

weathering change

newsletter of the northern climate exchange winter 2004

Climate change and health and well-being in Canada's North

MARCIA ARMSTRONG, HEALTH SECTOR COORDINATOR, CANADIAN CLIMATE IMPACT AND ADAPTATION NETWORK

How is climate change affecting Canada's North?

Scientists, governments, and international organizations have recognized that greenhouse gas accumulations in the atmosphere are changing the global climate and will affect both the environment and human health and well-being. People residing in Canada's three territories and in the northern regions of some provinces are already observing impacts on their communities from a changing climate. Elders report that permafrost is melting and vegetation is growing where ice used to be, that new species of birds and wildlife have been seen in the North for the first time, that caribou meat tastes different and hides are thinner, that fall ice forms later, and that water levels are getting lower in some areas.

How will these changes affect human health?

Climate change is affecting the environment and, thus, traditional lifestyles in the North, and it is important to understand how these changes will affect people's health. For example, climate change is decreasing the reliability of traditional knowledge in understanding and predicting local

weather patterns, and this can result in increased rates of land- and water-based accidents. Village life and access to harvest sites can be disrupted by the melting of permafrost, which can damage roads, pipelines, and structures, leading to sanitation and contamination concerns and even to the necessity to relocate entire communities.

People residing in Canada's three territories and in the northern regions of some provinces are already observing impacts on their communities from a changing climate.

Climate change may result in new and increased rates of infectious disease, including those found in wildlife that can be transmitted to humans. Plants used in traditional medicine may be more difficult to find. The migration patterns of some wildlife may change, influencing the diet of local residents, with important direct and indirect implications to health. We must be concerned about these new stresses, as northern populations already suffer from high incidence of heart disease, diabetes, injuries, infectious diseases, suicide, and other conditions.

On the other hand, climate change may also open up new opportunities for northern Canada, and these can improve the well-being of the residents of our northern regions. These changes have already begun to occur, and we must ensure we have the capacity to understand

and adapt to the new situations brought about by climate change.

How will we increase our understanding of health impacts and adaptations in the North?

Health Canada, as the federal department with an overall mandate to protect the health of Canadians, works to advance understanding of the health impacts of climate change in collaboration with researchers across Canada, and provides advice to health care partners in provinces, territories, and communities.

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A note from the editor

The topic for this issue of *Weathering Change* is climate change and health. Last summer's heat wave in Europe was responsible for the deaths of 14,800 people in France alone, while in North America the media was full of articles about the West Nile fever as it spread across the continent. These high-profile examples of climate change effects on health have been capturing world attention, but there are specific concerns about health effects in Canada's North.

In this issue, Northern Climate ExChange's Aynsle Ogden provides a book review of the new World Health Organization publication *Climate Change and Health: Risks and Responses*, while Marcia Armstrong of the Canadian Climate Impacts and Adaptation Research Network's Health Sector gives us an overview of climate change health effects in Canada's North. Dr. Chris Furgal examines the effects of climate change on Inuit health in Nunavik and Labrador, while

Scot Nickels explores aspects of Inuit knowledge and capacity building. We hope this issue will provide help in understanding the implications of climate change on health, at both the direct and indirect levels.

Bob Van Dyke

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Health Canada is also raising awareness of potential adaptation strategies available for governments, community groups, and individuals.

To facilitate the building of interdisciplinary knowledge to manage the risks from climate change, Health Canada has

created the Climate Change and Health Office. The office is the host organization for the Health Sector of the Canadian Climate Impacts and Adaptation Research Network (C-CIARN) and has established and coordinates five research networks of experts who study health concerns related to climate change (www.c-ciarn.ca/health). In July 2002, the Climate Change and Health Office hosted a public health planning workshop on climate change and health and well-being in the North in Yellowknife, NWT. A report of this workshop can be obtained at www.hc-sc.gc.ca/cc or by emailing climatinfo@hc-sc.gc.ca. The Government of Canada is also financing further research efforts on climate change, including an investment of \$25.7 million into ArcticNet (http://nce.nserc.ca/nces-rces/arcticnet_e.htm). This research initiative will address the scientific challenges posed by the warming of the Arctic, and will involve some 145 specialists in the natural, social, and medical sciences from 41 Canadian and foreign universities.

Within the North, First Nations and Inuit roundtables, international organizations such as the Arctic Council and the Inuit Circumpolar Conference, as well as C-CIARN North and the NCE, are working to bridge the gap between scientific research and adaptation. The Arctic Climate Impact Assessment, a project of the Arctic Council, was undertaken to

increase understanding of climate variability, climate change, and increased UV radiation and their consequences, and to provide useful and reliable information to the governments, organizations, and peoples of the Arctic on options to meet such changes. The assessment is expected to be completed by 2004.

What are the implications for public health in the North?

In the North, climate change has implications for many public health programs such as those dealing with mental health, nutrition, sanitation, air quality, disease monitoring and surveillance, disaster preparedness and relief, search and rescue, and children's environmental health. As our understanding about the health impacts of climate change increases, some of these programs and the capacity to deliver them may need to be strengthened or adapted, given a changing environment. Promoting adaptation strategies such as taking bottled water on hunting trips to avoid dehydration in hotter temperatures, earlier hunting in the spring before the ice breaks up, use of insect repellants, and travelling along different paths to hunting camps to avoid shifting ice floes, will contribute to the building of strong and healthy communities required for a 21st century northern society.

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Canada's health concerns from climate change and variability

HEALTH CANADA, CLIMATE CHANGE AND HEALTH OFFICE

HEALTH CONCERN	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 • 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
Health effects of water- and food-borne contamination	<ul style="list-style-type: none"> • Diarrheas and intoxication caused by chemical and biological contaminants
Vector-borne and zoonotic 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
Health effects of exposure to ultraviolet rays	<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 • Chronically ill people • Low-income and homeless people • Northern residents • Disabled people • People living off the land
Socio-economic impacts on community health and well-being	<ul style="list-style-type: none"> • Loss of income and productivity • Social disruption • Diminished quality of life • Increased costs to health care • Health effects of mitigation technologies

Putting the human face on climate change in the Canadian Arctic: Inuit knowledge, capacity building, and partnership research

SCOT NICKELS, INUIT TAPIIRIT KANATAMI, OTTAWA, CANADA

As the national organization representing Inuit regions in Canada, Inuit Tapiriit Kanatami (ITK) is dedicated to supporting the abilities of regional Inuit organizations to address issues that affect them and their communities. One issue ITK is currently working on is responding to Inuit concerns about climate change. Global circulation models consistently predict that the polar regions will be most affected by climate change, and it is important to continue compiling information on the nature and extent of local impacts, particularly in sensitive Arctic ecosystems where people have a heavy reliance on the land, sea ice, and ocean.

There exists little information gathered or organized in a cohesive form to support Arctic communities' ability to identify, understand, and communicate their concerns about environmental change, both within and outside of their communities. Further, much of the discussion on northern climate change has centred on documenting changes and not necessarily on discussing how communities are adapting or can adapt in the future. Little attention has been paid to

the need to build research capacity within Arctic communities so that they may begin to investigate and answer questions that are important to them. It is for these reasons that ITK initiated a project with four Inuit settlement regions of the

Canadian Arctic to help them document observations, understandings, and effects of climate-related changes and to develop strategies to cope and adapt where possible.

Through partnerships, training, and research workshops the project has allowed communities in the regions of Inuvialuit, Nunavik, and Labrador to build research capacity, collect and share local observations, identify impacts and adaptive strategies, and

develop local indicators of environmental change. Funded largely by the Northern Ecosystem Initiative (Environment Canada), the training sessions and research workshops take advantage of a network and capacity that has been built through ITK, Inuit regional land claims organizations, their communities, and national and international organizations. Specialists from ITK, Centre de recherche du CHUL, International Institute for Sustainable Development (IISD), and regional Inuit land claim organizations facilitate the sessions and record and communicate the results. The sessions make use of a range of participatory exercises, developed and tested as the project progressed in each Arctic region.

A set of compare-and-contrast regional workshop reports summarizing the state

of local knowledge will be strategically communicated to key decision-making audiences to inform policy development and point to priority areas for ongoing research and monitoring. The project will expand this year to include communities in Nunavut, thus completing pan-Arctic scope of this research project.

The project helps to build research capacity in Inuit regions, identify issues and concerns, and fill an important knowledge gap on the impacts of climate change in Canada's Arctic. Additionally, the process is intended to help bring a 'human face' to the issue of climate change in the circumpolar Arctic regions.

Some health impacts/adaptations from the Inuvialuit Settlement Region workshops

In the community workshops held in Labrador, Nunavik, and the Inuvialuit Settlement Region, individuals identified current changes they are observing, their perspectives on the effects these changes are having, and what is currently being done to adapt to these changes. Some examples from the Inuvialuit community workshops are presented in the table on page 5.

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The IPCC Third Assessment Report (2001) devoted to a full chapter to the health risks of climate change. This chapter assesses how climate changes and associated environmental and social changes are likely to affect human population health, recognizing that the foundations of long-term good health lie in the continued stability and functioning of the biospheres's natural systems.

CLIMATE CHANGE 2001, IMPACTS, ADAPTATION, AND VULNERABILITY, CHAPTER 9, CAMBRIDGE UNIVERSITY PRESS, 2001

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Full citation

Nickels, S., Furgal, C., Castelden, J., Moss-Davies, P., Buell, M., Armstrong, B., Dillon, D., and Fonger R. 2002. "Putting the Human Face on Climate Change Through Community Workshops," In Krupnik, I., and Jolly, D. (Eds.) *The Earth is Faster Now: Indigenous Observations of Arctic Environmental Change*. Arctic Research Consortium of the United States, Arctic Studies Centre, Smithsonian Institution, Washington, D.C. Pgs 300-344.

Examples of observed changes, effects, and coping strategies/adaptations community residents are using or recommend should be used in their particular communities

OBSERVATION OF CHANGE	EFFECT	COPING STRATEGY/ADAPTATION
Erosion of the shoreline	Relocation of homes and possibly communities, resulting in stress and concern among residents	Stone breakwalls and gravel have been placed on the shoreline to alleviate erosion from wave action.
Warmer temperatures in summer	Inability to store country food properly and, therefore, inability to store it for use in winter More difficult to access country foods all year round	Community members are traveling back to communities more often in summer in order to store country food. (Effect: increased time and costs for hunting) Community members are not hunting and storing as much for future. (Effect: pressure for return of government-funded community freezers)
Lower water levels and some brooks drying up	Fewer quality natural sources of drinking water available when out on the land	Bottled water is now taken on trips.
More mosquitoes and other biting insects	Getting bitten more and increased concerned about new insects Concern over allergic reactions and vectors for virus	Use of insect repellent has increased, and there is a need for public education. Use of netting and screens for windows and entrances to houses has increased. (Effect: increased cost)
Changing animal travel/migration routes	Higher costs of hunting and need to go further, requiring more fuel, gear and time, and resulting in fewer residents (particularly Elders) being able to afford to go hunting and limiting year-round access to country foods	Community programs for Elders have been initiated, in which younger hunters provide meat to Elders who are unable to travel/hunt for themselves.

(from Nickels et al., 2003)

Climate change and Inuit health: identifying, assessing, and monitoring impacts in Nunavik and Labrador

CHRISTOPHER FURGAL, Ph.D - UNITÉ DE RECHERCHE EN SANTÉ PUBLIQUE, UNIVERSITÉ LAVAL

As a result of ongoing work in Nunavik and Labrador on aspects of environmental change and health (e.g., contaminants, country foods, and health), and increasing awareness of climate changes in Inuit regions (e.g., video of changes in Sachs Harbour, NWT), a cooperative project was started in 2000 among the Nunavik Regional Board of Health and Social Services, Nunavik Nutrition and Health Committee, Labrador Inuit Association/Labrador Inuit Health Commission, and researchers at the Public Health Research Unit, CHUL

Research Centre to document changes and identify potential health impacts on communities in Nunavik and Labrador.

Through a review of pertinent literature (science and Inuit knowledge) and the conduct of focus groups and interviews with Inuit hunters, fishers, and Elders in the two regions, this project brought together both scientific and Inuit knowledge and observations to identify potential impacts of climate on communities and health in Nunavik and Labrador. The project identified a number of *direct* impacts of climate-related

changes on health relevant to these Inuit communities. Direct impacts are health consequences resulting from direct interactions with aspects of the environment that have changed or are changing with local climate. Additionally, the project identified a number of *indirect* climate-related health effects as well. Indirect impacts refer to health consequences resulting from indirect interactions mediated via human behaviours and components of the environment that have changed or are changing with local climate.

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Estimates, even approximate, of the potential health impacts of climate change are essential input to policy discussion on reducing greenhouse gas emissions and on social adaptation to climate change.

CLIMATE CHANGE AND HUMAN HEALTH—RISKS AND RESPONSES—SUMMARY, WMO 2003

Since this initial project, work has continued to further document changes via community workshops in these two regions (conducted in cooperation with Inuit Tapiriit Kanatami), and:

- To develop and monitor indicators for climate and health.
- Further investigate the relationships between drinking water quality and climate, and between food security and climate.
- Document Inuit women's perspectives on climate and health.
- Learn more about climate impacts on access to resources.

Much of this Canadian Inuit climate research has gone on to support various sections of the international circumpolar assessment on climate change in the Arctic (Arctic Climate Impact Assessment), to be released in the fall of 2004.

Acknowledgements

Great thanks go to the residents of the communities taking part in these studies to date, without whom this work would not have been possible. The participation and support of the regional Inuit organizations and community organizations in Nunavik and Labrador has guided this work and been critical to its success. We gratefully acknowledge the financial support provided for various aspects of this work by the Canadian Institutes for Health Research, Climate Change Action Fund, the Northern Ecosystem Initiative, Inuit Tapiriit Kanatami, Health Canada and the MSSS-Québec.

Summary of potential direct health impacts of climate change in Nunavik and Labrador

MEDIATING PROCESS	POTENTIAL DIRECT HEALTH IMPACTS
Exposure to thermal extremes	Heat- and cold-related stress and related illnesses (e.g., cardiovascular disease)
Changes in frequency or intensity of other extreme weather events (storms, etc.)	Accidents resulting in injuries, death, stress related disorders, and psychosocial disruption (e.g., being injured or stranded while traveling in a storm)
Changes in ice distribution and stability, and snow composition and amount	Accidents while traveling or hunting, resulting in injury or death
Increased UV exposure	Increased risks of skin cancers, burns, eye damages (cataracts), immunosuppression

Summary of potential indirect health impacts of climate change in Nunavik and Labrador

MEDIATING PROCESS	POTENTIAL INDIRECT HEALTH IMPACTS
Exposure to thermal extremes	Infectious diseases, stress-related disorders, psychosocial disruption
Change in ice distribution and stability, snow composition and amount	Impacts on availability and access to country foods and resulting increased risk of dietary and social health problems associated with diet changes
Effects on range and activity of vectors and infective parasites	Changes in geographical range and incidence of vector-borne diseases and transmission to humans
Changes in local ecology of water-borne and food-borne infective agents	Changed incidence of infectious diseases, emergence of new diseases
Changes in distribution and composition of permafrost	Psychosocial disruption related to damages to infrastructures and population displacement, impacts on access to country food species
Sea level rise	Increased risks of infectious diseases, psychosocial disruption associated with health infrastructure damage, and population displacement
Changes in air pollution (airborne contaminants, pollens, and spores)	Increased incidence of respiratory and cardiovascular diseases, asthma, etc.

Book review: *Climate Change and Human Health: Risks and Responses*

AYNSLIE OGDEN, COORDINATOR, NORTHERN CLIMATE EXCHANGE

Human health is closely linked to the health of the Earth's biosphere, hydrosphere, and atmosphere. On a global scale, these ecological relationships have never been as imperiled as they are today; the influence of human activity can now be detected in even the remotest regions of our planet. Climate change is threatening the sustainability and health of our natural environment, which in turn poses risks to human health. Just how much at risk are we? What measures can we take to reduce this risk?

In 2003, the World Health Organization released *Climate Change and Health: Risks and Responses* (McMichael et al., 2003) to provide answers to some of these very difficult questions. This comprehensive volume reviews the science of climate change, the implications of climate change to human health, and possible responses to this emerging health issue.

Among other topics, this book reviews the health risks of climate change arising from infectious diseases, ozone

depletion, and climate extremes, and explores the question of how much disease climate change could cause. On the response side, the authors review how to undertake national assessments of health impacts, and how to monitor the health effects of climate change. The challenges for scientists studying climate change and health are discussed, as is the adaptive capacity of public health systems. The book concludes with several case studies on health policy, and recommends actions that should be undertaken to address the risks to human health posed by climate change.

Risks and Responses is an engaging read for what can be an unapproachably technical topic, and it is an essential reference for students and practitioners of health and environmental studies. The value of this publication is greatly enhanced by the comprehensive glossary, explanatory figures, and reference lists.

To order, email bookorders@who.int.

Full citation

A.J. McMichael, D.H. Campbell-Lendrum, C.F. Corvalan, K.L. Ebi, A. Githeko, J.D. Scheraga, A. Woodward (editors). 2003. *Climate Change and Human Health: Risks and Responses*. World Health Organization, Geneva, Switzerland, xi + 322pp., illustrations, maps, references, glossary, index. ISBN 924156248X.

To order, email: bookorders@who.int

Editor's picks

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Health Canada. 2002. *Climate Change and Health and Well-Being: A Policy Primer for Canada's North*. Ottawa, ON., ISBN 0-662-66981-9

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Watson, R., Zinyowera, M. and Moss, R. (editors). 1998. *The Regional Impacts of Climate Change, An Assessment of Vulnerability*. New York, NY: Cambridge University Press, ISBN 0-521-634555, Chapter 3

Kovats, S., Mennie, B., McMichael, A., Corvalan, C., and Bertoni, R. (editors) Climate Change and human health: Impacts and Adaptation. World Health Organization WHO/SDE/OEH/00.4

Climate Change. Are you doing your bit?



Tip: Turning down your thermostat at bedtime or installing a programmable thermostat can save money and reduce emissions. For every degree you lower the heating level, you'll save 2% on your heating bill.

For more tips from the NCE's Bob and Dog Mackenzie go to www.taiga.net/nce/doyourbit.html.

a Northern VIEW

Building resilience to climate change in northern ecosystems by reducing contaminants and pollutants

AYNSLIE OGDEN, COORDINATOR, NORTHERN CLIMATE EXCHANGE AND MANAGER, C-CIARN NORTH

Climate change is one of many factors that may affect the health of northern peoples and ecosystems. Human and ecosystem health can also be affected by pollutants and contaminants, either from local sources, such as PCBs from transformers and acid rock drainage from mining activities, or transported to the North from distant sources, such as persistent organic pollutants (POPs), heavy metals, and radionuclides. Some environmental contaminants occur at relatively high levels in some species in northern ecosystems. In many of these cases, the long-term biological, ecological, and health effects are not yet known. In addition, there are strong linkages between climate change and contaminants issues in northern ecosystems.

The principle behind building resilience in ecosystems is that intact and healthy ecosystems have more resources for withstanding stresses. For example, non-climatic stresses such as high levels of pollutants and contaminants may impede the ability of northern ecosystems to respond to climatic stresses such as climate change. Therefore, limiting pollutant and contaminant loads is a good adaptation strategy for building resilience to climate change in northern ecosystems (Rosentrater and Ogden, 2003).

Before measures can be taken to reduce pollutant loads, it is critical to understand the sources and transport pathways of pollutants. Transport pathways are complex interactive systems involving ocean currents, rivers, winds, precipitation, and the food web, all of which are inextricably linked to climate. New research shows that the pathways by which contaminants are delivered to the Arctic are strongly influenced by climate variability and change.

The most recent report of the Arctic Monitoring and Assessment Programme identifies two major difficulties in assessing how climate change will alter exposure of Arctic ecosystems to contaminants (MacDonald et al., 2003). First, current climate trends are difficult to detect because of short-term and sparse instrumental records, making it even more difficult to predict long-term changes. Secondly, our understanding of environmental processes in the Arctic is limited and insufficient to establish the link between primary changes (e.g., air temperature, ice cover) from more complex changes having greater impact on contaminant transfer (i.e.

ecological structure and function, hydrological cycle). Understanding pathways of contaminant transport is key to understanding how climate change may alter contaminant exposure in the Arctic.

Local sources of pollution are regulated by legislation within each Arctic nation. However, the sources of many contaminants in the Arctic are in other parts of the world, requiring international regulation. Indigenous peoples were instrumental in drawing international attention to the issue of long-range transport of POPs (Downie and Fenge, 2003). Subsequently, international negotiations led to the signing of the Stockholm convention, a global treaty signed by 151 countries that regulates the disposal, use, and release of some of the worst offenders in this category of pollutants. Despite this success story, not all

contaminants of concern in the Arctic have been regulated.

Reducing pollutant and contaminant loads in the Arctic will result in healthier ecosystems that are more resilient to the other stresses. Resilient ecosystems will have a greater ability to adjust to a changing climate while broad global action to reduce greenhouse gas emissions takes effect.



There are strong linkages between climate change and contaminants issues in northern ecosystems.

Additional Reading

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Macdonald, R.W., T. Harner, J.Fyfe, H. Loeng and T. Weingartner. 2003. *AMAP Assessment 2002: The Influence of Global Change on Contaminant Pathways to, within, and from the Arctic*. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.

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