

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

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**NCCEH Seminar**  
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# Presentation Overview

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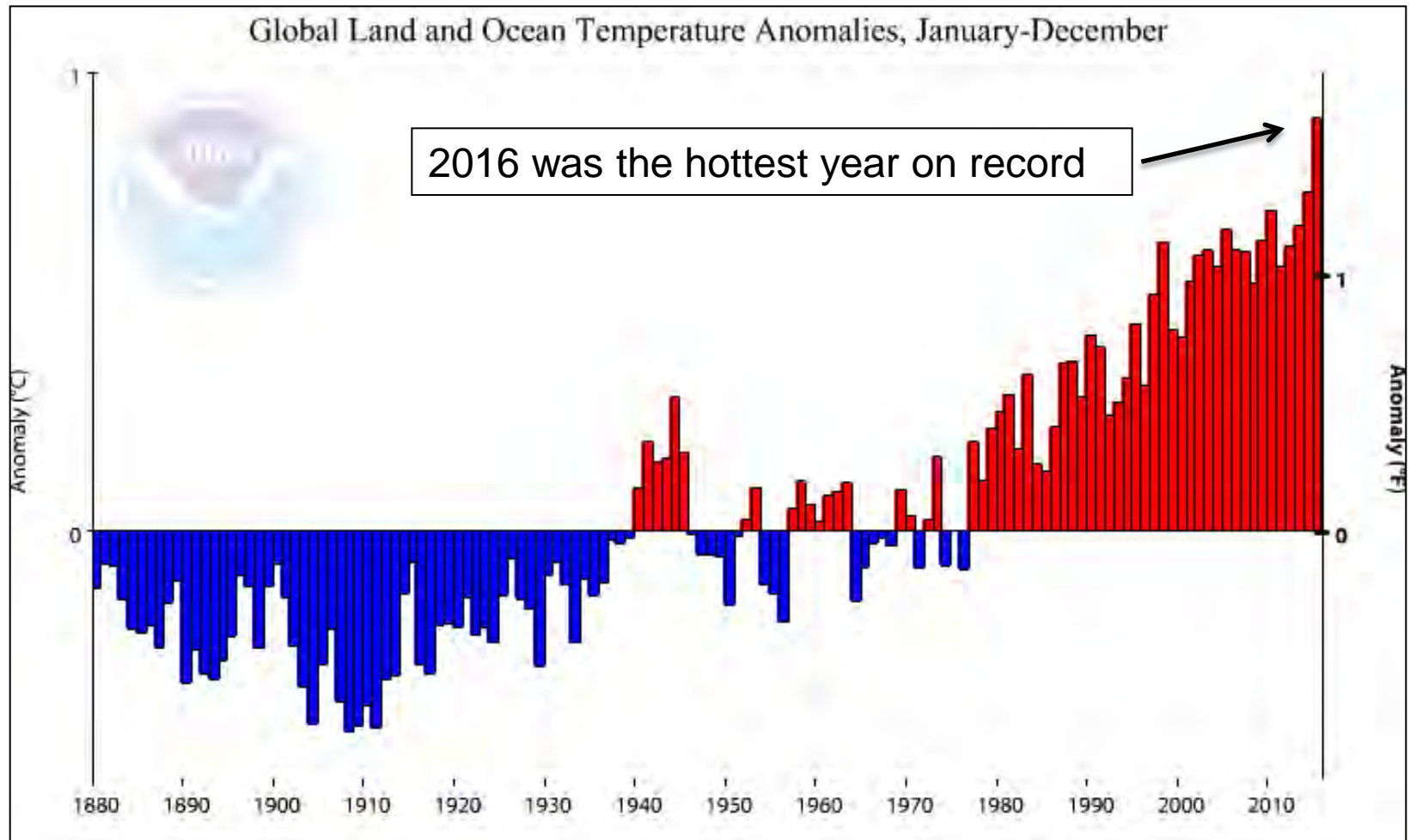
- How the climate is changing
- Climate change risks to health
- Health authorities are preparing for climate change
- Health Canada's actions to protect Canadians

# How the Climate is Changing



# Evidence of Climate Change - “Warming is unequivocal”

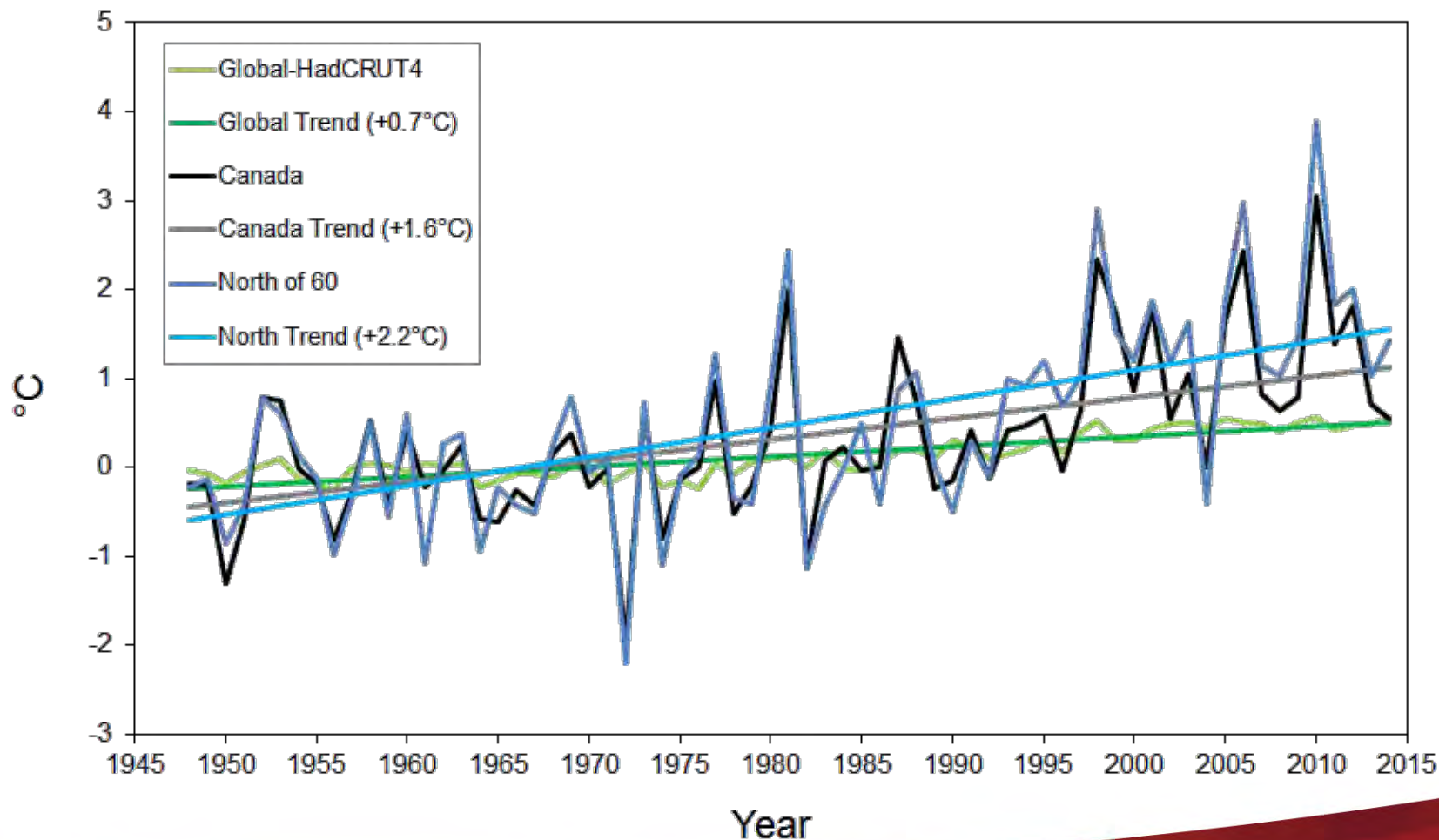
**Global Land and Ocean Temperature Anomalies, January - December**  
(Annual anomalies relative to 20<sup>th</sup> century)



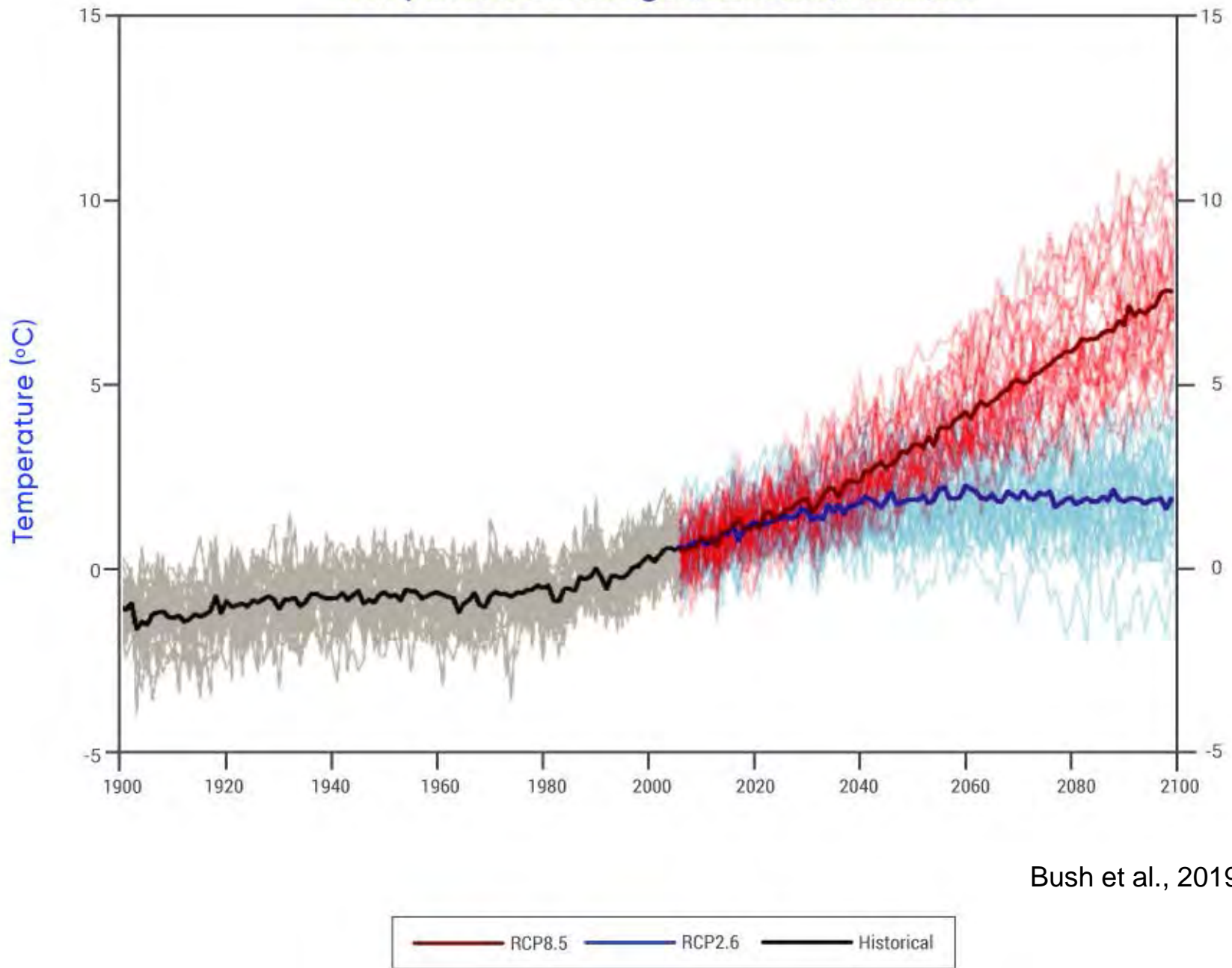
NOAA, 2017

# 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

# 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

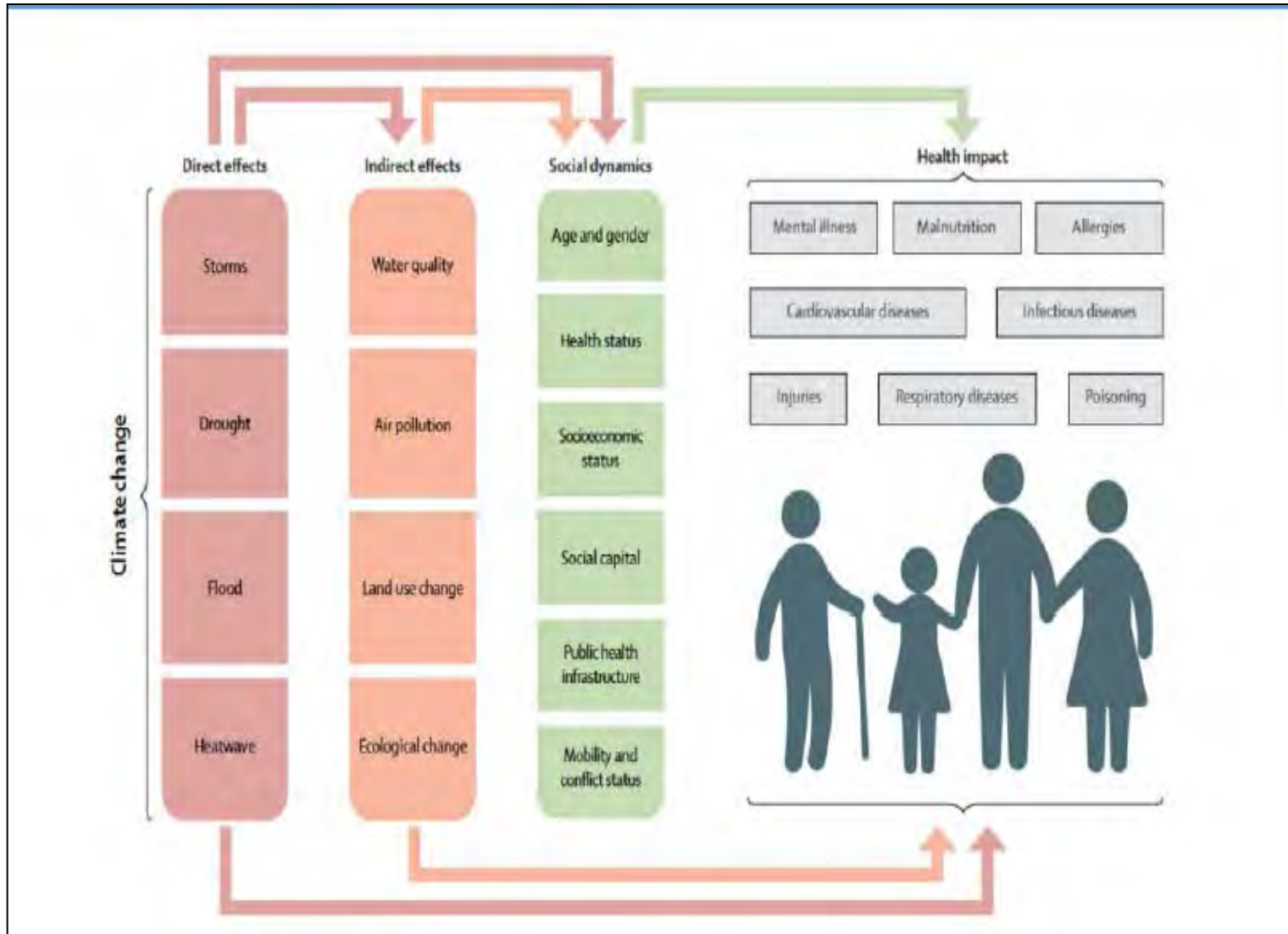


# Future Global Health Impacts from Climate Change

Heat waves and forest fires	→	<i>Very high confidence</i>
Reduced labour productivity	→	<i>High confidence</i>
Increased under-nutrition	→	<i>Very high confidence</i>
Foodborne diseases	→	<i>Very high confidence</i>
Water-borne diseases	→	<i>Very high confidence</i>
Vector-borne diseases	→	<i>Medium confidence</i>

IPCC, 2014

# Direct and Indirect Health Impacts of Climate Change



Watts et al., 2015

# Infectious diseases related to climate change will increasingly threaten Canadians

- 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)



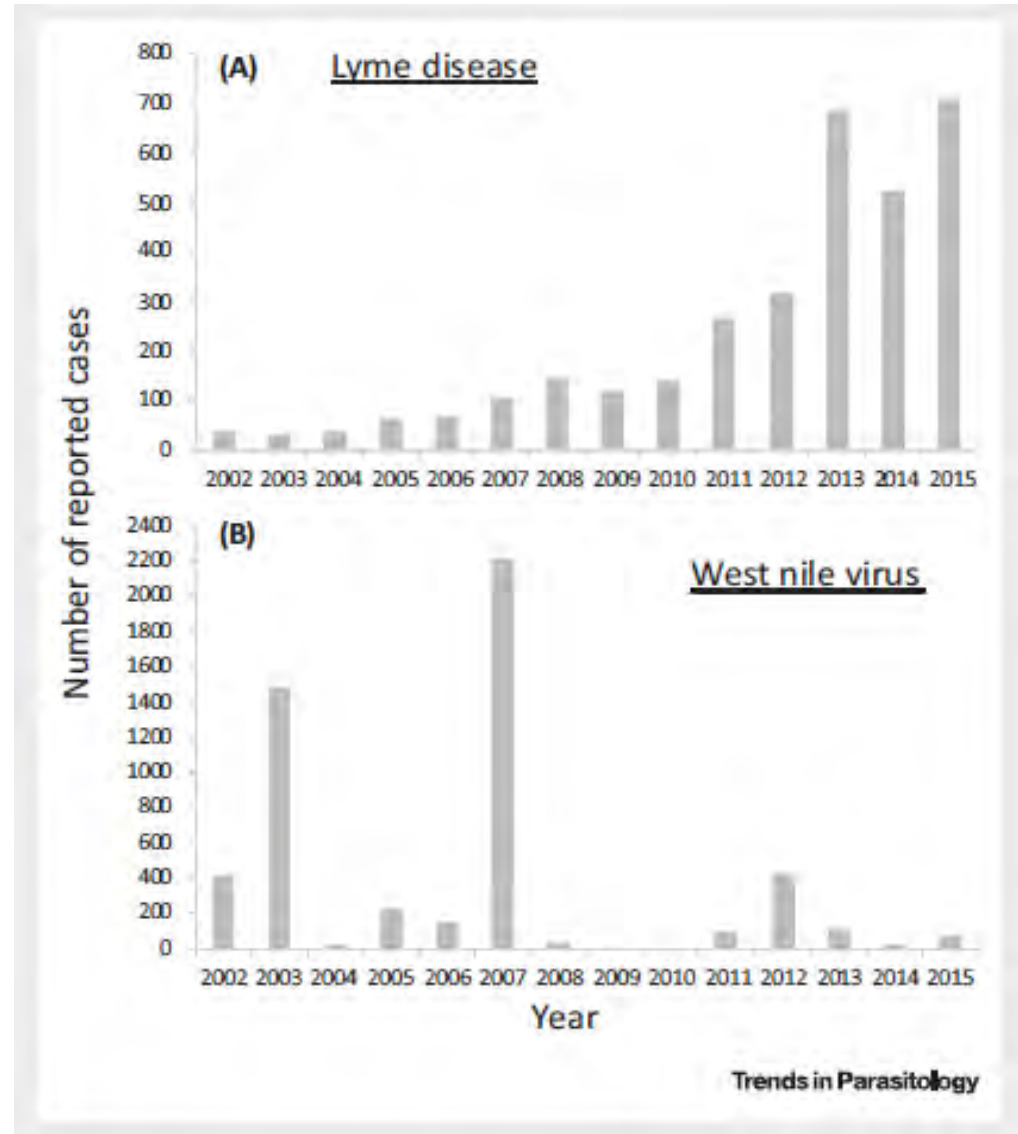
Risks will change with exposure (e.g., number of infective individuals, microorganisms, anthropod vectors, animal reserve hosts) and sensitivity (e.g., increasing number of elderly and people with chronic diseases)

<https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2019-45/issue-4-april-4-2019.html>

# 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)***

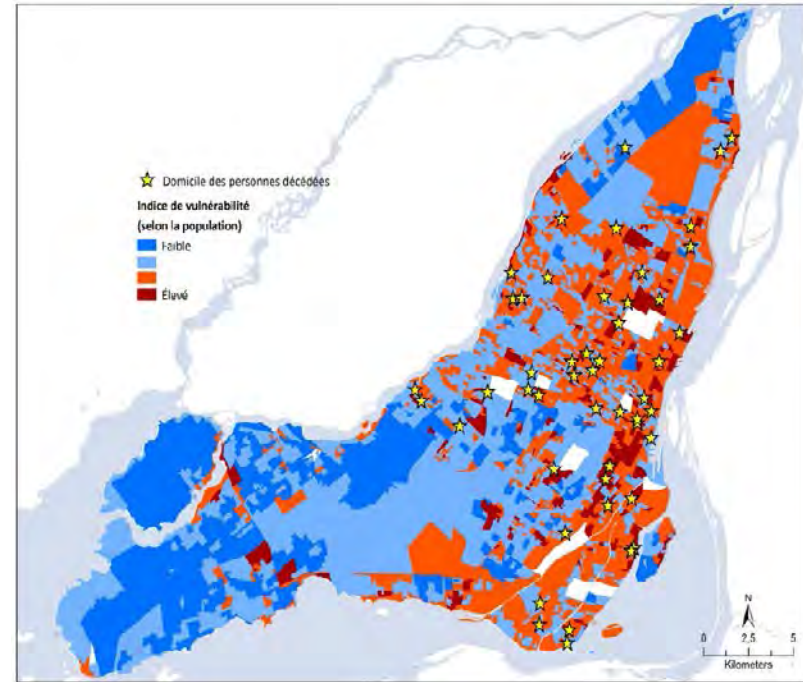


# Montreal Heat Wave (June 30 – July 8, 2018)

## 66 deaths

(as at May 2019)

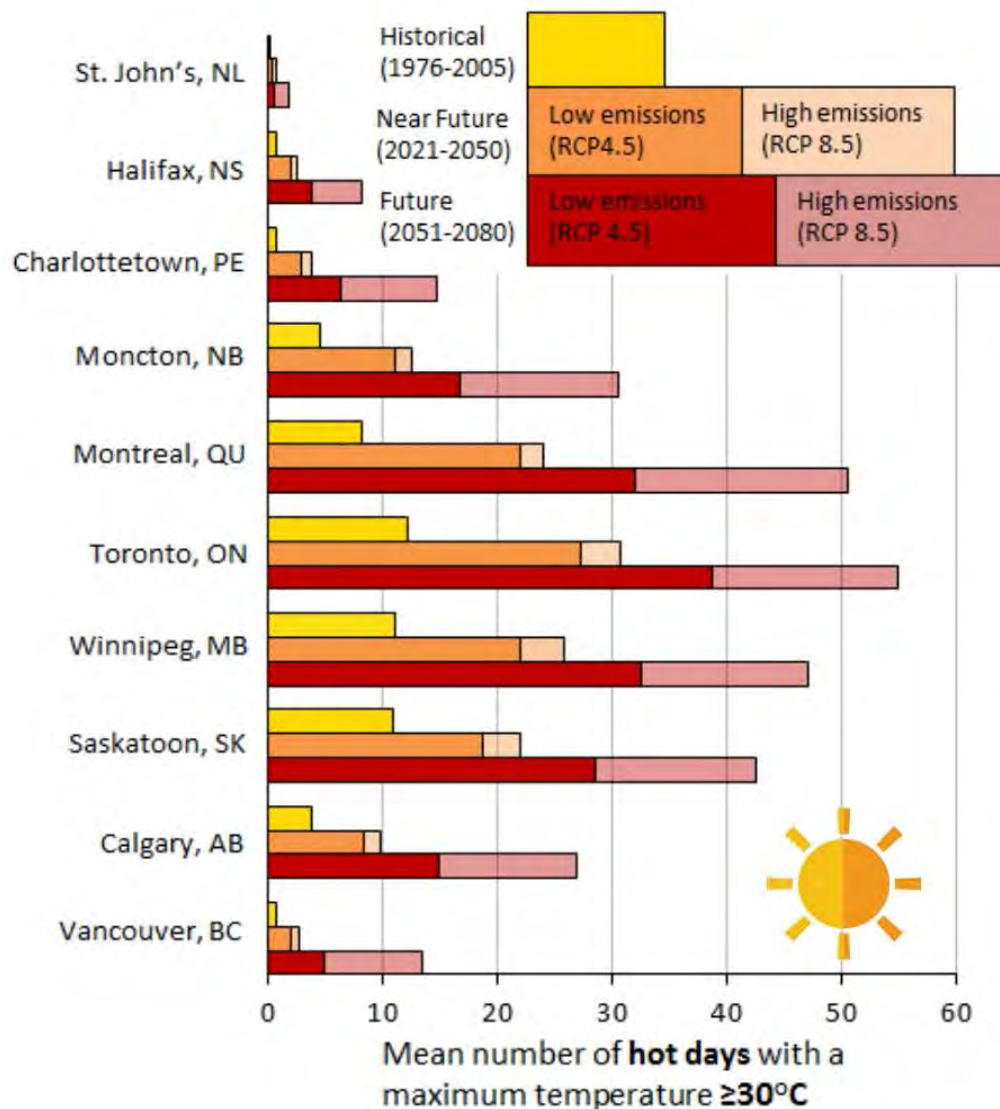
- **72%** per cent of those who died suffered from a **chronic illness**
- **66%** per cent were **over the age of 65**
- **25%** were people living with **schizophrenia** (who make up only 0.6% of the population)



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

**Citation:** Malik, M., Stranberg, R., Meunier, M., Donaldson, S. (2018). Poster: Heat Health - Addressing Adaptation. Climate Change and Innovation Bureau. Health Canada. Ottawa.



# Mental Health Impacts of Climate Change

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

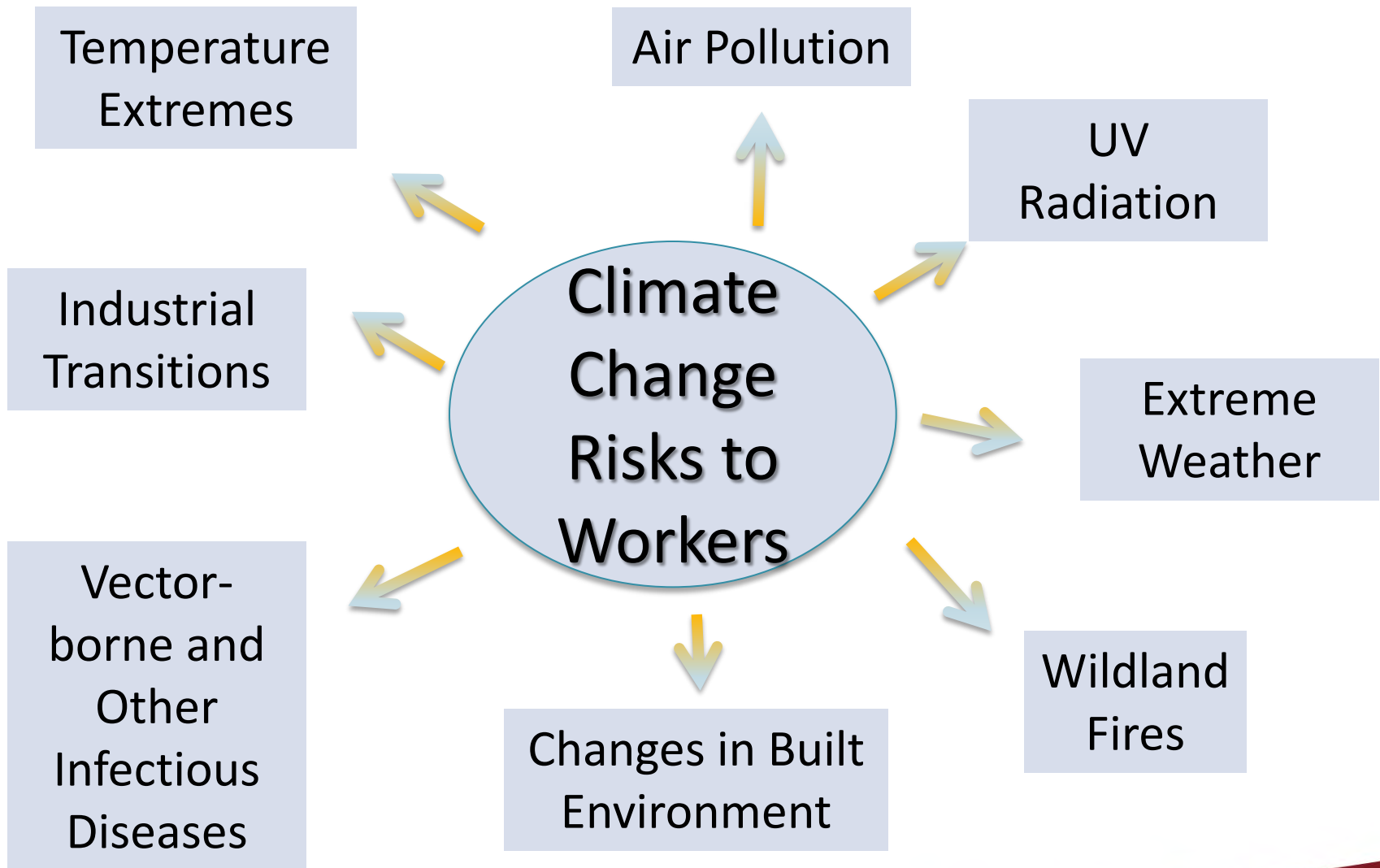
Psychosocial impacts included:

- Increases in alcohol and drug use
- Increases in family violence
- Depression
- Anxiety
- Sleep disruption

## Manitoba Flood 2011



# Climate Change and Occupational Health



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



<https://www.cbc.ca/news/politics/flooding-canada-federal-assistance-1.4100938>

WHO, 2013; Berry et al., 2014

# Complex Emergencies and Disasters

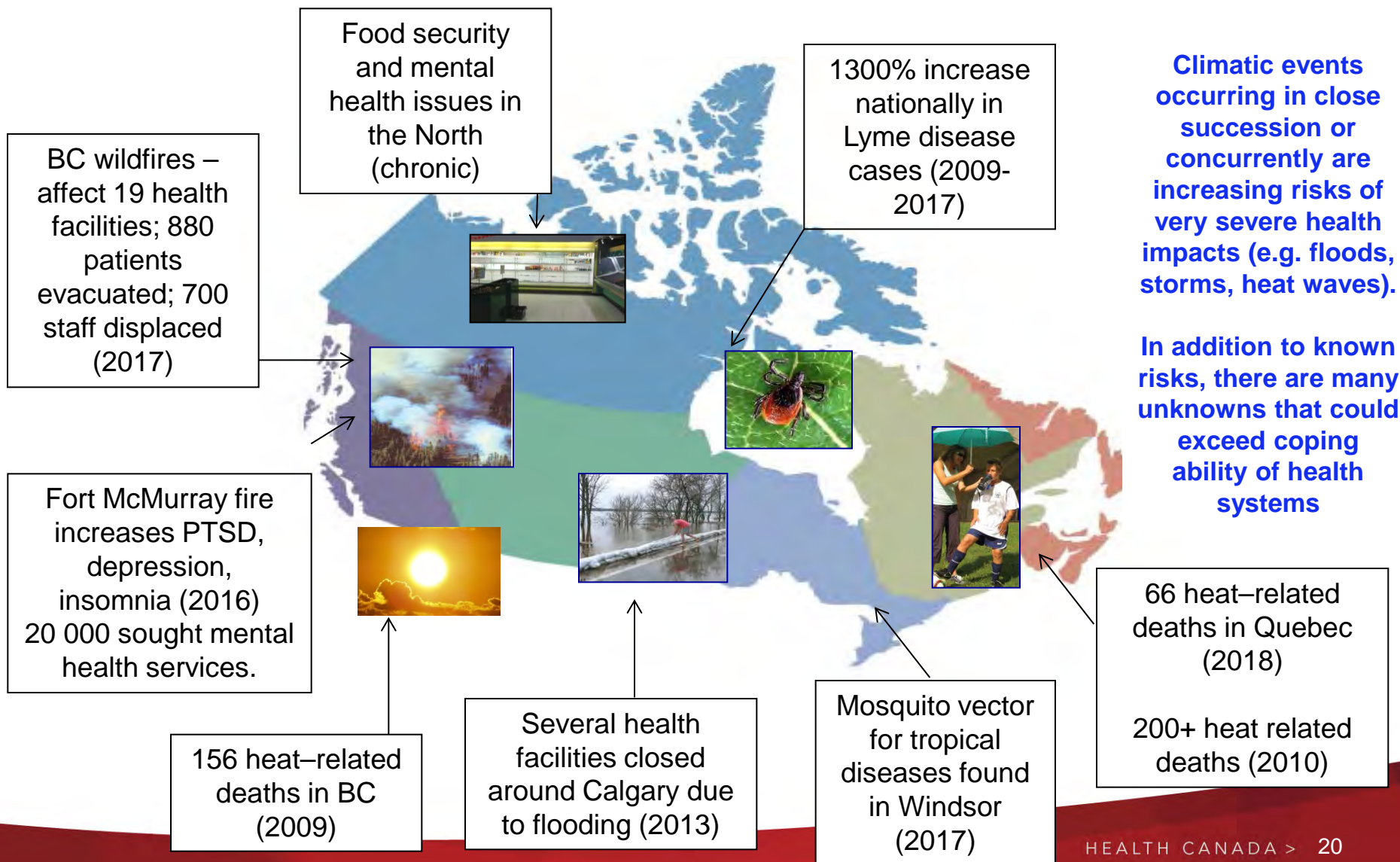
## 2011: Wildfires and then Floods in Slave Lake

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.*



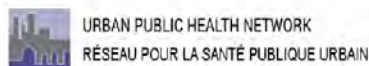


# Health Authorities in Canada are Preparing for Climate Change



# Growing Awareness and Concern About Impacts on Canadians

## Health organizations raising awareness



## Canadians are concerned about health impacts

93%



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

55%



**feel personally vulnerable**

(Environics, 2017)

## 22+ municipalities have declared climate emergencies

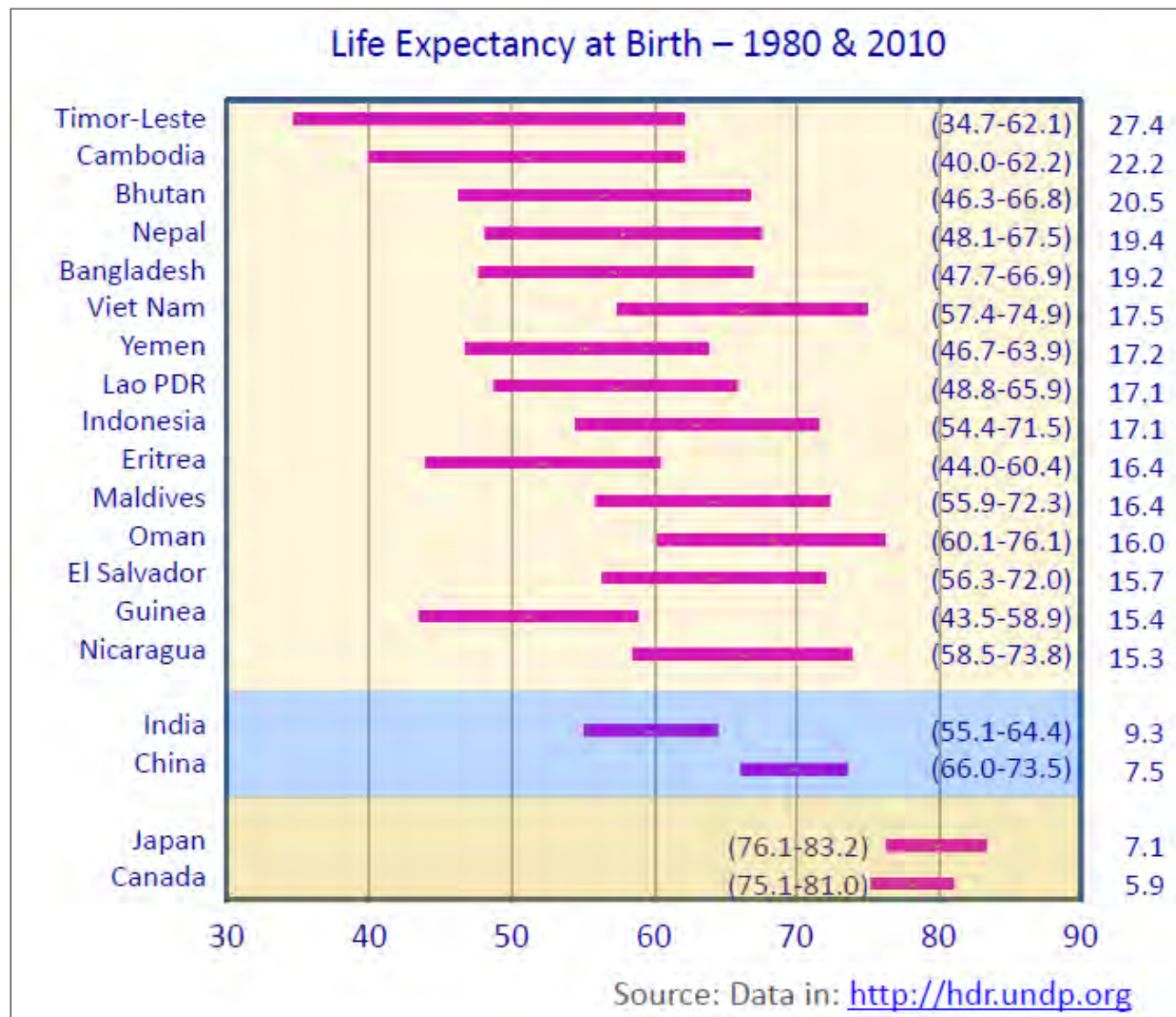




# Historic Gains in Protecting Health

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

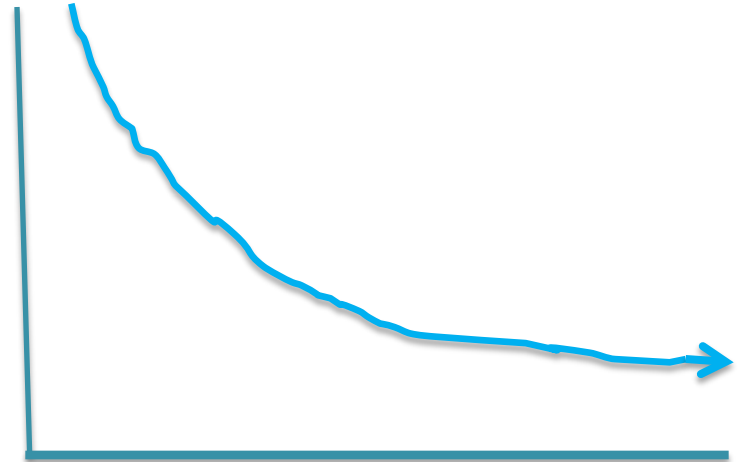
Over the same time, life expectancy has increased from 47 years to 69 years.



# Historic Gains in Protecting Health

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

- Natural disaster deaths
- Lightning 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



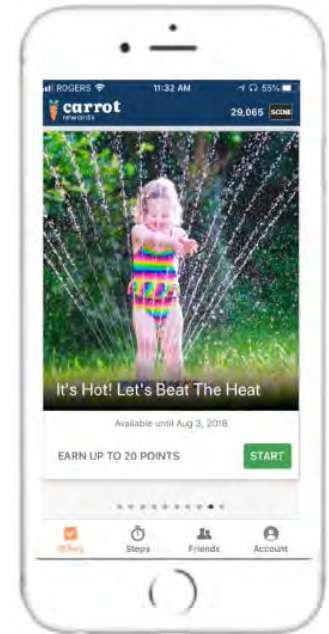
# Many Health Authorities and Canadians are Adapting



Rogaeva, 2016



Waddington et al., 2013

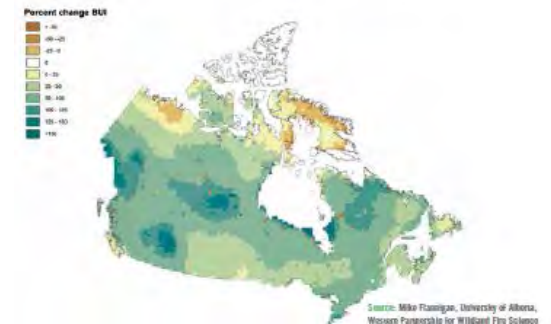


Rutledge and de Scally, 2018



Waddington et al., 2013

FIGURE 6 : Percentage change in Build Up Index (BUi) across Canada for the period 2081-2099 as compared to the baseline 1971-2000



# Health sector resiliency measures can save money and protect people

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

- Annual CO<sub>2</sub> 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

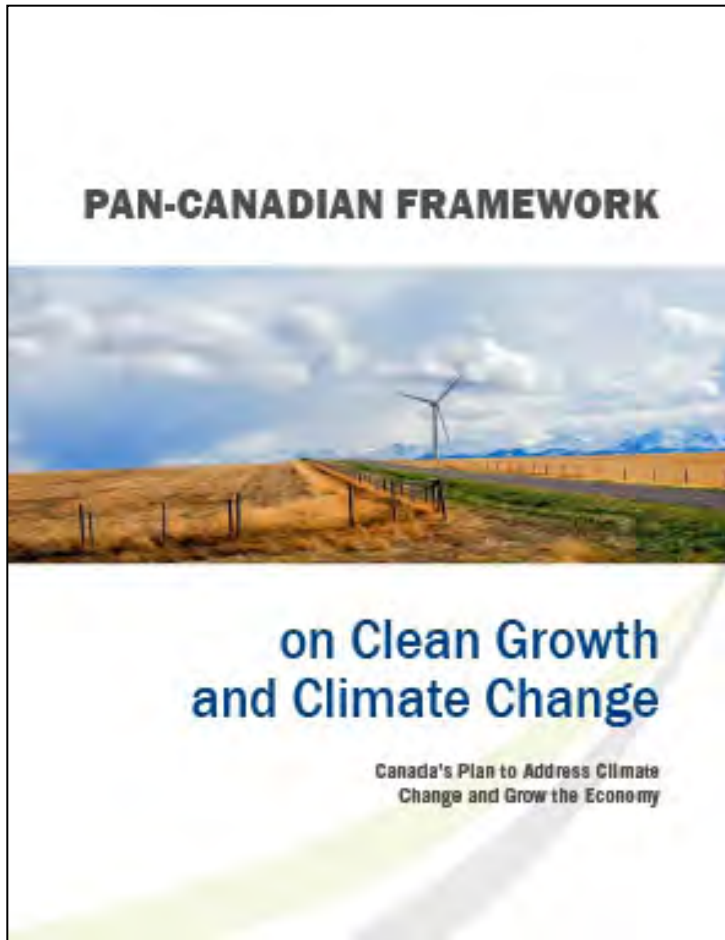


*"Tackling climate change could be the greatest **global health opportunity** of the 21st century"*

Lancet Commission on Climate and Health, 2015



# Pan-Canadian Framework on Clean Growth and Climate Change



## 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

<https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>

# 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

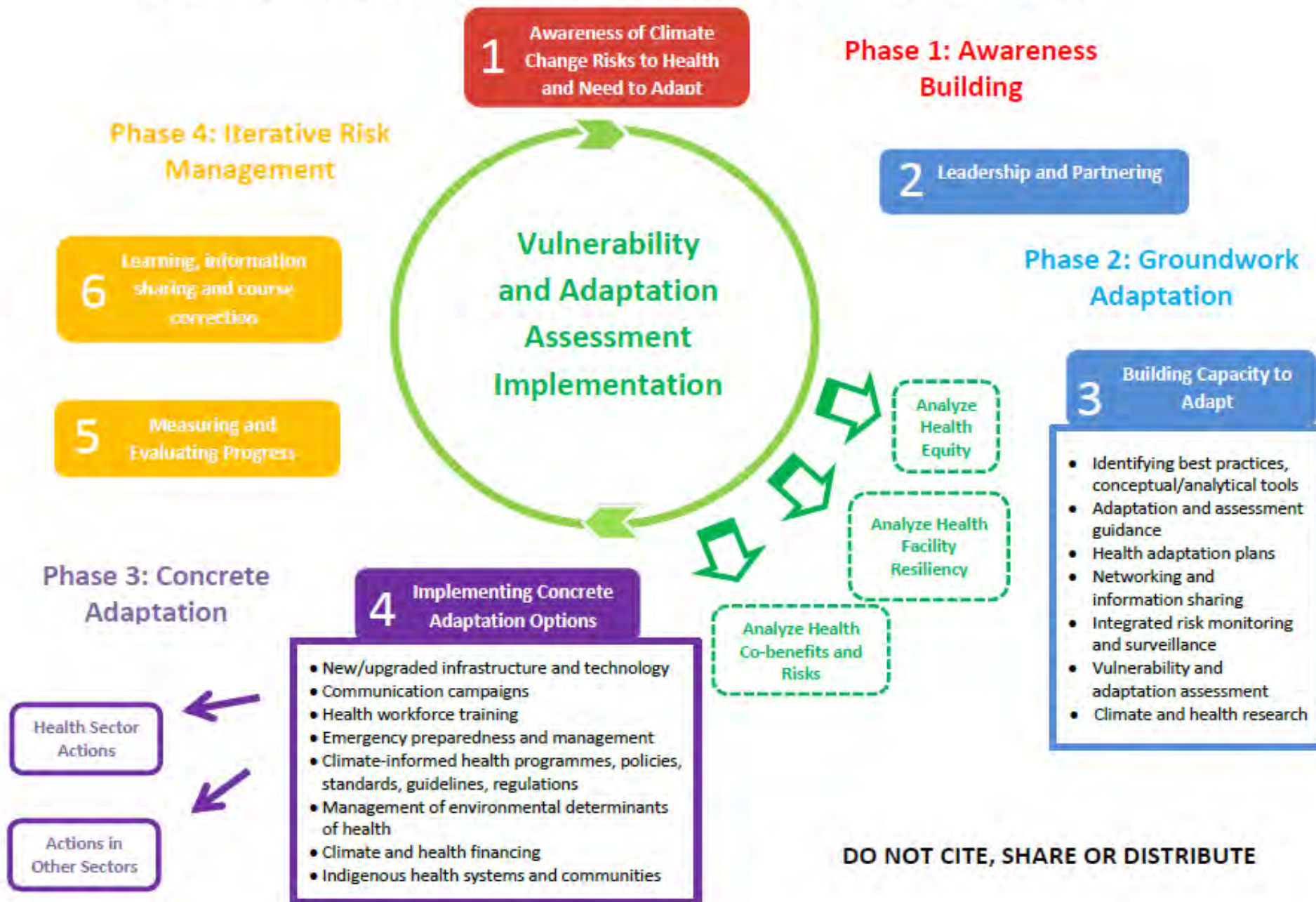
PHAC

- **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

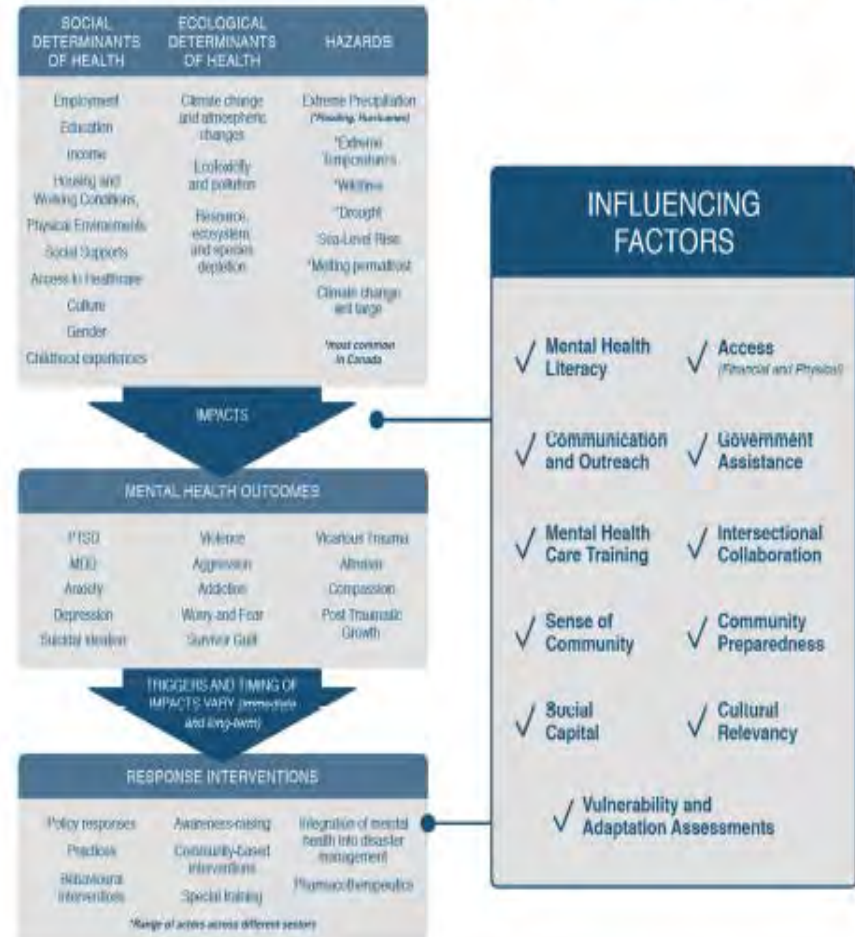




# New Science to Support Adaptation

- 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

## Factors that Influence the Psychosocial Health Impacts of Climate Change

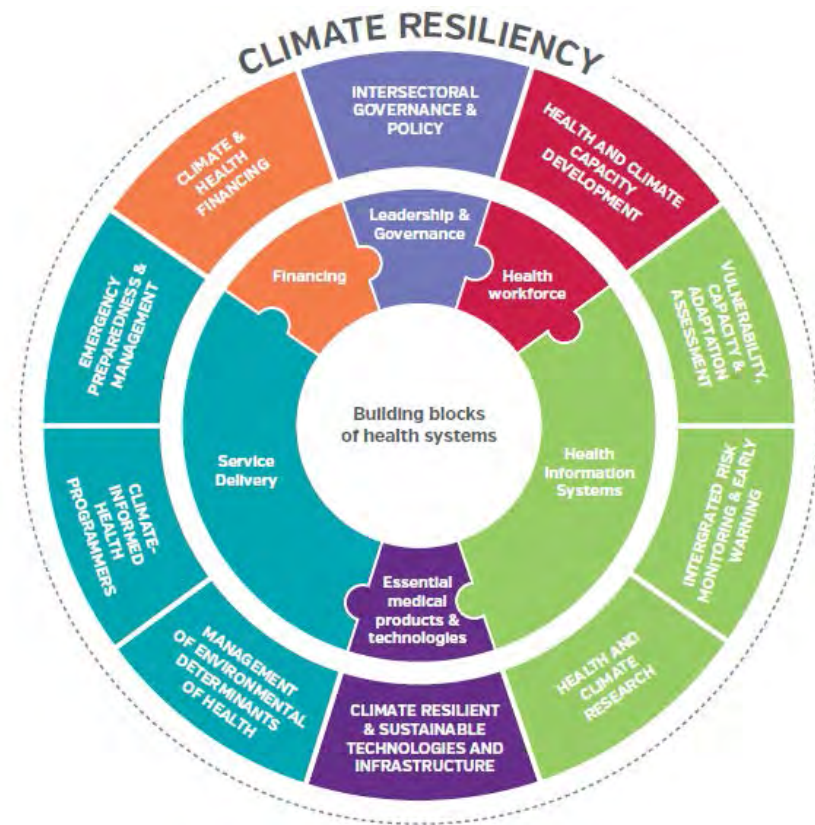


Hayes et al., 2019

<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

**WHO will be affected?**

**WHAT climate hazards will endanger health?**

## Health Risks in Canada from Climate Change

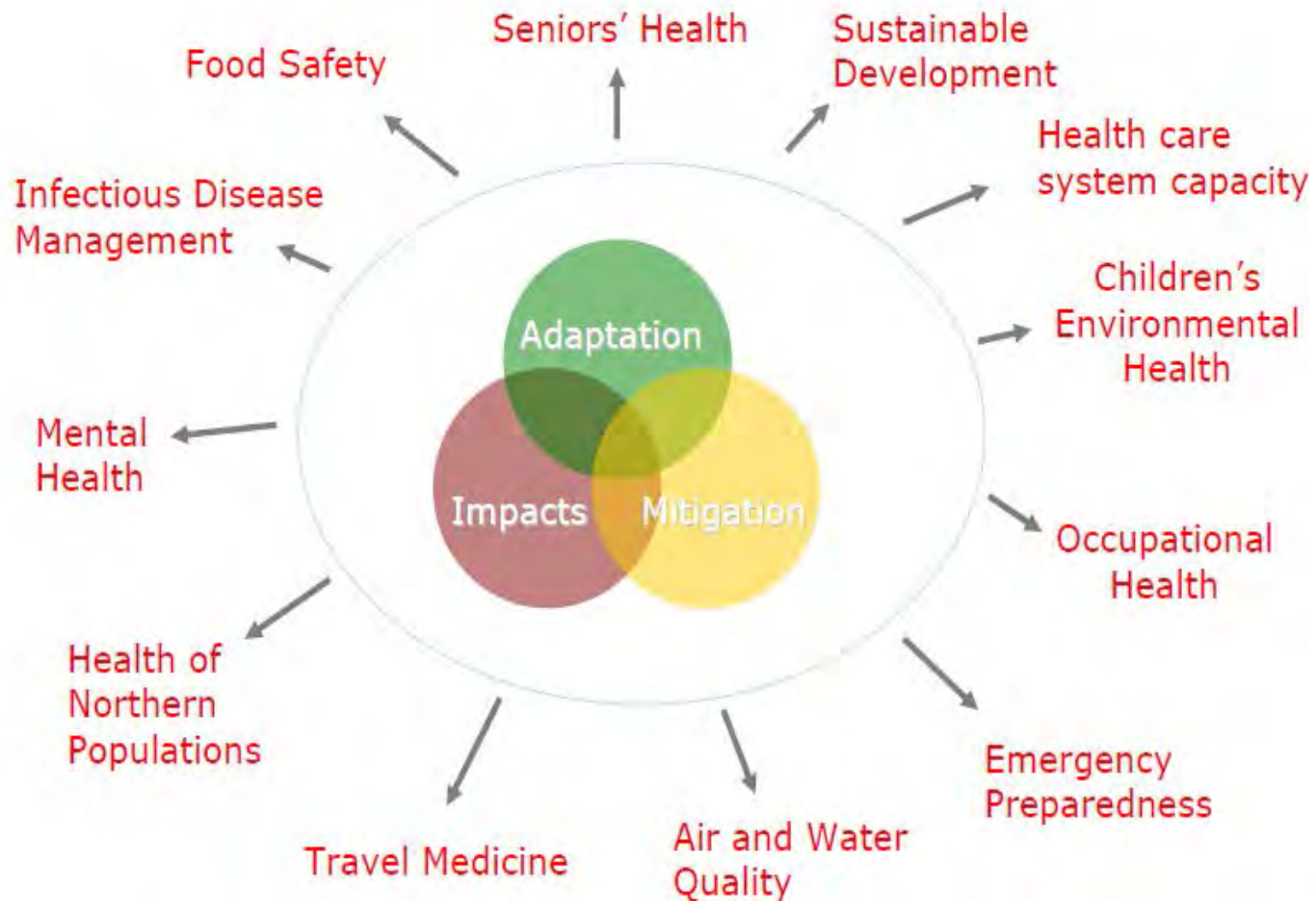


**WHEN will health be impacted?**

**WHERE will health risks be the greatest?**



# “Climate Sensitive” Health Programs





## Canada in a Changing Climate: Advancing Our Knowledge for Action



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.

[Learn more about the assessment process](#)

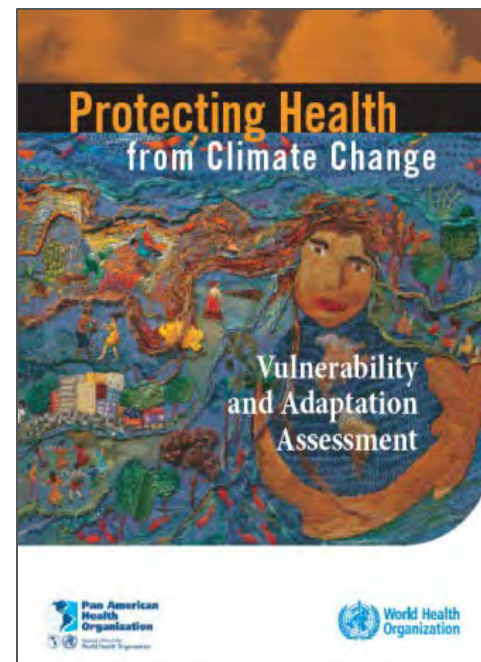
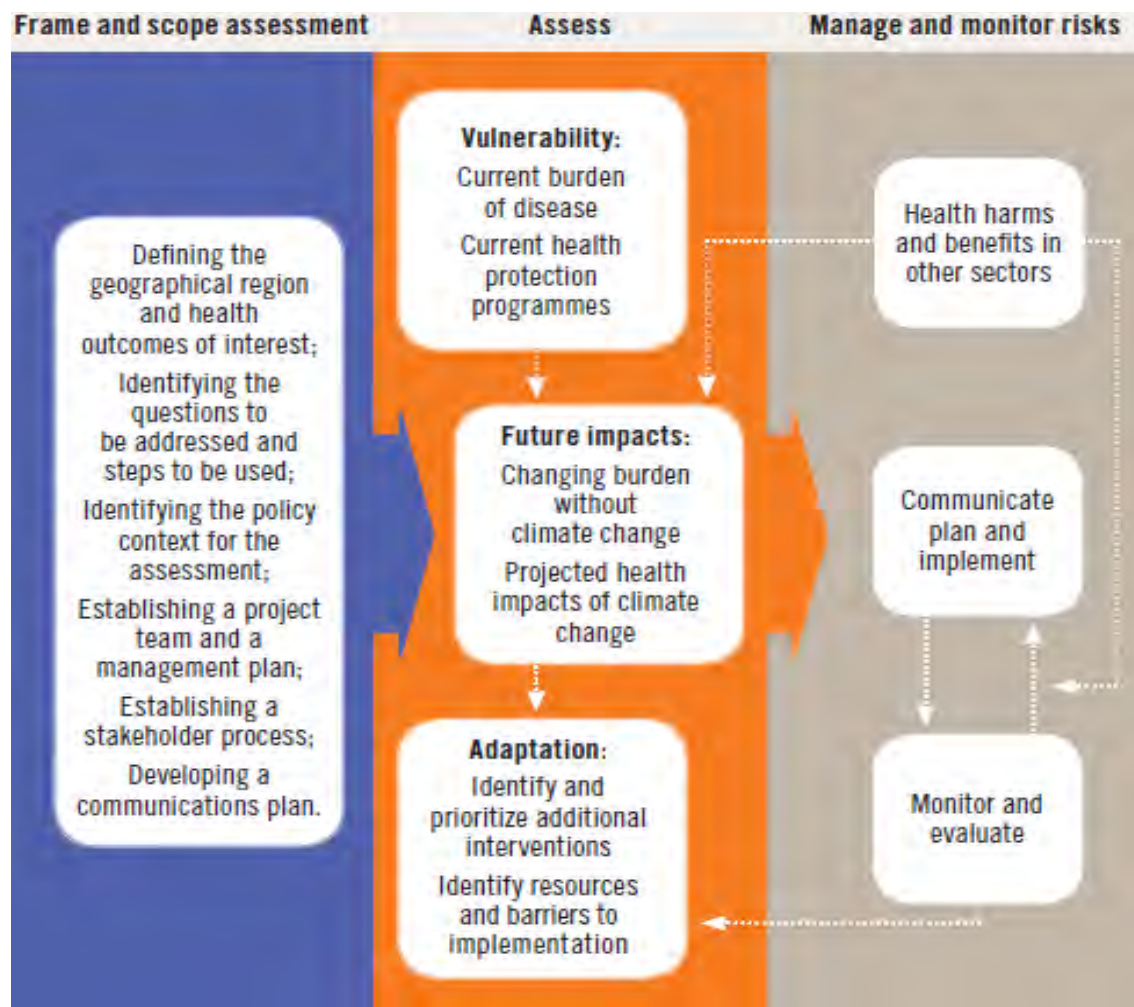
[Look ahead at what products you can expect to see](#)

[Share Your Views on Canada's Assessment](#)

## *Health of Canadians in a Changing Climate: Advancing Our Knowledge for Action 2021*

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

# 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

Canada's Changing Climate



National Issues



Regional Perspectives



Health of Canadians in a Changing Climate



Frequently Asked Questions



Enhanced Synthesis



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



# HealthADAPT Capacity Building Initiative

## 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

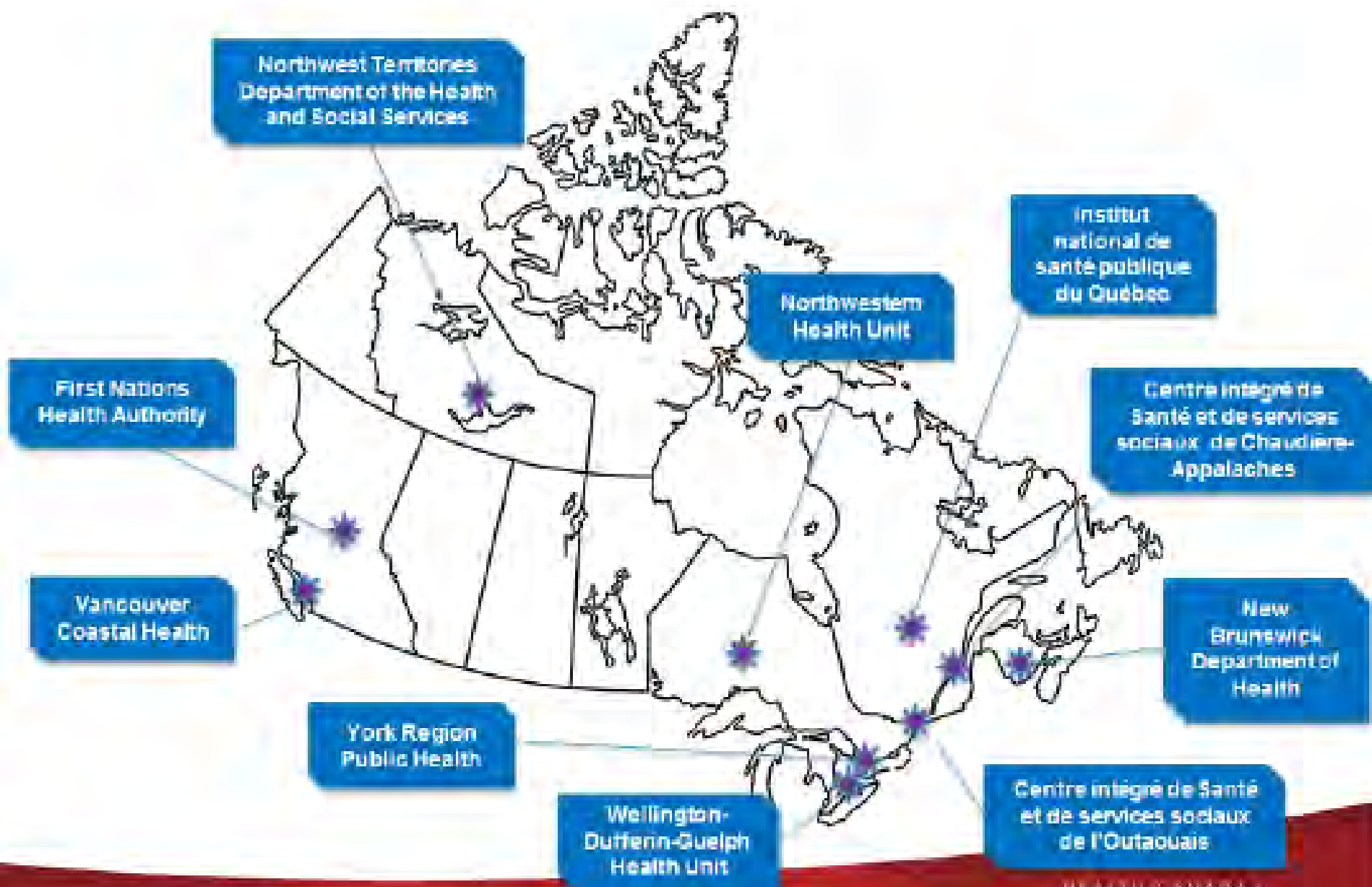
- Approximately \$3 million in funding is awarded through this process.
- Ten projects will be funded for approximately \$300,000 each spread over the full funding period, ending March 31, 2022.

## 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



# HealthADAPT Funding Recipients





# 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.

# HealthADAPT Funding Recipients

**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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