

Background Paper on the Human Health Consequences of Climate Change in the Circumpolar North

Lawrence D. Weiss PhD, MS
Alaska Center for Public Policy

There is a significant literature on the direct and indirect relationship between climate change and human health, both physical health and mental health. It is my intention in this background paper to briefly raise just a few of the issues as an illustration of the enormous range and complexity, and the extraordinary importance of the subject matter.

Health Canada is the Federal department responsible for helping Canadians maintain and improve their health. In July of 2002, Health Canada sponsored a health planning workshop and published the proceedings as, "Climate Change And Health And Well-Being In Canada's North: Report On A Public Health Planning Workshop On Climate Change And Health & Well-Being In The North - July 6-7, 2002, Yellowknife, NWT." The overwhelming size and complexity of the subject of the relationship between climate change and the effects on human health dominated the workshop. The authors note in the overview of the proceedings that,

Climate change has implications for a wide range of public health programs in the North such as those associated with mental health, nutrition, water and air quality, disease monitoring and surveillance, disaster preparedness and relief, search and rescue, housing and shelter, education and awareness, and children's environmental health.²

As a further example of the breadth of this issue, Health Canada has identified eight significant climate change induced health issues which are expected to increase in the future. These issues are summed up in the table below,

Canada's Health Impacts From Climate Change And Variability

Health Issues	Examples of Health Vulnerabilities
Temperature-related morbidity and mortality	<ul style="list-style-type: none"> • Cold and heat related illnesses • Respiratory and cardiovascular illnesses • Increased occupational health risks
Health effects of extreme weather events	<ul style="list-style-type: none"> • Damaged public health infrastructure • Injuries and illnesses • Social and mental health stress due to disasters • Occupational health hazards • Preparedness and population displacement
Air pollution-related health effects	<ul style="list-style-type: none"> • Changed exposure to outdoor and indoor air pollutants and allergens • Asthma and other respiratory diseases • Heart attacks strokes and other cardiovascular diseases • Cancer
Water- and food-borne contamination	<ul style="list-style-type: none"> • Enteric diseases and contamination
Vector-borne infectious diseases	<ul style="list-style-type: none"> • Changed patterns of diseases caused by bacteria, viruses and other pathogens carried by mosquitos, ticks and other vectors
Stratospheric ozone depletion and increased exposure to ultra-violet radiation	<ul style="list-style-type: none"> • Skin damage and skin cancer • Cataracts • Disturbed immune function
Population vulnerabilities in rural and urban communities	<ul style="list-style-type: none"> • Seniors • Children • Poor health • Low income and homeless • Traditional populations • Disabled • Immigrant populations
Health and Socio- Economic Impacts on Community Health and Well-being	<ul style="list-style-type: none"> • Changed determinants of health and well-being • Global burden of disease • Vulnerability of community economies • Health co-benefits and risks of GHG reduction technologies

Source: Climate Change and Health & Well-Being: A Policy Primer for Canada's North.

The health effects of climate change in northern latitudes will vary within the region, but these effects are expected to be particularly severe in northern communities, and for vulnerable populations such as "children, the elderly, the poor, disabled people, immigrant populations, Aboriginal Canadians and populations living in the North." In addition, "a host of broad socio-economic issues related to climate change are also of considerable concern including changed determinants of health and well-being, vulnerability of community economies and the health and social risks of climate change mitigation actions." Some of these concerns in northern areas may include,

- the indoor air quality in housing in northern regions, particularly issues relating to poor ventilation and indoor contaminants that may be affected by a warming climate
- the supply of food, fuels, access to medical care, and other necessities of life in communities that rely on ice roads that may be usable for shorter durations, may become more dangerous to use, or may disappear altogether
- a warmer climate may result in increased safety issues in an icy environment
- a warmer and otherwise changing climate may affect the accessibility and safety of traditional foods in northern climates
- distresses in multiple areas introduced by climate change may result in community mental health impacts²

There is a consensus in the literature that climate change and the resulting health consequences will probably be most severe in far northern regions. Since the average Arctic temperature has increased at nearly twice the rate of the rest of the world during the last 20 years, northern regions may be a sentinel site for the detection of changes in the epidemiology of hazards to human health resulting from climate change. There may be changes in the incidence and distribution of infectious diseases, and waterborne and foodborne diseases in northern, but not necessarily arctic, regions. For example, flooding may damage the water and sanitation infrastructures leading to outbreaks of cholera, hepatitis A, malaria, and dengue. A changing habitat for insects and rodents may result in the increase of infectious diseases such as malaria, yellow fever, and Lyme disease. Other examples include,

- warming oceans may lead to an increase of vibrio parahemolyticus which is associated with fish and shellfish and causes gastroenteritis
- the incidence of paralytic shellfish poisoning may increase
- botulism is caused by eating food contaminated with botulinium neurotoxin and is common in the United States, the Canadian Arctic, and Greenland. It is associated with the preparation and consumption of fermented foods prepared in sealed containers. The incidence may increase as a function of a warmer climate.
- giardia may increase as the expansion of beaver habitat follows warmer weather. Beaver is a common host of *giardia lamblia* in the Arctic.
- changing habitats of animals such as foxes, dogs, rodents, rabbits, muskrats, voles, and squirrels may contribute to the increase in diseases such as tularemia and *Echinococcus multilocularis*, a parasitic tapeworm disease.¹

The fact is we do not know with great certainty how the relationship between climate change and human health is going to play out. Therefore the question of regional and national and even local capacity for response, and capacity for preparation and prevention looms large. The question then becomes how does a region or a nation prepare for the potential consequences to human health of climate change? The single easiest answer is to build and maintain an adequate public health infrastructure.

It is a simple answer, but the politics and economics behind it are more or less challenging depending on which circumpolar nation we are assessing. Further, the starting places are different. For example, United States has a very expensive but poorly performing medical care infrastructure and system. It also has an inadequately funded, widely disbursed, and poorly coordinated public health system. Other circumpolar nation's start from a better prepared foundation. There are many other important considerations and issues. For example,

- The health consequences of climate change range far beyond the borders of individual nations. Consequently, the role of international organizations and international treaties and agreements becomes increasingly important.
- The disparities between rich and poor nations are already great and will likely be exacerbated as climate change progresses. We need to find ways to shift resources internationally to minimize the differential consequences of climate change on those nations and regions least able to cope.
- The health disparities among diverse groups even within one nation can vary tremendously and we need to work even harder to address the social economic processes that create and perpetuate these disparities before the multiple stresses of climate change fully emerge.
- The prospect of tremendous social upheavals due to massive flooding for example, may destroy communities and create environmental refugees in unprecedented numbers. Are we planning for the health consequences of these destroyed communities and the coinciding mass migrations?

In summary, there is a large and growing body of literature discussing climate change in general, and there is a smaller body of literature that discusses the health consequences of climate change. However, the literature regarding the health consequences of climate change in the Arctic and far northern latitudes is less developed but critical due to the sentinel nature of these events unfolding in the Arctic and northern regions faster than in other regions of the planet. We are pressed to move ahead on multiple fronts.

References

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