

# Health Status of the Arctic Residents

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## Summary

In recent years there has been significant improvement in the general health of the indigenous peoples of the North. However, significant health disparities remain between indigenous residents and majority populations. For instance, shorter life expectancy and mortality related to suicide and injuries are still more frequent. Lifestyle related conditions, such as obesity, diabetes mellitus, and circulatory disease have become more frequent. Since the age structure in the indigenous populations includes a large number of young persons, preventive measures are very important in reducing the burden of these diseases.

## 3.1. Introduction

The health status of Arctic residents, as it is for all people, is the result of the complex interaction between environment, genetics, nutrition, psychological factors, and economic conditions.

The Arctic is not a homogeneous region, and Arctic residents, while fewer in number than in temperate regions, are extremely diverse, with very few features in common except latitude of residence and hours of daylight. Some Arctic regions are economically depressed, such as much of Arctic Russia, while most others do provide at least adequate economic opportunities and support for residents. Some regions do not keep ethnic-specific health data, while others separate health data by ethnic group. Some countries combine the sparse Arctic population data with that of the remainder of the country so that regional differences in health status are not discernible. In some regions, data are difficult or impossible to obtain.

Despite these limitations, examination of available health status information can provide useful insights into major public health problems, and can suggest where, over time, useful information on the possible health impact of contaminants might be obtained. As this chapter will show, there are significant differences in the age structure of the various Arctic populations. Indigenous (or largely aboriginal) populations such as those found in Alaska, Greenland, and Canada (the Yukon, the Northwest Territories, Nunavut, and northern Quebec and Labrador – referred to collectively as Arctic Canada) have a larger percentage of younger persons and fewer elderly persons than the non-indigenous populations of Iceland, Sweden, Norway, Finland, and the Faroe Islands. For this reason, most population data are age-adjusted to compensate for these differences. Data for Greenland are presumed to represent the dominant (90%) Inuit population.

This chapter does not include information on the current health care system in each country, nor on access to health care, as these are both outside the scope of AMAP. Rather, it reviews current population structure,

current population health indicators and selects indicators of maternal and child health morbidity and mortality for the populations of Arctic countries. A section highlighting the differences in health status of Arctic indigenous residents is included to focus attention on the most vulnerable Arctic populations.

Among Arctic populations, advances in acute care, in public health practices, such as childhood immunization, prenatal care, safe water supplies and sewage disposal, family planning, antibiotics, and in improved transportation and communication have considerably changed the likelihood of survival to an older age, and have improved basic health for Arctic children and adults. As an example, by the mid-1990s, the infant mortality rate in Alaska Native infants was approaching that for the United States as a whole (Figure 3-1).

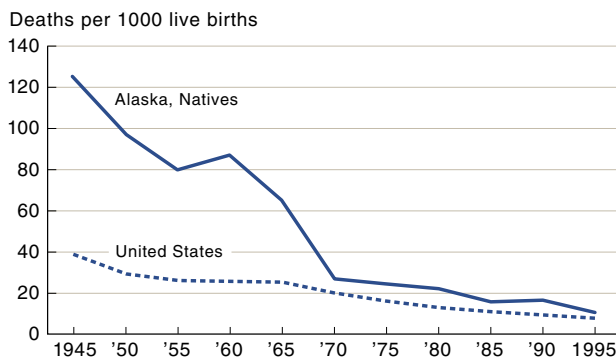


Figure 3-1. Infant (under 1 year) mortality rates in the United States general population and in Alaska Natives, 1945 to 1995. Source: Alaska Area Profile FY2000.

This improvement in the infant mortality rate is related to safe water supply, sanitation improvements, and on-site village primary health care providers, which were all steadily improved in the period 1960 to 1970. These, along with improvements in transportation, infant immunizations, and medical care have lowered the infant mortality rate to present levels.

### 3.1.1. Data sources

The primary data sources utilized in this section include NOMESCO (2001), NWT (1999), the World Health Organization, the State of Alaska, and other cited literature.

A series of basic health status indicators are utilized, as well as trend data, where available. Data used in this section for Canadian Arctic residents are labeled 'Northwest Territories (NWT)'. During the period reflected by the data, the Northwest Territories contained virtually all of Arctic Canada (excluding the Yukon). In 1999, a large part of the Northwest Territories (some 60%, or one fifth of the Canadian landmass, including most of the Canadian Arctic islands) became the new territory of Nunavut.

Data from sources such as published studies of Arctic populations, which usually focus on single conditions or a narrow set of risk factors, are also utilized. Such data are usually representative of a single period of time, and are often not directly comparable in all respects with other populations. Often, however, such data may represent the only information available.

### 3.2. Population demographics

#### 3.2.1. Population structure

The age composition of the residents of Arctic countries varies greatly, as can be seen in Figure 3-2. Due to their shape, these representations are often referred to as population pyramids.

A population pyramid is influenced at its base by the number of women in the 15 to 45 year age ranges, the

most common ages at which women bear children, and the number of children each woman bears. The base is also affected by infant mortality. The middle portion of the pyramid can be decreased by any major source of mortality in the early and middle adult years. The narrowing of the pyramid for the elderly ages reflects the incidence of chronic disease, access to medical care, and the quality of medical care. A stable population, reproducing at a replacement rate, with no major sources of unusual premature mortality, would have a population pyramid tapering only slightly from its base to the fifth decade, when it would more rapidly attenuate to the eighth decade. A population pyramid can effectively predict numbers of population in certain age groups, aiding in planning the infrastructure for the country or area concerned.

From these figures, for the population of Alaska Natives, the Canadian Arctic, and Greenland, the average

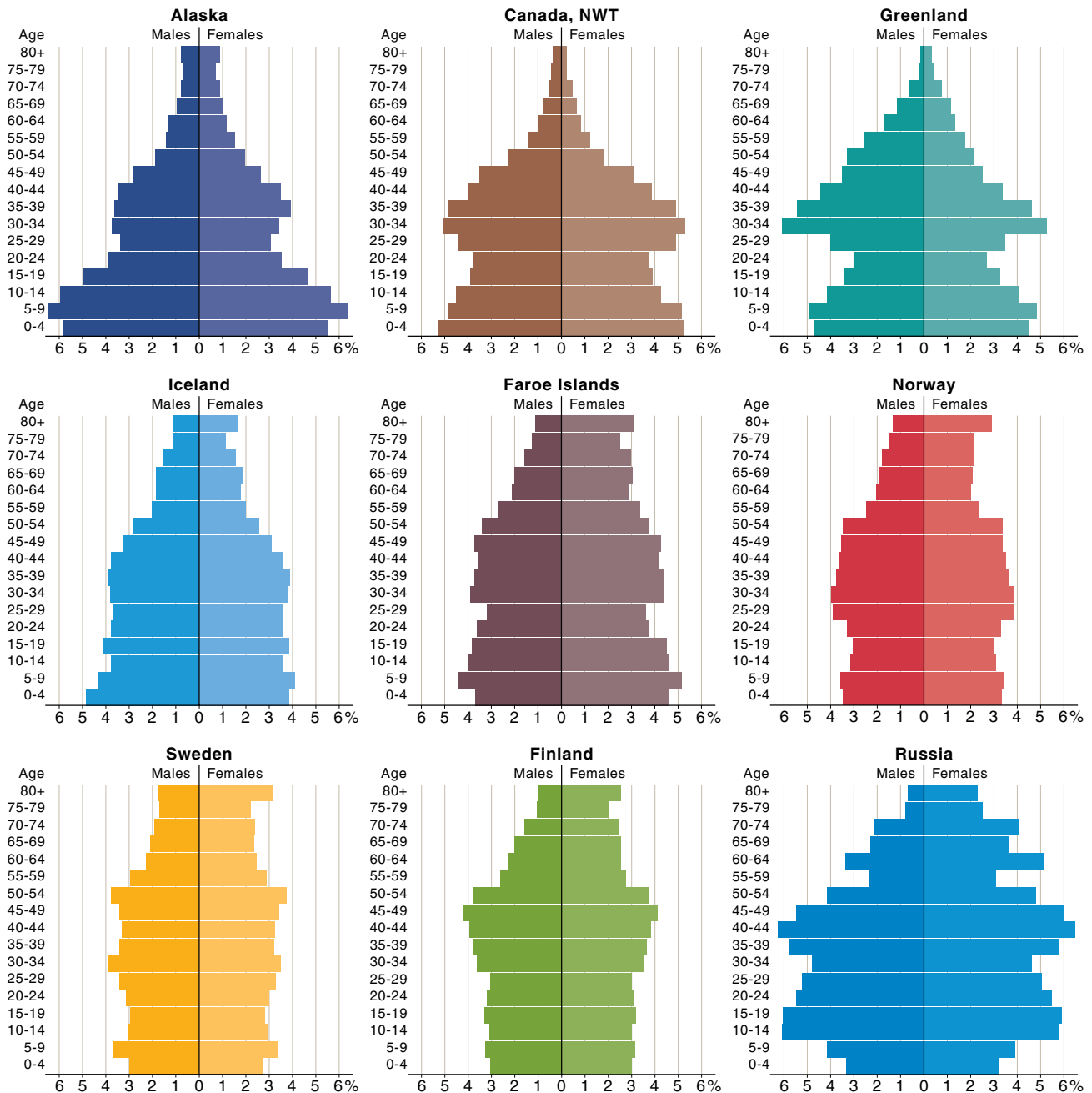


Figure 3-2. Population pyramids for Alaska (1998), Canada (NWT, 1996), and Arctic countries (1999). Source: Alaska Area Profile FY2000 (Alaska); NWT, 1999 (Canada); NOMESCO, 2001 (Faroe Islands, Finland, Greenland, Iceland, Norway, and Sweden).

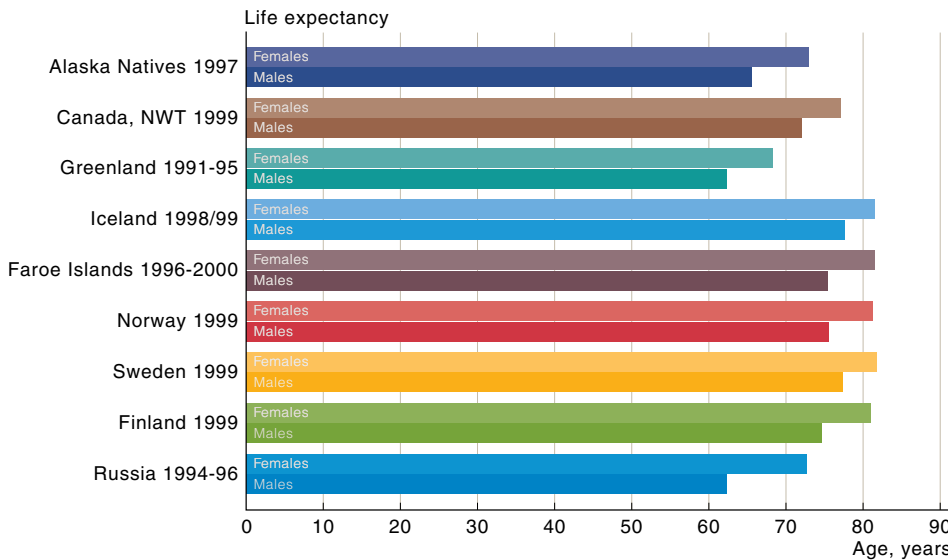


Figure 3-3. Life expectancy in the 1990s of Alaska Natives, residents of NWT/Nunavut in Canada, and general populations of other Arctic countries. Source: WHO Statistical Database; US IHS, 2000; NWT, 1999; NOMESCO, 2001.

age is younger, the proportion of children greater, and the proportion of elderly less than the reference population statistics for the other countries shown. The population structure for Russia is unique in this dataset and shows a lower proportion of both children and the elderly, the highest average age, and a smaller man to woman ratio, this is primarily due to the absence of older men, one effect of devastating wars, where several million young men were killed. The fertility rate and infant mortality rate graphs show how these factors influence the base of the Russian population pyramid (see sections 3.3.3. and 3.3.5.).

### 3.3. Health status indicators

#### 3.3.1. Life expectancy

In most countries, the largest single contributor to an improvement in life expectancy is a decrease in infant mortality. Other factors include population diet, tobacco and alcohol use, lifestyle choices, access to medical care, and socio-economic factors. In Figure 3-3, the Nordic countries have a stable life expectancy for women, exceeding 80 years, with that for men about four years less. The life expectancies for the indigenous Arctic populations in other countries are considerably lower for men and women alike, one cause being higher infant mortality rates (see section 3.3.5.).

#### 3.3.2. Maternal and infant indicators

Many persistent organic pollutants, and certain toxic metal contaminants, have the ability to act as agonists or antagonists of steroid hormones. Chronic low-level exposure to these compounds in fetuses, pregnant women, and young infants is being investigated for possible association with adverse health effects. Effects under investigation include decreased fertility, an increased likelihood of spontaneous abortion, abnormal intrauterine growth, and abnormal neurodevelopment in infancy, increased susceptibility to infection in infancy, and blood pressure elevation in children (see chapters 6 and 9). Regularly gathered health status indicators that reflect maternal and/or infant health do not provide specific data for most of these impacts, and subtle effects may be difficult to separate from the impact of confounding factors,

such as prenatal use of alcohol and tobacco, breast feeding, maternal nutrition, and poverty.

In Greenland, the ratio of male to female live births has changed from 1.05 (the usual ratio for humans) to 1.02 over the past 30 years (Bjerregaard and Young, 1998). If this ratio persists it may reflect, among other influences, prenatal exposure to endocrine disrupting persistent organic chemical compounds (Bjerregaard and Young, 1998).

In western Arctic Russia, occupational stress, tobacco use, and heavy metal exposure have all been associated with adverse pregnancy outcome (see section 8.4.2.) (Odland *et al.*, 1999b).

#### 3.3.3. Fertility rates

Fertility rates are highest in Russia, Arctic Canada (NWT/Nunavut), Greenland, and Alaska (Natives) between the ages of 20 and 24, whereas in the other locations the peak fertility rates occur in the 25 to 29 year age group (Figure 3-4). A large number of factors affect fertility, especially socio-economic conditions and access to family planning. One such factor is the increasing

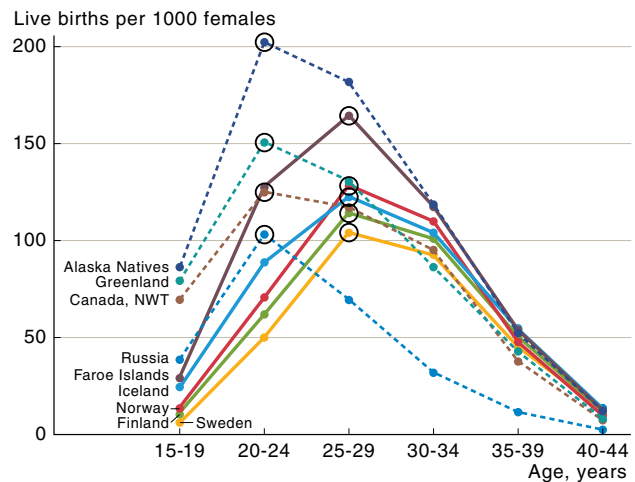


Figure 3-4. Fertility rates for Alaska Natives (1998–1999), residents of NWT in Canada (1992–1996), and populations of other Arctic countries (Faroe Islands/Greenland, 1991–1995; Iceland/Norway/Sweden, 1999; Russia, 1994–1997); circles indicate peaks. Source: WHO Statistical Database; US IHS, 2000; NWT, 1999; NOMESCO, 2001.

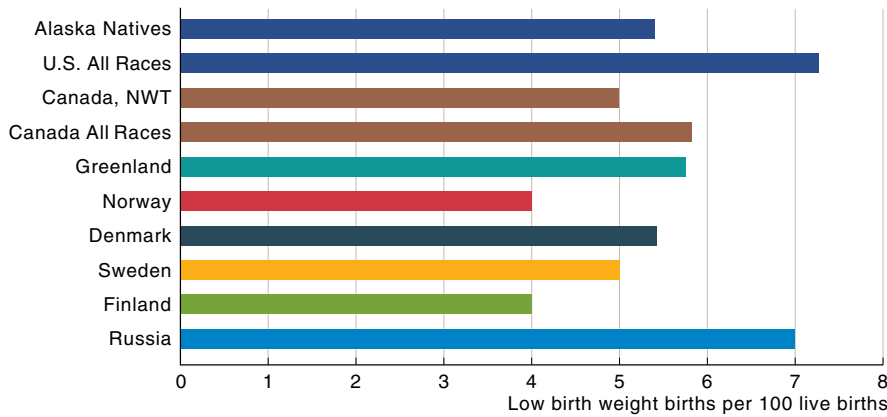


Figure 3-5. Low birth weight rates in Arctic countries (general populations: Canada All Races, 1996; Russia, 1994–1997; Sweden/Norway/Iceland/Finland/Greenland/Faroe Islands/Denmark, 1998; U.S. All Races, 1995) and some indigenous populations (Alaska Natives, 1994–1996; Canada NWT/Nunavut 1996). Source: US IHS, 2000; Health Canada, 1999; WHO Statistical Database; NOMESCO, 2001.

proportion of women in the work force, which delays child bearing and is reflected in the older age of mothers in the Nordic countries.

### 3.3.4. Low birth weight

In general, low birth weights (less than 2500 grams) may reflect shortened duration of pregnancy, poor maternal nutrition, maternal use of alcohol and/or tobacco, hypertensive complications of pregnancy, and prenatal maternal/infant infection. There is a possibility that a low birth weight predisposes to certain chronic diseases in older age, like high blood pressure, cardiovascular disease, and asthma (Forsdahl, 1977; Barker, 1990). It is thus desirable to reduce the proportion of babies with a low birth weight. Methods to bring this about include improving the socio-economic conditions for the fertile population together with early access to high quality prenatal care. In the Naryan-Mar region of Arctic Russia, prenatal exposure to polychlorinated biphenyls (PCBs), DDE, and DDT have shown a weak, but significant correlation with lower birth weight (Polder *et al.*, 2002b), suggesting that environmental factors may significantly affect health status.

The incidence of low birth weight in circumpolar populations, with the exception of Russia (at 7%), is between 4% and 5.8%, similar to the Nordic countries (Figure 3-5). This may reflect the increase in efforts to provide early access to high quality prenatal care.

### 3.3.5. Infant mortality and morbidity

Infant mortality is generally subdivided into deaths in days 0 to 28 of age (neonatal mortality) and deaths in days 29 to 365 (post-neonatal mortality) (Figure 3-6).

Neonatal mortality reflects prenatal care and the availability of intensive perinatal care. The most important contributor to this indicator is pre-term delivery; before 37 weeks gestation.

Post-neonatal deaths are influenced by the rate of Sudden Infant Death Syndrome (SIDS) in a population, as well as by infection, congenital anomalies in fetal development, and socio-economic conditions such as poverty.

In Greenland, Arctic Canada (NWT/Nunavut), and Alaska, infant mortality among the indigenous populations, particularly post-neonatal mortality, is higher than for the other Arctic countries shown. In Alaska Natives, the excess post-neonatal mortality above the U.S. All Races rate is due to the higher incidence of SIDS.

Serious morbidity in indigenous infants in the first year of life usually reflects their predilection to infection, and, for each region, is usually dominated by types of infection that reflect environmental conditions. Rate of respiratory infection often reflect crowded housing. Gastrointestinal illness may reflect the quality of the water supply (Berman, 1991; Maynard and Harmmes, 1970).

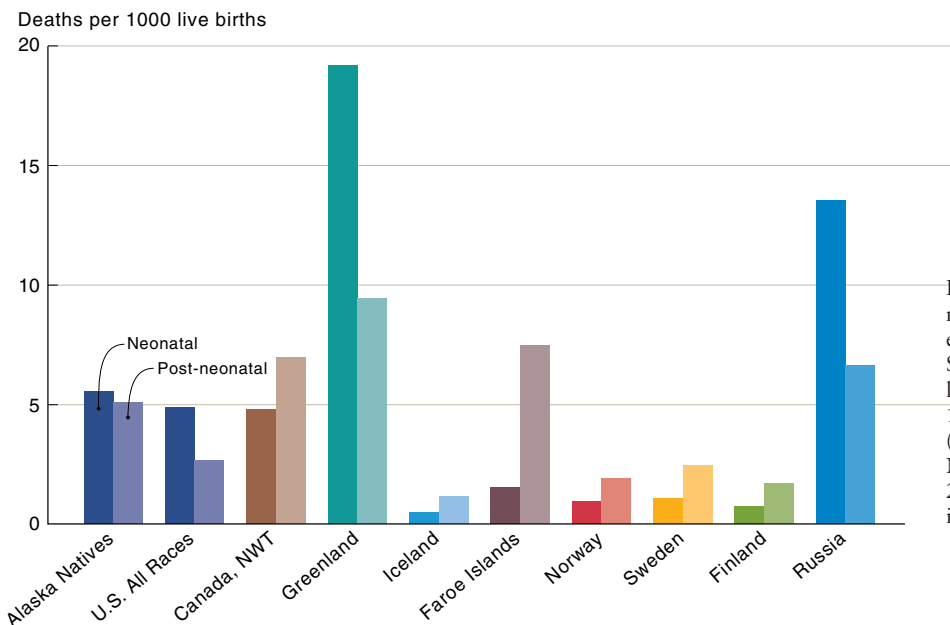


Figure 3-6. Neonatal and post-neonatal mortality rates in Arctic countries (general populations: Russia 1994–1997; Sweden/Norway/Iceland/Finland/Greenland/Faroe Islands 1998; U.S. All Races, 1995) and some indigenous populations (Alaska Natives, 1994–1996; Canada NWT/Nunavut, 1994). Source: US IHS, 2000; Health Canada, 1999; WHO Statistical Database; NOMESCO, 2001.

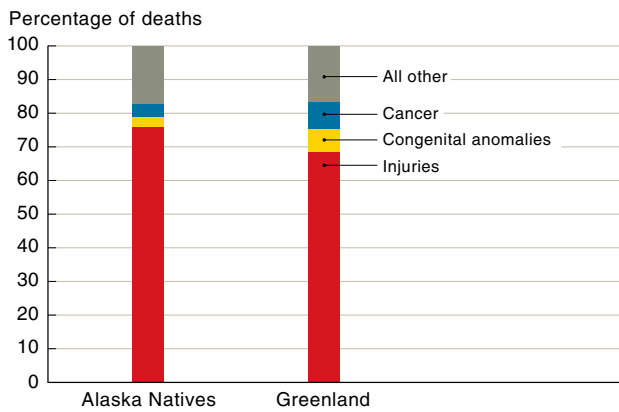


Figure 3-7. Percentage distribution of causes of child mortality (age 1 to 16 years) in Alaska Natives (1994–1996) and Greenland (1998). Source: US IHS, 2000; Annual Report from the Chief Medical Officer in Greenland 1999.

### 3.3.6. Child mortality and morbidity

Among Alaska Natives and Greenland Inuit, about 70% of all deaths between 1 year and 16 years are related to injury, either intentional or unintentional. Less than 10% are attributed to cancer and congenital anomalies, respectively (Figure 3-7).

### 3.3.7. Adult mortality and morbidity

Causes of adult mortality and morbidity vary with age and sex. Mortality in the young adult age range is largely related to injury, both intentional and unintentional. Among Arctic men, suicide is a major cause of injury mortality, and injury mortality from all causes is greater for men than for women. In general, morbidity tends to be related to injury and infections. Morbidity for certain infectious diseases and for diabetes is discussed in section 3.4.

Wide variation between populations/cultures exists, especially in intentional injury mortality, and may reflect differences in cultural stress, economy, or rates of depressive illness (Bjerregaard and Young, 1998).

In both sexes, over age 45 years, chronic disease becomes increasingly prominent in both mortality and morbidity indicators. Atherosclerotic heart disease, strokes, and cancer are the primary causes of mortality in this age range, partly reflecting an increasingly western lifestyle (Figure 3-8). In many countries, strokes and heart disease are combined in a single category called circulatory disease. As use of tobacco, a sedentary lifestyle, and a western diet have become more common, cancer, heart disease, obesity, and diabetes mellitus have become more frequent in indigenous Arctic residents. In certain Arctic regions environmental factors have been shown to be associated with health status. Studies of the Republic of Karelia residents in western Russia, where naturally low levels of calcium and magnesium are found in the water supply, indicate that these residents are associated with a high risk of hypertension, and strokes (Dorshakova and Karapetian, 2002).

### 3.4. Health status of indigenous Arctic residents

Disparities in health status of indigenous Arctic residents are presented in sections 3.2. and 3.3. Limited data availability restricts the possibilities for a detailed examination of health status differences among Arctic residents, especially among indigenous peoples. The most useful datasets exist for Alaska Natives, Canadian First Nations peoples, and the Inuit of Greenland. Nowhere are the datasets for Arctic populations as continuous or as comprehensive as the health data for the majority national populations of the relevant countries (United States, Canada, and Denmark). The reasons for the differences described in this section are multi-factorial and,

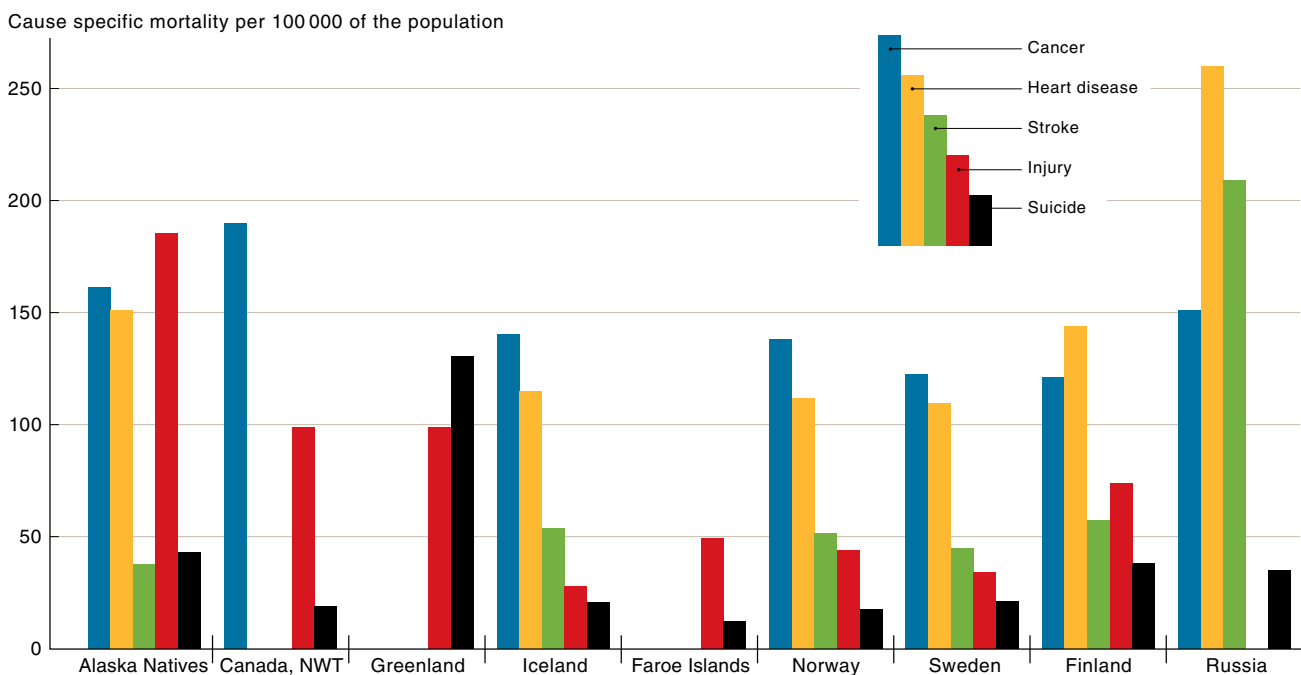


Figure 3-8. Adult age-standardized population mortality rates for cancer, heart disease, strokes, injury, and suicide within the Arctic countries (general populations: Greenland/Faroe Islands, 1991–95; Iceland/Norway, 1995; Russia, 1997; Sweden/Finland, 1996) and some indigenous populations (Alaska Natives 1994–1996; Canada NWT/Nunavut 1991–1996). Source: WHO Statistical Database; US IHS, 2000; NWT, 1999; NOMESCO, 2001.

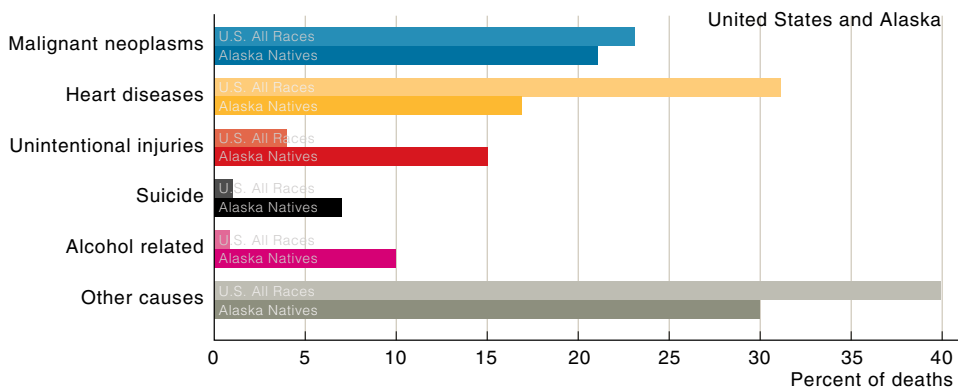


Figure 3-9. Percentage comparison of causes of death in U.S. All Races (1998) and Alaska Natives (1996–98). Source: Alaska Native Tribal Health Consortium (ANTHC) Statistics.

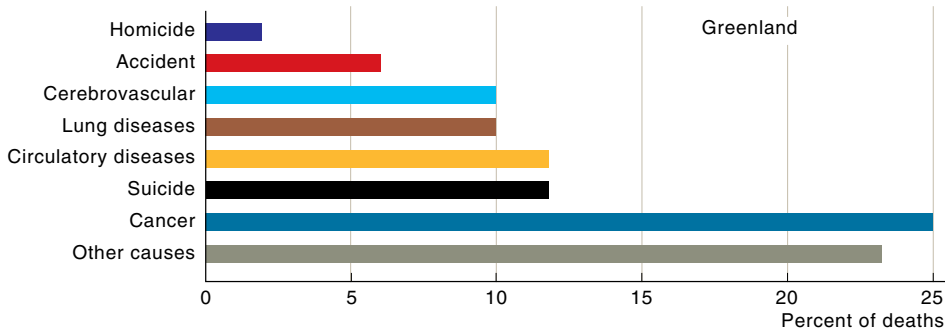


Figure 3-10. Percentage distribution of causes of death in Greenland in 1996. Source: Report from the Chief Medical Officer in Greenland 1999.

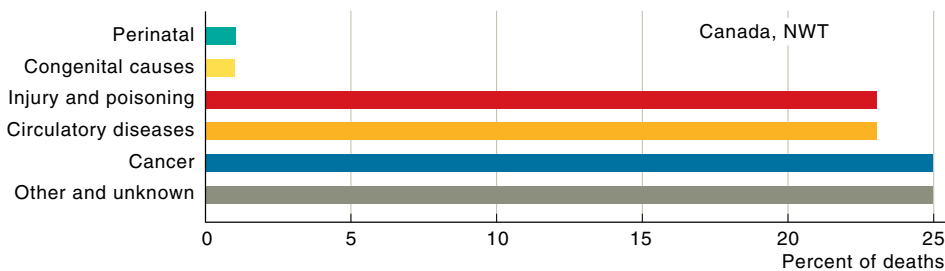


Figure 3-11. Percentage distribution of causes of death in Canada NWT/Nunavut, 1991 to 1996. Source: NWT, 1999.

in some cases, poorly understood. Major differences exist in the categories of injury, infant mortality, infectious disease, cancer, cardiovascular disease, and child health that are described in the compiled national/regional statistics. The population age structure is generally quite similar among various groups of indigenous Arctic residents, with more children, and fewer elderly (see section 3.2.1). For this reason, it is useful to compare causes of death by percentage of cause with the corresponding data for a non-indigenous population to better understand the way indigenous communities perceive the most common causes of death in their communities. From Figure 3-9 it is apparent that the main difference between Alaska Natives and U.S. All Races causes of death is due to suicide, unintentional injuries and alcohol-related deaths. A somewhat smaller proportion of Alaska Natives die from heart disease. Also, in Greenland (Figure 3-10) and Arctic Canada (Figure 3-11), violent death by homicide, suicide, and accidents is common and accounts for about 20% of all deaths.

### 3.4.1. Cancer

The incidence of invasive cancer has risen steadily from the mid-1970s in most populations studied (Nielsen *et al.*, 1996; Lanier *et al.*, 2001).

Although comparison data since 1988 from other Arctic countries are not available, the incidence of all invasive cancers in Alaska Natives from 1969 until 1998 is

shown in Figure 3-12, for males and females, compared to U.S. Caucasians.

The incidence of all invasive cancers has increased significantly for both sexes, with the major statistically significant increases for Alaska Native men in lung, colorectal, and prostate cancer. In Alaska Native women, significant increases were seen in lung and breast cancer (Lanier *et al.*, 2001). Lung cancer increases are probably

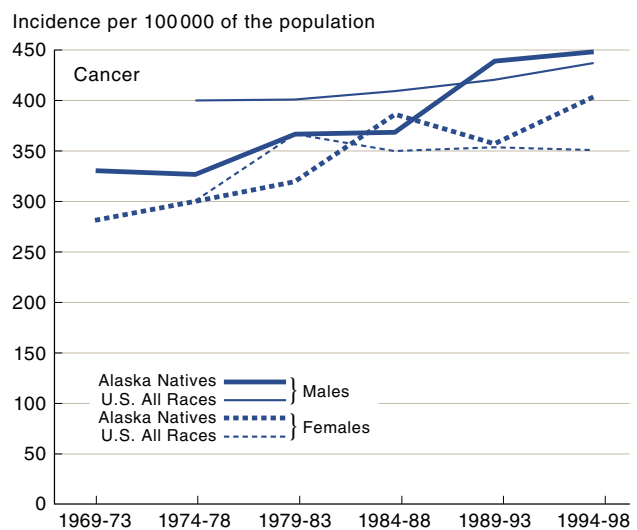


Figure 3-12. Trends in age-adjusted invasive cancer incidence rates in Alaska Natives (1969–1998) and U.S. All Races (1974–98). Source: Lanier *et al.*, 2001.

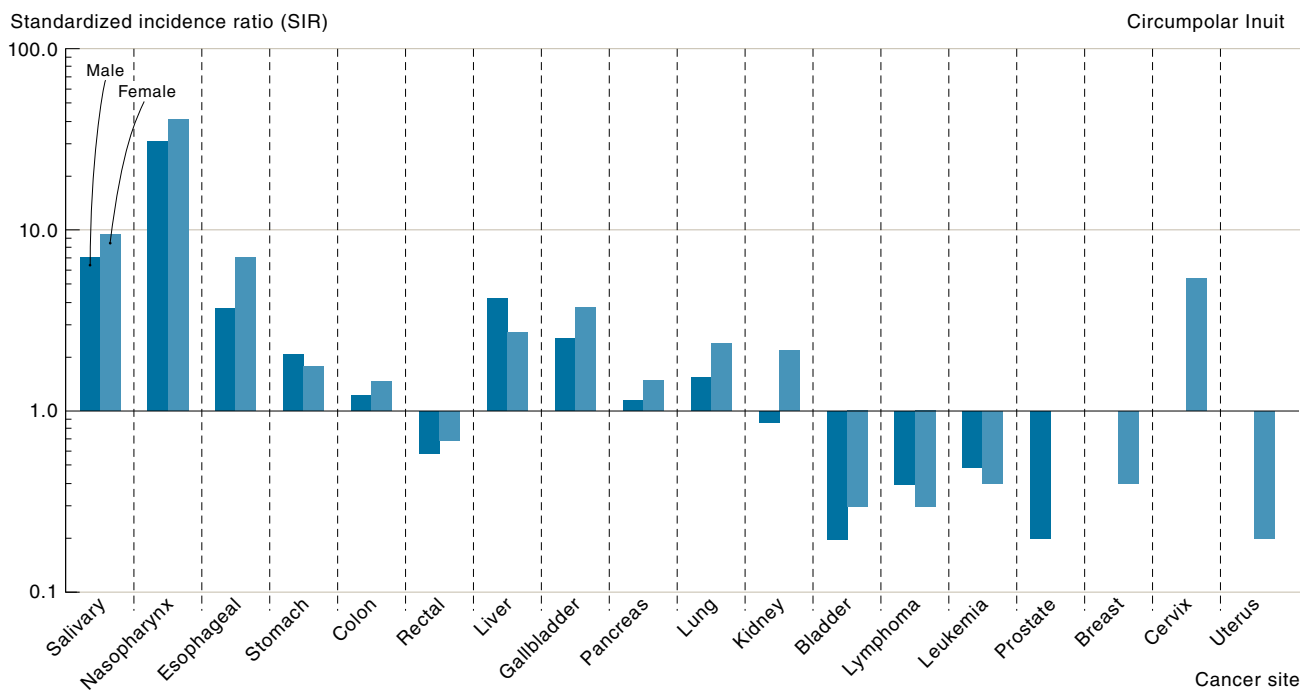


Figure 3-13. Standardized incidence ratio for selected cancer sites among male and female circumpolar Inuit, 1969 to 1988. Source: Bjerregaard and Young, 1998.

related to tobacco use, with tobacco becoming readily available throughout rural Alaska in the years following the Second World War. Changes in diet, and other relevant factors, along with the increase in the number of elderly probably contribute to the overall rise in cancer incidence (Nielsen *et al.*, 1996). Although tobacco is the major risk factor for lung cancer, the rise in colorectal cancer may be related to genetics, increased use of western foods, and other factors.

The incidence of various types of cancer differs in pattern from that apparent in non-indigenous residents, as seen in Figure 3-13, which shows relative risk for Inuit men and women for developing certain cancers, over the period 1966 to 1988, compared to the risk experienced by the majority populations, which is expressed as 1.0.

Certain cancers, notably prostate for men and breast for women, appear to be less common in indigenous populations (Nielsen *et al.*, 1996). In Alaska Natives, prostate and breast cancers remain less frequent than in the U.S. reference population, however comparable data for the Greenlandic and Canadian indigenous populations are not available (Lanier *et al.*, 2001). Figure 3-13 represents a compilation of all cancer incidence data for western hemisphere Inuit men and women, between 1969 and 1988, expressed as a 'standardized incidence ratio' (SIR). This is compared to national populations in Canada, Denmark, and the United States. Thus, a malignancy with an SIR of 1.0 occurs with equal frequency in Inuit and the majority populations used for comparison. A malignancy with an SIR of 7.0 occurs seven times more frequently in the age-adjusted Inuit population, while a malignancy with an SIR of less than 1.0 occurs less frequently in the age-adjusted Inuit population.

Other malignancies related to known risk factors, such as lung cancer (tobacco) are at least as frequent as in other populations, and liver cancer related to previ-

ously endemic hepatitis B infection is greatly increased. Other well established malignancies with increased frequencies, such as nasopharyngeal cancer, might well be related to other infectious agents such as the Epstein-Barr Virus, as well as other unidentified genetic or environmental factors (Nielsen *et al.*, 1996).

### 3.4.2. Infectious diseases

Immunizations, antibiotics, and basic sanitation have greatly lessened mortality from infectious diseases, but the burden of infectious disease continues to be a major

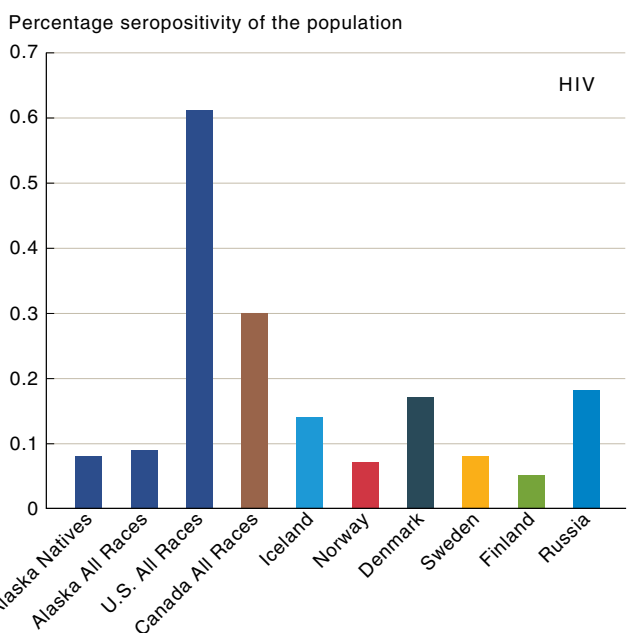


Figure 3-14. Percentage of population living with HIV/AIDS in Arctic countries (general populations: Alaska All Races/U.S. All Races, 1998-99; Canada All Races, 1999; Denmark/Finland/Iceland/Norway/Sweden, 1999), and among Alaska Natives (1998-99). Source: US IHS, 2000; Health Canada, 1999; NOMESCO, 2001.

source of disproportionate morbidity for Arctic indigenous residents. The majority of serious morbidity falls in the 0 to 4 year age range, and the over 50 years age groups. The exceptions are sexually transmitted diseases (STDs), and Human Immunodeficiency Virus (HIV) infections, which are predominantly seen in the 15 to 45 year age range. The prevalence of people living with HIV/AIDS is fairly low in most Arctic populations with the exception of Canada (0.30%) and the United States (0.61%) (Figure 3-14).

#### 3.4.2.1. Bacterial diseases

*Streptococcus pneumoniae* and *Hemophilus influenzae*, type B, cause diseases most frequently seen in infants and the elderly. The incidence of invasive disease from both these bacteria were 10 to 20 times higher in Arctic indigenous infants compared to Caucasian infants, with frequent severe illness leading to mental retardation, hearing loss, and death (Singleton *et al.*, 1994). The recent availability of vaccines for these organisms has begun to lessen the frequency of disease dramatically.

**Tuberculosis** is no longer a significant cause of mortality, but infection is more frequent among indigenous residents, primarily due to re-activation of tuberculosis in elderly people previously infected during the 1920 to 1960 period. Notable is the incidence in NWT/Nunavut Canada (over 50 per 100 000 population) and Greenland (110 per 100 000 population) (Figure 3-15).

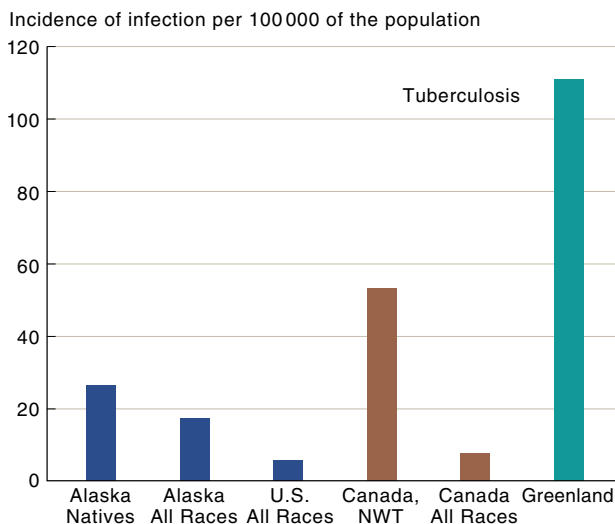


Figure 3-15. Crude incidence rate of tuberculosis infection, 1998 to 2000. Source: US IHS, 2000; Tuberculosis Control in Alaska, July 2001, State of Alaska; NWT, 1999; Annual Report from the Chief Medical Officer in Greenland 1999.

In settings of small, crowded housing and with high smoking prevalence, early symptoms, such as coughing, are often not seen as alarming or significant and as a result disease spread by airborne droplets is very efficient and effective.

*Helicobacter pylori* is a relatively recently discovered bacterium infecting the stomach, and capable of causing ulcers, stomach inflammation and bleeding. It has also been associated with increased risk for certain types of stomach malignant disease. The risk factors for infection

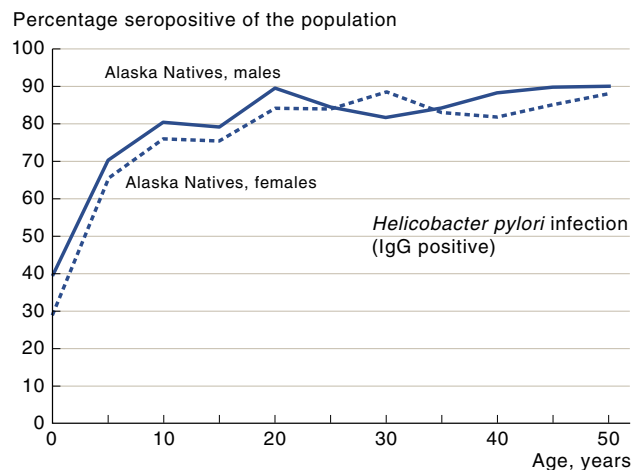


Figure 3-16. Rates of *Helicobacter pylori* infection among Alaska Natives by age and gender, 1980 to 1986. Source: Alaska Native Tribal Health Consortium (ANTHC) Statistics.

are not all known, but could include crowded housing and poor sanitation. The infection is common in the developing world, and is endemic among Alaska Natives, who begin to acquire the infection in early childhood (Figure 3-16) (Parkinson *et al.*, 2000).

Whether other Arctic peoples are endemically infected is not known, but the similarity of environmental conditions suggests that it is possible. Alaska Natives have the highest prevalence of *Helicobacter pylori* infection of any U.S. population.

#### 3.4.2.2. Sexually transmitted diseases

There are many different organisms, both bacterial and viral, which cause disease and are transmitted by sexual contact. There are four for which comparable data exist: HIV, gonorrhea, syphilis, and *Chlamydia trachomatis*. HIV has not shown penetration into the Arctic indigenous populations in amounts greater than (and is in most places less than) in the Caucasian population (Figure 3-14). Syphilis has, in recent times, not been detected in amounts exceeding that in the Caucasian population (Bjerregaard and Young, 1998).

The rates of gonorrhea and chlamydia infection in Alaska Natives, however, are regularly reported to be two to four times the rate for Caucasians in Alaska. Among Canadian and Greenland Inuit, rates range from ten to 100 times the rates seen in Canada and Denmark (Bjerregaard and Young, 1998).

#### 3.4.2.3. Viral diseases

Arctic residents, including indigenous residents, are connected by air transportation to the rest of the world, and experience regular seasonal viral epidemics of respiratory illness such as influenza, at the same times as cities in the subarctic and northern temperate zone.

Conditions of crowding and poor sanitation contributed to endemic hepatitis B in Alaska, Arctic Canada and Greenland, although universal immunization, beginning at birth, has virtually eliminated new hepatitis B infections (Bjerregaard and Young, 1998).

Hepatitis A swept the rural Arctic populations in epidemics on a 10 to 20 year cycle, infecting up to 90% of village populations in some regions (Bjerregaard and



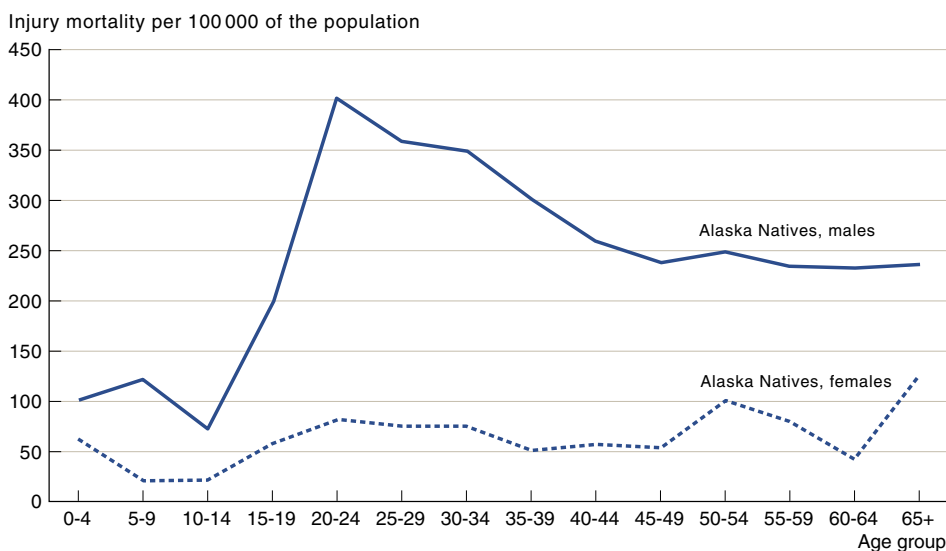


Figure 3-17. Injury mortality rates for Alaska Natives, 1991, by age-group and gender. Source: Bjerregaard and Young, 1998.

Young, 1998). Using an aggressive hepatitis A immunization effort, in the year 2000, no new hepatitis A infection was clinically recognized in the State of Alaska, demonstrating the potential of this vaccine (Middaugh, pers. comm., 2001).

Among Alaska Native infants, the Respiratory Syncytial Virus (RSV) causes far more severe lower respiratory illness than in other populations studied (Karron *et al.*, 1999), at rates from ten to 25 times higher. In studies of risk factors for severe RSV disease in Alaska Natives, premature birth, smoking in the home, and congenital heart disease increased risk, while breast feeding was found to decrease risk. Even so, 50% of severely ill infants did not have identified risk factors.

### 3.4.3. Unintentional injury

National injury data was previously presented in section 3.3.7. All indigenous Arctic residents have higher rates of mortality for unintentional injury, related to multiple factors, including the severe climate and weather, and substance abuse. The excess mortality is seen in all age groups with a dominance in the 20 to 24 year age group,

also with an increase in the rates among the 65+ age group (Figure 3-17).

### 3.4.4. Intentional injury

Suicide is more common in young men and women among Arctic indigenous peoples, than the All Races data from the United States, Canada, and Denmark (Figure 3-18). The rates for Alaska Native men in the 15 to 24 year age group is four times the rate for women.

Cultural stress, erosion of traditional lifestyles, and substance abuse are all considered to be contributory factors (Bjerregaard and Young, 1998). In a Greenland study of risk factors, for both men and women, the presence of alcohol problems in the parental home and sexual abuse as a child were strong independent risk factors for serious suicidal thoughts (Bjerregaard and Young, 1998).

### 3.4.5. Diabetes mellitus

Diabetes has historically been thought to be absent from Arctic indigenous peoples, but recent data suggest that rates of type II diabetes among some indigenous popula-

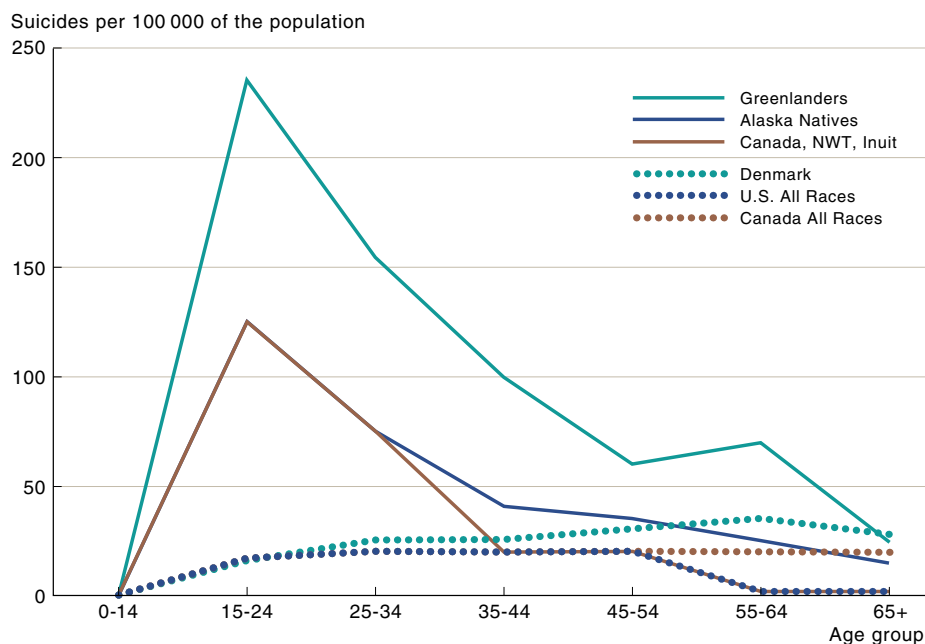


Figure 3-18. Suicide mortality rates in different age-groups of Greenlanders, Alaska Natives, and Inuit in Canada NWT/Nunavut compared to general populations in Denmark, Canada, and the United States, 1980 to 1989. Source: Bjerregaard and Young, 1998.

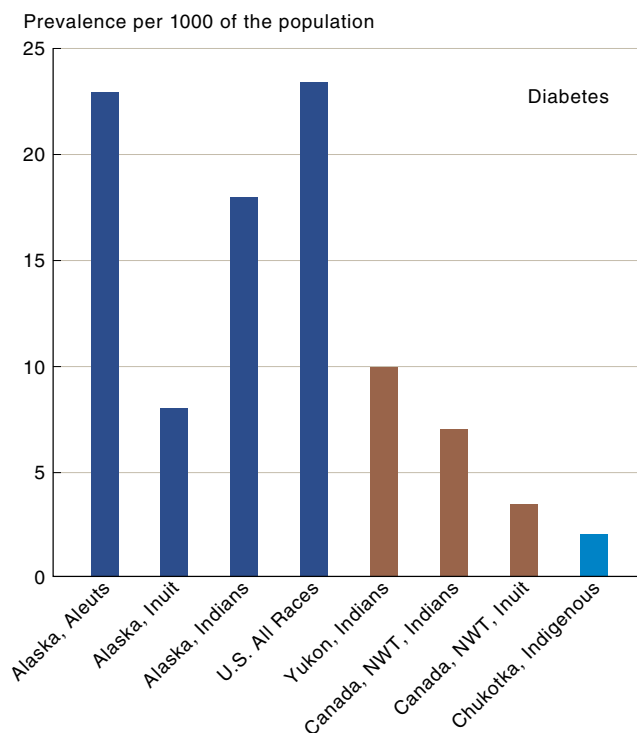


Figure 3-19. Age-standardized prevalence of diabetes mellitus in indigenous populations of Chukotka, Alaska, Yukon, and NWT/Nunavut, and in U.S. All Races in the late 1980s. Source: Bjerregaard and Young, 1998.

tions have increased to levels approaching those of other developed countries (Figure 3-19) (Bjerregaard and Young, 1998).

Rates of obesity have also increased which may be one explanation for the increase in type II diabetes, and for the increase in gestational diabetes which has also occurred. Increased rates of obesity may be partly related to the increased consumption of western foods, lower consumption of traditional foods, and lifestyle factors, such as decreased exercise.

### 3.4.6. Substance abuse

The data sources for use of alcohol and illegal drugs, such as marijuana, cocaine, opiates, amphetamines, and solvents abused by inhalation, are incomplete, and rarely comparable across groups (see section 8.2.3).

A survey of Greenland residents showed that 39% of men and 12% of women meet criteria for 'binge drinking' or 'high consumer.' Among Inuit residents in Arctic Canada, the results of the Indigenous Peoples Survey indicate that the prevalence of problems with alcohol (self-reported for at least one incident of an alcohol-related problem, such as missed days of work, arrest related to driving a vehicle while under the influence of alcohol, etc.) in the population range from 13% to 29%, and are highest in the 20 to 24 year age range, with only slight differences between men and women (Bjerregaard and Young, 1998).

The results of the Alaska Behavioral Risk Factor Survey indicated that for Alaska Natives 34% of men and 21% of women practised binge drinking (5 or more drinks on at least one occasion within the last month) compared to the U.S. rate of 14% for men and women together (Bjerregaard and Young, 1998). Inhalant abuse,

often involving gasoline or glue sniffing, is a problem in many Arctic communities, usually among children and adolescents, with rates of adolescents stating that they had inhaled solvents at least once ranging from 7% to 26%, and with current rates of between 1% and 8% (Bjerregaard and Young, 1998). Data for Alaska Natives reveal that solvent inhalation in childhood is a strong predictor of alcohol and illegal drug use in later life (Prinz, pers. comm. 2001).

Consumption of alcohol during pregnancy can result in damage to the developing fetus, including cognitive impairment, small stature, poor growth, and altered development of facial bones. In its most severe form, the combination of poor prenatal or postnatal growth, poorly developed mid-facial bone structure, and a variety of brain function impairments is referred to as Fetal Alcohol Syndrome (FAS). Lesser degrees of prenatal alcohol exposure can result in brain dysfunction without growth impairment or altered development of facial features (Egeland *et al.*, 1998b).

Active surveillance for FAS carried out in the Alaska Native health care system from 1988 to 1994 indicated a rate of 4.2 per 1000 live births, compared to rates of 0.3 to 1.0 per 1000 live births in the U.S. population. Among Alaska Natives, FAS is the most common cause of preventable congenital mental retardation (Egeland *et al.*, 1998b).

It is quite possible that rates of FAS are also elevated in other Arctic populations, but active surveillance has not regularly taken place.

### 3.4.7. Indigenous infant and child health

#### 3.4.7.1. Infant mortality

Infant mortality steadily decreased between 1950 and 1995 for all Arctic indigenous residents, but remains elevated above the rates for the United States, Canada, and Denmark (see section 3.3.5.). Anecdotal evidence about adverse trends in, e.g., infant mortality rates among Russian Arctic indigenous populations in the late 1990s, is a matter of concern. Disruption to essential services (food supply, fuel, employment opportunities, and health care services, etc.) following the change to a market economy is proposed as a major contributory factor in these negative developments. There is an urgent need for reliable statistics to confirm these indications and to document recent trends.

When neonatal (age 0–28 days) and post-neonatal mortality are examined separately, larger disparities are present in indigenous post-neonatal mortality rates with much smaller differences seen in neonatal mortality. SIDS is a major contributor to post-neonatal mortality among all indigenous residents in the Arctic. The cause of SIDS is unknown, but smoking in the home is a major risk factor.

Injury deaths in infancy are also elevated among indigenous peoples, as in all other age groups.

#### 3.4.7.2. Oral health

Oral health status in children is recorded as the number of teeth which are decayed, missing, or filled (DMF) at certain ages. Although the ages and time periods represented are somewhat different, the rates of DMF teeth,

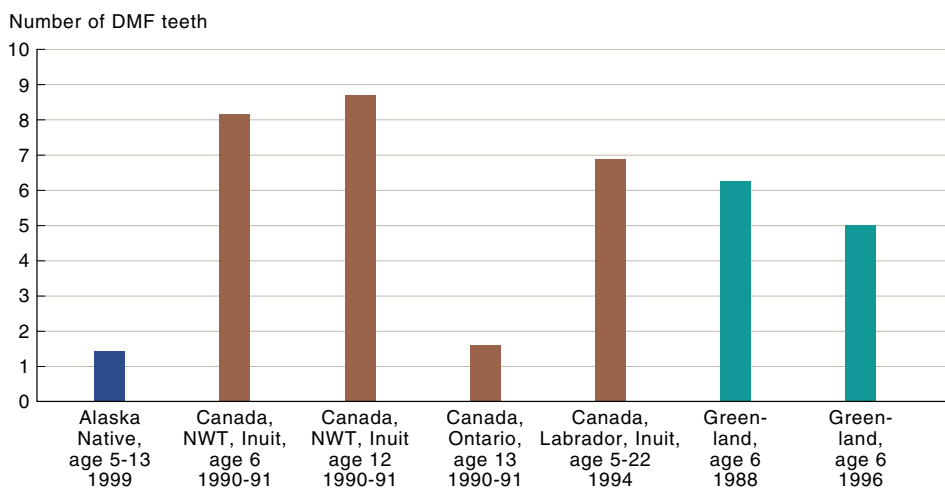


Figure 3-20. Oral health, measured as the number of Decayed, Missing and Filled (DMF) teeth in indigenous children in Alaska, Canada (NWT/Nunavut and Labrador) and Greenland, and children from Ontario, Canada, 1988 to 1999. Source: Bjerregaard and Young, 1998.

compared to majority populations, is higher among indigenous populations (Figure 3-20).

Tooth decay is greatly enhanced by simple sugars in foods, and, in Greenland was virtually unknown until the twentieth century (Bjerregaard and Young, 1998). The bacterium *Streptococcus mutans* is the causative agent of common childhood tooth decay and is often passed from mother to child during infancy. Measures such as fluoridation of water supplies and other public health dental practices can also reduce the DMF rates in childhood, but access to these measures is limited in many rural Arctic communities, as is restorative dental care.

### 3.5. Conclusions and recommendations

Arctic regions, in general, have much smaller, more isolated, younger populations, with fewer elderly people and larger families. Their mortality patterns are changing as increasing life expectancy and western influences on diet, lifestyle, and culture alter health status. As is the case in the more populated temperate regions of Arctic countries, cancer, strokes, and heart disease have become leading causes of death.

The younger age structure of the population in the Arctic regions provides an opportunity for effective emphasis on preventive measures for cardiovascular disease and general health promotion. Availability and access to comparable data for the different populations in the circumpolar region is still a problem and hampers the development of detailed comparisons and evaluations. This lack of data should be addressed by the health ministries of the Arctic countries.

Injury remains a disproportionately prominent cause of death and the suicide rate appears strikingly different in some regions. Crude indicators, such as suicide and homicide rates, would seem to point to a need to better identify prevalence and trends in behavioral risk factors, in order to better target early interventions and prevention

efforts. Data on behavioral risk factors, such as alcohol consumption, or domestic violence, are inconsistently gathered among rural, isolated Arctic populations.

Illness associated with infections, especially infant respiratory disease, and sexually transmitted diseases (STDs), are far more frequent among some Arctic residents. Better housing, less crowding and advice aimed at increasing the proportion of breast-feeding mothers would lead to a reduced burden of infectious disease among infants. Innovative STD prevention programmes currently in use in some Arctic countries should be considered as models for those Arctic regions with high incidence rates.

Among certain Arctic peoples, the incidence of obesity and type II diabetes have increased to rates equal to those in most developed western countries. This may, in part, reflect an intake of more western foods, with a shift away from the traditional diet, sometimes as a result of community concern about the safety of traditional food sources.

Data on cultural factors, such as regular subsistence diet information, traditional harvests and celebrations, use of native language in the home, and traditional health practices are infrequently gathered, and would be useful in planning prevention programmes for a variety of medical and behavioral health problems.

The net effect of medical and public health advances has been to increase life expectancy. However, as the impact of western influences on indigenous cultures becomes more apparent, lifestyle changes have made chronic diseases a negative factor in the lives of Arctic residents.

As well as improving living conditions for the population in the reproductive age range, it is also important to improve the quality and number of 'healthy mother and baby programmes' to reduce pre- and postnatal morbidity and mortality, and possibly also to decrease the burden of adult chronic disease.