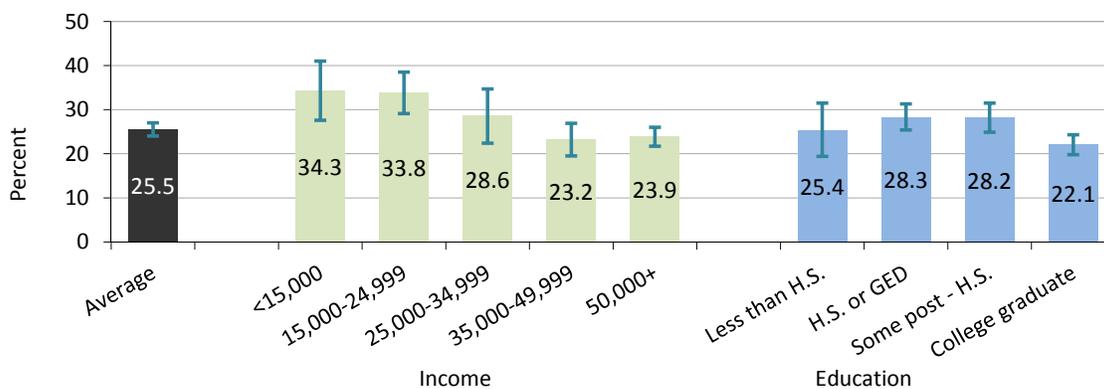
Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 Numerator: All respondents who had their BMI in the range of overweight or obese category
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Figure 76. Prevalence of Overweight in New Hampshire by Income and Education, 2010



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 Numerator: All respondents who had their BMI in the range of overweight or obese category
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Figure 77. Prevalence of Obesity by Income and Education in New Hampshire, 2010



Data Source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 Numerator: All respondents who had their BMI in the range of overweight or obese category
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Table 33. Prevalence of Overweight and Obesity in New Hampshire, 2010

Sociodemographic Characteristics	Overweight		Obese	
	Percentage	95% CI	Percentage	95% CI
Total	37.6	35.9-39.3	25.5	24.0-27.0
Sex				
Male	45.4	42.7-48.3	27.2	24.7-29.6
Female	29.9	27.9-31.9	23.9	22.0-25.7
Age				
18-24	25.2	17.1-33.4	16.4	9.3-23.6
25-34	32.7	27.3-38.2	26.2	21.1-31.4
35-44	38.1	34.0-42.2	27.2	23.6-30.9
45-54	40.1	36.7-43.4	26.1	23.2-29.1
55-64	41.4	38.4-44.4	29.1	26.4-31.9
65+	41.0	38.5-43.6	23.5	21.3-25.7
Income				
<15,000	31.1	24.9-37.4	34.3	27.6-41.0
15,000-24,999	31.5	27.0-36.0	33.8	29.1-38.5
25,000-34,999	33.6	27.7-39.5	28.6	22.4-34.7
35,000-49,999	40.9	36.3-45.5	23.2	19.5-26.9
50,000+	40.9	38.4-43.5	23.9	21.7-26.0
Education				
Less than H.S.	37.1	29.3-44.9	25.4	19.4-31.5
H.S. or G.E.D.	33.5	30.4-36.7	28.3	25.4-31.3
Some post-H.S.	38.8	35.2-42.3	28.2	24.9-31.5
College graduate	39.6	37.0-42.3	22.1	19.8-24.3

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2010

Numerator: All respondents who had their BMI in the range of overweight or obese category

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

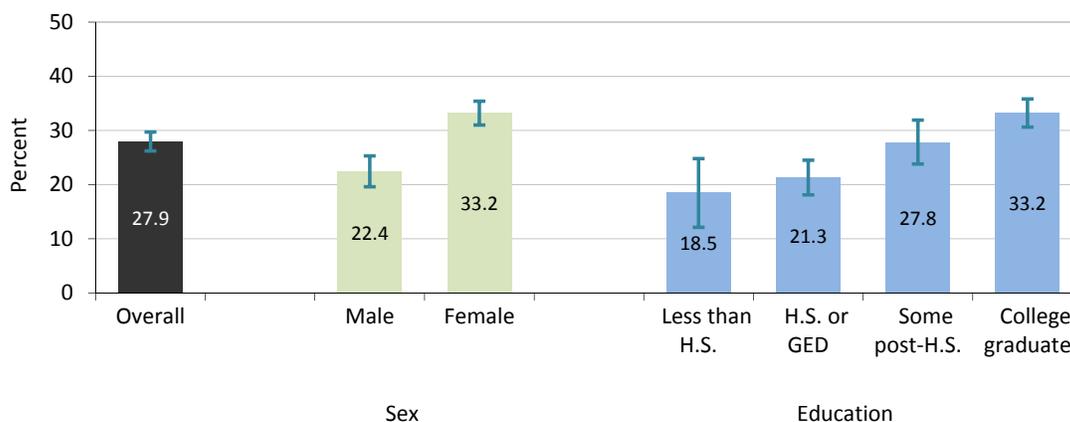
Fruit and Vegetable Consumption

A diet rich in fruits and vegetables offers many health benefits, including reduced risks of some types of cancer and other chronic diseases such as stroke, type 2 diabetes, and heart disease.^[36]

To estimate fruit and vegetable consumption among adults in New Hampshire, respondents from the 2009 BRFSS survey were asked the following questions: "How often do you eat fruit?" "How often do you eat green salad?" "How often do you eat carrots?" AND "Not counting carrots, potatoes, or salad, how many servings of vegetables do you usually eat?" Answers to those questions were used to determine the proportion of adults who have consumed fruits and vegetables five or more times per day.

The proportion of New Hampshire adults who consumed fruits and vegetables five or more times per day in 2009 was 27%, with more women (33.2%) reported consuming fruits and vegetables five times or more than men (22.4%). With respect to education, the proportion of fruit and vegetable consumption was significantly higher among college graduates (33.2%) than those who did not complete high school (18.5%). However, no significant association was observed with age or income level (Table 34).

Figure 78. Proportion of Adults Who Consumed Fruits and Vegetables Five or More Times per Day in New Hampshire by Sex and Education, 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2010
 95% Confidence Intervals are also shown
 Numerator: All respondents who consumed fruits and vegetables five or more times per day
 Denominator: All respondents except those with missing, don't know, and refused answers
 *Ages 18 and older

Table 34. Proportion of Adults Who Consumed Fruits and Vegetables Five or More Times per Day in New Hampshire, 2009

Sociodemographic Characteristics	Percent	95% CI
Total	27.9	26.2-29.7
Sex		
Male	22.4	19.6-25.3
Female	33.2	31.0-35.4
Age		
18-24	NA	NA
25-34	26.7	21.6-31.8
35-44	25.6	22.1-29.2
45-54	27.1	24.1-30.2
55-64	29.4	26.4-32.4
65+	29.8	27.3-32.4
Income		
<15,000	24.3	17.3-31.4
15,000-24,999	27.1	21.4-32.7
25,000-34,999	25.6	20.0-31.2
35,000-49,999	27.9	22.9-32.9
50,000+	29.6	27.1-32.2
Education		
Less than H.S.	18.5	12.1-24.8
H.S. or G.E.D.	21.3	18.1-24.5
Some post-H.S.	27.8	23.8-31.9
College graduate	33.2	30.6-35.8

Data source: New Hampshire BRFS - Centers for Disease Control and Prevention, 2009

Numerator: respondents who consumed fruits and vegetables five or more times per day

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

Physical Activity

"Being physically active is one of the most important steps that Americans of all ages can take to improve their health."^[37] Regular physical activity can help with:

- Weight control
- Lowering the risk for cardiovascular disease, type 2 diabetes, and some cancers
- Bone and muscle strength
- Improving mood
- Preventing falls, especially in elderly

Depending on the amount of energy used by the body per minute of activity, someone's physical activity can be classified as moderate or vigorous.^[38] For the considerable health benefits mentioned above, adults should do at least 2 hours and 30 minutes a week of moderate activity, or 1 hour and 15 minutes a week of vigorous activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity.^[37]

Moderate activity includes:

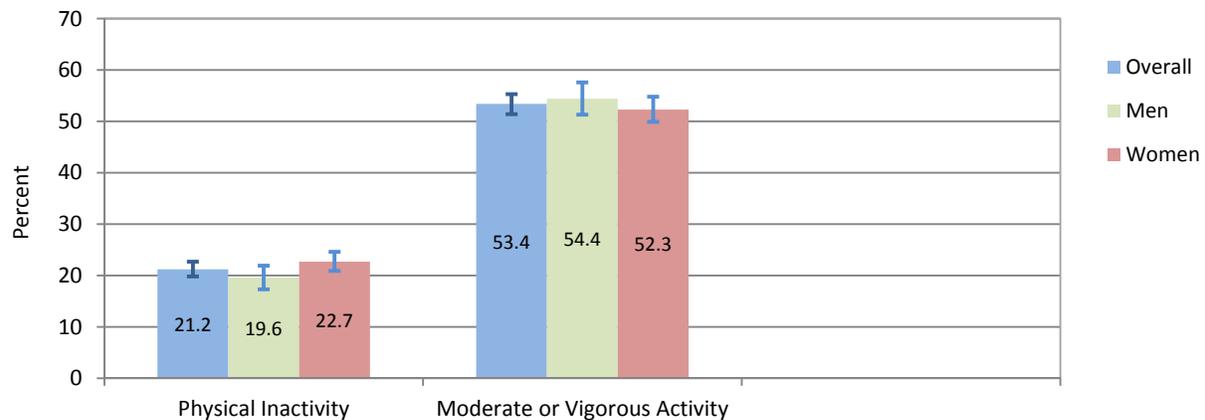
- Walking (at about 3 miles per hour)
- Water aerobics
- Tennis (doubles)
- Bicycling slower than 10 miles per hour
- Ballroom dancing
- General gardening
- Vacuuming

Vigorous activity includes:

- Jogging or running, race walking
- Swimming laps
- Tennis (singles)
- Aerobic dancing
- Bicycling 10 miles per hour or faster
- Jumping rope
- Heavy gardening (continuous digging or hoeing)
- Heavy hard work
- Hiking uphill or with a heavy backpack

To estimate activity level among adults in New Hampshire, respondents from the 2009 BRFSS survey were asked many questions to determine if they are active and their level of moderate and/or vigorous activity level. From the survey results, 21.2% were physically inactive. Among those physically active, 53.4% engaged in moderate or vigorous activities (Figure 79).

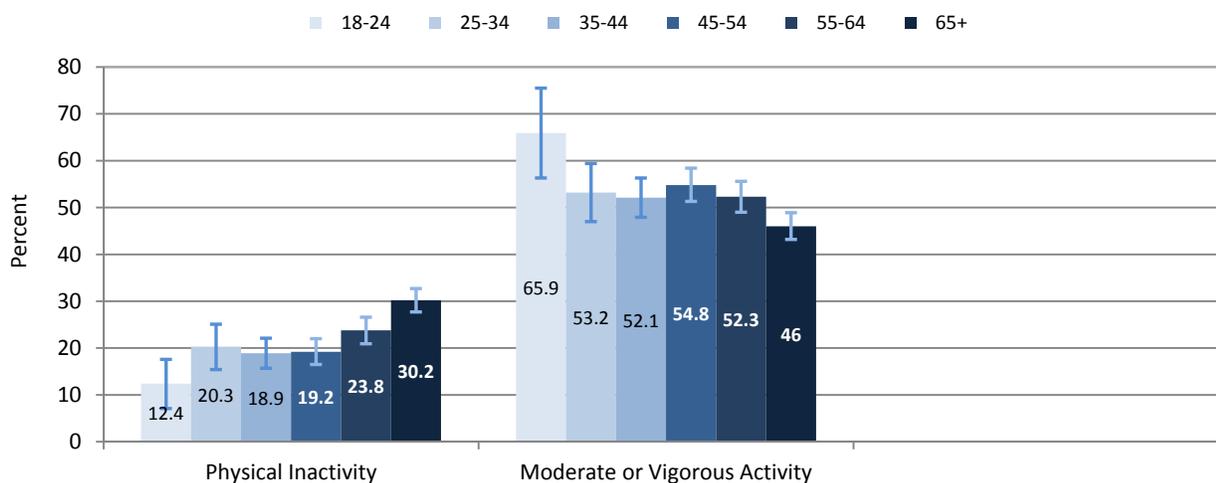
Figure 79. Proportion of Physical Inactivity or Moderate or Vigorous Activity by Sex in New Hampshire 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009
 95% Confidence Intervals are also shown
 *Ages 18 and older

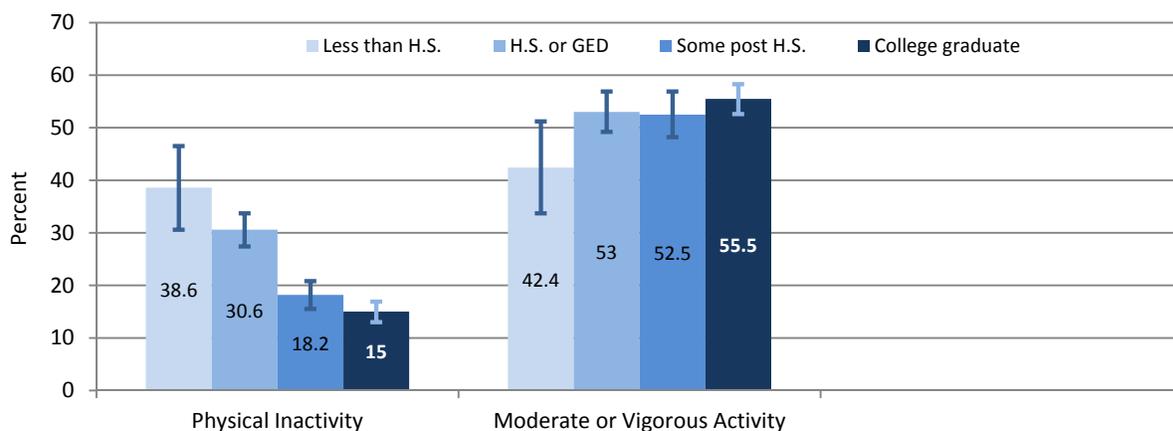
With respect to age, income, and education, the proportion of each activity level varied within each group. First, people 65 years of age and older reported a higher proportion of physical inactivity than any younger group, and they were also less likely to engage in moderate or vigorous activity (Figure 80). Second, people with a family income of \$50,000 or more were less likely inactive than any lower income level (Table 35). Third, people who graduated from college reported less physical inactivity and more moderate or vigorous activity level than those who did not complete high school (Figure 81).

Figure 80. Proportion of Physical Inactivity or Moderate or Vigorous Activity by Age Group in New Hampshire, 2009



Data Sources: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009
 95% Confidence Intervals are also shown
 *Ages 18 and older

Figure 81. Proportion of Physical Inactivity or Moderate or Vigorous Activity by Education Level in New Hampshire, 2009



Data Source: New Hampshire BRFSS, Centers for Disease Control and Prevention, 2009
 95% Confidence Intervals are also shown
 *Ages 18 and older
 HS: High school
 GED: General Educational Development

Table 35. Physical Activity Level in New Hampshire, 2009

Sociodemographic Characteristics	Physical Inactivity		Moderate or Vigorous Activity	
	Percentage	95% CI	Percentage	95% CI
Total	21.2	19.8-22.7	53.4	51.4-55.3
Sex				
Male	19.6	17.3-21.9	54.4	51.3-57.6
Female	22.7	20.9-24.6	52.3	49.9-54.8
Age				
18-24	12.4	7.1-17.6	65.9	56.3-75.5
25-34	20.3	15.4-25.1	53.2	47.0-59.4
35-44	18.9	15.7-22.1	52.1	47.9-56.3
45-54	19.2	16.5-22.0	54.8	51.3-58.4
55-64	23.8	20.9-26.6	52.3	49.0-55.6
65+	30.2	27.7-32.7	46.0	43.2-48.9
Income				
<15,000	38.8	30.7-47.0	41.9	33.1-50.7
15,000-24,999	32.6	27.7-37.5	45.5	39.4-51.7
25,000-34,999	27.8	22.5-33.1	48.5	42.0-55.0
35,000-49,999	27.8	23.5-32.1	52.5	47.5-57.6
50,000+	14.7	12.8-16.6	56.8	54.1-59.5
Education				
Less than H.S.	38.6	30.6-46.5	42.4	33.7-51.2
H.S. or G.E.D.	30.6	27.4-33.7	53.0	49.2-56.9
Some post-H.S.	18.2	15.5-20.8	52.5	48.2-56.9
College graduate	15.0	13.0-16.9	55.5	52.6-58.3

Data source: New Hampshire BRFSS - Centers for Disease Control and Prevention, 2009

Numerator: Respondents, who are physically inactive, are moderately active, or vigorously active

Denominator: All respondents except those with missing, don't know, and refused answers

*Ages 18 and older

County Comparison for the 2009 NH BRFS

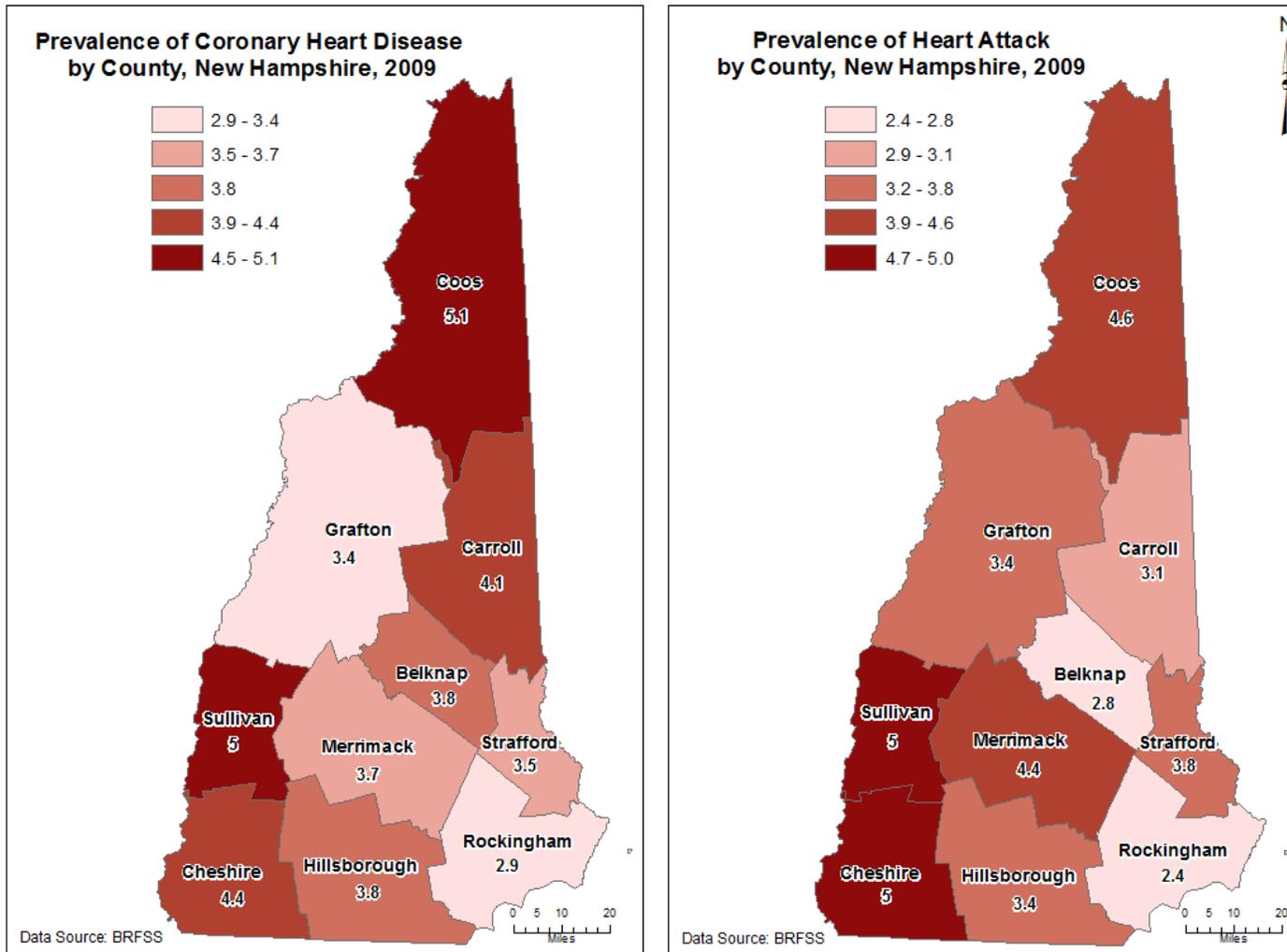
At the county level, Coos County had a significantly higher proportion than the State for HBP (36.9%), high blood cholesterol (48.0%), and obesity (35.9%), whereas Grafton County had significantly lower proportion than the State for obesity (19.9%). For additional information, see Table 36 and Figures 82-86.

Table 36. Prevalence of Selected Heart Disease and Stroke and Their Associated Risk Factors by County in New Hampshire, 2009

		Coronary Heart Disease	Heart Attack	Stroke	High Cholesterol	High Blood Pressure	Overweight	Obesity	Overweight or Obesity	Inactivity	Smoking	Diabetes
Belknap	%	3.8	2.8	1.8	42.0	33.1	35.0	25.7	60.8	20.6	17.9	7.1
	CI	2.0-5.6	1.1-4.4	0.7-2.9	35.7-48.4	27.2-38.9	29.0-41.1	19.8-31.7	54.2-67.3	15.8-25.5	12.4-23.4	4.7-9.5
Carroll	%	4.1	3.1	2.1	36.7	36.8	35.9	22.7	58.6	20.7	20.1	6.7
	CI	2.1-6.2	1.5-4.8	0.6-3.5	29.8-43.6	29.9-43.7	28.6-43.2	16.5-28.8	51.3-65.8	14.9-26.5	13.5-26.7	4.1-9.3
Cheshire	%	4.4	5.0	2.2	35.5	27.3	34.3	24.9	59.2	18.6	14.6	7.4
	CI	2.5-6.3	3.0-7.0	0.6-3.9	29.9-41.1	22.8-31.8	28.7-39.9	19.6-30.1	52.8-65.6	14.3-22.9	10.2-18.9	4.6-10.2
Coos	%	5.1	4.6	2.8	48.0*	36.9*	36.9	35.9*	72.8	28.4	19.6	10.4
	CI	2.6-7.6	2.0-7.2	1.1-4.5	41.0-55.1	30.6-43.2	30.4-43.5	28.9-42.9	66.8-78.9	22.1-34.6	14.0-25.2	6.7-14.1
Grafton	%	3.4	3.4	2.4	40.4	25.5	36.0	19.9*	55.9	21.5	20.2	6.9
	CI	1.9-4.9	1.8-5.1	1.1-3.6	34.9-45.9	21.0-30.1	30.5-41.5	15.7-24.0	49.7-62.0	16.6-26.3	14.3-26.2	4.8-9.0
Hillsborough	%	3.8	3.4	2.3	38.9	28.2	36.7	25.6	62.2	22.7	15.3	8.1
	CI	2.7-4.9	2.5-4.3	1.5-3.1	34.9-42.9	24.8-31.6	32.4-41.0	22.1-29.0	57.7-66.7	19.4-26.0	11.8-18.7	6.4-9.8
Merrimack	%	3.7	4.4	2.9	37.6	26.3	37.8	23.5	61.3	20.4	15.1	7.6
	CI	2.1-5.4	2.3-6.5	1.1-4.7	32.5-42.8	22.3-30.2	32.6-43.0	18.9-28.0	56.2-66.3	16.5-24.4	10.6-19.6	5.3-9.9
Rockingham	%	2.9	2.4	1.5	37.7	28.5	36.2	29.3	65.5	19.3	13.4	5.3
	CI	1.9-3.8	1.6-3.3	0.8-2.1	33.7-41.6	25.0-32.0	32.2-40.3	25.1-33.5	61.6-69.5	16.3-22.2	10.6-16.2	3.9-6.7
Strafford	%	3.5	3.8	1.1	38.5	26.7	37.2	30.4	67.6	20.1	17.3	6.8
	CI	2.1-4.9	1.9-5.6	0.5-1.7	33.5-43.6	22.5-31.0	31.9-42.6	24.7-36.0	62.6-72.6	16.2-24.1	12.4-22.2	4.7-8.8
Sullivan	%	5.0	5.0	1.9	39.1	33.8	37.3	24.1	61.4	26.5	15.5	8.1
	CI	2.6-7.4	2.5-7.4	0.0-4.0	32.4-45.9	27.7-40.0	30.7-44.0	18.3-29.9	54.3-68.5	20.5-32.4	10.7-20.2	5.2-11.0
State Level	%	3.7	3.5	2.0	38.6	28.6	36.5	26.3	62.8	21.2	15.8	7.1
	CI	3.1-4.2	3.0-4.0	1.6-2.4	36.8-40.5	27.1-30.2	34.6-38.4	24.6-28.0	60.9- 64.7	19.8-22.7	14.2-17.3	6.4-7.9

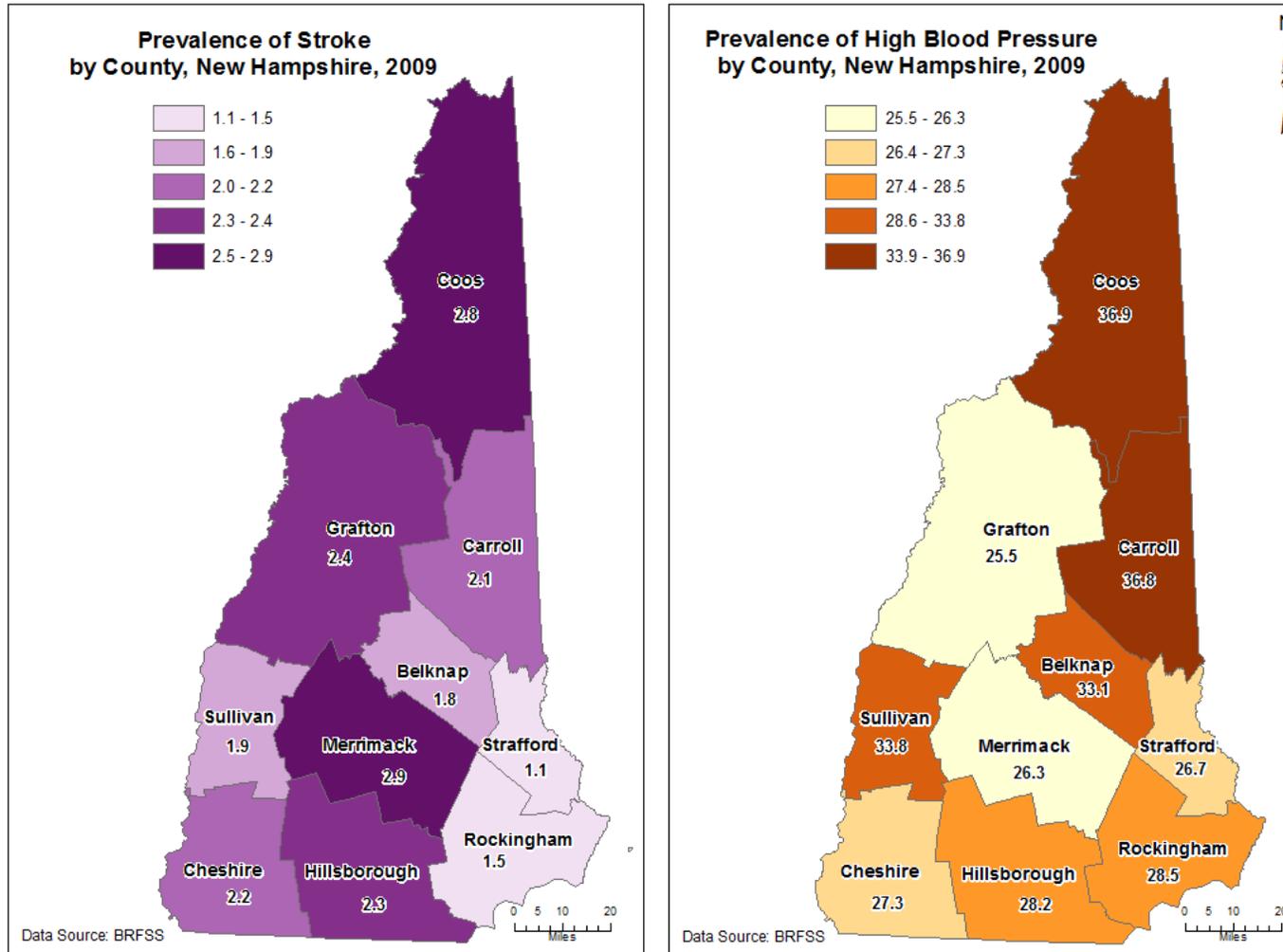
*Are significantly different than the state prevalence **Data Source:** New Hampshire BRFS, 2009 CI: Confidence Interval

Figure 82. Prevalence of Coronary Heart Disease and Heart Attack in New Hampshire, 2009



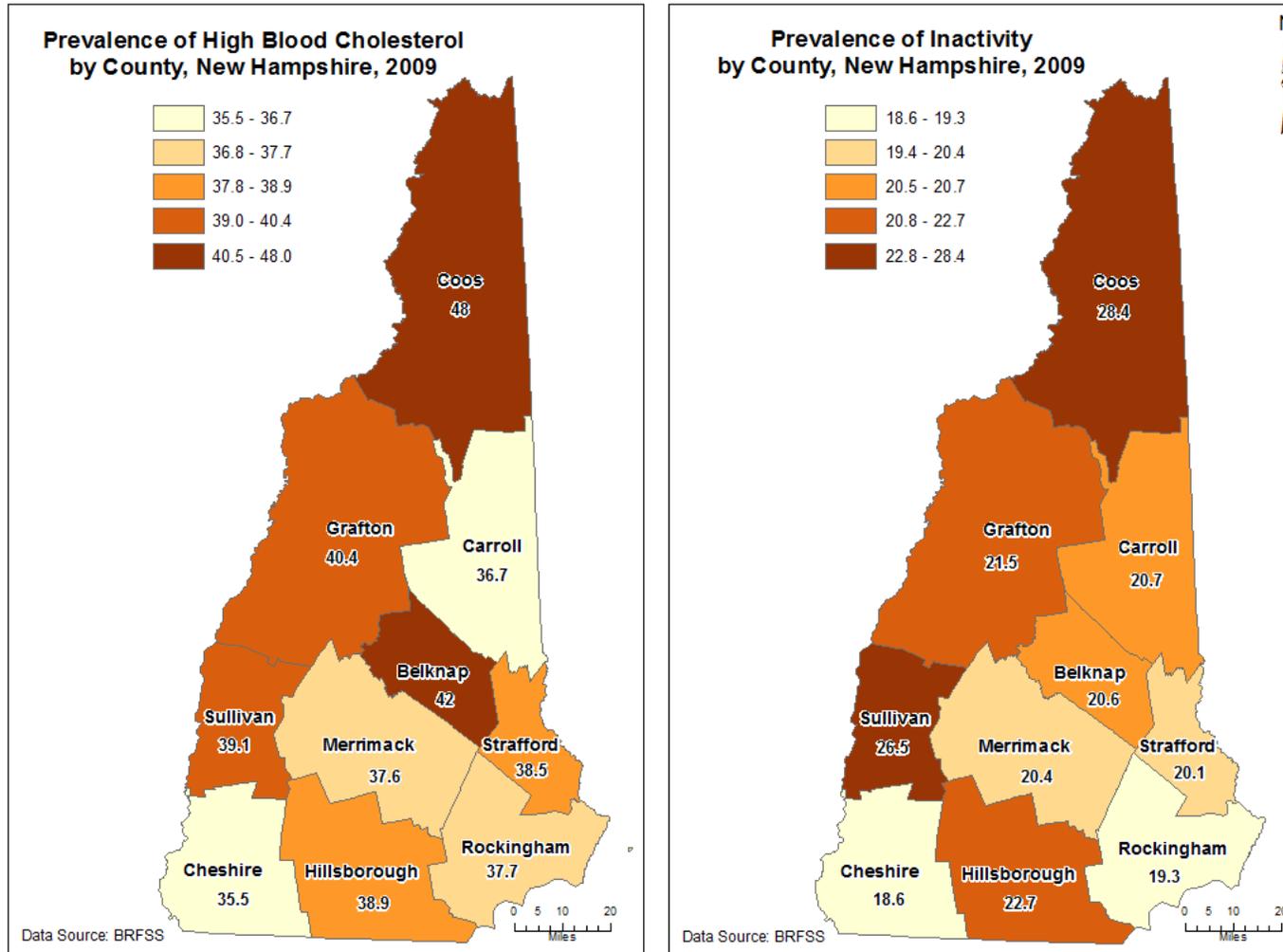
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 83. Prevalence of Stroke and High Blood Pressure in New Hampshire, 2009



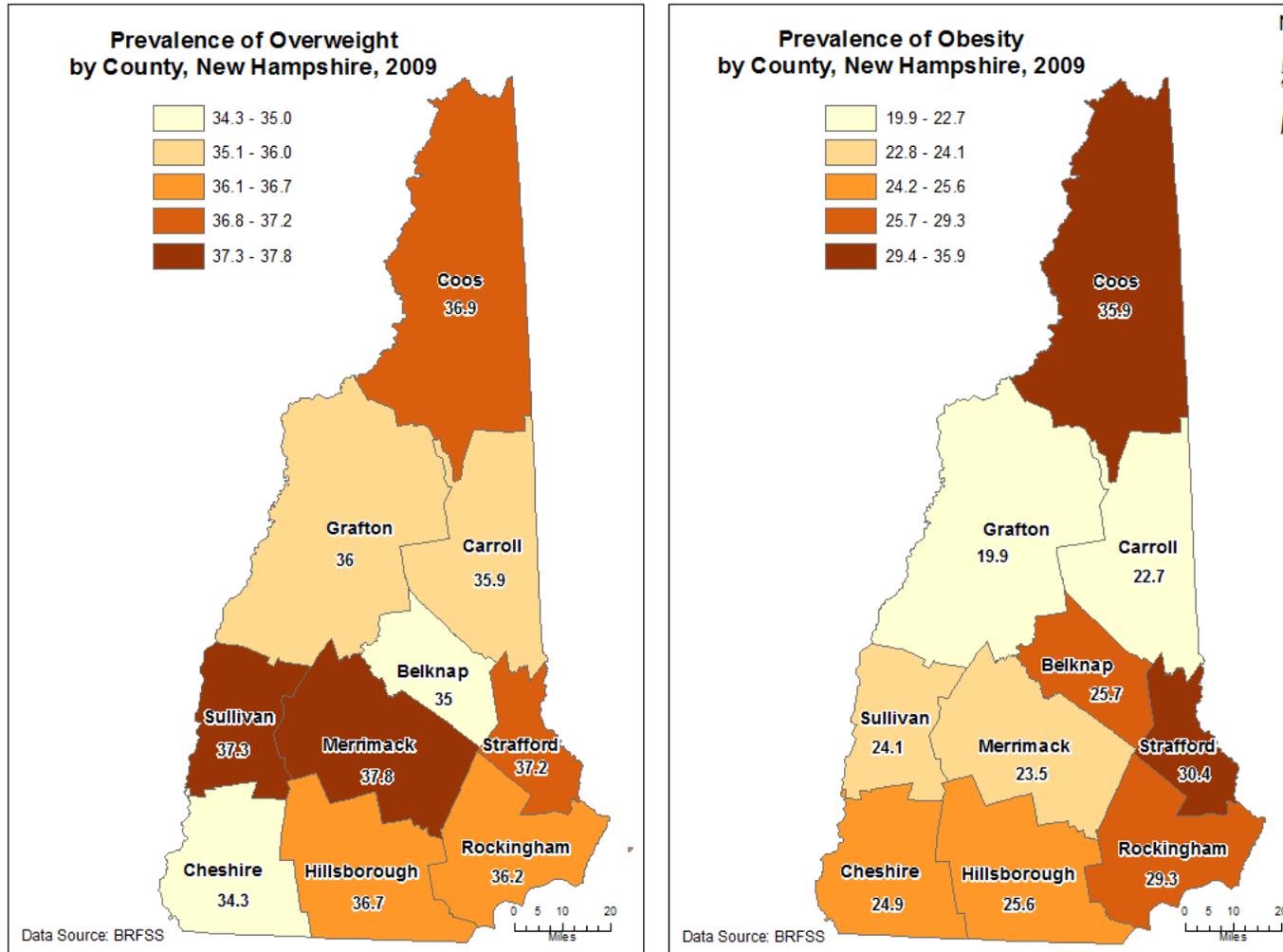
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 84. Prevalence of High Blood Cholesterol and Inactivity in New Hampshire, 2009



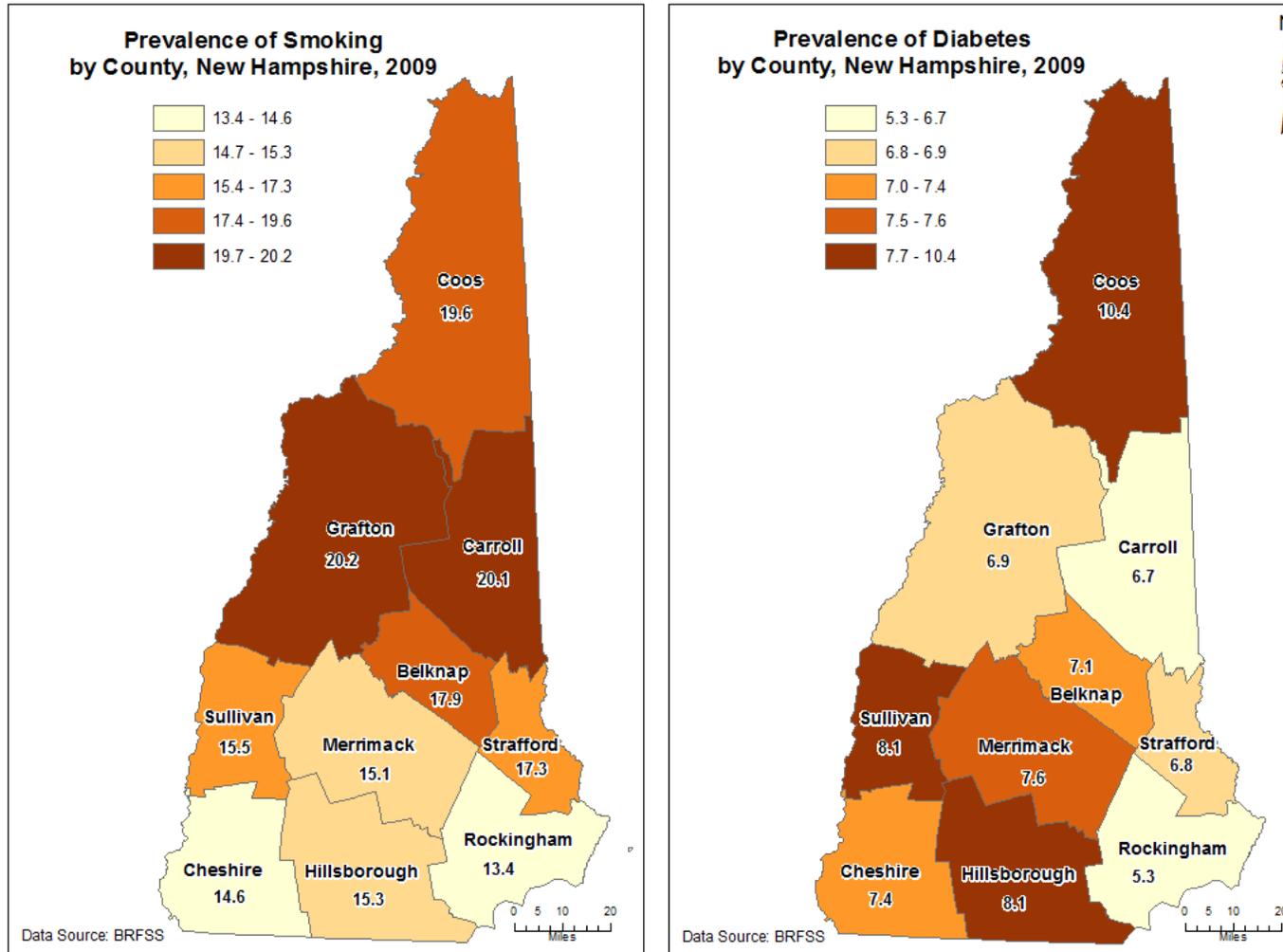
Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 85. Prevalence of Overweight and Obesity in New Hampshire, 2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Figure 86. Prevalence of Smoking and Diabetes in New Hampshire, 2009



Produced by the New Hampshire Department of Health and Human Services, Division of Public Health Services, Heart Disease and Stroke Prevention Program. For more information visit: <http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>

Terms and Definitions

Age-adjusted rate: a rate that has been statistically modified to eliminate the effect of different age distributions among different populations.^[39]

Alzheimer's disease: a brain disorder that seriously affects a person's ability to carry out daily activities.^[40]

Average: a central value that represents a distribution of data. It is calculated by adding all the values in a group of measurements and dividing by the number of values in the group.^[39]

Cardiovascular diseases: a group of diseases or disorders of the heart and blood vessels.^[41]

Cerebrovascular disease: disease of the blood vessels supplying the brain.^[41]

Cholesterol: a waxy, fat-like substance that's found in all cells of the body.^[26]

Confidence interval: a range of values for a measure (e.g., rate or odds ratio) constructed so that the range has a specified probability (often, but not necessarily, 95%) of including the true value of the measure.^[39]

Congestive heart failure: Heart failure is a condition in which the heart can't pump enough blood to meet the body's needs. Congestive heart failure is a type of heart failure in which fluid builds up in the lungs, liver, legs and other organs causing the body to become congested.

Coronary heart disease: disease of the blood vessels supplying the heart muscle.^[41]

Crude rate: the total number of events divided by the population at risk over a period of time, without adjustment.

Heart attack: a condition caused by the interruption of blood supply to a portion of the heart muscle for long enough that the portion is damaged or may die.

Heart failure: a condition in which the heart is unable to pump an adequate amount of blood to meet the body's need.

Hormones: chemical messengers in the body, which travel in the bloodstream to tissues or organs and are involved in different processes including growth, the way the body uses energy, sexual function, reproduction, and mood.^[40]

Incidence: a measure of the frequency with which new cases of illness, injury, or other health conditions occur among a population during a specified period.^[39]

Influenza pneumonia: an infection of the lungs caused by the influenza virus.^[40]

Malignant neoplasm: a tumor or mass in one part of the body that tends to spread to other parts. It is also called cancer.

Median: a central value that represents a distribution of data. It is calculated by dividing a set of numerically ordered data into two equal parts, above and below the median, which lie an equal number of values.^[39]

Nephritis: an inflammation of the kidneys.

Population: the total number of inhabitants of a geographic area or the total number of persons in a particular group (e.g., the number of persons engaged in a certain occupation).^[39]

Prevalence: the number or proportion of cases or events or attributes among a given population.^[39]

Rate: an expression of the relative frequency with which an event occurs among a defined population per unit of time, calculated as the number of new cases or deaths during a specified period divided by either person-time or the average (mid-interval) population.^[39]

Risk factor: an aspect of personal behavior or lifestyle, an environmental exposure, or an inborn or inherited characteristic that is associated with an increased occurrence of disease or other health-related event or condition.^[39]

Standard population: a specific population whose age distribution is used in the calculation of age-adjusted rates. In this report, we use the year 2000 Standard Population for the United States.

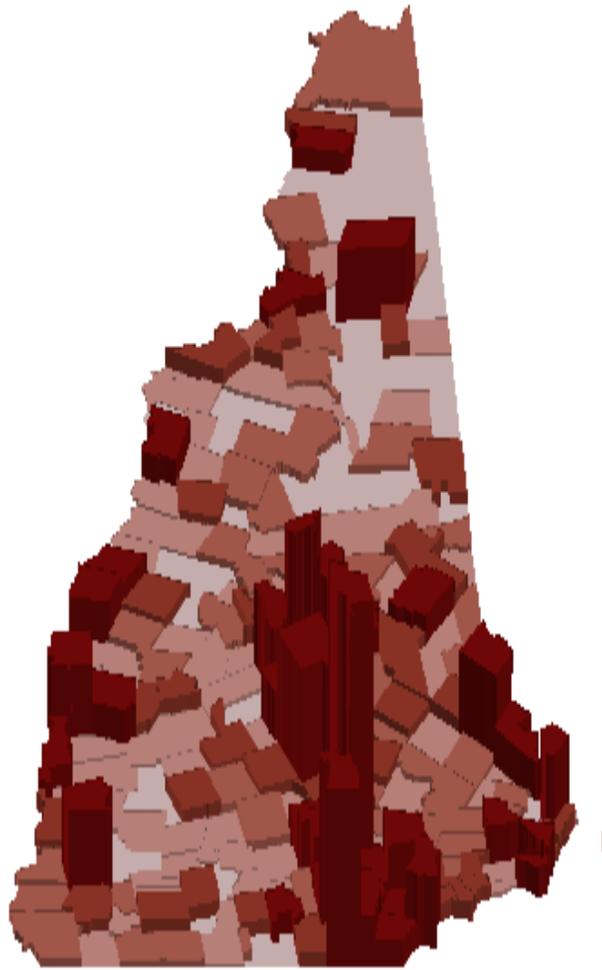
Stroke: See Cerebrovascular disease.

Trends: movement or change in frequency or rate over time, usually upwards or downwards.^[39]

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Heart Attack Counts in New Hampshire
2005-2009



For more information please visit the NH Heart Disease & Stroke
Prevention Program at
<http://www.dhhs.nh.gov/dphs/cdpc/hdsp.htm>.