Chapter 15
Comparing the Health of Circumpolar Populations: Patterns, Determinants, and Systems

Kue Young and Susan Chatwood

Abstract Arctic communities are undergoing rapid social, cultural and environmental changes which affect their patterns of health and disease. Circumpolar peoples and their governments and organizations have developed health system responses to such changes. Innovations involving both technological advances and revitalization of traditional cultural practices hold promise for improving access to and the quality of health care and ultimately the wellness of circumpolar people and their communities.

Keywords Health status • Health determinants • Health systems • Wellness • Indigenous people

15.1 Introduction

There is a diversity of regions and populations in the Arctic (Young et al. 2012). While they differ substantially in their physical and social environments, they also share many common features that reflect their experiences with the changing climate, close relations with the land, and political and historical evolution with increasing levels of autonomy being repatriated to Indigenous groups. In this chapter, we discuss human health in the context of the changing Arctic and comment on the emerging responses of circumpolar peoples.

The health of Arctic peoples can be described from three perspectives: (1) the patterns of health – how common diseases and health problems are distributed in the

K. Young (✉)
School of Public Health, University of Alberta,
11405-87 Avenue, Edmonton, AB T6G 1C9, Canada
e-mail: kue.young@ualberta.ca

S. Chatwood
Institute for Circumpolar Health Research,
PO Box 11050, Yellowknife, NT X1A 3X7, Canada

Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada
e-mail: susan.chatwood@ichr.ca

B. Evengård et al. (eds.), *The New Arctic*, DOI 10.1007/978-3-319-17602-4_15

population; (2) the determinants of health – what are some of the underlying factors which contribute to the health patterns that we observe; and (3) their health systems – what national and regional governments and health authorities have developed in response to the health conditions. These divisions are not rigid. They are inter-related and capture the depth and complexity of health challenges facing circumpolar peoples at this time.

15.2 Health Patterns

The 8 Member States of the Arctic Council, with the exception of Russia, report the best indicators of health, wealth, and well-being in international league tables, such as the United Nations' Human Development Index, a composite index of health, education and standard of living (United Nations Development Programme 2013). Within countries, however, there are often considerable disparities between North and South, and between Indigenous and non-Indigenous peoples. Such disparities, however, are not consistently observed – they are most pronounced between Alaska Natives and other Alaskans, between the northern territories of Canada and the rest of the country, and between Greenlanders and Danes, but least between the Sami and other Scandinavians. Overall, the northern regions of Russia tend to have the worst health indicators. A compendium of selected health indicators on 27 circumpolar regions has been compiled and available from the Circumpolar Health Observatory (http://circhob.circumpolarhealth.org).

As an example, one can take the infant mortality rate (IMR) – the number of deaths among infants under 1 year of age per 1,000 livebirths – a sensitive indicator not only of child health, but also of overall health status of a population. IMR varies from less than 5 per 1,000 livebirths in the Nordic countries to over 10 in Nunavut and Greenland, and over 20 in some Russian regions. There is little difference between the northern regions of the Nordic countries and the rest of the country. There is a 30-year time lag between the IMR of Greenland and Denmark (Bjerregaard 2008). In Alaska, the Alaska Native rate is more than twice the rate among non-Natives in the state (Alaska Native Epidemiology Center 2009). In Canada, the Inuit rate is 3 times higher than Canadians nationally (Inuit Tapiriit Kanatami 2010).

Circumpolar populations, similar to populations elsewhere, have undergone a health transition (Young and Bjerregaard 2008). Until the middle of the twentieth century, infectious diseases were major causes of death. Since then, mortality rates have decreased markedly, although the overall burden of infectious diseases in the Arctic remains high, and higher than in southern populations. There are also infections that are prevalent in the Arctic because of its physical environment and socioeconomic conditions (Parkinson et al. 2008). Tuberculosis is a good indicator condition for highlighting the relationship between the built environment and health. The geographical variation within the Arctic is substantial. The highest incidence rates are reported by Nunavut, Greenland, and some Russian regions (Fig. 15.1).

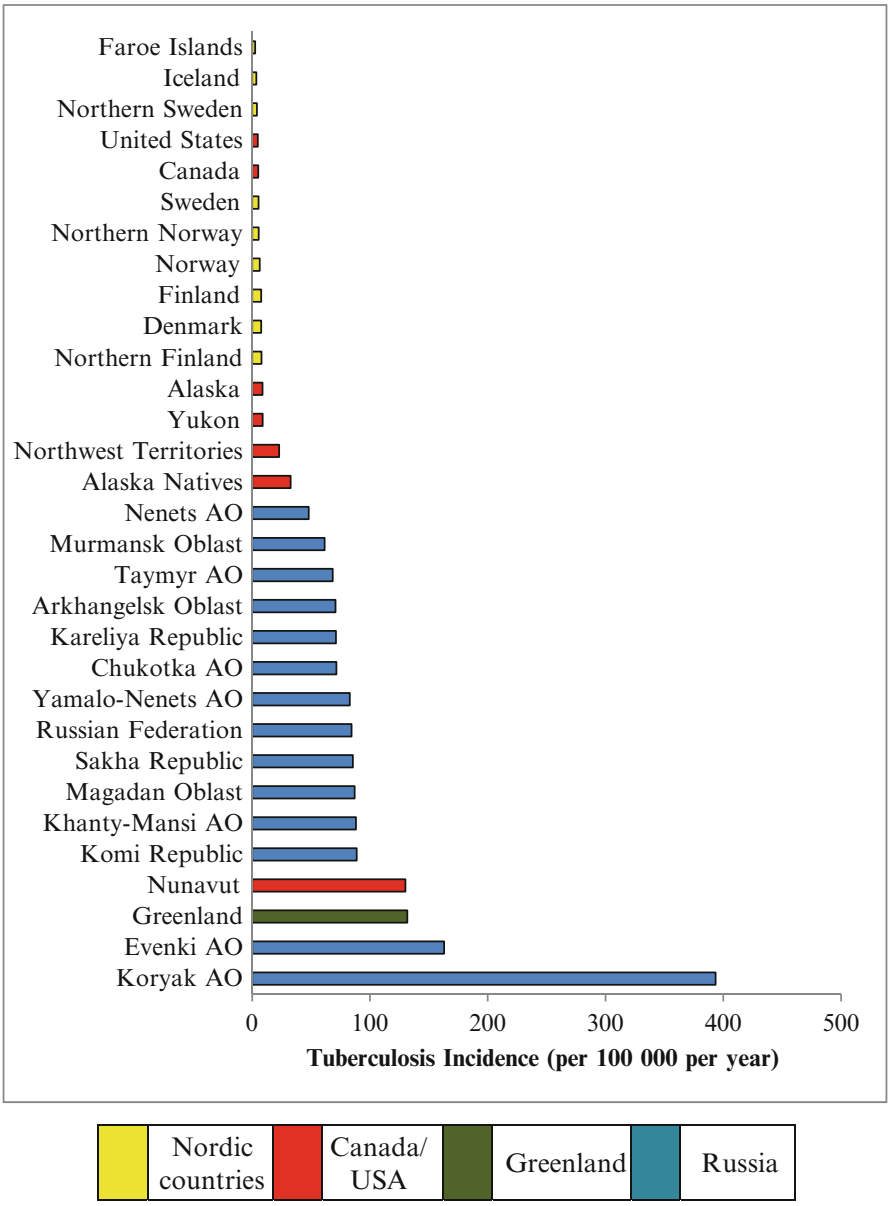

Fig. 15.1 Incidence of tuberculosis in circumpolar countries and regions, 2000–2009, new cases per 100,000 per year (Source: Circumpolar Health Observatory)

The rapid transitions in dietary practices and activities of daily living have contributed to the emergence of chronic diseases such as cancer, cardiovascular diseases, and diabetes (Bjerregaard et al. 2004). These new health threats have eclipsed infectious diseases in recent years. Cancer is not a single disease, but a cluster of diseases affecting different body tissues, with different causes or risk factors, all having in common the uncontrolled growth and spread of abnormal cells. When grouped together, there is also variation in cancer incidence across the Arctic, with Nunavut and Greenland reporting the highest rates. This reflects their predominantly Inuit population, among whom cancer has steadily increased over the past decades, especially in cancer of the lung (Circumpolar Inuit Cancer Review Working Group 2008).

Among the most serious health problems affecting northern peoples in recent decades are injuries sustained as a result of accidents and violence, whether intentional or unintentional, self-inflicted or inflicted by others. Mortality from injuries is highest among Russian regions. In Alaska and Northern Canada, the rate is 2–3 times their respective national rates. Greenland's rate is more than 4 times that of Denmark. In northern Fennoscandia, the rates are little different from the respective national rates. In all jurisdictions, injury mortality is higher among men than women. In both Alaska and northern Canada, the rates among the indigenous population is higher than the non-indigenous population. Suicide is a particularly serious problem among the Inuit in Greenland and Nunavut, and Alaska Natives (Fig. 15.2). For every completed suicide, there are many more suicide attempts, and for every sui-

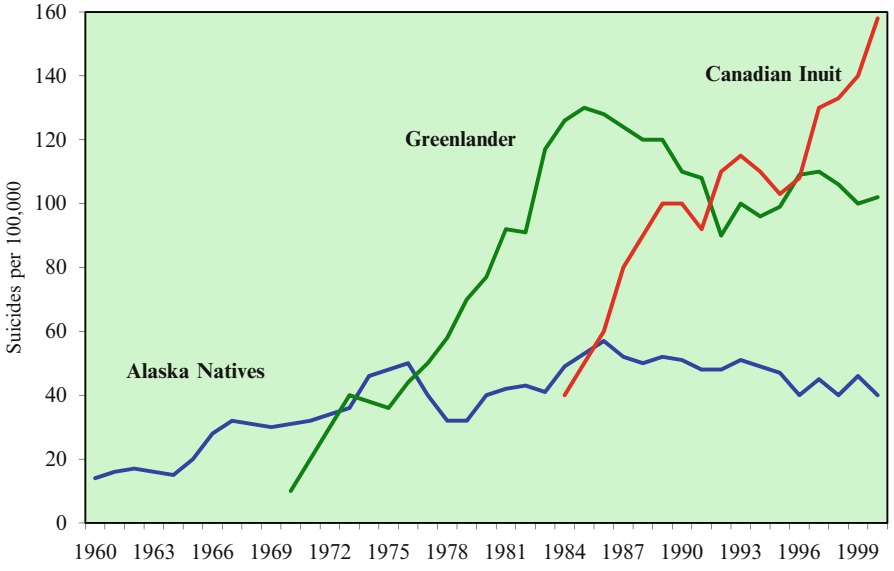

Fig. 15.2 Evolution of the suicide epidemics in three Arctic Indigenous populations (Source: Data from Jack Hicks, reproduced from *Hope and Resilience Report*)

cide attempt there are numerous people harbouring suicidal thoughts. Studies such as the The Survey on Living Conditions in the Arctic (SLiCA) among indigenous people in several regions provides some measure of the extent of suicidal ideation (in the past year and over the lifetime) and also the people's perception of suicide as a community problem (Government of Greenland 2010).

As the communities are recovering from profound social and cultural changes that have been influenced by national assimilation policies, manifestation of mental health issues is very prevalent, yet statistics that capture the true impact are not readily available, due to challenges in measurement and access to services. Higher rates of alcohol use provide an indication of non-optimal adaptive behaviour to underlying mental health challenges.

15.3 Health Determinants

It is well recognized in many populations that different factors, or determinants, contribute to the health status differences that we observe. These could broadly be categorized as human biology (genetics, adaptation to cold), the physical environment (e.g. climate, water supply, sanitation, housing, pollution), lifestyles and behaviours (smoking, diet, physical activity), and social, cultural and economic factors.

There are two major kinds of environmental health threats. The first result from poor quality of housing, water supply, sanitation and solid waste management. The associated health problems (such as gastrointestinal, respiratory and skin infections) are well recognized, and the solutions already exist. The second type of threat arises from the invisible contamination with man-made chemical substances which are produced far from the Arctic but transported to the region by ocean and atmospheric currents, biomagnified in the marine food chain, and bioaccumulated in humans (Arctic Monitoring and Assessment Programme 2009). Rapid resource developments, especially in the extraction of minerals and oil and gas are currently underway in many Arctic localities. Their adverse impact on the immediate environment, and the social conditions and health of the people need to be monitored and mitigated. The Arctic is also recognized as the sentinel of global warming, and its residents face new health threats including increased land based injuries and food and water insecurity.

A major determinant of health in circumpolar regions is diet, and more broadly food security. For the indigenous people of the Arctic, food obtained from hunting and fishing, or "country food", continue to be a major part of the diet (Kuhnlein et al. 2004). Subsistence and living off the land, besides the immediate nutritional benefits, promotes physical activity and enhances spiritual health. There is variation across the Arctic in the pattern of food consumption. Analyses of traditional foods tend to show that nutritional quality is superior to that of imported or market foods. Imported food is generally rich in saturated fatty acids while the fat of marine mammals and fish are high in polyunsaturated fats. Traditional food does not contain

refined sugar and is therefore beneficial also for dental health. The notion that country food is healthy and imported food is unhealthy is an over-simplification. Initiatives to address food security and nutritional status need to include improving access to healthy imported foods in stores (for e.g. through improved shipping and cost containment). Communities need to make informed choices that balance the nutritional benefits of country foods with the health risks associated with contaminants in some species. Continued access to country foods is also dependent on the health of wildlife (mammals, fish and birds) populations that could be affected by climate change.

The association between socioeconomic factors and health has been observed for a long time. A gradient across different socioeconomic classes, no matter how such classes are defined, has been consistently demonstrated for various measures of mortality and morbidity, for individual diseases and for all causes combined. This gradient exists in many countries around the world, and has persisted despite major improvements in the overall health and wealth of the population.

Within circumpolar regions, indigenous people tend to fare worse in their socioeconomic status (SES) than non-indigenous people, especially in Alaska, northern Canada, and Russia. While Alaska and Yukon report better SES than the national averages, the disparities relative to the country as a whole widens as the proportion of indigenous people increases. This situation reflects the in-migration of non-indigenous people seeking employment; those who are no longer employed or retired tend to leave the North.

15.4 Health Systems

In circumpolar regions health systems and their responsiveness plays an important role in promoting wellness and recovery from disease. The health care system in any country comprises the preventive, curative, rehabilitative and long-term care sectors. The boundaries of these sectors are not well demarcated – they overlap with social services, with education, with environment, and with food and agriculture, usually administered by distinct government ministries.

Fundamental differences in the political systems of the Arctic States affect the way health care, indeed most government services and programs, is organized. Canada, the United States, and the Russian Federation are federal states, with division of authority between the national and sub-national levels of government, with some duplication of roles and responsibilities. The Nordic countries are unitary states where there is a national ministry of health with delegated service delivery functions to various regional/local governments. The Faroe Islands and Greenland are both parts of the Kingdom of Denmark but quasi-independent states as far as domestic affairs are concerned. The health departments of Greenland and Faroe Islands are completely separate from Denmark's.

Across circumpolar countries there are a broad array of programs and services of varying quantity and quality that address the full spectrum of health care (Young

and Marchildon 2012). Health systems in circumpolar regions have had to be adaptive to the unique environment that includes a large geographical expanse, small scattered populations, severe climate and varying degree of health disparities within the population, especially between indigenous people and other citizens. In this context there have been adaptations to health systems so they may be more responsive to the environment.

The health care system for Alaska Natives pioneered the training and deployment of village-based Community Health Aides and Dental Health Aide Therapists who provide primary care, supported by physicians and dentists based in regional clinics. Nurse practitioners and physician assistants are also used.

In northern Canada nurse practitioners are the backbone of the system. They provide both primary care and public health services in the communities. While supported by visiting physicians, they function quite independently in the health centres. Greenland, which resembles Nunavut demographically and geographically, has a different system of small hospitals in all the main towns staffed by 1–5 general medical officers. However, consolidation into larger health regions has been introduced with the Greenland government's health care reform since 2011.

The Russian health care system developed a middle-level cadre of medical practitioners called *feldschers*; in remote areas, mobile medical teams have served remote reindeer herding brigades. In towns and cities, primary care services are delivered in polyclinics. Under the Russian system, primary care was poorly developed relative to the hospital sector, and over-reliance on specialists rather than general practitioners. Strengthening of primary health care is also a priority of health care reform with mixed results.

All circumpolar health care systems are faced with serving a scattered population separated by large distances. The "glue" that keeps this geographically dispersed and tiered service delivery system has been transportation and telecommunication. Information technology has been much touted as the solution to remote health care delivery, particularly in clinical support of peripheral health units. Examples of applications include transmission of digital imaging, videoconferencing for consultations, internet-based electronic health records, remote control robotic surgery, etc. Bandwidth limitations have proved an obstacle to robust applications in the North, which is less of a problem in Fennoscandia than elsewhere. The increased utlization of such technology could result in improvements to the quality care, decreased transportation costs and reduction in hospitalizations.

15.5 What Is New and What Is Different?

With the complex web of determinants of health and continuing health transition among circumpolar populations, new and innovative health system responses have emerged, especially those created by and intended for Indigenous peoples. These are culturally based programs that are respectful of holistic worldviews and recognize the influence of sectors beyond health care on community and individual

wellness. Notable examples of culture based care are Inuit specific community birthing programs pioneered in northern Québec, the Nuka System of Care for Alaska Natives conceived by the Southcentral Foundation in Alaska, and mental health services developed in northern Norway serving Sami (known as SANKS). These improvements occurred in the context of increasing levels of autonomy and Indigenous control over health systems responses and designs.

With Indigenous governments and organizations playing an increased role in wellness initiatives, activities that incorporate traditional knowledge and promote practices that revitalize culture have far reaching effects on health determinants, health outcomes and health systems. Emerging research increasingly utilizes participatory methods and engage elders and youth, who each bring unique perspectives on how to approach health issues in the modern context. In recent years, climate change and its impact on health and wellness have been studied by communities and have provided important contributions to understanding a broad range of challenges such as food security, emergency response and water quality (Climate Telling 2014). These activities have been complemented by partnerships involving university researchers and government policy makers. Such partnerships have the potential to apply rapidly research evidence into program design that is relevant and appropriate for Arctic communities (Brubaker et al. 2013).

Circumpolar populations are undergoing rapid social and environmental changes that are reflected in their evolving patterns of health status and health determinants. While there are many struggles inherent in the health systems responses to such changes, therein also lies may innovations through revitalization of cultural practices and adaptations to modern applications of new technologies to improve access and quality of health and wellness. These holistic approaches promote multisector approaches to health that incorporate education, environmental quality, and economic development, to name a few. These adaptations provide a basis for best practices that could have applications in other global context, especially when the Arctic is the sentinel for impacts of global phenomena such as climate change (Chatwood et al. 2012).

References

Alaska Native Epidemiology Center. (2009). *Alaska Native Health status report*. Anchorage: Alaska Native Tribal Health Consortium. http://www.anthctoday.org/epicenter/assets/health_status_report_2009/2009_anai_health_status_report.pdf. Accessed 1/7/2014.

Arctic Monitoring and Assessment Programme. (2009). *AMAP assessment 2009: Human health in the Arctic*. Oslo: AMAP. http://www.amap.no/documents/doc/amap-assessment-2009-human-health-in-the-arctic/98. Accessed 1/7/2014.

Bjerregaard, P. (2008). Greenland. In T. K. Young & P. Bjerregaard (Eds.), *Health transitions in Arctic populations* (p. 32). Toronto: University of Toronto Press.

Bjerregaard, P., Young, T. K., Dewailly, E., & Ebbesson, S. O. E. (2004). Indigenous health in the Arctic: An overview of the circumpolar Inuit population. *Scandinavian Journal of Public Health, 32*, 390–395.

Brubaker, M., Berner J., & Tcheripanoff, M. (2013). LEO, the Local Environmental Observer Network: A community based system for surveillance of climate, environment, and health events. *International Journal of Circumpolar Health*, *72*, 22447. http://dx.doi.org/10.3402/ijch.v72i0.22447.

Chatwood, S., Bjerregaard, P., & Young, T. K. (2012). Global health – A circumpolar perspective. *American Journal of Public Health, 102*, 1246–1249.

Circumpolar Inuit Cancer Review Working Group. (2008). Cancer among the circumpolar Inuit, 1989–2003. II. Patterns and trends. *International Journal of Circumpolar Health, 67*, 408–420.

Climate Telling. (2014). http://climatetelling.ca/projects. Accessed 1/7/2014.

Government of Greenland. (2010). *Hope and resilience: Suicide in the Arctic, November 7–8, 2009, Conference report*. Nuuk. http://old.peqqik.gl/Publikationer/Rapporter_og_redegoerelser/~/media/Publikationer/Hope_Resilience_2010/ConferenceReport_HopeResilience.ashx. Accessed 1/7/2014.

Inuit Tapiriit Kanatami. (2010). *Health Indicators of Inuit Nunangat within the Canadian Context, 1994–1998 and 1999–2003.* https://www.itk.ca/publication/health-indicators-inuit-nunangat-within-canadian-context. Accessed 1/7/2014.

Kuhnlein, H. V., Receveur, O., Soueida, R., & Egeland, G. (2004). Arctic Indigenous peoples experience the nutrition transition with changing dietary patterns and obesity. *Journal of Nutrition, 134*, 1447–1453.

Parkinson, A. J., Bruce, M. G., & Zulz, T. (2008). International Circumpolar Surveillance, an Arctic network for the surveillance of infectious diseases. *Emerging Infectious Diseases, 14*(1), 18–24.

United Nations Development Programme. (2013). *Statistical tables from the 2013 human development report*. http://hdr.undp.org/en/data. Accessed 1/7/2014.

Young, T. K., & Bjerregaard, P. (Eds.). (2008). *Health transitions in Arctic populations*. Toronto: University of Toronto Press.

Young, K., & Marchildon, G. (Eds.). (2012). A comparative review of Circumpolar Health Systems. *Circumpolar Health Supplements, 2012*(9). http://www.circumpolarhealthjournal.net/public/journals/32/chs/CHS_2012_9.pdf. Accessed 1/7/2014.

Young, T. K., Rawat, R., Dallmann, W., Chatwood, S., & Bjerregaard, P. (2012). *Circumpolar health Atlas*. Toronto: University of Toronto Press.