Health Risks and Vulnerabilities Due to Climate Change in Canada: New Evidence and HealthADAPT

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Presentation Overview

• How the climate is changing

• Climate change risks to health

• Health authorities are preparing for climate change

• Health Canada’s actions to protect Canadians
How the Climate is Changing
Evidence of Climate Change - “Warming is unequivocal”

Global Land and Ocean Temperature Anomalies, January - December
(Annual anomalies relative to 20th century)

2016 was the hottest year on record

NOAA, 2017
Canada is Warming Faster

Annual Global, National, and Northern Canada mean temperature departures and long-term trend, 1948-2014
Temperature Change (Canada): Annual

Bush et al., 2019

https://changingclimate.ca/CCCR2019/
Climate Change Risks to Health
Climate change will be **the defining issue for health systems** in the 21st century, interacting with all social determinants of health

WHO, 2015

Watts et al., 2018
Future Global Health Impacts from Climate Change

- Heat waves and forest fires: Very high confidence
- Reduced labour productivity: High confidence
- Increased under-nutrition: Very high confidence
- Foodborne diseases: Very high confidence
- Water-borne diseases: Very high confidence
- Vector-borne diseases: Medium confidence

IPCC, 2014
Direct and Indirect Health Impacts of Climate Change

Watts et al., 2015
1) Potential increased risks of introduction, and endemic transmission, of “exotic” infectious diseases from around the world (e.g. malaria, dengue, SARS, Chikungunya virus, yellow fever)

2) Spread northward of diseases currently endemic to the United States (e.g. Lyme disease, Anaplasmosis; Babesiosis; Powassan virus; and Borrelia miyamotoi disease)

3) Re-emergence (i.e. more epidemic behaviour and range change) of Canada-endemic infectious diseases (e.g. West Nile virus outbreaks)

(Sources: Ogden & Gachon, 2019; Ng et al., 2019; Bouchard et al., 2019)

Risks will change with exposure (e.g., number of invective individuals, microorganisms, anthropod vectors, animal reserve hosts and sensitivity (e.g., increasing number of elderly and people with chronic diseases)

Increased Risks from Lyme Disease to Canadians

Number of Reported Cases of (A) Lyme Disease and (B) West Nile Virus in Canada between 2002 and 2015

Source: Ogden & Lindsay, 2016
Fire Disasters in Canada

Health Impacts of 2017 BC Wildfires

• Affected 19 health facilities or sites
• 880 patients evacuated
• Over 700 health services staff displaced
• Cost to Interior Health - $2.7M

(Toews et al., 2018)

“Global smoke related fatalities estimated at 339,000 per year” (Johnston et al., 2012)
Montreal Heat Wave (June 30 – July 8, 2018)

66 deaths
(as at May 2019)

- 72% per cent of those who died suffered from a **chronic illness**
- 66% per cent were **over the age of 65**
- 25% were people living with **schizophrenia** (who make up only 0.6% of the population)

Centres intégrés universitaires de santé et de services sociaux (CIUSSS) du Centre-Sud-de-l'Île-de-Montréal, 2018.

Heat waves dangerous to health occur in many Canadian communities every year
Extreme Heat – Future Projections for Canadian Communities

At-risk groups include:

- Older Adults
- Infants and young children
- People with chronic illnesses
- The physically active
- Low socio-economic status
- Newcomers to Canada and transient populations
Mental Health Impacts of Climate Change

- 1 in 300 year flood
- 1932 people remained evacuated 2 years after the flood

Psychosocial impacts included:

- Increases in alcohol and drug use
- Increases in family violence
- Depression
- Anxiety
- Sleep disruption
Climate Change and Occupational Health

Temperature Extremes

Air Pollution

UV Radiation

Industrial Transitions

Extreme Weather

Vector-borne and Other Infectious Diseases

Wildland Fires

Changes in Built Environment

Climate Change Risks to Workers

Shulte and Chun, 2009
Vulnerability to Climate-Sensitive Health Outcomes

- Infants and children
- First responders; police; health care and social services workers
- Pregnant women
- Seniors
- People with chronic medical conditions
- Indigenous Peoples
- Impoverished/low socioeconomic status
- Outdoor workers

WHO, 2013; Berry et al., 2014

Complex Emergencies and Disasters

2011: Wildfires and then Floods in Slave Lake

One-third of the homes and businesses in Slave Lake (about 400 structures) were incinerated in the wildfires in May 2011. Total damage was $700Mil. Three weeks after the fire storm 17 consecutive days of rain caused widespread flooding as did another deluge July 7-9.
Health Impacts of Climate Variability and Change

Canada faces a broader range of health threats than many other countries due to its diverse geography and various climatic zones.

- Fort McMurray fire increases PTSD, depression, insomnia (2016)
- 20,000 sought mental health services.
- BC wildfires – affect 19 health facilities; 880 patients evacuated; 700 staff displaced (2017)
- Several health facilities closed around Calgary due to flooding (2013)
- Mosquito vector for tropical diseases found in Windsor (2017)
- Food security and mental health issues in the North (chronic)
- 1300% increase nationally in Lyme disease cases (2009-2017)
- 156 heat-related deaths in BC (2009)
- 200+ heat related deaths (2010)

Climatic events occurring in close succession or concurrently are increasing risks of very severe health impacts (e.g. floods, storms, heat waves).

In addition to known risks, there are many unknowns that could exceed coping ability of health systems.

Mosquito vector for tropical diseases found in Windsor (2017)
Health Authorities in Canada are Preparing for Climate Change
Growing Awareness and Concern About Impacts on Canadians

Health organizations raising awareness

Canadians are concerned about health impacts

22+ municipalities have declared climate emergencies

93% believe climate change is having an impact on their health now or will in the future

55% feel personally vulnerable

(Environics, 2017)
Historic Gains in Protecting Health

Over the last 55 years, death rates in children under 5 years of age has decreased from 214 per 1000 live births to 59.

Over the same time, life expectancy has increased from 47 years to 69 years.
Historic Gains in Protecting Health

Over the last century dramatic progress has been made in reducing health impacts related to:

- Natural disaster deaths
- Lightening strike deaths
- Motor vehicle accident deaths
- Pedestrian deaths
- Plane crash deaths
- Falls, fire, drowning and poison (except drug overdoses)
- Occupational accidental deaths
- Homicide deaths

Pinker, 2018

10,400 deaths in 2018 due to natural disasters which continues the downward trend from the average of 53,000 (per year) over the past 30 years. (Source: Munich Re, 2018)
Many Health Authorities and Canadians are Adapting

Survey Topline Results: Which of the following activities has your organization undertaken, if any,

- A climate change and health vulnerability assessment (35.0%)
- An assessment of the resiliency of health care facilities to climate change (e.g., hospitals, medical clinics, nursing stations, community health centres, pharmacies) (18.8%)
- Climate change and health education and outreach with stakeholders (53.8%)
- Climate change and health education and outreach with the public (47.5%)
- Adaptation actions tailored to populations of concern (vulnerable populations) (41.3%)
- Education/training on climate change and health risks and adaptations among your organization's staff, public health officials and /or health professionals (36.3%)

Source: Survey Research Centre, University of Waterloo
Many Health Authorities and Canadians are Adapting

Rogaeva, 2016

Waddington et al., 2013

Rutledge and de Scally, 2018

Waddington et al., 2013
Health sector resiliency measures can save money and protect people

Gundersen Health System (U.S.) energy transformation from 2008 – 2016

- Annual CO₂ emissions reduced from 70 million to 1.6 million pounds
- PM emissions from 435,000 to 11,000 pounds
- Mercury emissions from 2.5 to 0.16 pounds
- Energy costs remained below 2008 levels

(NAS, 2018)

Infrastructure hardened health facility through investments in resiliency response to hurricane scenario:

- Avoided 10% revenue loss from business interruption
- 5% increase in costs due to major emergency repairs vs 20% for unprepared facility
- Overall savings of 100 million dollars

(Health Care Without Harm, 2018)
Health Canada’s actions to protect Canadians
"Tackling climate change could be the greatest global health opportunity of the 21st century"

Lancet Commission on Climate and Health, 2015
Protecting and improving human health and well-being

1. Addressing climate change-related health risks
   - Extreme heat events
   - Infectious diseases
   - Adaptation investments - surveillance and monitoring, risk assessments, modelling, laboratory diagnostics, health professional education and public awareness activities.

2. Supporting healthy Indigenous communities

## Federal Health Partners Actions on Climate Change

| **HC** | **Heat and Health Risk Program**  
  - Extreme Heat & Health Risk Assessment (National Assessment 2021)  
  - Information and Action for Resilience  
  - National Monitoring and Surveillance Program & Capacity Building in the Health Sector based on US model (‘BRACE’) |
| **ISC** | **Climate Change and Health Adaptation Program for First Nations & Inuit Communities**  
  - North and South of 60  
  - Community-driven and culturally relevant adaptation planning & actions |
| **PHAC** | **Infectious Disease and Climate Change Program**  
  - Vector-borne, Water-borne, Zoonotic  
  - Research, surveillance, lab diagnostics, knowledge translation, health professional education  
  - Métis |
| **CIHR** | **Climate Change and Health Research Initiative**  
  - Focus on food security in the North and Lyme disease |
Climate Resilient Health Systems Framework - DRAFT

Phase 1: Awareness Building

1. Awareness of Climate Change Risks to Health and Need to Adapt

Phase 2: Groundwork Adaptation

2. Leadership and Partnering

Phase 3: Concrete Adaptation

3. Building Capacity to Adapt
   - Identifying best practices, conceptual/analytical tools
   - Adaptation and assessment guidance
   - Health adaptation plans
   - Networking and information sharing
   - Integrated risk monitoring and surveillance
   - Vulnerability and adaptation assessment
   - Climate and health research

Phase 4: Iterative Risk Management

4. Implementing Concrete Adaptation Options
   - New/upgraded infrastructure and technology
   - Communication campaigns
   - Health workforce training
   - Emergency preparedness and management
   - Climate-informed health programmes, policies, standards, guidelines, regulations
   - Management of environmental determinants of health
   - Climate and health financing
   - Indigenous health systems and communities

5. Measuring and Evaluating Progress

6. Learning, information sharing and course correction

Vulnerability and Adaptation Assessment Implementation

DO NOT CITE, SHARE OR DISTRIBUTE
New Science to Support Adaptation

- Climate change, food insecurity and human health nexus
- Adapting mental health programs to climate change
- Effectiveness of syndromic surveillance systems
- New technologies to support health adaptation
- Indicators of vulnerability to the health impacts of flooding and of drought in the context of climate change
- Factors that influence the psychosocial health impacts of climate change

Hayes et al., 2019
https://www.mdpi.com/1660-4601/16/9/1583/htm
Increasing Resiliency of Health Systems

• Climate-informed health planning

• Health and climate capacity development

• Emergency preparedness and management

• Vulnerability, capacity and adaptation assessment

• Integrated risk monitoring and early warning

WHO, 2015
Health Risks in Canada from Climate Change

WHO will be affected?

WHAT climate hazards will endanger health?

WHEN will health be impacted?

WHERE will health risks be the greatest?

- Permafrost melt damaging infrastructures
- Heat-related illnesses and deaths
- Psychosocial impacts from droughts
- Water-borne diseases from floods
- Respiratory illnesses from forest fires
- Dangerous travelling conditions
- Changes in drinking water quality and quantity
- Food security - changing animal distributions
- Health impacts from more severe storms
- Expansion of Lyme Disease vector
“Climate Sensitive” Health Programs

- Food Safety
- Infectious Disease Management
- Mental Health
- Health of Northern Populations

Central Themes:
- Adaptation
- Impacts
- Mitigation

Additional Topics:
- Seniors’ Health
- Sustainable Development
- Health care system capacity
- Children’s Environmental Health
- Occupational Health
- Emergency Preparedness

Travel Medicine
Air and Water Quality
Health of Canadians in a Changing Climate: Advancing Our Knowledge for Action 2021

The impacts of climate change are already being felt across Canada. Ongoing climate change poses significant risks to communities, health and well-being, our economy and the natural environment. Meeting the challenges posed by climate change means both reducing emissions to limit the amount of change, as well as adapting to the observed and anticipated impacts, in order to build resilience.

Canada in a Changing Climate: Advancing Our Knowledge for Action is a series of authoritative science and information products about how Canada’s climate is changing, the impacts of these changes and how we are adapting to reduce risk.

Assessment products will serve as a resource for Canadians raising awareness of the key issues facing our country, and providing information to support sound adaptation decisions and actions.

https://www.nrcan.gc.ca/environment/impacts/adaptation/21189

Share Your Views on Canada's Assessment

Learn more about the assessment process

Look ahead at what products you can expect to see
Climate Change and Health Assessment Guidance

http://apps.who.int/iris/handle/10665/104200
CCHA 2021: What You Can Expect

Key areas of focus:

• Natural hazards
• Water security and safety
• Food security and safety
• Mental health and well-being
• Infectious disease
• Air quality
• Health co-benefits and risks
• Impacts on health equity / populations of concern
• Indigenous populations and communities
• Health system vulnerabilities
• Health sector adaptation, capacity and resilience

https://www.nrcan.gc.ca/environment/impacts-adaptation/21189
Purpose

• Support the health sector to prepare for and adapt to the impacts of climate change through the development of climate change and health vulnerability and adaptation assessments

Funding Amount and Duration

• Approximately $3 million in funding is awarded through this process.
• Ten projects will be funded for approximately $300,000 each spread over the full funding period, ending March 31, 2022.

10 projects selected across Canada that represent the diversity across the country, including:

• Indigenous Peoples
• Urban/rural/coastal communities
• Health sector spectrum (i.e., provincial/territorial ministries of health, regional/local health authorities, public health units)
• Official language communities
Heat Program
Protecting Canadians From Extreme Heat

Data, Monitoring, Surveillance, and Forecasting
Providing Data and Evidence for Decision-Making
Policy, Outreach, Capacity Building, and International Understanding Health Risks and Building Capacity in the Health Sector

HealthADAPT Funding Recipients

Northwest Territories Department of the Health and Social Services
First Nations Health Authority
Vancouver Coastal Health
York Region Public Health
Wellington-Dufferin-Guelph Health Unit
Northwestern Health Unit
Institut national de santé publique du Québec
Centre intégré de Santé et de services sociaux de Chaudière-Appalaches
New Brunswick Department of Health
Centre intégré de Santé et de services sociaux de l'Outaouais
HealthADAPT Funding Recipients

WATCH: We All Take Care of the Harvest. Safe and Secure Harvesting of Marine Foods in the Context of Climate Change

Recipient: First Nations Health Authority

Funding Amount: $297,936

Project Summary: The project will result in the development of local- and Indigenous-relevant adaptation strategies to reduce the impacts of climate change on Indigenous marine foods and enhance the resiliency of First Nations communities in British Columbia.
Together We Can: Population Health-Based Integrated Climate Change and Health Vulnerability Assessment and Adaptation Planning for Vancouver Coastal Health and Fraser Health Authority

Recipient: Vancouver Coastal Health Authority

Funding Amount: $300,000

Project Summary: This project will result in the creation of a multi-agency Climate Change and Health Adaptation Strategic Plan to increase health system resiliency. Public Health, Emergency Management, and Facilities Management for the two health authorities will collaborate on this initiative, which will benefit over 450 health facilities and 60% of the BC population.
THANK YOU

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