

Chapter 4:

Chronic Health Problems

Chronic diseases include such major health problems as diabetes and cardiovascular diseases, including high blood pressure, heart disease, and stroke. The conditions of being overweight and being obese are also included here under the category of chronic health problems. A number of other common disorders can also be included in this category, including degenerative arthritis and other rheumatic diseases, certain gastrointestinal problems, mental illnesses, and thyroid disorders. Chronic diseases are the leading causes of death and disability in the U. S., and they are also among the most preventable. Cancer, often categorized as a chronic disease, is discussed in a separate section, although it shares many risk factors with the other chronic diseases discussed in this chapter. Chronic respiratory diseases such as emphysema, or chronic obstructive pulmonary disease (COPD), and asthma, are discussed separately in the respiratory disease section.

4.1. Chronic Health Problems: Prevalence and Mortality

4.1.1. Cardiovascular Disease

Cardiovascular diseases are disorders involving the heart and blood vessels. Cardiovascular disease disproportionately affects those who are poor and less educated, but in Alaska, there does not appear to be a significant difference between rates among Native and non-Natives.¹ In the past, Alaska Natives had lower rates of heart disease mortality than non-Natives, but that difference has now disappeared. Furthermore, Alaska Natives suffer from a high prevalence of cardiovascular risk factors such as obesity, high blood pressure, tobacco smoking, and diabetes, putting them at increased risk for future disability and death from both coronary heart disease and stroke.²

4.1.1.1. Heart Disease and Stroke

Heart Disease Prevalence: Data from the 2010 NSB Census

In the 2010 NSB Census, 7% of household heads and 5% of all adult household members reported or were reported to have heart disease,³ compared with 12% of all adults in the U.S.⁴ The estimated prevalence in the NSB was lower than U.S. estimates for all age groups, although these comparisons must be made with caution because of other potential differences in the populations as well as the survey methods used. Heart disease, thus defined, may include not only coronary artery disease but also such problems as heart failure, rhythm abnormalities, and valve problems. Among NSB adults over 40 years of age, reported heart disease was slightly more prevalent among Iñupiat than other ethnic groups. Men were also more likely to report heart disease than were women. The prevalence of heart disease in the NSB was not associated with community of residence.³

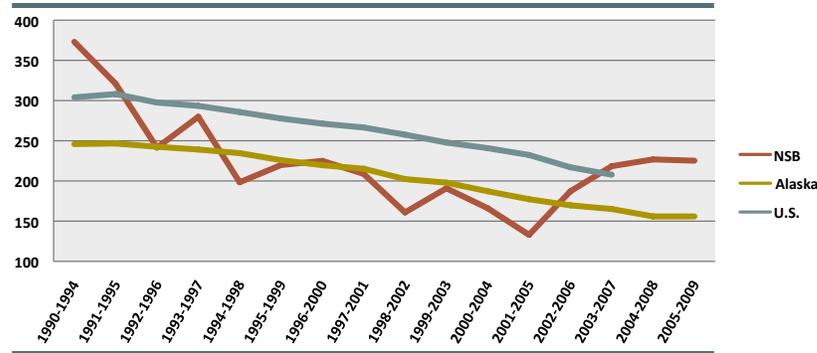
Heart Disease and Stroke Prevalence: Data from BRFSS

According to BRFSS survey data, in the combined years 2005–2007, the estimated percentages of NSB residents who had been told that they had had a heart attack (3%), had been diagnosed with angina or coronary artery disease (1%), or had had a stroke (1%) were slightly lower but not significantly different from statewide estimates.¹ Any comparisons between NSB and statewide must be made with considerable caution because of the small number of respondents in the NSB, lack of adjustment for age differences in the population, and lack of post-stratification at the borough level.

Heart Disease Mortality

Heart disease has been a leading cause of death in the NSB for many decades. Nationwide, death rates from heart disease and specifically from coronary heart disease, its most common form, have been declining for several decades, and rates in Alaska have been following a similar downward trend since the early 1990s.⁵⁻⁷ Because NSB rates are based on fewer events, rates fluctuate more widely from year to year. While heart disease rates in the NSB do also seem to have trended downward during the 1990s, it is not clear that this trend has continued over the past decade.

Figure 4.1: Heart Disease Mortality Rates: Average annual number of deaths per 100,000 population, 1990–2009

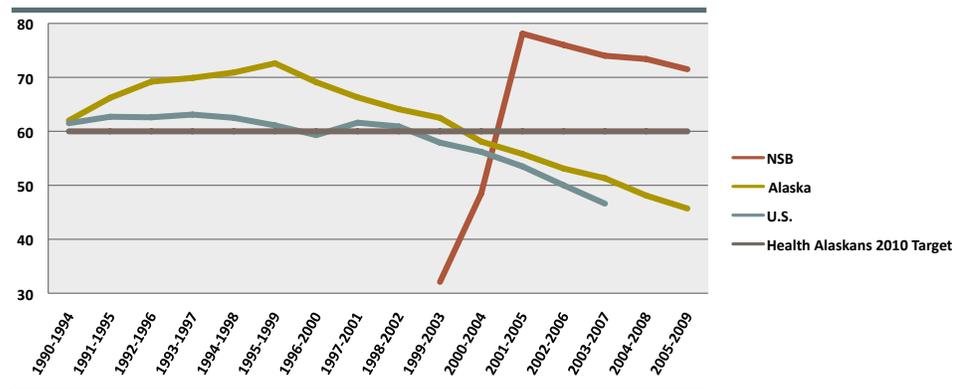


Rates are age-adjusted to the 2000 U.S. standard population.
 NSB and Alaska data source: Alaska Bureau of Vital Statistics.
 U.S. data source: *Health, United States 2007 with Chartbook on Trends in the Health of Americans and Health, United States 2008*.
 U.S. rates are for the single, midpoint of the 5-year period noted.
 NSB Rate for 2001–2005 is based on fewer than 20 events and must be interpreted with caution.

Stroke Mortality

In 2004–2006, stroke was the 5th leading cause of death in the NSB.⁵ Trends in stroke mortality in the NSB must be interpreted with extreme caution because of the low number of events (fewer than 20 deaths per time period); however, the apparent upward trend during the past decade raises concern about possible increasing burden of disease and death caused by stroke in the NSB. Nationwide and in Alaska, mortality rates from stroke are decreasing; among Alaska Natives, however, rates have not decreased significantly since 1980.⁸ In 2003–2007, stroke mortality rates among Alaska Natives were 30% higher than among U.S. whites. Unlike in the case of heart disease mortality, stroke mortality rates remain higher in Alaska as compared with national rates.^{5,6}

Figure 4.2: Stroke Mortality Rates: Average annual number of deaths per 100,000 population, 1990–2009



Rates based on fewer than six occurrences are not reported.
 NSB rates are based on fewer than 20 occurrences per time period and must be interpreted with caution.
 All rates are age-adjusted to the 2000 U.S. standard population.
 U.S. rates are for the single, midpoint year of the five-year period noted.
 Data source: Alaska Bureau of Vital Statistics, Healthy Alaskans 2010.
 U.S. data source: *Health, United States 2007, with Chartbook on Trends in the Health of Americans*.

4.1.1.2. High Blood Pressure

High blood pressure, or hypertension, is a cardiovascular condition that can lead to health problems such as stroke, heart attack, heart failure, and kidney failure. Because high blood pressure does not generally cause symptoms, the recognition of it requires an individual to seek out blood pressure screening or have contact with the healthcare system for another reason. It is estimated that about one-third of persons with high blood pressure are not aware that they have it. High blood pressure is more common among people who are overweight, lead a sedentary lifestyle, smoke, or have diabetes.

High Blood Pressure: Data from the 2010 NSB Census

The 2010 NSB Census collected data on the prevalence of high blood pressure in NSB communities. Overall, 28% of household heads reported that they had high blood pressure and 20% of all adult household members, including household heads, were reported to have high blood pressure. The prevalence of high blood pressure was not significantly associated with ethnic group except in the 40- to 64-year-old age group, where adults of other ethnicities were more likely to have been diagnosed with high blood pressure than Iñupiat or Caucasian adults. Men were slightly more likely than women to report a diagnosis of high blood pressure. The prevalence of high blood pressure was not significantly associated with community of residence.³ Comparing similar age groups, the prevalence of high blood pressure was similar among NSB adults³ and Alaskan adults overall.¹

High Blood Pressure: Data from BRFSS and SLiCA

According to BRFSS survey data, in the survey years 1994–2008, between 13% and 27% of NSB adults surveyed reported having been told they had high blood pressure. Estimates vary substantially from year to year because of the small numbers of respondents in the NSB, but unlike the pattern seen in diabetes rates, an upward trend in high blood pressure diagnoses is not apparent in the NSB. Estimates for Alaskan adults ranged between 19% and 25% for this period. Hypertension rates have been increasing in the U.S., with estimates for U.S. adults rising from 22% in 1995 to 28% in 2007.⁹ Statewide, the prevalence of high blood pressure is similar among Alaska Natives and non-Native Alaskan adults.¹

The SLiCA study also asked looked at high blood pressure. In this survey, 29% of Iñupiat ages 16 and over in the NSB reported having high blood pressure, compared with 17% of all respondents across the arctic indigenous regions combined.¹⁰

4.1.1.3. Cholesterol

Elevated cholesterol is a risk factor for coronary artery disease and stroke, and often exists in combination with other risk factors, such as diabetes, obesity, and hypertension. As in the case of high blood pressure, elevated cholesterol generally does not cause symptoms and diagnosis requires a screening blood test. Our understanding of the role of cholesterol in cardiovascular disease has evolved over the past two decades, becoming increasingly complex. Screening practices and diagnostic criteria have also changed during that time. The availability of powerful cholesterol-lowering drugs has encouraged more aggressive screening, diagnosis, and treatment practices in recent years.

Cholesterol: Data from the 2010 NSB Census

In the 2010 NSB Census, 19% of household heads and 13% of all adult household members reported or were reported to have high cholesterol,³ both significantly lower than the 38% of Alaskan adults in the 2007 Alaska BRFSS telephone survey who reported a diagnosis of high cholesterol.¹ These differences persisted when analyzed by individual age group, although differences may be due, in part, to differences in screening practices and level of awareness of the condition. In the NSB Census, Caucasians and those of other ethnic groups were significantly more likely to have been diagnosed with high cholesterol than were Iñupiat adults. Reported prevalence of high cholesterol among Iñupiat household heads was significantly related to community of residence, ranging from 5% in Point Lay to 29% in Anaktuvuk Pass. Of note, residents of Anaktuvuk Pass generally get their primary healthcare in Fairbanks rather than in Barrow, and it is possible that this difference reflects varying screening or treatment practices in these two healthcare settings. It may also reflect differences in diet or other factors.

Cholesterol: Data from BRFSS

According to BRFSS data, in the survey years 1994–2007, between 15% and 34% of NSB adults surveyed reported having been told they had high cholesterol. As with hypertension, the NSB sample size was small, and there was no obvious trend during this period.¹ It is not clear why these estimates tended to be higher than those from the 2010 NSB Census. In Alaska and the U.S., the percentage of adults reporting a diagnosis of high cholesterol has increased significantly since the early 1990s.⁹

4.1.2. Diabetes

Type 2 diabetes, the most common form of diabetes by far, is a chronic condition marked by abnormally high levels of blood sugar. It generally develops when the body's cells become progressively resistant to insulin, the main hormone responsible for regulating blood sugar. The risk of type 2 diabetes is increased by certain factors, including being overweight or obese, physically inactive, or of non-white race, or having family members with diabetes. Stress may also play a role. Like high blood pressure and high cholesterol, diabetes typically causes no symptoms until complications develop. Many people are unaware that they have diabetes or are at high risk of developing diabetes. Depending on the source of data, estimates of NSB diabetes prevalence vary substantially. Moreover, no data are available on residents who have not been tested for diabetes.

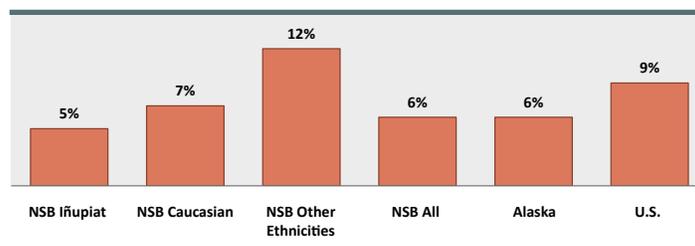
Nationwide, diabetes prevalence rates have doubled since 1980. Rates among some lower-48 American Indian tribes are among the highest in the world. Historically rare among Alaska Natives, type 2 diabetes rates have been rising rapidly across the state. Diabetes prevalence in Alaska Natives increased 148% between 1985 and 2004. Currently, there is no significant difference in self-reported diabetes prevalence between Alaska Natives and non-Natives.¹

4.1.2.1. Diabetes Data from the 2010 NSB Census

The 2010 NSB Census results suggest that the overall adult diabetes prevalence in the NSB (6%)³ is similar to that among adults statewide (6%).¹ The reported diabetes prevalence among NSB adults was similar to statewide estimates for all age groups. The overall adult diabetes prevalence in the NSB is slightly lower than the most recent national estimate from the National Health Interview Survey, but when analyzed by individual age groups, the differences are marginal.⁴ Of note, gestational diabetes, or diabetes occurring only during pregnancy, was not explicitly excluded from the NSB Census prevalence estimate, and so it is possible that the NSB Census estimate slightly overestimates the true prevalence of type 2 diabetes in the NSB.

According to 2010 NSB Census data, Iñupiat and Caucasian adults were significantly less likely to have a diagnosis of diabetes than were adults in other ethnic groups. The reported prevalence of diabetes in adults was significantly lower in the outlying villages than in Barrow, looking both at all ethnic groups combined (7% vs. 4%, respectively) and Iñupiat only (6% vs. 3%, respectively).³

Figure 4.3: Diabetes Prevalence* Among Adults, by Ethnic Group



*Rates reflect crude rates (not-age adjusted). In addition, pregnancy-related diabetes is excluded from state and national prevalence estimates and was not specifically excluded from the NSB census prevalence (generally adds 1% or less).

NSB data source: 2010 NSB Census.

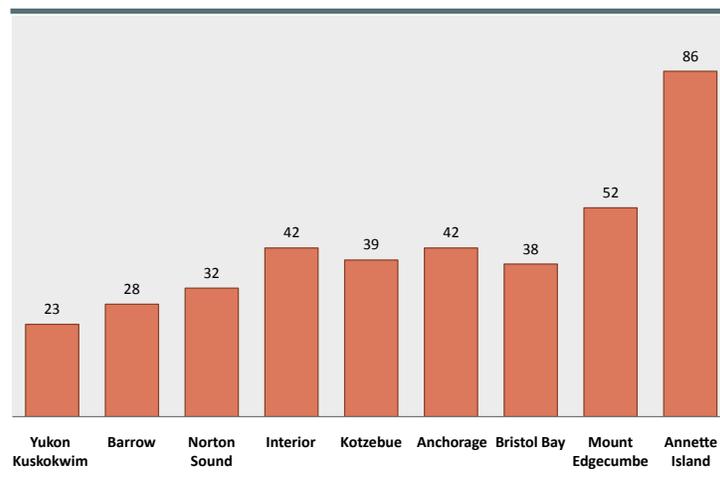
Alaska data source: 2008 Alaska BRFSS.

U.S. data source: 2009 National Health Interview Survey.

4.1.2.2. Data from the Alaska Native Diabetes Program Registry

The Alaska Native Medical Center’s Diabetes Program maintains a statewide diabetes registry for Alaska Natives based on the health records database used by the local diabetes programs in each service area. These prevalence estimates use as a denominator the Alaska Native user population for the Indian Health Service (IHS) service area (all ages), resulting in prevalence estimates that are lower than for adults or household heads as measured in the 2010 NSB Census. Barrow service area age-adjusted diabetes prevalence in 2006 was the second lowest among Alaska Natives statewide, estimated at 2.8%.¹¹

Figure 4.4: 2006 Age-Adjusted Diabetes Prevalence Among Alaska Natives, by IHS Service Unit: Number of cases per 1000 user population*



*Active cases per 1000 estimated user population, age-adjusted to 2000 U.S. standard population. Active cases are those who have had a visit within the service unit in the past three years.

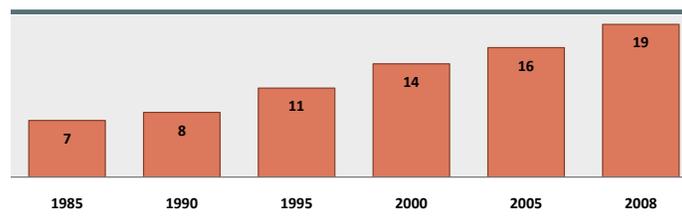
The Barrow IHS service unit generally covers the following villages: Atkasuk, Barrow, Kaktovik, Nuiqsut, Point Lay, and Wainwright. Residents of Anaktuvuk Pass and Point Hope are generally seen in Maniilaq and Tanana Chiefs services units, respectively.

Data source: Alaska Native Diabetes Program.

IHS=Indian Health Service

Based on the Alaska Native Diabetes Program registry data, diabetes has increased among Alaska Natives in the North Slope: between 1990 and 2006, age-adjusted diabetes prevalence increased 132% in the Barrow service unit. Crude prevalence in the NSB is shown below, demonstrating more than a doubling of the burden of the disease in the region between 1985 and 2008.¹¹

Figure 4.5: Trends in Diabetes Prevalence* Among NSB Alaska Natives: Number of cases per 1000 IHS estimated population



*Crude Prevalence: Not age-adjusted. Includes Alaska Native patients who have had a visit within the service area in the past three years (active cases).

Data source: Alaska Native Diabetes Program Registry.

Includes Alaska Native patients living in the following villages: Anaktuvuk Pass, Atkasuk, Barrow, Kaktovik, Nuiqsut, Point Hope, Point Lay, and Wainwright.

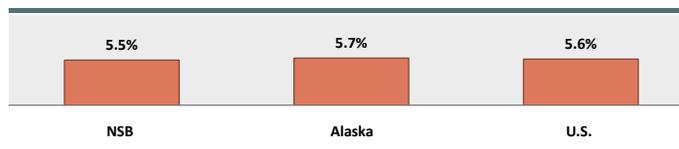
IHS=Indian Health Service

The Alaska Native Diabetes Program registry crude prevalence estimate for 2008 for the NSB, 1.9%, is lower than the 2.9% reported diabetes prevalence for Iñupiat, all ages, from the NSB 2010 census. The registry uses strict diagnostic criteria, and it is likely that the NSB census estimates included some self-reported diabetes diagnoses that did not meet these strict criteria. The ANMC Diabetes Registry also calculates separate estimates for pre-diabetes and diabetes of pregnancy, some of which may have been included in the 2010 NSB Census estimates.

4.1.2.3. Diabetes Estimates from the Alaska BRFSS

Based on three years of Alaska BRFSS telephone survey data (2005–2007), the age-adjusted prevalence of self-reported diabetes among adults in the NSB was similar to state and national estimates. Again, the NSB BRFSS estimates are based on a small number of survey respondents.

Figure 4.6: Age-Adjusted Adult Diabetes Prevalence from the Alaska BRFSS Survey, 2005–2007



NSB and Alaska data source: Alaska DHSS Diabetes Prevention and Control Program.

U.S. data: Centers for Disease Control and Prevention: Diabetes Statistics

All rates are age-adjusted to the 2000 U.S. standard population.

4.1.2.4. Diabetes in Teens: Data from YRBS

In the 2010 NSB Census, fewer than 1% of adolescents aged 14–18 years were reported to have diabetes.³ In the 2005 YRBS survey, 4.6% (C.I. 2.5–8.3%) of NSB high school students reported having ever been told by a doctor that they had diabetes, compared with 2.8% of students sampled statewide in 2007.¹² This difference was not statistically significant. The reason for the discrepancy between the 2010 NSB Census and 2005 YRBS data is not entirely clear.

4.1.3. Obesity

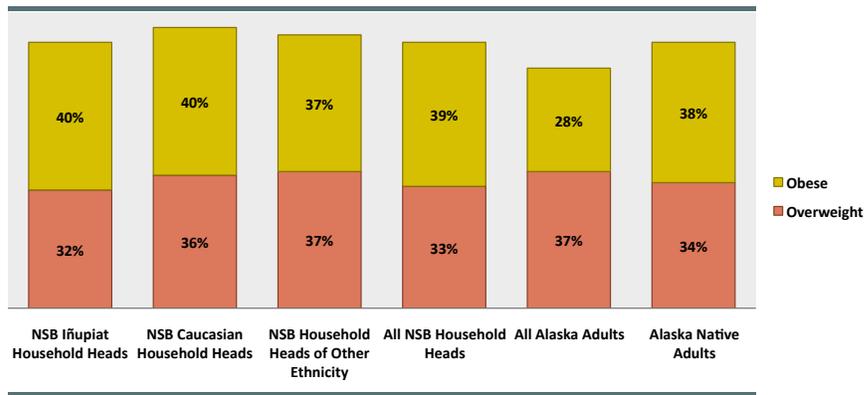
Obesity and being overweight are among the most common chronic health problems in the country, together affecting roughly two-thirds of Americans.⁹ Obesity and being overweight are associated with a number of other chronic health problems, including high blood pressure, heart disease, diabetes, arthritis, certain cancers, and some types of respiratory problems. Those who are obese are far more likely to report poor general health than those who are not obese.

Estimation of population obesity rates typically utilizes a measure called body mass index (BMI), which is simply a ratio of weight to height. Weight and height may be measured, or, for survey data, self-reported. Whereas it is not a perfect indicator, for most populations, BMI correlates fairly well with percent body fat and is a good predictor of health risks associated with various weight categories. In some populations, however, BMI may be a less accurate predictor of weight status than percent body fat or other measurements. There is some evidence that this is the case in Alaska Native women.¹³ Percent body fat and other measurements, such as waist circumference, are typically not available at the population level, however, and are more difficult to obtain than BMIs calculated from reported height and weight. BMI has been shown to correlate well with health risks in diverse racial and ethnic populations.¹⁴

4.1.3.1. Obesity Data from the 2010 NSB Census

BMI data from the 2010 NSB Census demonstrate that being overweight and/or being obese are common among NSB household heads. Fewer than one-third of NSB household heads were at a healthy weight.³ The prevalence of being overweight and/or being obese did not vary significantly by ethnic group among NSB household heads,³ unlike adults at the state and national level.¹⁹ NSB household heads were slightly less likely to be overweight but more likely to be obese than were adults statewide, and estimates were similar to those for Alaska Natives statewide.¹

Figure 4.7: Overweight and Obesity Among Adults, by Ethnic Group



NSB data source: 2010 NSB Census.

Alaska data source: 2008 BRFSS.

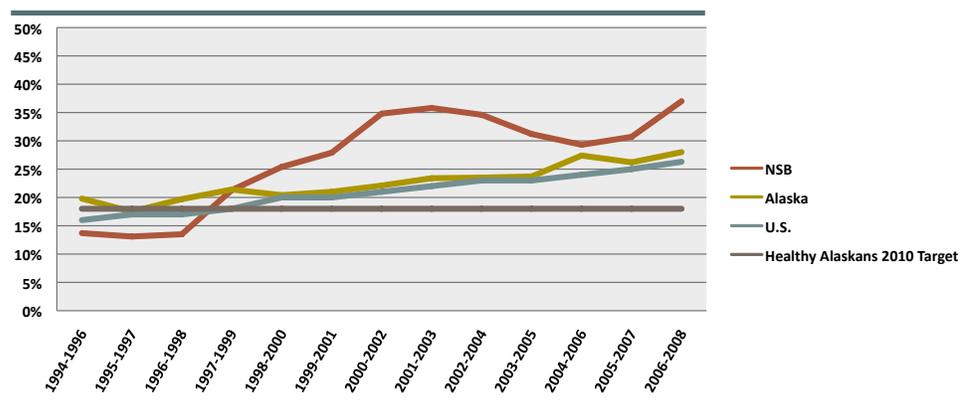
Overweight is defined as BMI ≥ 25 and < 30 , and obesity is defined as BMI ≥ 30 .

Household heads aged 30–39 years were most likely to be overweight or obese, and women were more likely to be obese than men (45% vs. 34%, respectively). The likelihood of obesity was also significantly associated with village of residence. Estimated obesity rates ranged from a low of 23% in Anaktuvuk Pass to a high of 48% in Point Hope. Anaktuvuk Pass household heads were the most likely to be within the healthy weight range (45%), while Wainwright household heads were least likely (23%) to be of a healthy weight.³

4.1.3.2. Obesity Trends: Data from BRFSS

BRFSS survey data also confirm that being overweight and/or being obese are common conditions in the NSB, with almost two-thirds of adults estimated to be either overweight (BMI ≥ 25 and < 30) or obese (BMI ≥ 30). Whereas the estimated percentage of adults in the NSB who are overweight does not show a clear trend, obesity rates have increased in the NSB since the mid 1990s. The prevalence of obesity and being overweight has risen dramatically nationwide among both adults and children over the past three decades. Obesity rates have also risen statewide during this time period, more than doubling since 1991. Obesity is an area of racial and socioeconomic health disparity nationwide, with higher rates in racial minorities and those with lower education and income levels. In Alaska, obesity is more common among Alaska Natives than non-Natives statewide.¹

Figure 4.8: Adult Obesity Trend Data from the BRFSS Survey:
Percent of adults who are obese (BMI ≥ 30), 1994–2008



*BMI=body mass index.

U.S. and Alaska data source: Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS).

NSB data source: Sub-regional analysis of Alaska BRFSS data for 1994–2007 provided by Alaska Department of Health and Social Services, Chronic Disease Prevention and Health Promotion, Division of Public Health. 2006–2008 estimates are from the County Health Rankings website based on BRFSS data.

NSB results are weighted according to the BRFSS rural region and not post-stratified to the NSB. Results are not age-adjusted.

Alaska and U.S. data are for the single, midpoint year of time period shown.

In 2006–2008, the NSB had one of the highest estimated adult obesity rates in the state, based on BRFSS survey data.¹⁵ Estimates vary from year to year, and rankings must be interpreted with caution due to small sample sizes and wide error margins.

Table 4.1: Adult Obesity Rates in Alaska, by Borough and/or Census Area, 2006–2008

	% of Adults Who Are Obese (BMI ≥ 30)	Error Margin
Dillingham	37%	29–47%
NORTH SLOPE	37%	29–47%
Bethel	34%	29–41%
Bristol Bay	34%	24–47%
Lake and Peninsula	34%	24–47%
Prince of Wales-Outer Ketchikan	34%	26–44%
Skagway-Hoonah-Angoon	34%	26–45%
Ketchikan Gateway	33%	28–39%
Southeast Fairbanks	33%	25–42%
Northwest Arctic	32%	25–41%
Valdez-Cordova	32%	26–39%
Nome	31%	25–39%
Wade Hampton	30%	23–38%
Aleutians West	29%	22–38%
Kenai Peninsula	29%	26–33%
Matanuska-Susitna	29%	24–34%
Sitka	29%	22–36%
Yakutat	29%	20–41%
Yukon-Koyukuk	29%	23–37%
Aleutians East	28%	20–39%
Denali	28%	21–38%
Haines	28%	21–38%
Juneau	27%	23–31%
Kodiak Island	27%	22–32%
Anchorage	26%	23–29%
Fairbanks North Star	26%	24–29%
Wrangell-Petersburg	25%	19–32%

Data source: County Health Rankings: Mobilizing Action Toward Community Health, citing data from U.S. BRFSS.

Child obesity is discussed separately in Chapter 6: Maternal and Child Health.

4.1.4. Arthritis and Chronic Pain

In the 2010 NSB Census, arthritis and/or chronic pain was second only to high blood pressure as the most common chronic health problem reported among adults. Twenty-nine percent of household heads and 21% of all adults reported or were reported to have daily pain or arthritis that limits activities or requires prescription pain medicine. Women were more likely than men to report this problem, and it was more common among Iñupiat than other ethnic groups (although the relationship with ethnic group was only statistically significant in the 40- to 64-year-old age group).³

Arthritis is a growing problem in Alaska, and is associated with significant disability, cost, and suffering. The prevalence of reported doctor-diagnosed arthritis in Alaska increased 59% between 2001 and 2007, and among Alaskans aged 45–64 years, it increased 70%. Overall, persons with arthritis are more likely to report fair to poor overall health, and they often suffer from other chronic diseases.¹⁶

Rheumatoid Arthritis: Rheumatoid arthritis is a chronic autoimmune disease causing inflammation of the joints and sometimes involvement of other organs. At Samuel Simmonds Memorial Hospital outpatient clinics, rheumatoid arthritis is among the top 10 visit codes, accounting for more than 650 visits in the Barrow service unit.¹⁷ This visit frequency may be due, in part, to the frequent laboratory monitoring required for many rheumatoid arthritis medications.

Osteoarthritis: Osteoarthritis, or degenerative arthritis, is the most common form of arthritis. It is associated with obesity, increasing age, and history of joint injury. Prevention of this common form of arthritis involves maintaining a healthy weight through diet and physical activity, and avoiding injury by protecting joints through stretching and appropriate gear and equipment.¹⁶

4.1.5. Thyroid Disorders

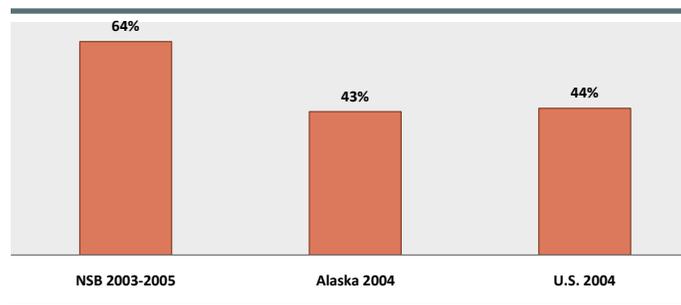
Thyroid problems have been brought up as a health concern in at least one NSB community.¹⁸ Local anxiety about thyroid problems has likely been amplified by the unfortunate history of unethical thyroid function research involving the radioactive tracer Iodine 131¹⁹ as well as by worries over environmental contamination from local industrial and global sources.

The 2010 NSB Census asked household heads whether they had ever been diagnosed with a thyroid problem. Overall, 6% of household heads and 4% of all adults reported or were reported to ever have had a thyroid problem.³ The prevalence of thyroid problems did not vary significantly by village of residence. National statistics are limited, but based on one analysis of National Health and Nutrition Examination Survey (NHANES) data, the lifetime prevalence of self-reported thyroid disorders among U.S. adults is slightly higher than the NSB prevalence estimate, approximately 9%. The difference in these estimates may be affected by differences in age composition of the populations.²⁰ In the NSB and nationally, women are significantly more likely than men to report thyroid problems.^{3,20} Prevalence rates can also vary widely because of varying screening practices among providers and health systems, as thyroid disorders often have subtle symptoms, and require laboratory testing to confirm a diagnosis.

4.1.6. Periodontal Disease and Tooth Decay

Almost two-thirds of adults in the NSB have had at least one permanent tooth removed (excluding tooth loss because of trauma), a statistically significantly higher proportion than among Alaska or U.S. adults overall.¹⁹ About one-fourth of NSB adults have had six or more permanent teeth removed.¹

Figure 4.9: Percent of Adults with Any Permanent Teeth Removed



Alaska and U.S. data source: Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS).

NSB data source: Sub-regional analysis of Alaska BRFSS data provided by Alaska Department of Health and Social Services, Chronic Disease Prevention and Health Promotion, Division of Public Health.

NSB results are weighted according to the BRFSS rural region and not post-stratified to the NSB. Results are not age-adjusted.

Tooth decay and periodontal disease can lead to loss of permanent teeth, resulting in difficulty chewing and eating a healthy diet. Periodontal disease can also worsen diabetes and may be a causal factor in a number of other health problems, including preterm delivery and cardiovascular disease. Chronic poor dentition is often a marker of poor overall health. Dental health among children is discussed in Chapter 6: Maternal and Child Health.

4.1.7. Chronic Gastrointestinal Problems

The fourth most common health problem reported by Iñupiat adults in the NSB in the SLICA study was “stomach problems or intestinal ulcers,” with 15% of Iñupiat adults surveyed reporting experiencing these problems.¹⁰ Although sometimes minor and self-limited, gastrointestinal problems often become chronic. Gastritis, or inflammation of the stomach lining, as well as gastrointestinal ulcers are common in rural Alaska and are also thought to contribute to the high rate of chronic iron deficiency anemia through microscopic bleeding in the gastrointestinal tract.²¹ Gastrointestinal problems were not asked about in the 2010 NSB Census.

4.2. Determinants of Chronic Health Problems

Many of the chronic health conditions discussed in this chapter share a pattern of health determinants. Whereas genetic factors certainly play an important role, research suggests that a substantial portion of these diseases can be attributed to health-related behaviors as well as social, economic, and environmental factors.²² Again, personal behaviors are also strongly influenced by these external factors. In other words, the context of people’s lives drives much of human behavior, including many of the important behaviors that influence health.

4.2.1. Health-Related Behaviors

4.2.1.1. Tobacco Smoking

The high smoking rates in the NSB are discussed in detail in Chapter 1: Overall Health.

Whereas the effects of tobacco on respiratory diseases and cancer are often emphasized and generally well-known, tobacco smoking also plays a major role in the development of other chronic diseases, for example:

- It is estimated that smoking tobacco accounts for 30% of deaths from coronary heart disease and 18% of deaths from stroke.²³
- Tobacco use, especially cigarette smoking, is a known risk factor for periodontal disease.²⁴

4.2.1.2. Diet and Nutrition

Diet and nutritional factors in the NSB are discussed in detail in Chapter 1: Overall Health.

It has long been recognized that diet plays a major role in the development of chronic disease.

- Up to 30% of deaths from coronary heart disease are because of unhealthy diets.²³ Unhealthy diets include those with inadequate intake of fiber, fruits, and vegetables, and excessive intake of processed food containing high levels of salt, sugar, and saturated fat and trans-fatty acids.
- Subsistence foods have been associated with lower rates of impaired glucose tolerance, a risk factor for diabetes,²⁵⁻²⁷ high blood pressure,²⁸ and unfavorable cholesterol profiles.^{27,29} Bowhead whale blubber, an important subsistence food in the NSB, has been found to contain high levels of omega-3 fatty acids, which have been suggested or shown to be important in the prevention of many chronic diseases, including elevated blood pressure and cholesterol, heart disease, stroke, diabetes, arthritis, depression, and some cancers.³⁰
- Each additional serving of fruits and vegetables is associated with a 6% lower risk of stroke,²³ an emerging leading cause of death in the NSB.
- Poor diet is a factor in many other chronic health problems such as chronic gastrointestinal problems, tooth decay, and periodontal disease.
- High consumption of soda and other sugar-sweetened beverages (SSBs) is associated with obesity, cardiovascular disease, tooth decay, diabetes, and other chronic health conditions.³¹

4.2.1.3. Physical Activity

Physical activity data for the NSB are discussed in detail in Chapter 1: Overall Health.

Many studies have demonstrated that adequate levels of physical activity can reduce the risk of developing cardiovascular disease, diabetes, high blood pressure, certain cancers, chronic constipation, and other health problems such as chronic back pain and certain types of dementia.

- Those with an inactive lifestyle are twice as likely to develop coronary heart disease as those who are vigorously active, and women who walk briskly for half an hour each day reduce their risk of coronary heart disease by 35%.²³
- Middle-aged men who are inactive are three times as likely to have a stroke as men who exercise vigorously.²³
- Non-mechanized activity has been associated with reduced risk of hypertension among Alaska Natives.²⁸

4.2.1.4. Alcohol and Substance Abuse

Alcohol and drug use data for the NSB are discussed in detail in Chapter 7: Behavioral Health.

In addition to their obvious social and psychological impacts, alcohol and substance abuse are associated with a number of chronic diseases, including chronic liver disease and other gastrointestinal problems, high blood pressure and other heart conditions, and certain cancers.

4.2.2. Socioeconomic Factors

Socioeconomic conditions in the NSB are discussed in detail in Chapter 1: Overall Health.

As with most areas of health, socioeconomic factors exert a strong influence on chronic disease risk through a variety of pathways, including but not limited to impacts on health-related behaviors. The chronic stress associated with poor job opportunities, lack of social support, exposure to violence and discrimination, and the lack of good educational experiences and opportunities at all ages have been associated with increased prevalence of many chronic diseases.

4.2.3. Physical Environment

Physical environment in the NSB is discussed in detail in Chapter 1: Overall Health.

The physical environment in which one lives affects the risk of developing chronic diseases through a variety of pathways.

- Opportunities for physical recreation: In recent years, growing attention has been paid to the importance of recreational opportunities in the prevention of chronic disease. These may take the form of gyms or basketball courts, walking or biking paths, space for traditional dance groups to meet, or simply access to natural environments.
- Air pollution: Poor air quality has been associated with an increased risk of cardiovascular disease,³² as well as asthma, chronic lower respiratory disease, and lung cancer.³³⁻³⁶
- Other environmental toxins and contaminants: Studying the links between environmental contaminants and chronic disease is difficult because of the multitude of potential exposures, the complex nature of chronic disease risk, and the often long period of time between exposure and development of disease. Moreover, the vast majority of chemicals in common use today have never been tested for safety, including their possible contributions to the risk of cancer and other chronic diseases. Nonetheless, decades of research have demonstrated that environmental contaminants clearly play a role in a number of major diseases in the U.S. Environmental contributions to cancer risk are briefly discussed in Chapter 2: Cancer. Other research has also explored possible connections between environmental pollutants and other chronic diseases such as diabetes^{37,38} and thyroid disorders.^{39,40}

4.2.4. Access to Preventive Health Services

Access to various preventive health services in the NSB is discussed in detail in Chapter 1: Overall Health.

Health education, screening, and medical preventive measures can affect the likelihood of developing chronic diseases as well as the likelihood of experiencing complications or death from chronic disease.

Chapter 4 Endnotes

1. Behavioral Risk Factor Surveillance System (BRFSS): Statewide data accessed online at <http://www.hss.state.ak.us/dph/chronic/hsl/brfss/default.htm>. NSB-specific data for 1991–2007 was provided upon request for this report by the Alaska Department of Health and Social Services, Chronic Disease Prevention and Health Promotion, Division of Public Health.
2. McLaughlin, J.B., J.P. Middaugh, C.J. Utermohle, E.D. Asay, A.M. Fenaughty, and J.E. Eberhart-Phillips. Changing patterns of risk factors and mortality for coronary heart disease among Alaska Natives, 1979–2002. *Journal of the American Medical Association* 291, no. 21 (2004): 2545–2546.
3. 2010 NSB Census (Full report to be published this spring, available through NSB Planning Department).
4. Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2009. Series 10: Data from the National Health Interview Survey, No. 249. http://www.cdc.gov/nchs/data/series/sr_10/sr10_249.pdf. This is a door-to-door household survey conducted annually in the U.S.
5. Alaska Bureau of Vital Statistics (ABVS): <http://www.hss.state.ak.us/dph/bvs/data/default.htm>
6. *Health, United States, 2007, with Chartbook on Trends in the Health of Americans*. National Center for Health Statistics, Hyattsville, MD. 2007. Accessed online at <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=healthus07>.
7. *Health, United States, 2008, with Special Feature on the Health of Young Adults*. National Center for Health Statistics, Hyattsville, MD. Accessed online at <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=healthus08>.
8. *Alaska Native Health Status Report*. Prepared by the Alaska Native Epidemiology Center, Alaska Native Tribal Health Consortium. August, 2009. <http://www.anthc.org/chs/epicenter/upload/ANHSR.pdf>.
9. Centers for Disease Control and Prevention: Behavioral Risk Factor Surveillance system (BRFSS) Prevalence and Trends Data. Data accessed online at <http://apps.nccd.cdc.gov/brfss/>.
10. Poppel, B., J. Kruse, G. Duhaime, and L. Abryutina. 2007. *SLiCA Results*. Anchorage: Institute of Social and Economic Research, University of Alaska Anchorage. Data tables and other information about the study were accessed online at http://www.iser.uaa.alaska.edu/Projects/living_conditions/results.htm.
11. Alaska Native Diabetes Program: <http://www.anmc.org/services/diabetes/epidemiology/>.
12. Alaska Youth Risk Behavior Survey (YRBS): <http://www.hss.state.ak.us/dph/chronic/school/YRBSresults.htm>. NSB-specific data from 2005 survey was provided courtesy of the NSB School District. Weighted state-level data are not available from the 2005 survey, so the 2007 survey was used for statewide estimates.
13. Stommel, M., and Schoenborn, C. Variations in BMI and prevalence of health risks in diverse racial and ethnic populations. *Obesity* 18, no. 9 (2010): 1821–1826.
14. Smith, J., P. Easton, D. Wiedman, N. Rody, K. Hamrick, E.D. Nobmann, E.G. Widmark, D. Peck, and J. Cipra: Comparison of BMI and body fat determinations in rural Alaska women: results of the WIC Healthy Mom Survey, Summer 2001. *Alaska Medicine* 46, no. 1 (2004): 18–27.
15. County Health Rankings: Mobilizing Action Toward Community Health, a project of the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. Accessed online at: <http://www.countyhealthrankings.org/>.
16. *Alaska Arthritis Plan*. State of Alaska Department of Health and Social Services. June 2008. Accessed online at <http://www.hss.state.ak.us/dph/chronic/arthritis/>.
17. Indian Health Service National Patient Information and Reporting System/National Data Warehouse (NPIRS/NDW). Department of Health and Human Services, Indian Health Services. <http://www.ihs.gov/CIO/DataQuality/warehouse/>.
18. Atuanguaruk, R., resident and former community health aide, Nuiqsut, Alaska. Personal communication December, 2009.
19. *Investigation and Analysis of the Arctic Aeromedical Laboratory's Thyroid Function Experiment on Humans and the U.S. Government's Response*, prepared for the NSB by Petumenos, T., J. Woodruff, R. Buckendorf, at Birch, Horton, Bittner and Cherot. January, 1997. Provided courtesy of the NSB, Tuzzy Consortium Library.
20. Melzer, D., N. Rice, M.H. Deplodge, W.E. Henley, T.S. Galloway: Association between Serum Perfluorooctanoic Acid (PFOA) and thyroid disease in the U.S. NHANES. *Environmental Health Perspectives* 118, no. 5 (2010): 686–692.
21. Parkinson, A., B. Gold, L. Bulkow, R. Wainwright, B. Swaminathan, B. Khanna, K. Petersen, M.A. and Fitzgerald: High prevalence of helicobacter pylori in the Alaska Native population and association with low serum ferritin levels in young adults. *Clinical and Diagnostic Laboratory Immunology* 7, no. 6 (2000): 885–888.
22. Marmot, M. and R. Wilkinson: *Social Determinants of Health*, Second Edition, Oxford University Press, 2006.
23. *The Burden of Heart Disease and Stroke in Alaska: Mortality, Morbidity, and Risk Factors. July 2006 Update*. State of Alaska Department of Health and Social Services, Section of Chronic Disease Prevention and Health Promotion, Division of Public Health. Accessed online at http://www.hss.state.ak.us/dph/chronic/chp/pubs/burden_july06.pdf.

24. *An Oral Health Survey of American Indian and Alaska Native Dental Patients: Findings, Regional Differences and National Comparisons*. Indian Health Service. Accessed online at http://www.hss.state.ak.us/dph/wcfh/oralhealth/docs/Oral_Health_1999_IHS_Survey.pdf.
25. Adler, A.I., E.J. Boyko, D.C. Schraer, and N.J. Murphy: Lower prevalence of impaired glucose tolerance and diabetes associated with daily seal oil or salmon consumption among Alaska Natives. *Diabetes Care* 17, no. 12 (1994): 1498–1501.
26. Murphy, N.J., and C.D. Schraer: Dietary change and obesity associated with glucose intolerance in Alaska Natives. *Journal of the American Dietetic Association* 95, no. 6 (1995): 676–682.
27. Ebbesson, S.O., P.M. Risica, L.O. Ebbesson, J.M. Kennish, and M.E. Telero: Omega-3 fatty acids improve glucose tolerance and components of the metabolic syndrome in Alaskan Eskimos: The Alaska Siberia Project. *International Journal of Circumpolar Health* 64, no. 4 (2005): 396–408.
28. Murphy, N.J., C.D. Schraer, M.C. Theile, E.J. Boyko, L.R. Bulkow, B.J. Doty, and A.P. Lanier: Hypertension in Alaska Natives: association with overweight, glucose intolerance, diet and mechanized activity. *Ethnicity and Health* 2, no. 4 (1997): 267–275.
29. Bjerregaard, P., M.E. Jorgensen, and K. Borch-Johnsen: Serum lipids of Greenland Inuit in relation to Inuit genetic heritage, westernization and migration. *Atherosclerosis* 174, no. 2, (2004): 391–398.
30. Reynolds, J.E., D.L. Wetzel, and T.M. O'Hara: Human health implications of omega-3 and omega-6 fatty acids in blubber of the bowhead whale. *Arctic* 59, no. 2 (2006): 155–164.
31. *CDC Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages*. Centers for Disease Control and Prevention. March, 2010. Accessed online at http://inhealthyweight.org/files/StratstoReduce_Sugar_Sweetened_Bevs.pdf.
32. *Air Pollution and Cardiovascular Disease*. National Institute of Environmental Health Sciences—National Institutes of Health. Accessed online at <http://www.niehs.nih.gov/health/impacts/cardiovascular.cfm>.
33. Pruss-Ustun, A., and C. Corvalan: *Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease*. World Health Organization, 2006. Accessed online at http://www.who.int/quantifying_ehimpacts/publications/preventingdisease/en/.
34. Chimonas, M.R., and B.D. Gessner: Airborne particulate matter from primarily geologic, non-industrial sources at levels below national Ambient Air Quality Standards is associated with outpatient visits for asthma and quick-relief medication prescriptions among children less than 20 years old enrolled in Medicaid in Anchorage, Alaska. *Environmental Research* 102, no.3 (2007): 397–404.
35. Gordian, M.E., and A.H. Choudhury: PM10 and asthma medication in schoolchildren. *Arch Environ Health* 58, no. 1 (2003): 42–47.
36. Gordian, M.E.: Air Quality in Alaska Asthma Studies. Presentation, Institute for Circumpolar Health Studies. Accessed online at <http://www.uaa.alaska.edu/search.cfm?cx=002889948422138258969%3Am5fqhfwigqk&cof=FORID%3A11&ie=UTF-8&q=Air+Quality+in+Alaska+Asthma+Studies&sa=>.
37. Lee, D.H., I.K. Lee, K. Song, M. Steffes, W. Toscano, B. A. Baker, and D.R. Jacobs: A strong dose-response relation between serum concentrations of persistent organic pollutants and diabetes. *Diabetes Care* 29, no. 11(2006): 1638–1644.
38. Turyk, M., H. Anderson, L. Knobeloch, P. Imm, and V. Persky: Organochlorine exposure and incidence of diabetes in a cohort of great lakes sport fish consumers. *Environmental Health Perspectives* 117, no. 7 (2009): 1076–1082.
39. Melzer, D., N. Rice, M.H. Depledge, W.E. Henley, T.S. Galloway: Association between Serum Perfluorooctanoic Acid (PFOA) and thyroid disease in the U.S. NHANES. *Environmental Health Perspectives* 118, no. 5 (2010): 686–92.
40. Dallaire, R., G. Muckle, E. Dewailly, S. Jacobson, J. Jacobson, T. Sandanger, D. Sandau, and P. Ayotte: Thyroid hormone levels of pregnant Inuit women and their infants exposed to environmental contaminants. *Environmental Health Perspectives* 117, no. 6 (2009): 1014–1020.