The Burden of Heart Disease and Stroke
Mortality, Morbidity, and Risk Factors
The Burden of Heart Disease and Stroke in Alaska: Mortality, Morbidity, and Risk Factors

December 2009 Update

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Executive Summary

Heart disease and stroke are pervasive threats to adults almost everywhere. This report encapsulates existing data regarding the scope of heart disease and stroke in Alaska into one easy-to-use resource. It examines the state’s “burden” of heart disease and stroke in terms of mortality (the number of deaths caused by these diseases) and morbidity (the amount of disability caused by these diseases), and it assesses the prevalence of key heart disease and stroke risk factors that will determine the likely burden in the future.

Some key findings:

- Compared to most other states, Alaska has a relatively low heart disease death rate. Furthermore, rates of death from heart disease—particularly ischemic heart disease—have been falling over the past decade and a half, similar to the pattern seen in the US overall.

- In contrast, the stroke death rate in Alaska has tended to be above the national rate over the past 14 years. Although highly variable due to relatively small numbers, it appears as though this gap between the Alaska and US stroke mortality rates is closing.

- Although socioeconomic and racial disparities do exist, heart disease and stroke touch Alaskans of every race, ethnic group, occupation and social class.

- Ten percent of hospitalizations in Alaska in 2007 were for a primary diagnosis of either heart disease or stroke. Compared to the pattern seen in the US overall, the Alaskans being hospitalized primarily for heart disease and stroke are disproportionately male and between the ages of 45 and 64.

- There is a gender gap in terms of in-hospital treatment of ischemic heart disease. Women hospitalized for ischemic heart disease are less likely than men to receive angiography or arteriography, cardiac catheterization, percutaneous coronary intervention, and bypass surgery.

- Treatment and care related to heart disease and stroke have a tremendous economic cost in Alaska.

- Hospitalizations for heart disease in Alaska cost $515 million in 2007—just over one-third of the total for all hospitalization costs in that year; hospitalizations for stroke cost over $80 million.
Medicaid payments alone for health care services related to heart disease in SFY 2007 ran $9.4 million. Over $12.4 million was paid by Medicaid for claims related to stroke; given that there were 1,354 individuals with Medicaid claims related to a primary diagnosis of stroke in SFY 2007, which translates to a cost of nearly $10,000 per stroke sufferer.

Seventy-five percent of stroke-related Medicaid claims in SFY 2007 went towards long-term care.

Less than one-third of the approximately 15,000 Alaskans who reported having had a heart attack say they were referred to cardiac rehabilitation.

Heart disease and stroke risk factors are generally present in Alaska in levels comparable to what is seen in the US overall, and most have either remained stable or increased over that past decade and a half. For example:

- Smoking prevalence has declined to 22%, but this rate is still higher than in the US overall.
- Obesity/overweight is increasing, and at 65% is slightly higher than in the US overall.
- Diabetes prevalence has been slowly increasing over the past decade; the steadily rising obesity rate will likely continue to fuel this rise.
- Although at 25% Alaska’s hypertension prevalence is lower than US overall rate, this key risk factor is on the rise in Alaska.
- Cholesterol screening is improving, but 29% of adult Alaskans did not have their blood cholesterol tested in the previous 5 years. In the US overall only 25% are not obtaining these important screenings.
- At 38%, the prevalence of high cholesterol has reached its highest level since being assessed on the Alaska BRFSS beginning in 1991.

Almost half of Alaskans have 2 or more of the above risk factors; an additional one-third has a single risk factor.

In many cases, American Indian/Alaska Natives, residents of rural Alaska, and socioeconomically disadvantaged Alaskans experience higher levels of risk factors related to heart disease and stroke.

Alaska’s currently high level of population risk poses a significant challenge for public health to keep ahead of the curve and reduce the state’s heart disease and stroke burden into the future. Heart disease and stroke will never be completely eliminated in Alaska. But with our aging population, even modest percentage gains in preventing premature death and disability from these diseases will pay our state huge dividends in coming years, in terms of medical care savings, economic productivity, and quality of life.
Introduction

Among all 50 states, Alaska ranks 48th in population (626,932 in the 2000 census), and 50th in population density (1.1 persons per square mile). Other significant Alaska population demographics include:

- a unique mix of races and ethnicities
- men outnumbering women (Alaska is the only state in which this occurs)
- an unusually large number of migrants, who were born in other states and countries

All of these distinctive characteristics can potentially have profound effects on the risk of chronic illnesses, such as heart disease and stroke.

Finally, and perhaps most significantly, there are fewer senior citizens in Alaska today than in any other state. Chronic diseases like heart disease and stroke are extremely rare in young adults, but they become increasingly more common after middle age.

Alaska has historically had a “young” population, with relatively few residents over the age of 65. The elderly have chosen to move out of state as they age.

Figure 1. Age, Sex Population Distribution: Alaska, 1980

This historic trend is, however, changing rapidly. By 2000, the state’s median age rose to 32 years, and in recent years the proportion of the population over age 65 has grown faster in Alaska than in any other state. Now there are proportionately more older Alaskans than ever before, and this shift will only increase.
As the age-sex pyramid of 2000 shows (Figure 2), the number of young adults in Alaska 20 years ago now represents those rapidly entering middle age. It is projected that by the year 2020, over 12% of Alaskans will be age 65 or older (see Figure 3).

Given these population dynamics, Alaska’s health promotion and healthcare personnel and policy makers have a unique opportunity to impact behavioral and environmental factors that put Alaskans at risk for heart disease and stroke. The need for public health approaches for prevention of chronic disease has never been greater in Alaska than it is right now.

This report has been prepared to provide Alaskans with the facts they need to understand the burden of heart disease and stroke in their state. It examines heart disease, ischemic heart disease, and stroke, and the risk factors for these diseases. A secondary focus is congestive heart failure.

mortality (death), morbidity (disability), and risk factors for heart disease and stroke.

The following terminology will be used throughout this report. Heart disease (diseases of the heart) and stroke are part of the broader category, cardiovascular disease (CVD). Cardiovascular disease refers to a variety of heart and blood vessel diseases. Other types of CVD include congenital heart disease, rheumatic heart disease, and infections of the heart. This report focuses heart disease, ischemic heart disease, and stroke, and the risk factors for these diseases. A secondary focus is congestive heart failure.
Heart Disease and Stroke Mortality
The Burden of Heart Disease and Stroke in Alaska: Mortality, Hospitalization and Risk Factors
Heart Disease and Stroke Mortality

More Alaskans die from heart disease and stroke combined than any other cause. Of the approximately 3,500 Alaskans who died in 2007, 766 died from either heart disease or stroke. That translates to more than 3,000 years of productive life lost in a single year due to heart disease and stroke.

In the next 10 years, the number of Alaskans who are expected to die from heart disease and stroke will be roughly equivalent to the population of the North Slope Borough, or the city of Ketchikan, or the entire Aleutian archipelago. Death from heart disease and stroke is a common event in every Alaskan city, town, and village. It touches Alaskans of every race, ethnic group, occupation and social class.

Every person now living in Alaska knows someone well who will die as a result of either heart disease or stroke. Although deaths from these 2 causes will never be completely eliminated, renewed public health efforts can substantially reduce premature death from heart disease and stroke.

As serious as heart disease is for Alaska’s health, our state enjoys one of the lowest heart disease death rates in the United States. Far fewer Alaskans die from heart disease than would be expected in a contemporary American population of Alaska’s size. In fact, Alaska is one of only 9 states where heart disease is not the leading cause of death.1

It is possible that out-migration of Alaskans with heart disease and other chronic illnesses reduces the state’s observed mortality rates. Little is known about who migrates out of Alaska or why, but a portion of Alaskans with known heart disease may choose to relocate each year to other states, where their deaths no longer contribute to Alaska’s mortality rates. Such relocation has not been studied, but it seems plausible given the state’s harsh winter climate and the long distances that often separate patients from advanced treatment services.
A more certain explanation of Alaska’s comparative advantage in heart disease risk is the younger age structure of the state’s population. Alaska’s relatively small proportion of residents over age 65 reduces the pool of individuals most at risk of fatal strokes and heart disease events in the population at large. Because Alaska’s age structure is so different from that of the United States as a whole, all the mortality rates presented below have been age-adjusted.

But even taking differences in age structure into account, Alaska has a relatively low death rate from heart disease, compared to most other states. The age-adjusted death rate for heart disease in Alaska is 18% lower than the national rate.

In contrast, the stroke death rate in Alaska, after adjusting for age, is about 6% higher than the national rate. As Table 1 shows, the ranking of Alaska’s top causes of death is very dissimilar from the United States as a whole.

Table 1. Top 10 causes of death, Alaska and US, 2007

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Alaska Deaths</th>
<th>Alaska Age-Adjusted Rate</th>
<th>US Age-Adjusted Rate</th>
<th>US Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cancer</td>
<td>781</td>
<td>176.2</td>
<td>180.8</td>
<td>2</td>
</tr>
<tr>
<td>2. Diseases of the Heart</td>
<td>631</td>
<td>163.8</td>
<td>199.4</td>
<td>1</td>
</tr>
<tr>
<td>3. Unintentional Injuries</td>
<td>313</td>
<td>52.1</td>
<td>38.5</td>
<td>5</td>
</tr>
<tr>
<td>4. Stroke</td>
<td>174</td>
<td>46.4</td>
<td>43.6</td>
<td>3</td>
</tr>
<tr>
<td>5. Chronic Lower Respiratory Disease</td>
<td>139</td>
<td>37.1</td>
<td>40.4</td>
<td>4</td>
</tr>
<tr>
<td>6. Suicide</td>
<td>132</td>
<td>20.0</td>
<td>10.6</td>
<td>11</td>
</tr>
<tr>
<td>7. Diabetes</td>
<td>109</td>
<td>25.7</td>
<td>23.3</td>
<td>7</td>
</tr>
<tr>
<td>8. Alzheimer’s Disease</td>
<td>73</td>
<td>24.8</td>
<td>22.7</td>
<td>6</td>
</tr>
<tr>
<td>9. Influenza and Pneumonia</td>
<td>49</td>
<td>13.4</td>
<td>17.7</td>
<td>8</td>
</tr>
<tr>
<td>10. Chronic Liver Disease and Cirrhosis</td>
<td>44</td>
<td>6.9</td>
<td>8.7</td>
<td>12</td>
</tr>
<tr>
<td>10. Nephritis, Nephrotic Syndrome and Nephrosis</td>
<td>44</td>
<td>12.6</td>
<td>14.3</td>
<td>9</td>
</tr>
</tbody>
</table>

Notes: Data sources are Alaska Bureau of Vital Statistics (for Alaska data) and National Center for Health Statistics, CDC (for US data); rates are per 100,000 persons, standardized to the US 2000 standard million.

The next 3 figures illustrate changes in the age-adjusted rates of death from all types of heart disease, ischemic heart disease (which includes heart attacks) and stroke in Alaska between 1994 and 2007, and the United States between 1994 and 2005. Regression lines have been fit to the annual age-adjusted rates to test the significance of the trend during this period. Percentage of change during this time period is reported as an average annual percentage change.
The age-adjusted death rate from diseases of the heart has declined significantly in Alaska since 1994, dropping an average of nearly 3% annually through 2007, as indicated by the trend line in Figure 5. This is comparable to a corresponding decline in age-adjusted mortality from diseases of the heart in the United States as a whole during this same time. In Alaska, the rate of death from diseases of the heart has fallen from a high of 247.9 per 100,000 in 1994 to 151.4 per 100,000 by 2007. The Alaska rates have remained below the national rates during the entire period. It is also worth noting that as of 2004, Alaska’s ischemic heart disease mortality rate has been consistently below the Healthy Alaskans 20102 target of 120 per 100,000.
The age-adjusted death rate from stroke in Alaska decreased from 65.7 per 100,000 in 1994 to 42.1 per 100,000 in 2007, for an annual average percent change of 2.8. The age-adjusted mortality from stroke has declined in the United States during this period by an average of 1.7% annually.

The next 6 figures illustrate Alaska’s mortality trends for all heart disease, ischemic heart disease, and stroke by sex.

Age-adjusted death rates from diseases of the heart have declined significantly for both men and women in Alaska since 1994. Among Alaska men, death rates from diseases of the heart declined an average of 2.8% per year between 1994 and 2007, dropping from a high of 312.9 per 100,000 in 1994 to a low of 175.1 per 100,000 in 2007. Among women, the age-adjusted diseases of the heart mortality rates decreased an average of 2.6% per year, from 189.2 per 100,000 in 1994 to 125.0 per 100,000 in 2007.
Both trends are parallel to, yet consistently below, those seen nationally.

A similar pattern is found when focusing on ischemic heart disease deaths alone. Among Alaska men, death rates from ischemic heart disease declined by an average of 2.9% per year between 1994 and 2007, dropping from a high of 231.3 per 100,000 in 1994 to a low of 105.9 per 100,000 by 2007. Alaska women experienced a 3.2% average annual drop in mortality due to ischemic heart disease between 1994 and 2007, with age-adjusted rates dropping from a high of 121.1 per 100,000 in 1994 to a low of 59.3 per 100,000 in 2007.
The Burden of Heart Disease and Stroke in Alaska: Mortality, Hospitalization and Risk Factors

Age-adjusted mortality from ischemic heart disease similarly declined among both men and women in the United States during the same period.

Despite considerable year-to-year variation, age-adjusted death rates from stroke have shown declines among both Alaska men and women. Rates among men declined an average of 1.3% annually over the 14-year period, with a high of 74.8 stroke deaths per 100,000 in 1997, and a low of 42.0 per 100,000 in 2006. Among Alaska women stroke death rates ranged from a high of 95.5 per 100,000 in 1995 to a low of 36.2 per 100,000 in 2007; the annual average change was 3.7%.
The Alaska and United States trends in men’s age-adjusted mortality from stroke are virtually identical from 1994 to 2007. In comparison, the US trend in women’s stroke death rates appears more gradual (1.4% annual average change) relative to the trend in Alaska women’s rates (3.7% annual average change). As a result it appears that, although Alaska’s rates have exceeded the national rates in all years but 1997, the two trend lines may intersect at some point in the near future, with Alaska’s rates being below that of the US.

Figures 14 through 17 illustrate differences in age-adjusted rates of death from heart disease and stroke in Alaska according to sex and race. The rates shown are based on total mortality from diseases of the heart, ischemic heart disease, congestive heart failure, and stroke, during the 14-year period from 1994 to 2007. Congestive heart failure mortality rates are shown by race only due to small numbers.

Age-adjusted death rates from diseases of the heart were higher among men compared to women in all racial groups, except among Asian Pacific Islanders, where there was no significant sex difference in mortality rates (Figure 14). Among women, Asian/Pacific Islanders had the lowest rate at only 94.7 per 100,000; rates among the other racial/ethnic groups did not differ significantly.

A slightly different pattern was seen in men’s mortality rates for diseases of the heart. Among men, the highest age-adjusted rates were seen in American Indian/Alaska Natives, followed by Whites, then African Americans, and finally Asian/Pacific Island men.
The pattern of race-by-sex differences in ischemic heart disease rates was similar to that seen in diseases of the heart overall, with the exception that the men’s American Indian/Alaska Native and White rates did not differ significantly.

As seen in Figure 16, the age-adjusted rates of death from congestive heart failure among American Indian/Alaska Natives (24.7 per 100,000) and Whites (19.0 per 100,000) were higher than the rates among either Asians/Pacific Islanders (4.8 per 100,000) or African Americans (10.9 per 100,000).
No significant sex differences were observed in stroke mortality rates, either among all race groups combined or within any single race group. Among men, the only significant racial disparity in stroke mortality rates was between White men (53.5 per 100,000) and the relatively higher rates of both Asian/Pacific Islander men (69.7 per 100,000) and American Indian/Alaska Native men (66.9 per 100,000).

The only racial disparity observed among women’s stroke mortality rates was that American Indian/Alaska Native women had a higher rate (71.7 per 100,000) than either Asian/Pacific Islander women (56.5 per 100,000) or White women (58.1 per 100,000).
Table 2. Number of deaths due to selected causes, by region, Alaska (1994-2007 combined)

<table>
<thead>
<tr>
<th>Region of Alaska</th>
<th>Diseases of the Heart (Rank)</th>
<th>Ischemic Heart Disease* (Rank)</th>
<th>Stroke (Rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipality of Anchorage</td>
<td>3146</td>
<td>2051</td>
<td>950</td>
</tr>
<tr>
<td>Fairbanks North Star Borough</td>
<td>966 (2)</td>
<td>632 (2)</td>
<td>234 (2)</td>
</tr>
<tr>
<td>Matanuska-Susitna Borough</td>
<td>927 (3)</td>
<td>605 (4)</td>
<td>204 (3)</td>
</tr>
<tr>
<td>Kenai Peninsula Borough</td>
<td>854 (4)</td>
<td>582 (3)</td>
<td>182 (4)</td>
</tr>
<tr>
<td>Juneau Borough</td>
<td>347 (5)</td>
<td>218 (5)</td>
<td>103 (5)</td>
</tr>
<tr>
<td>Ketchikan Gateway Borough</td>
<td>276 (6)</td>
<td>186 (6)</td>
<td>54 (8)</td>
</tr>
<tr>
<td>Bethel</td>
<td>173 (7)</td>
<td>82 (12)</td>
<td>57 (7)</td>
</tr>
<tr>
<td>Sitka Borough</td>
<td>166 (8)</td>
<td>117 (7)</td>
<td>58 (6)</td>
</tr>
<tr>
<td>Wrangell-Petersburg</td>
<td>144 (9)</td>
<td>89 (9)</td>
<td>40 (10)</td>
</tr>
<tr>
<td>Valdez-Cordova</td>
<td>139 (10)</td>
<td>92 (8)</td>
<td>26 (12)</td>
</tr>
<tr>
<td>Kodiak Island Borough</td>
<td>138 (11)</td>
<td>83 (10)</td>
<td>48 (9)</td>
</tr>
<tr>
<td>Nome</td>
<td>130 (12)</td>
<td>83 (10)</td>
<td>40 (10)</td>
</tr>
<tr>
<td>Yukon-Koyukuk</td>
<td>113 (13)</td>
<td>75 (12)</td>
<td>31 (12)</td>
</tr>
<tr>
<td>Southeast Fairbanks</td>
<td>100 (14)</td>
<td>75 (12)</td>
<td>34 (11)</td>
</tr>
<tr>
<td>Prince Of Wales-Outer Ketchikan</td>
<td>98 (15)</td>
<td>60 (13)</td>
<td>13 (17)</td>
</tr>
<tr>
<td>Northwest Arctic Borough</td>
<td>83 (16)</td>
<td>50 (14)</td>
<td>23 (14)</td>
</tr>
<tr>
<td>North Slope Borough</td>
<td>81 (17)</td>
<td>42 (15)</td>
<td>20 (15)</td>
</tr>
<tr>
<td>Wade Hampton</td>
<td>74 (18)</td>
<td>38 (17)</td>
<td>14 (16)</td>
</tr>
<tr>
<td>Skagway-Hoonah-Angoon</td>
<td>64 (19)</td>
<td>39 (16)</td>
<td>14 (16)</td>
</tr>
<tr>
<td>Haines Borough</td>
<td>55 (20)</td>
<td>37 (18)</td>
<td>12 (18)</td>
</tr>
<tr>
<td>Dillingham</td>
<td>54 (21)</td>
<td>28 (19)</td>
<td>24 (13)</td>
</tr>
<tr>
<td>Aleutians West</td>
<td>33 (22)</td>
<td>22 (20)</td>
<td>6 (20)</td>
</tr>
<tr>
<td>Lake And Peninsula</td>
<td>25 (23)</td>
<td>18 (21)</td>
<td>8 (19)</td>
</tr>
<tr>
<td>Aleutians East Borough</td>
<td>17 (24)</td>
<td>10 (23)</td>
<td>5 (21)</td>
</tr>
<tr>
<td>Bristol Bay Borough</td>
<td>14 (25)</td>
<td>9 (24)</td>
<td>1 (24)</td>
</tr>
<tr>
<td>Denali Borough</td>
<td>14 (25)</td>
<td>11 (22)</td>
<td>2 (23)</td>
</tr>
<tr>
<td>Yakutat Borough</td>
<td>13 (26)</td>
<td>10 (23)</td>
<td>3 (22)</td>
</tr>
<tr>
<td>Total</td>
<td>8250</td>
<td>5348</td>
<td>2207</td>
</tr>
</tbody>
</table>

*Ischemic heart disease falls within the broader diagnosis of diseases of the heart.


Table 2 shows the regional distribution of deaths due to diseases of the heart, ischemic heart disease, and stroke for the period 1994 through 2007. The relatively small number of cause-specific deaths observed for some census areas in Alaska, even during a 14-year period, makes computation of age-adjusted rates for most geographic areas of the state unreliable. Although the absence of rates makes meaningful regional comparisons problematic, it is important to at least understand how the burden of heart disease and stroke mortality is experienced across the state.
Over the 14-year period, 8,250 Alaskans died due to diseases of the heart—5,348 specifically from ischemic heart disease. An additional 2,207 Alaskans died due to stroke in this time period. Not surprisingly, the greatest burden of diseases of the heart, ischemic heart disease, and stroke mortality was experienced collectively in the 5 largest population centers in Alaska: the Municipality of Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Borough, Kenai Peninsula Borough, and Juneau Borough. The boroughs reporting the lowest number of deaths due to these 3 causes are: Bristol Bay, Yakutat, Denali, and Aleutians East.

Heart disease and stroke events may occur suddenly and with very little warning. Outcomes are significantly enhanced if those experiencing symptoms of heart attack or stroke are transported quickly to a hospital. This can be problematic in Alaska where traveling to a hospital may involve significant geographic, weather, and transportation barriers. By examining where Alaskans who do not survive heart attack and stroke events die, we learn what percentage of these deaths occurs before people are able to receive care and whether that percentage varies markedly from the United States as a whole.

In Alaska in 2007, only 1% of deaths from diseases of the heart occurred while en route to the hospital (i.e., dead on arrival, or DOA). Forty-three percent of all diseases of the heart deaths occurred in a hospital (i.e., inpatient, emergency room, or outpatient). Nursing homes were the recorded place of death for only 7% of heart disease deaths. The remaining 49% of deaths from heart disease took place either in a residence or some other non-hospital setting (e.g., in a grocery store).

Comparable US data for place of death for diseases of the heart reveal a similar pattern. Two notable discrepancies are deaths occurring in nursing homes or hospice facilities (23% in the US) and residence or other non-hospital setting (29% in the US). These differences may be an indication of Alaska’s unique challenges in transporting heart attack victims quickly to appropriate health care facilities. They may also simply reflect that fact that a state with a relatively young population has fewer individuals living in nursing homes.
Figure 19. Place of Death for Deaths Due to Stroke, Alaska 2007

The distribution of place of death for stroke deaths in Alaska is distinct from that observed with heart disease deaths. Compared to deaths due to heart disease in Alaska, deaths due to stroke are much more likely to occur in a nursing home (18% versus 7%) or inpatient hospital setting (44% versus 30%), and much less likely to occur in one’s residence (26% versus 40%) or in the ER/outpatient setting (4% versus 13%).

Similar to what is seen with diseases of heart, US deaths due to stroke are much more likely to occur in nursing homes and much less likely to occur at a residence compared to stroke deaths in Alaska. These differences may be related to both demographic (specifically, age structure) and healthcare system differences between Alaska and the US overall.
The Burden of Heart Disease and Stroke in Alaska: Mortality, Hospitalization and Risk Factors
Heart Disease and Stroke Morbidity

In addition to death, heart disease and stroke contribute significantly to serious morbidity in the population. A substantial portion of outpatient medical visits, pharmacy dispensing, and rehabilitation services in the state are a direct result of heart disease and stroke experienced by Alaskans.

A. History of Heart Attack and Stroke

Figure 20. Prevalence of History of Selected Cardiovascular Disease Conditions/Events 2005, 2007 & 2008 (combined)

Unfortunately, it is difficult to measure the full impact of non-fatal heart disease and stroke in Alaska, as few population-based morbidity data sources are currently available for analysis. As of 2003, several questions related to heart disease and stroke have been included on the Behavioral Risk Factor Surveillance System (BRFSS). Specifically, these questions assess whether an individual has ever been told by a doctor, nurse or other health professional that they had had either a heart attack or a stroke. A set of follow-up questions asks whether the individual had gone to outpatient rehabilitation following a hospital stay for either a heart attack or stroke, and whether any physical, mental, or emotional limitations have resulted from the heart attack or stroke.

According to these self-reported data, 3% of Alaska adults have been told they had a heart attack, 3% have been told they have angina or coronary heart disease, and 2% have been told that they had a stroke. While these percentages may seem low, they represent over 21,000 Alaskan lives touched by heart attack or stroke.

For individuals who have suffered a heart attack in particular, completing a secondary prevention rehabilitation program which includes:

- supervised exercise, and
- risk factor education and counseling offered singly or together, will significantly reduce their risk of having a subsequent heart attack.³
Unfortunately, less than one-third of adult Alaskans who report having had a heart attack say they went to a rehabilitation program following release from the hospital. Comparable data for stroke are no more encouraging—only 28% of those with a history of stroke have attended a stroke rehabilitation program.

Statewide representative data on referral rates for heart attack and stroke rehabilitation services are currently unavailable; however, national data suggest that providers refer only 10% to 47% of eligible patients to rehabilitation services. Assuming similar referral rates in Alaska, it is not too surprising that the majority of heart attack patients do not attend—and thus miss out on the benefits of—rehabilitation services.

Figure 21 also reveals that more than 1 in 4 individuals who have experienced either a heart attack or stroke report having had physical, mental, or emotional problems as a result of their cardiovascular event. Greater utilization of appropriate rehabilitation services would presumably lower the incidence of these problems.
B. Hospitalization for Heart Disease and Stroke

The most useful data source for assessing morbidity associated with heart disease and stroke is Alaska’s hospital discharge database. This database includes all discharges from the state’s larger hospitals, as well as most smaller hospitals, occurring during 2007.

Figure 22. Heart Disease and Stroke as Primary Hospital Discharge Diagnosis, Alaska 2007, US 2005

Of the more than 51,000 hospitalizations reported in the hospital discharge database in Alaska during 2007, about 10% were primarily for heart disease and stroke. In the United States during 2005, the most recent year for which national data are available, there were more than 34 million discharges meeting the same criteria. Of those, about 15% were primarily for heart disease and stroke.

In the United States, discharges for heart disease and stroke are nearly equally divided between the sexes. But in Alaska there is a significant gender gap, with males outnumbering females at a level far in excess of their over-representation in the population at large.

Figure 23. Primary Hospital Discharge Diagnosis for Heart Disease and Stroke, by Sex, Alaska 2007, US 2005
Nationwide, just over one-third of hospital discharges for heart disease and stroke involve persons under 65 years of age. In Alaska, nearly half of the discharges for these conditions involve persons under age 65. The proportion of discharges among the 45- to 64-year-old age group in Alaska is 38% greater than in the United States as a whole.

Hospitalization rates for diseases of the heart, ischemic heart disease, and stroke are consistently lower in Alaska than in the United States as a whole, even after adjusting the state rates for hospitalizations missing from the Alaska hospital discharge database (Table 3). Hospitalization rates are lower in Alaska in both sexes and all age groups. For example, Alaskans age 45- to 64-years are only 64% as likely as other Americans their age to be hospitalized for heart disease, and only 65% as likely to be hospitalized for stroke. Alaskans over 64 years of age are only 70% as likely as other Americans their age to be hospitalized for heart disease, and only 77% as likely to be hospitalized for stroke.

Reasons for lower age-specific hospitalization rates in Alaska are not clear. They may reflect differences in rates of underlying disease or differences in the likelihood of hospital admission for the same level of disease. Clearly the extreme environment and physically demanding occupations that attract many people to Alaska may serve to select for a higher overall level of cardiovascular fitness than would be expected in other states. Alternatively, the long distances to definitive hospital care—sometimes available only by fixed-wing air transport, and the predominance of a private, fee-for-service medical care system in this state may mediate against hospital admission for less urgent cases that could be hospitalized elsewhere. Both factors, or others, may be involved.

Figure 24. Primary Hospital Discharge Diagnosis for Heart Disease and Stroke, by Age, Alaska 2007, US 2005
<table>
<thead>
<tr>
<th></th>
<th>Diseases of the Heart</th>
<th>Ischemic Heart Disease*</th>
<th>Congestive Heart Failure*</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AK</td>
<td>US</td>
<td>AK</td>
<td>US</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>10,171</td>
<td>10,645,763</td>
<td>4,322</td>
<td>4,997,206</td>
</tr>
<tr>
<td>Rate</td>
<td>171.4</td>
<td>357.0</td>
<td>72.8</td>
<td>167.6</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>5,874</td>
<td>5,209,447</td>
<td>2,904</td>
<td>2,808,405</td>
</tr>
<tr>
<td>% within Disease</td>
<td>58%</td>
<td>49%</td>
<td>67%</td>
<td>56%</td>
</tr>
<tr>
<td>Rate</td>
<td>193.5</td>
<td>355.6</td>
<td>95.7</td>
<td>191.7</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>4,294</td>
<td>5,436,316</td>
<td>1,418</td>
<td>2,188,801</td>
</tr>
<tr>
<td>% within Disease</td>
<td>42%</td>
<td>51%</td>
<td>33%</td>
<td>44%</td>
</tr>
<tr>
<td>Rate</td>
<td>148.0</td>
<td>358.3</td>
<td>48.9</td>
<td>144.3</td>
</tr>
<tr>
<td><strong>&lt;15</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>115</td>
<td>81,431</td>
<td>2</td>
<td>7,104</td>
</tr>
<tr>
<td>% within Disease</td>
<td>1%</td>
<td>1%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Rate</td>
<td>8.1</td>
<td>13.4</td>
<td>0.1</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>15-44</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>769</td>
<td>625,412</td>
<td>173</td>
<td>174,654</td>
</tr>
<tr>
<td>% within Disease</td>
<td>8%</td>
<td>6%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Rate</td>
<td>30.4</td>
<td>49.9</td>
<td>6.8</td>
<td>13.9</td>
</tr>
<tr>
<td><strong>45-64</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>3,607</td>
<td>2,664,507</td>
<td>1,739</td>
<td>1,460,911</td>
</tr>
<tr>
<td>% within Disease</td>
<td>35%</td>
<td>25%</td>
<td>40%</td>
<td>29%</td>
</tr>
<tr>
<td>Rate</td>
<td>229.3</td>
<td>356.2</td>
<td>110.6</td>
<td>195.3</td>
</tr>
<tr>
<td><strong>65+</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharges</td>
<td>5,680</td>
<td>7,274,413</td>
<td>2,408</td>
<td>3,354,537</td>
</tr>
<tr>
<td>% within Disease</td>
<td>56%</td>
<td>68%</td>
<td>56%</td>
<td>67%</td>
</tr>
<tr>
<td>Rate</td>
<td>1374.4</td>
<td>1952.3</td>
<td>582.7</td>
<td>900.3</td>
</tr>
</tbody>
</table>

*Ischemic heart disease and congestive heart failure fall within the broader diagnosis of diseases of the heart. US data source is the National Hospital Discharge Survey, 2006, CDC, National Center for Health Statistics; Alaska population data are from the Alaska Department of Labor and Workforce Development, Research & Analyses Section, 2009; Alaska population denominators are reduced (to .88) to account for hospitals not contributing to the data set; secondary discharge diagnoses are those up to and including the 7th-listed diagnosis; rates are discharges per 10,000 population; ICD-9 codes used: Diseases of the Heart: 390-398, 402,404, 410-429, Ischemic Heart Disease: 410-414, 429.2, Congestive Heart Failure: 428, Stroke: 430-434, 436-438.
Comparing the mean length of hospital stay across disease types, there are relatively few differences between heart disease and all other diagnoses, either in Alaska or the United States. In Alaska, hospital stays where stroke was the primary discharge diagnosis were, on average, about a day and a half longer than stays for all other diagnoses combined.

Alaska data for median charges per hospital stay show substantially higher costs associated with heart disease and stroke admissions than most other diagnoses. This is especially true when the primary diagnosis is ischemic heart disease, where median charges are 3 1/2 times that of all other diagnoses combined. Stroke and congestive heart failure are also expensive diagnoses. With heart failure these costs may be compounded over time since multiple admissions are often necessary.

Considering the cost of hospital stays in Alaska that list heart disease as a primary or a secondary diagnosis, a total of $515 million was spent on those hospitalizations in just 2007. This represents just over one-third of the total of all hospitalizations costs for one year. The comparable figure for stroke-related hospitalizations in 2007 was over $50 million. This analysis excludes those cases treated in military hospitals where charge data were not recorded.
Given the costs associated with ischemic heart disease hospitalizations in particular, we examined the types of procedures conducted during ischemic heart disease hospital stays. The procedures driving the costs for ischemic heart disease hospital stays are cardiac catheterization, percutaneous coronary intervention (PCI)—commonly angioplasty and stent insertion—and bypass surgery, hospital stays involving the latter being by far the most costly.

Although an expensive procedure, bypass surgery is conducted on fewer than 1 in 5 individuals with a primary discharge diagnosis of ischemic heart disease. In comparison, more than one-third of ischemic heart disease patients are receiving PCI. This corresponds to national data indicating decreasing use of coronary artery bypass surgery in favor of the less invasive angioplasty and stent insertion for heart attack patients.5,6

The Alaska data also reveal a gender disparity. Female hospital patients with ischemic heart disease are consistently less likely than males to receive angiography or arteriography, cardiac catheterization, PCI, or bypass surgery. This is a reflection of a pattern seen nationally: compared to their male counterparts, women with heart disease are less likely to be referred for diagnostic procedures, experience greater delays to intervention, and are less likely to receive effective treatments such as PCI.7
In fact, whereas 61% of men hospitalized for ischemic heart disease receive either PCI or have bypass surgery, fewer than half of women with this discharge diagnosis receive the same treatments.

C. Heart Disease and Stroke among the Medicaid Population

Another important indicator of the heart disease and stroke burden in Alaska is the extent to which the state’s Medicaid population experiences diagnosis and treatment of heart disease and stroke. Medicaid is the primary public program for covering basic health and long-term care services of low-income Alaskans—many of whom are children. Medicaid also provides coverage for those who are permanently disabled, as well as those Alaskans over the age of 65 whose Medicare costs have exceeded the maximum allowable amount. For many Alaskans over the age of 65, consequences of chronic diseases—including heart disease and stroke—may be the very reason that their Medicare benefits need to be supplemented with Medicaid. For this reason and due to the fact that not all Alaskans are eligible for Medicaid, Medicaid claims data cannot be used to estimate the statewide prevalence or costs associated with heart disease and stroke. The data can, however, provide an estimate of the burden of heart disease and stroke among a segment of the Alaska population that includes some of the state’s most vulnerable groups. Furthermore, this estimate of burden is almost certainly a conservative one given the reliance upon claims that list a primary diagnosis of these specific diseases.

In state fiscal year (SFY) 2007, over 113,300 Alaskans were provided health care services for which some portion was paid by Medicaid. This represents approximately 91% of those considered to be eligible for Medicaid in that year. Nearly three-fourths (73%) of the Alaskans with Medicaid charges were those under the age of 15 or women age 15 to 44; approximately 7,800 (7%) were men or women 65 or older.
Table 5. Number of individuals with and total costs for Medicaid payments related to selected primary diagnoses, by sex and age, Alaska (SFY 2007)

<table>
<thead>
<tr>
<th>Diseases of the Heart</th>
<th>Ischemic Heart Disease*</th>
<th>Congestive Heart Failure*</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals Payments</td>
<td>Individuals Payments</td>
<td>Individuals Payments</td>
<td>Individuals Payments</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,020 $9,358,918</td>
<td>1,161 $1,742,501</td>
<td>880 $3,298,844</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td>1,737 $3,915,652</td>
<td>567 $1,079,161</td>
<td>376 $1,221,648</td>
</tr>
<tr>
<td>% within Disease</td>
<td>43% 42%</td>
<td>49% 62%</td>
<td>43% 37%</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>2,283 $5,443,267</td>
<td>594 $663,341</td>
<td>504 $2,077,196</td>
</tr>
<tr>
<td>% within Disease</td>
<td>57% 58%</td>
<td>51% 38%</td>
<td>57% 63%</td>
</tr>
<tr>
<td><strong>&lt;15</strong></td>
<td>384 $665,193</td>
<td>2 $3,210</td>
<td>20 $27,864</td>
</tr>
<tr>
<td>% within Disease</td>
<td>10% 7%</td>
<td>&lt;1% &lt;1%</td>
<td>2% 1%</td>
</tr>
<tr>
<td><strong>15-44</strong></td>
<td>561 $1,291,364</td>
<td>54 $160,044</td>
<td>58 $242,185</td>
</tr>
<tr>
<td>% within Disease</td>
<td>14% 14%</td>
<td>5% 9%</td>
<td>7% 7%</td>
</tr>
<tr>
<td><strong>45-64</strong></td>
<td>1,211 $3,291,392</td>
<td>449 $873,034</td>
<td>259 $906,095</td>
</tr>
<tr>
<td>% within Disease</td>
<td>30% 35%</td>
<td>39% 50%</td>
<td>29% 27%</td>
</tr>
<tr>
<td><strong>65+</strong></td>
<td>1,864 $4,110,968</td>
<td>656 $706,213</td>
<td>543 $2,122,701</td>
</tr>
<tr>
<td>% within Disease</td>
<td>46% 44%</td>
<td>57% 41%</td>
<td>62% 64%</td>
</tr>
</tbody>
</table>

*Ischemic heart disease and congestive heart failure fall within the broader diagnosis of diseases of the heart.


More than 4,000 individuals (unduplicated) had Medicaid charges that were related to a primary diagnosis of diseases of the heart in SFY 2007. Of those, 1,161 were specifically diagnosed with ischemic heart disease and 880 with congestive heart failure. Women were slightly more likely than men to have Medicaid claims for diseases of the heart overall, and congestive heart failure more specifically. Approximately half of the diseases of the heart and ischemic heart disease claims were for Alaskans over the age of 64. Nearly two-thirds of the individuals with Medicaid claims associated with congestive heart failure were 65 or older.
There were 1,354 Alaskans in SFY 2007 who had Medicaid claims related to a primary diagnosis of stroke. These were more likely to be women than men, and over half were over the age of 64.

A total of nearly $9.4 million was paid by Medicaid to cover health care services related to a primary diagnosis of diseases of the heart in SFY 2007. Specifically, $1.7 million was spent on claims for individuals with a primary diagnosis of ischemic heart disease, and $3.3 million on claims for individuals with a primary diagnosis of congestive heart failure. These costs were distributed across gender and age groups proportionate to the number of individuals with claims related to diseases of the heart, ischemic heart disease, and congestive heart failure.

Over $12.4 million was paid by Medicaid for claims with a primary diagnosis of stroke. Sixty percent ($7.3 million) of these costs were for women, and nearly three-fourths ($8.7 million) were for the 756 Alaskans age 65 or older with stroke-related Medicaid claims. Over $9.3 million (75%) of the total stroke-related Medicaid payments that were made in SFY 2007 were associated with long-term care services (data not shown).
Heart Disease and Stroke Risk Factors
Heart Disease and Stroke Risk Factors

There is a growing understanding of the factors that determine the risk of heart disease and stroke. Some of these factors, such as family history, advancing age, and male sex, cannot be modified. But most of the major determinants of heart disease and stroke risk are, to various degrees, amenable to change. While heart disease and stroke will likely never be completely eliminated, public health interventions aimed at specific risk factors can substantially lessen the burden of heart disease and stroke in the population, now and in the future.

Considerable research has shown that each of the following factors contributes directly or indirectly to heart disease or stroke risk:

- Cigarette smoking
- Diabetes
- Overweight and Obesity
- Physical Inactivity
- Hypertension
- High blood cholesterol

In general, as exposure to each factor increases, so does the risk of disease. When multiple factors are present, risk increases progressively.

This chapter will examine the prevalence of these risk factors in Alaska, together with a measure of poor nutrition, using data from the Alaska BRFSS. Background information about the BRFSS can be found in the Methodology section at the end of this report.

The scientific study of other potential risk factors for cardiovascular disease continues. In addition to the well-established risk factors mentioned above, (that will be further discussed on the following pages), there include other factors which singly or in certain combinations appear to place individuals at increased risk for cardiovascular disease. These include certain fractions of blood cholesterol, triglycerides, lipoprotein (a), C-reactive protein, homocysteine, abnormalities in coagulation factors, and metabolic syndrome. As yet, no population-based data are available to assess the extent of these potential risk factors in Alaska.
A. Smoking

Cigarette smoking is the foremost preventable cause of death in the United States, worsening the risk of heart disease, stroke and peripheral vascular disease, as well as a range of cancers and other disorders. Tobacco exerts a powerful influence on a person’s risk of heart disease and stroke in many ways, including acceleration of arterial plaque formation and promotion of plaque rupture and thrombosis.

Some facts about smoking related to heart disease and stroke:

- Smoking accounts for as many as 30% of deaths from ischemic heart disease each year and 18% of strokes.
- Smoking even 1-3 cigarettes per day increases the risk of heart disease by about 64%. Those smoking about a pack of cigarettes each day increase their risk of death by about 100%.
- Smoking increases the risk of stroke by 80%.
- Environmental tobacco smoke is the third leading preventable cause of death in the United States today, behind active smoking and alcohol, accounting for the deaths of about 53,000 nonsmokers from heart disease each year.
- One year after quitting, a smoker’s risk of ischemic heart disease is cut in half. Within 15 years, the risk approaches that of someone who never smoked.

In the Alaska BRFSS, participants are asked, “Have you smoked at least 100 cigarettes in your entire life?” Those who answer “no” are considered never to have been smokers. Those who answer “yes” are then asked, “Do you now smoke cigarettes every day, some days or not at all?” Those who answer “not at all” to the second question are considered former smokers. Those who answer “every day” and “some days” are considered current smokers.

The percentage of Alaskan adults who report that they currently smoke cigarettes has declined significantly in Alaska, from 27% in 1991 to 22% in 2008. Despite this decrease, the Alaska rate is still above the national rate of 18%.
Not all Alaskans are equally likely to smoke. Similar to the pattern found nationally, Alaska men are more likely than Alaska women to smoke (24% versus 20%, respectively). The most dramatic disparity in smoking rates, however, is by race: Alaska Native adults are more than twice as likely as Whites or those of other racial backgrounds to report being a smoker.

Smoking prevalence is highest among adults living in parts of Alaska collectively called the “rural” region according to the BRFSS. This region includes all areas other than Anchorage and vicinity, Fairbanks and vicinity, and the southeast and gulf coast areas of Alaska.
Among both men and women, the prevalence of smoking in Alaska is highest among young adults and decreases with age.

In Alaska, smoking is most prevalent among those with low annual household incomes and those who did not complete high school. Prevalence decreases steadily as income and education increase. The inverse association with education is particularly striking. Compared to those who graduated from college, those who did not graduate from high school are about 5 times as likely to report being a smoker.
B. Diabetes

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It is strongly associated with ischemic heart disease, stroke, and peripheral vascular disease.

Some facts about diabetes related to heart disease and stroke:

- More than 65% of people with diabetes die from heart disease or stroke.\(^{16}\)
- Diabetes increases the risk of ischemic heart disease in men by a factor of 2 to 3. In women it increases the risk 3 to 7 times.\(^{17}\)
- Diabetes increases the risk of stroke by a factor of 2 to nearly 6.\(^{10}\)
- Patients with diabetes who develop ischemic heart disease experience more morbidity and mortality than patients with ischemic heart disease who don’t have diabetes.\(^{18}\)
- Intensive glycemic control is associated with a 17% reduction in non-fatal myocardial infarctions and a 15% reduction is coronary heart disease; however, intensive glycemic control has no significant effect on stroke events.\(^{19}\)
- Excess body fat and physical inactivity predispose people to develop type 2 diabetes, the most common form of the disease.\(^{20}\)
- People with diabetes commonly have other risk factors, including high blood pressure and lipid disorders. Tight control of these other risk factors is essential to reduce their increased risk of heart disease.\(^{21}\)
- About one-fourth of Americans with diabetes are undiagnosed.\(^{22}\)

In the Alaska BRFSS, participants are asked, “Have you ever been told by a doctor that you have diabetes?” Respondents have the option to choose “no”, “yes”, or “yes, gestational diabetes”. As of 2004, respondents have also had the option to respond “pre-diabetes or borderline diabetes”. Only those who answer “yes” (and not those with either pre-diabetes, borderline diabetes, or gestational diabetes) are considered to have diabetes for this analysis. As with all health status indicators that rely upon a self-report of a diagnosis, this method for assessing morbidity produces an underestimate to the extent that the disease is undiagnosed.
The percentage of Alaskan adults who report that they have been diagnosed with diabetes has increased from 4% in 1991 to 6% in 2008. The percentage of US adults reporting a diagnosis of diabetes was 8% in 2008.\textsuperscript{23}

Diabetes prevalence does not differ by sex or race group. This snapshot of current diabetes prevalence in Alaska obscures the dramatic increase in diabetes prevalence seen among Alaska Natives in the past 2 decades. This change comes in the wake of significant lifestyle changes that augment disease incidence while improvements in health care are extending the life expectancy of people with diabetes. According to Alaska Area Diabetes Team of the Alaska Native Tribal Health Consortium, diabetes prevalence among Alaska Natives has risen by more than 100% statewide between 1990 and 2006; several regions of the state have seen even larger increases in diabetes prevalence among their Alaska Native populations.\textsuperscript{24}
The only significant regional differences in diabetes prevalence are between Anchorage and vicinity (7%) and rural Alaska (4%).

Diabetes prevalence increases sharply with age, and is highest among Alaska men and women 65 years of age and older. Approximately 1 in 5 Alaskans over the age of 64 is diagnosed with diabetes.
The prevalence of diagnosed diabetes in Alaska is highest among those with annual household incomes of $25,000 or less. There is no clear pattern of diabetes prevalence by level of educational attainment.

C. Overweight and Obesity

Overweight and obesity are reaching epidemic proportions in the United States, with adverse consequences for health. Obesity in adults is generally defined as a body mass index (BMI) greater than or equal to 30 kg/m². Overweight in adults is defined as a BMI of 25.0 to 29.9 kg/m². Excess body weight is strongly associated with high blood pressure, defective metabolism of cholesterol, and other serum lipids, insulin resistance and diabetes. Most of the effect of overweight and obesity on the risk of heart disease and stroke is probably mediated through these factors, although other mechanisms that are less well understood may play a role.

Some facts about overweight/obesity related to heart disease and stroke:

- Body weight in excess of 130% of ideal weight is associated with a doubling of risk for ischemic heart disease in men and women under age 50. For example, a 45 year-old man with an ideal weight of 175 but an actual weight of 230 is twice as likely to develop ischemic heart disease as he would be if he actually weighed 175.

- Those who were merely overweight had a risk of developing heart failure that was 34% greater than in non-overweight individuals; while those who were obese had an incredible 104% increase in risk.

- More than three-quarters of high blood pressure can be directly attributed to obesity.

- Abdominal obesity, independent of BMI, has been found to be a significant predictor of heart disease and stroke in women.
- Men with a markedly elevated waist-hip ratio are 2.3 times as likely to have a stroke as men without abdominal obesity.\textsuperscript{31}

In the Alaska BRFSS, participants are asked to report their height and weight. From these values individual BMI are calculated.

Figure 40. Prevalence of Overweight/Obesity (BMI ≥ 25.0), Alaska Adults, 1991-2008

The percentage of Alaskan adults whose reported weight and height meet the definition of overweight or obese (BMI > 25.0) has risen significantly from 49\% in 1991 to 65\% in 2008. Nationally, the percentage of adults whose reported weight and height meet the overweight or obese definition was 63\% in 2008.\textsuperscript{32}

Men are more likely to be above normal weight than are women. In addition, American Indian/Alaska Native adults are more likely than Whites to report weights and heights indicative of overweight or obesity.
There are no significant regional differences in the prevalence of overweight and obesity.

In general, overweight and obesity increase with age in both men and women. For example, 2 out of every 4 Alaskan men aged 18 to 24 are either overweight or obese; by the late forties/early fifties, this proportion jumps to more than 3 of every 4 Alaska men. In all but the youngest age group (18-24), men were significantly more likely than women to be above a normal weight.
The association between weight status and both income and education looks different for men and women. Among Alaska men, the prevalence of being above a normal weight increases as both income and education level rise. For example three-quarters of men who graduated from college are above a normal weight, compared to only about half of those with less than a high school education.

Among women it is the opposite—women with the highest household incomes and highest levels of educational attainment are the least likely to be above a normal weight. This may reflect differences in the types of occupations men and women tend to have. It may be that the high earning jobs for men tend to be more sedentary, while the lower earning “blue collar” jobs for men tend to involve more manual labor, thus more physical activity.
D. Physical Inactivity

Physical inactivity is strongly linked to heart disease, stroke, and many other adverse health outcomes. Optimal cardiovascular benefits from physical activity are achieved when the large muscle groups of the arms, legs and back are used steadily and rhythmically so that one’s heart rate and breathing are significantly increased. But even less intense activity is beneficial, compared to a sedentary lifestyle. Much of the protective effect of physical activity is probably mediated through improvements in blood pressure and body weight, as well as alterations in lipid and carbohydrate metabolism. But routine physical activity also has direct effects on risk of heart disease and stroke, by improving arterial elasticity and helping the cells that line the inside of arteries reduce the progression of atherosclerosis.

Some facts about physical inactivity related to heart disease and stroke:

- Physical inactivity is responsible for 12.2% of the global burden of heart attack.³³
- Compared to those who are vigorously active, those with a sedentary lifestyle have nearly twice the risk of developing ischemic heart disease.³⁴
- Inactive middle-aged men have 3 times the risk of stroke of those engaging in vigorous physical activity.³⁵
- Women who walk briskly for half an hour each day reduce their coronary heart disease risk by approximately 35%.³⁶
- Aerobic exercise can cause a decrease of 8 to 10 mm Hg in both systolic and diastolic blood pressure measurements.³⁷
- For both men and women at middle age or older, remaining sedentary is a major independent risk factor for cardiovascular disease, with persons reporting even moderate amounts of activity having a 20% lower risk.³⁸
- More activity and/or increased intense activity brings greater reduction of risk for heart disease and stroke with much of the benefit derived when performing 150 or more minutes of physical activity per week.³⁸

In the Alaska BRFSS, participants are asked, “During the past 30 days, other than your regular job, did you participate in any physical activities or exercise, such as running, calisthenics, golf, gardening or walking for exercise?” Those who answer “no” are considered physically inactive. This question has been asked in 1991, 1992, 1994, 1996, 1998, and annually since 2000.
There has been a slight but statistically significant decline in the percentage of Alaskan adults who report having no leisure time physical activity between 1991 and 2008—a trend mirrored nationally. According to the most recent data, 1 in 5 Alaska adults gets no leisure time physical activity. Nationally, the percentage of adults reporting no such physical activity was 25% in 2008.39

American Indian/Alaska Native adults report having no leisure time physical activity at higher levels than Whites. Men and women in Alaska are about equally likely to be inactive.
Adults living in rural regions of the state are significantly more likely to be inactive (28%) compared to those in all other regions (range of 19% to 21%).

Physical inactivity generally increases with age, and is highest in Alaska among those over 64 years of age. Among those 65 and over, more than one-quarter of men and more than one-third of women report no leisure time physical activity. The only significant sex difference in physical inactivity within age group is among young adults; women age 18-24 are more than twice as likely as men in this age group to be inactive.
Physical inactivity shows sharp inverse associations with both income and education in Alaska. Those with household earnings of less than $15,000 per year are nearly 3 times as likely to have no leisure time physical activity as those with earnings of $75,000 or more. Alaskans not completing high school are more than twice as likely to report no leisure time physical activity as those who graduate from college.

E. Inadequate Nutrition

Inadequate nutrition contributes significantly to heart disease and stroke. Diet exerts complex effects on health, and is closely associated with other risk factors, such as high blood pressure, elevated blood cholesterol and obesity. An overall healthy eating pattern includes a variety of fruits, vegetables, grains, low-fat or nonfat dairy products, fish, legumes, poultry and lean meats. Total energy intake should match energy needs. Foods high in saturated and trans-fatty acids should be avoided, as should excess salt and high alcohol intake (in excess of 1 drink per day on average for women or 2 drinks per day on average for men). Fish and other foods rich in omega-3 fatty acids should be encouraged, as should fruits and vegetables, especially cruciferous and green leafy vegetables. Measuring nutrition in surveys is often difficult. We are using consumption of fewer than 5 servings of fruits and vegetables in a day as an overall marker of an unhealthy diet.

Some facts about inadequate nutrition related to heart disease and stroke:

- Up to 30% of deaths from ischemic heart disease are due to unhealthy diets.40 
- Although the recommended intake of soluble fiber is at least 25 grams per day, Americans consume a daily average of just 15.6 grams per day.41
- Every gram of increase in soluble fiber intake will decrease LDL-cholesterol by an average of 2.2 mg/dL.42
- An adequate intake of fruits and vegetables has been shown to reduce the risk of stroke by 31%. One additional serving per day is associated with a 6% lower risk of stroke.43
In the Alaska BRFSS, participants are asked how many daily servings they usually consume of fruit, fruit juices, green salads, potatoes, carrots and other servings of vegetables. Those whose servings do not total 5 or more are considered to have inadequate nutrition. This set of questions was asked in Alaska in 1991, 1992, 1994, 1996, 1998, 2000, 2002, 2003, 2005 and 2007.

The percentage of Alaska adults who report that they consume fewer than 5 servings of fruits and vegetables per day has held fairly constant since 1991, at nearly 80%. The comparable national figure was 76% in 2007.\(^4\)

Men are more likely than women to consume less than the recommended amounts of fruits and vegetables. There is no difference among racial groups in terms of reported fruit and vegetable consumption.
Residents of rural Alaska are significantly more likely than residents of other regions to fail to consume the recommended amounts of fruits and vegetables daily.

Figure 53. Prevalence of Consuming Less Than 5 Daily Servings of Fruits and Vegetables by Region, Alaska Adults, 2003, 2005 & 2007 (combined)

Figure 54. Prevalence of Consuming Less Than 5 Daily Servings of Fruits and Vegetables by Age and Sex, Alaska Adults, 2003, 2005 & 2007 (combined)

Inadequate consumption of fruits and vegetables is common in both sexes and among all age groups of Alaskan adults. Among men, there is no change in fruit and vegetable consumption with increasing age. Among women, however, there is a significant decline in inadequate fruit and vegetable consumption with age. In other words, as they age, women are increasingly likely to eat the recommended amounts of fruits and vegetables.
With increasing levels of education, Alaskans are less likely to be consuming inadequate amounts of fruits and vegetables. That said, more than two-thirds of college-educated Alaskans do not meet these dietary recommendations. There is no association between fruit and vegetable consumption and income.
F. Hypertension

Normal blood pressure is generally defined as a systolic pressure less than 120mm Hg and a diastolic pressure less than 80mm Hg. The risk of heart disease and stroke increases as blood pressure increases above these numbers. Above-normal blood pressure is generally called hypertension. The specific categories of hypertension are as follows:45

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic Blood Pressure</th>
<th>Diastolic Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Hypertension, stage 1</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Hypertension, stage 2</td>
<td>160 or above</td>
<td>100 or above</td>
</tr>
</tbody>
</table>

Hypertension is known to accelerate the progression of arterial plaques. It also triggers the enlargement of heart muscles, increasing demand on the coronary arteries. In most people, hypertension is a silent disease, and the cause is unknown. Appropriate treatment of hypertension reduces the risk of heart disease and stroke, but many people with hypertension are unable, (for a variety of reasons), to keep their blood pressure within the normal range.

Some facts about hypertension related to heart disease and stroke:

- Approximately 28% of new cases of ischemic heart disease among men and 29% of such cases among women are attributable to high blood pressure.46
- Hypertension precedes more than 90% of new cases of congestive heart failure. The risk of heart failure is increased 2 to 3 times in those with hypertension.47
- For every 20-mmHg increase in systolic blood pressure (SBP) or 10-mmHg increase in diastolic blood pressure (DBP), risk of mortality from both ischemic heart disease and stroke doubles.48
- The incidence of stroke increases in proportion to both systolic and diastolic blood pressures, and the control of high blood pressure reduces stroke risk.46
- Nearly 1 in 3 adult Americans has high blood pressure.49 Of those, about 30% are unaware they have it. Most of the others do not have it under control, including nearly half of those taking blood pressure medications.50

In the Alaska BRFSS, participants are asked, “Have you ever been told by a doctor, nurse or other health professional that you have high blood pressure?” Those who answer “yes” are considered to have hypertension. This question was asked in Alaska in 1991, 1992, 1993, and in all odd years since 1995.
The percentage of Alaskan adults who report having been told that they have high blood pressure has gradually increased since 1991. In 2007, 1 in 4 Alaska adults reported being told they had high blood pressure. Nationally, the percentage of adults reporting high blood pressure was 28% in 2007.51

In Alaska, men are significantly more likely than women to report having been told by a healthcare provider that they have hypertension. This is similar to the pattern seen nationally. There are no significant racial disparities in self-reported hypertension prevalence.

Figure 56. Prevalence of High Blood Pressure, Alaska Adults, 1991-2007

![Chart showing prevalence of high blood pressure from 1991 to 2009]

Source: AK BRFSS

Figure 57. Prevalence of High Blood Pressure by Sex, Race, Alaska Adults, 2003, 2005 & 2007 (combined)

![Bar chart showing prevalence of high blood pressure by sex, race, and year]

*American Indian/Alaska Native

Source: AK BRFSS
Figure 58. Prevalence of High Blood Pressure by Region, Alaska Adults, 2003, 2005 & 2007 (combined)

The only regional differences in reported doctor-diagnosed hypertension is between those living in Fairbanks (20%) and those living in southeast Alaska (24%).

Figure 59. Prevalence of High Blood Pressure by Age and Sex, Alaska Adults, 2003, 2005 & 2007 (combined)

Among both men and women, reported hypertension prevalence increases dramatically with age. Among those 65 and over, nearly half of Alaska men and over half Alaskan women report high blood pressure. Among those 25-to-34 years old, men are more likely than women to report high blood pressure.

Source: AK BRFSS
The prevalence of reported hypertension in Alaska is highest among those with the lowest incomes, and generally decreases with increasing income level. There is no significant association between education and this measure of hypertension. Under-diagnosis of hypertension, particularly in persons with lower income and education, may be masking a stronger inverse association between socioeconomic variables and prevalence of reported hypertension.
G. High Blood Cholesterol

Cholesterol is a fatty, waxy substance that is found in every cell of the body, and flows through the body via the blood. It is made by the body and also acquired in the body, when certain foods are eaten. Cholesterol, in certain levels, is necessary for the normal and healthy functioning of the body. But high levels of cholesterol in the blood increase the risk of heart disease and stroke.

Cholesterol travels in the bloodstream by linking with other substances. It combines with either high-density lipoproteins (HDL) or low-density lipoproteins (LDL). HDLs transmit cholesterol to the liver for recycling or excretion from the body. LDLs carry cholesterol from the liver and intestines throughout the body. When levels of LDL particles are high, they can accumulate within the walls of critical arteries, stimulating an inflammatory process that leads to the growth of atherosclerotic plaques. Over time these plaques can rupture, triggering a blood clot that obstructs the flow of blood.

In healthy adults, blood cholesterol levels should be checked at least every 5 years, and elevated levels of non-HDL cholesterol should be treated with lifestyle modifications, and, in some cases, medication.

Some facts about high blood cholesterol related to heart disease:

- Elevated total cholesterol (> 200 mg/dl) accounts for 27% of new cases of ischemic heart disease in men and 34% of new cases in women.\(^{46}\)

- There are no “normal” levels for lipids in the blood. Cholesterol levels in the United States are, on average, 20% higher than in Asian countries.\(^{52}\)

- A 10% decrease in total cholesterol levels (population-wide) may result in an estimated 30% reduction in the incidence of coronary heart disease.\(^{53}\)

In the Alaska BRFSS, participants are asked, “Blood cholesterol is a fatty substance found in the blood. Have you ever had your blood cholesterol checked?” Those who answered “yes” are asked, “How long has it been since you last had your blood cholesterol checked?” Those who answer “no” to the first question or “5 or more years ago” to the second question are considered not to have been tested in the last 5 years. Participants who had ever been tested are also asked, “Have you ever been told by a doctor, nurse or other health professional that your blood cholesterol is high?” Those who answer “yes” are considered to have high blood cholesterol. This set of questions has been asked in Alaska from 1991 through 1993, in all odd years between 1995 and 2005, and in 2006 and 2007.
The percentage of Alaska adults who report they have not had their blood cholesterol level checked in the last 5 years has decreased significantly since 1991, to 29% in 2007. The percentage of those tested who report being told their blood cholesterol was high decreased to 25% in the mid-1990s, but has since increased to 38%. Nationally, the percentage of adults who report not being tested in the last 5 years was 25% in 2007, and the percentage of those tested who report having high blood cholesterol was 38%.

Figure 61. Prevalence of No Cholesterol Screening in Past 5 Years, Alaska Adults, 1991-2007

Figure 62. Prevalence of High Cholesterol, Alaska Adults Screened For Cholesterol, 1991-2007
Figure 63. Prevalence of No Cholesterol Screening in Past 5 Years by Sex, Race, Alaska Adults, 2005-2007 (combined)

*American Indian/Alaska Native
Source: AK BRFSS

American Indian/Alaska Native adults are less likely than Alaskans of other race groups to report having their blood cholesterol tested in the last 5 years. There are, however, no significant racial differences in prevalence of reported doctor-diagnosed high cholesterol among those screened. There is no gender difference in either blood cholesterol screening or high blood cholesterol.

Figure 64. Prevalence of High Cholesterol by Sex, Race, Alaska Adults Screened for Cholesterol, 2005-2007 (combined)

*American Indian/Alaska Native
Source: AK BRFSS
Residents of rural Alaska are more likely than residents of other regions of Alaska to have not gotten their cholesterol tested in the past 5 years. Those living in Southeast are more likely to have gotten cholesterol screening than are those living in the gulf coast region. The only regional disparity in prevalence of high cholesterol is between adults in the gulf coast (39%) and Fairbanks (31%) regions.

Figure 65. Prevalence of No Cholesterol Screening in Past 5 Years by Region, Alaska Adults, 2005-2007 (combined)

Figure 66. Prevalence of High Cholesterol by Region, Alaska Adults Screened for Cholesterol, 2005-2007 (combined)
The likelihood of not having had one’s blood cholesterol level checked in the past 5 years generally decreases with increasing age in Alaska; that is, the older one is, the more likely one is to obtain cholesterol screening. Men in the 45-to54 age group are significantly more likely than women in that age group to have not gotten their cholesterol tested in the past 5 years.

The prevalence of reported high blood cholesterol increases with age, up to the age group of 55-64 years. In that age group approximately half of Alaskan adults report having an elevated blood cholesterol level.
The likelihood of not having had a blood cholesterol screening in the past 5 years decreases steadily with higher income and education in Alaska; in other words, Alaskans with more resources are more likely to have their cholesterol tested. Alaskans with annual incomes below $15,000 are more than twice as likely as those with incomes over $75,000 to report not having had their cholesterol tested in the past 5 years. Alaskans with less than a high school education are more than twice as likely as those who graduated from college to have gone without cholesterol screening. There is no significant trend in the reported prevalence of high blood cholesterol by income or education.

H. Multiple Risk Factors

It is an unfortunate fact that many adults possess not one, but many of the heart disease and stroke risk factors described in the previous sections. Compared to those with no risk factors or those with only one, individuals with multiple risk factors have the greatest risk for heart disease and stroke. Results from one study showed that men who reach 50 years of age without any of the following risk factors—high total cholesterol, high blood pressure, diabetes, and smoking—have a lifetime risk of cardiovascular
disease of only 5%. In contrast, those who have 2 or more of those risk factors by age 50 have a lifetime risk of nearly 70%. Individuals with multiple risk factors require the most urgent clinical and public health interventions to prevent morbidity and premature mortality related to heart disease and stroke.

Participants in the Alaska BRFSS do not answer questions about all leading heart disease and stroke risk factors each year. When data for the years 2003, 2005 and 2007 are combined it is possible to measure the overlapping prevalence of 6 key risk factors: smoking, physical inactivity, diabetes, obesity, hypertension, and high blood cholesterol.

It is striking that fewer than 1 in 5 of those surveyed report having none of the 6 risk factors. Another one-third of Alaskan adults have 1 risk factor, and the remaining 47% have 2 or more risk factors for heart disease and stroke.

Alaska men are significantly more likely than Alaska women to have multiple risk factors for heart disease and stroke. Alaska Natives are significantly more likely than Whites to have 2 or more of the selected risk factors.
More than half of the residents of rural Alaska have multiple risk factors for heart disease and stroke—this is a significantly higher percentage than seen in other regions of the state.

As expected, the prevalence of 2 or more risk factors increases sharply with advancing age. This is largely the result of the relatively late onset of such conditions as hypertension, obesity, diabetes and high blood cholesterol, despite unhealthy behaviors that start much earlier.
The prevalence of multiple risk factors decreases with both higher income and more education. For example, only 38% of college graduates but more than half of those without a high school education possess multiple risk factors.

I. Health Behavior Change and Health Provider Advice

There are many real and perceived barriers to making the kinds of lifestyle changes that could reduce one’s risk of heart disease and stroke. Health risk behaviors, such as smoking, eating too much fat and sugar, eating too few vegetables and fruits, and avoiding exercise, are often formed over one’s lifetime and such behavioral patterns can be difficult to alter. Quitting smoking is a difficult process and can take numerous attempts before one is successful. Changes to one’s diet or exercise routine often impact not just that person but also their family members, who may or may not be supportive. Our cities and towns have been designed to provide us with limitless access to food, while at the same time discouraging us from walking or biking to and from work and school.

It is within this context that our public health messages encouraging behavior change exist. To increase the likelihood that such messages are heard and adopted, it is important that they are delivered by sources seen as credible and trustworthy. Health care providers can be an ideal source for such messages—particularly for those already made aware of their health issues such as hypertension and hyperlipidemia. Providers’ advice and encouragement to lose weight, quit smoking, become more physically active, etc., can have a priming effect on subsequent public health messages that those patients will encounter, increasing the chances that lifestyle changes are made.57
In 2005 in Alaska, the BRFSS included several questions that assessed the following of those who had been told by their health care provider that they had high blood pressure:

(a) whether they had been advised by their health care providers to engage in specific health behavior changes aimed at reducing blood pressure, such as increasing the amount of physical activity they engaged in; and

(b) what specific actions they were taking to control their high blood pressure.

Specifically, participants who had ever been told they had high blood pressure were asked, “Has a doctor or other health professional ever advised you to do any of the following to help lower or control your blood pressure…Change your eating habits? Cut down on salt? Reduce alcohol use? Exercise? Take medication? (as 5 separate questions). A second set of questions assessed asked, “Are you now doing any of the following to help lower or control your high blood pressure… Changing your eating habits? Cutting down on salt? Reducing alcohol use? Exercising? Taking medication? (as 5 separate questions).

In 2006, a similar set of BRFSS questions (minus the salt and alcohol use items) was asked that focused on advice and action to control high cholesterol, among just those ever told they had high cholesterol.

Figure 76. Prevalence of Healthcare Provider Advice and Behavior Regarding Actions to Reduce High Blood Pressure, Alaska Adults with High Blood Pressure, 2005

Adults who have been told they have high blood pressure report varying levels health care provider advice regarding different lifestyle modifications to address their condition. Eight out of 10 with high blood pressure say they’ve been advised to increase physical activity levels; a similar percentage report being prescribed medication. Smaller percentages report having been advised to make dietary changes (61%), reduce salt (64% among those who use salt), or reduce alcohol use (49% among those who use alcohol). Approximately two-thirds to three-fourths of those given each type of advice report they are taking that particular action in order to control their blood pressure, with the highest level of compliance for taking blood pressure lowering medication.
A slightly different pattern is seen regarding cholesterol lowering advice and action. Adults who have been told they have high cholesterol are most likely to report having received health care provider advice regarding dietary changes (79%), followed by increasing exercise (68%); they are least likely to have been prescribed cholesterol-lowering medication (62%). Consistently three-fourths of those given each type of advice report they are taking that particular action in order to control their cholesterol.
Conclusion and Recommendations
Conclusion and Recommendations

The routinely collected surveillance data presented in this report only begin to provide the information needed to develop an effective public health response to heart disease and stroke in Alaska. At best, the mortality, hospitalization, and Medicaid data reported here offer an incomplete picture of the burden of heart disease and stroke borne by Alaskans today. Little is known about the ongoing prevalence of heart disease and cerebrovascular disease in our communities, outside of hospitals and mortuaries. Although some recent BRFSS questions attempt to capture this, the usefulness of those questions is limited due to the fact they reflect not just self-reports but self-reports of doctor-diagnosed prevalence; undiagnosed disease is completely missed. And even less is known about the quality of care being provided to Alaskans who suffer from heart disease and stroke—throughout the entire continuum of care. We cannot improve the quality of secondary and tertiary prevention of heart disease and stroke in Alaska without access to high quality data on pre-hospital transport, outpatient care, and long-term care.

Information on risk factors, which is required for the development and maintenance of population-based primary prevention efforts, is also limited. We currently have an incomplete picture of the steps Alaskans are taking or are willing to take to reduce their risk of heart disease and stroke. Thanks to a recent expansion of our surveillance of key risk factors and preventive strategies, such data should be available in the near future. However, we have no objective measure of the prevalence of hypertension, lipid disorders, obesity, or diabetes in the population. There is also little available information on the economic burden of heart disease and stroke in Alaska.

The gaps in our knowledge of heart disease and stroke in Alaska are unsettling. Despite these gaps, the following recommendations for action seem clear:

1. Given Alaska’s low rates of heart disease mortality and morbidity and moderate to high levels of key risk factors, we have an enormous opportunity and public health responsibility to keep those disease rates low by tackling risk factors head on. We need to turn our obesity, diabetes, hypertension, and high cholesterol rates around, begin to make an impact on rates of inadequate nutrition, and continue to gain ground with physical activity, smoking, and cholesterol screening.

2. Hospital discharge and Medicaid claims data indicate that treatment and long-term care for Alaskans who have had a stroke create a tremendous economic burden. Given the demographic shift projected to occur in Alaska over the next decades, coupled with the reality that the vast majority of hospital discharges and Medicaid payments for stroke occur among those 65 and older, it is imperative that we take an evidence-based, comprehensive approach to stroke treatment and care in order to reduce these substantial health and economic stroke-related costs. Toward this end we recommend the development of standardized stroke diagnostic guidelines for pre-hospital transport and a comprehensive stroke treatment plan that addresses acute and subacute care.
3. The data indicate a significant gender gap in the treatment of female hospital patients with ischemic heart disease. They are consistently less likely to receive angiography or arteriography, cardiac catheterization, PCI, or bypass surgery. More data are needed to understand the reasons for the disparities, and to develop strategies to correct them.

4. Forty percent of hospital discharges for heart disease and stroke are for Alaskans between the ages of 18 and 64. As a large proportion of the individuals in this age group are in the workforce, worksite-based prevention strategies may be an effective way to reach this population. More work needs to be done establishing best practices for primary and secondary prevention of heart disease and stroke within Alaskan worksites, the majority of which are small businesses.

5. Phase II cardiac rehabilitation (CR)—that is, 12-week, outpatient CR—is an effective but highly underutilized method of reducing morbidity and mortality from heart disease. There are several coverage-related challenges to more widespread adoption of this standard of care. Current Medicare coverage guidelines for Phase II CR are: (a) ambiguous regarding requirements for physician supervision of CR, and, (b) too restrictive regarding requirements for physician referral to CR. Alaska’s unique size, population density, and limited road system create an additional challenge to achieving higher levels of CR participation—particularly in more rural parts of the state. Over 40% of Alaskans live in communities with less than 10,000 residents—61 communities have populations under 1,000. Traditional hospital-based CR facilities are not sustainable in such communities. Public health and health care professionals in Alaska are encouraged to advocate for the appropriate changes to Medicare guidelines, and to support the utilization of existing CR programs and the development of alternative safe and reimbursable delivery models of CR in rural Alaska.

6. The prevalence of several key heart disease and stroke risk factors is high in Alaska, particularly in subgroups with relatively low income and education. Clinicians and public health professionals need to pay close attention to these social class-based inequities, often called disparities. Addressing disparities in health often equates to reducing gaps in health outcomes between racial or ethnic groups. While such gaps exist in Alaska, there are even stronger disparities for heart disease and stroke along lines of income and education. These disparities are especially challenging to address, as they require interventions aimed at marginalized and poorly organized populations. Clearly, renewed efforts targeting poor and undereducated Alaskans are required, including those aimed at tobacco prevention and cessation, better availability of low-cost healthy foods, increased opportunities for physical activity, and improved access to clinical preventive services.
Other recommendations for further public health activity to reduce the burden of heart disease and stroke can be found in Take Heart Alaska: A Cardiovascular Disease Prevention Plan for Alaska (2003). The plan is available on line at: http://www.partners.hss.state.ak.us/takeheart/pdf_files/THA%20CVD%20Prevention%20Plan.pdf.
Methodology
Methodology

This report was assembled entirely from existing data sources. Population data were provided by the Research and Analysis Section of the Department of Labor and Workforce Development and the US Census Bureau.

Mortality

Data on deaths from heart disease and stroke in Alaska were provided by the Alaska Bureau of Vital Statistics, Division of Public Health, Department of Health and Social Services. Alaska deaths included deaths of Alaska residents who died in other states. Comparable data for the United States were provided by CDC Wonder, an on-line resource of the Centers for Disease Control and Prevention (CDC). Data on place of death for US heart disease deaths came from the National Center for Health Statistics, CDC.

The cause of death used in our analysis was the underlying cause, based on the Ninth Revision of the International Classification of Diseases (ICD-9) for the years 1980 to 1998. In subsequent years ICD-10 was used to classify causes of death. Rates were not adjusted to account for discontinuities in transitioning between the 2 classification systems, but for categories of heart disease and stroke the comparability ratios between the systems are close to 1, according to a recent report of the CDC’s National Vital Statistics System. The following table describes the codes used to define the disease categories in this report:

<table>
<thead>
<tr>
<th>Category</th>
<th>ICD-9 Codes</th>
<th>ICD-10 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of the Heart</td>
<td>390 – 398; 402; 404; 410 – 429</td>
<td>100-09; I11; I13; I20 – I51</td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>410 – 414; 429.2</td>
<td>I20 – I25</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>428</td>
<td>I50</td>
</tr>
<tr>
<td>Stroke</td>
<td>430 – 434; 436 – 438</td>
<td>I60 – I69</td>
</tr>
</tbody>
</table>

Unless stated otherwise, all mortality rates were age-adjusted by the direct method, using the US 2000 standard population. Trend lines were drawn when rates were compared over time using a linear regression model. This model smoothed out year-to-year variations in rates to provide an estimate of the average rate of change during the period. Annual average percent change in mortality rates over the 14-year period was calculated using the following formula: \( e^{(\ln(R/T)-1)}\times100 \), where \( T \) = time periods; \( R = \) Rate(last)/Rate(first).

Four categories were used to define race/ethnicity. These are White, African American, American Indian/Alaska Native and Asian/Pacific Islander. Persons of unknown or other race/ethnicity were excluded from race/ethnic-specific analyses, but were included in data for all racial/ethnic groups combined. For the purposes of this report individuals were not identified as Hispanic or non-Hispanic.
Counts of place-specific deaths were calculated for the 14-year period of 1994 to 2007. Age-adjustment was not possible for the geographical analysis of heart disease and stroke mortality because of the small numbers of deaths reported from many of the state’s rural areas.

Place of residence at time of death may be different from where the deceased had lived when the disease developed. Migration related to medical care for heart disease- or stroke-related illness shortly before death may distort the death rates obtained in the both the location the patient departed and the location where care was sought.

Lines on columns within certain bar charts displaying mortality data indicate the 95% confidence intervals (CI) around each estimate. This interval denotes the range of values within which we are 95% confident the true estimate falls. Populations or subgroups whose 95% CIs do not overlap are said to be statistically significantly different from one another at the p < .05 level.

**Hospitalization**

Hospital discharge data for 2007 were provided through an agreement between the Department of Health and Social Services and the Alaska State Hospital and Nursing Home Association (ASHNHA). The discharge database does not include information from some of the state’s smaller hospitals, which accounted for an estimated 12% of discharges during 2007. Hospitalization rates for Alaska were adjusted by reducing population denominators by 12% to account for cases from hospitals not participating in the discharge database. Comparable national data on hospitalizations were obtained from National Hospital Discharge Survey of 2006.

For most analyses within this report, the primary diagnosis listed in the patient’s medical record was used. Because the primary diagnosis describes only one immediate reason for each admission, this method may underestimate the burden due to hospitalizations for heart disease and stroke—especially the impact of ischemic heart disease on hospitalization. A majority of admissions for diseases of the heart that are not primarily for ischemic heart disease are for congestive heart failure and cardiac dysrhythmias, which are frequently sequelae of previously diagnosed ischemic heart disease. To deal with this problem of underestimation and to give a broader sense of the true burden of heart disease and stroke, both primary and secondary diagnoses were considered to produce the overall cost estimate for heart disease and stroke (see page 20) and the counts and rates of heart disease and stroke shown in Table 3. So that the latter analysis would be comparable to data provided through the National Hospital Discharge Survey, the first 7 listed diagnoses were examined.

Data on discharges for healthy newborn infants were excluded from these analyses. Primary and secondary discharge diagnoses for each hospitalization were defined by codes in the ICD-9 Clinical Modification (CM) corresponding to the ICD-9 codes used to define cause of death (see above). Analysis was based on each unique discharge, not on individuals, who may have had multiple hospitalizations during 2007.
The following procedure codes were used to define selected procedures related to ischemic heart disease:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>ICD-9 CM Procedure Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiocardiography/Arteriography</td>
<td>88.4 – 88.58</td>
</tr>
<tr>
<td>Coronary artery bypass graft (“Bypass”)</td>
<td>37.21 – 37.23</td>
</tr>
<tr>
<td>Removal of coronary artery obstruction and insertion of stent(s) (or percutaneous coronary intervention “PCI”)</td>
<td>36.0</td>
</tr>
<tr>
<td>Insertion, replacement, removal, and revision of pacemaker leads or device (“Pacemaker”)</td>
<td>37.7 – 37.8</td>
</tr>
</tbody>
</table>

**Medicaid Data**

Medicaid claims data from SFY 2007 were provided by the Division of Health Care Services, Alaska Department of Health and Social Services. All claims for a single individual occurring between July 1, 2006 and June 30, 2007 were aggregated, yielding unduplicated individual records, potentially with multiple payments for health care services. The same set of ICD-9 codes that were used to categorize diagnoses in the mortality and hospital discharge data were applied to the Medicaid data. A primary diagnosis of diseases of the heart, ischemic heart disease, congestive heart failure, or stroke was coded if that was the primary diagnosis associated with any of the Medicaid claims for an individual within the specified year period. Data on payments were aggregated across multiple claims for each unique individual based upon the diagnosis.

Alaska Medicaid claims data contain both a primary and (if applicable) a secondary diagnosis for each health service interaction. The reliance on the primary diagnosis for this report almost certainly underestimates the prevalence of heart disease and stroke within this population, as these 2 conditions contribute to many other conditions for which a person might receive a primary diagnosis other than heart disease or stroke.

**Risk Factors**

Data were taken from the Alaska Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a random, anonymous telephone survey of Alaskan adults conducted by the Section of Chronic Disease Prevention and Health Promotion, Division of Public Health in cooperation with the CDC. The survey uses a sample stratified into 5 regions, with roughly equal numbers of interviews conducted in each region. This method deliberately over-samples rural areas of the state. Approximately 2,500 Alaskans currently participate in the survey each year. Where possible, indicators from the BRFSS data were combined with data from a second survey, the Alaska Modified BRFSS. This second survey was state developed and is funded by the Alaska Tobacco Prevention and Control Program and focuses largely on tobacco use and attitudes. It has been collected in Alaska since 2004. The Modified BRFSS uses the same sample design and data collection methodology as the Standard BRFSS. All data from the BRFSS surveys are obtained by self-report only.
Our analysis reports the weighted percentages of responses to questions related to key heart disease and stroke risk factors, and compares the responses of subgroups of the survey population. Confidence intervals around prevalence estimates were obtained using SUDAAN software. Lines on columns within risk factor bar charts indicate the 95% confidence intervals (CI) around each estimate. This interval denotes the range of values within which we are 95% confident the true estimate falls. Populations or subgroups whose 95% CIs do not overlap are said to be statistically significantly different from one another at the \( p < .05 \) level. SUDAAN was also used to test the significance of linear trends across time, as well as income and education levels. Only those trends or subgroup differences statistically significant at the \( p < .05 \) level are reported as showing a “significant change” or “being significantly different”, respectively.

For the purposes of this burden document, risk factor prevalence estimates were not age-adjusted to the US 2000 standard population. Given Alaska’s relatively young population, the prevalence of many risk factors indicative of heart disease, stroke, and many other chronic diseases are expected to be lower in Alaska in comparison with national estimates.

For the risk factor data presented in this report, 3 categories were used to define race/ethnicity. These are American Indian/Alaska Native, White, and other. Persons of unknown race/ethnicity were excluded from race/ethnic-specific analyses, but were included in data for all racial/ethnic groups combined. For the purposes of this report individuals were not identified as Hispanic or non-Hispanic.

The Alaska BRFSS divides the state into 5 regions. The first 4 are: Anchorage and vicinity, which includes the Matanuska-Susitna Borough; Gulf Coast, which includes the Kenai Peninsula and Kodiak Island Boroughs and the Valdez-Cordova census area; southeast Alaska; and Fairbanks and vicinity. The “rural” region is defined as all other regions of the state combined. Go to http://www.hss.state.ak.us/dph/chronic/hsl/brfss/regions.htm to see map of the 5 Alaska BRFSS regions.

Respondents were classified into 6 categories of annual income and 4 categories of educational attainment. Roughly equal numbers of respondents fell into each category, except those for lowest income and education groups, which were smaller.

Prevalence data are reported, when available, for each year since the BRFSS was introduced in Alaska in 1991. It should be noted that all heart disease and stroke risk factor questions are not surveyed each year. Comparisons of responses according to age, sex, race, place of residence, income and education were made by combining data for the same questions from the 3 most recent years they were asked.

Analysis of multiple risk factors was limited to 6 factors: current smoking, physical inactivity, diabetes, obesity, hypertension, and high blood cholesterol, as these were the only factors examined consistently during the 2003, 2005 & 2007.
The Burden of Heart Disease and Stroke in Alaska: Mortality, Hospitalization and Risk Factors
References


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