

Assessing Vulnerability to Extreme Heat in Two Manitoba Communities: Piloting PAHO/WHO Guidelines

Kaila-Lea Clarke
Climate Change and Health Office
Health Canada
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Outline

- Heat a Growing Risk
- CCHO Heat Project
- PAHO/ WHO Draft Guidelines
- Canadian Approach to Piloting Guidelines





Extreme heat is becoming an increased health risk in Canada

Exposure will increase in the future

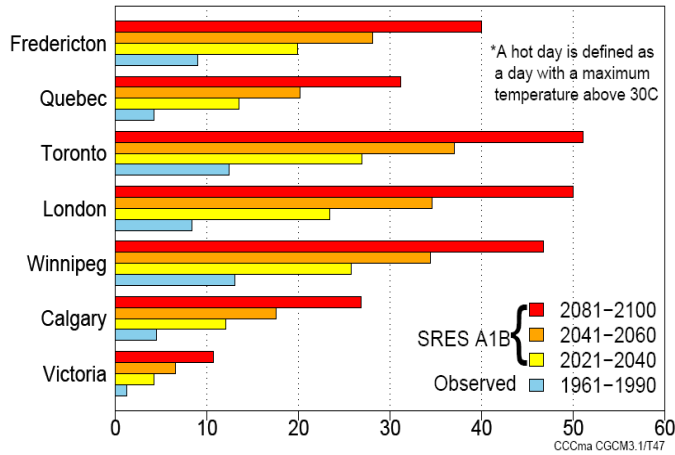
Table 3.3 Recent trends and projections for extreme weather events for which there is an observed late 20th-century trend

Phenomenon and direction of trend	Likelihood that trend occurred in late 20th century	Likelihood of future trends based on projections for the 21st century using SRES scenarios
Warmer and fewer cold days and nights over most land areas	Very likely	Virtually certain
Warmer and more frequent hot days and nights over most land areas	Very likely	Virtually certain
Warm spells/heat waves. Frequency increases over most land areas	Likely	Very Likely
Heavy precipitation events. Frequency (or proportion of total rainfall from heavy falls) increases over most areas	Likely	Very likely
Areas affected by droughts increases	Likely in many regions since 1970	Likely
Intense tropical cyclone activity increases	Likely in many regions since 1970	Likely
Increased incidence of extreme high sea level (excludes tsunamis)	Likely	Likely

Source: Adapted from IPCC, 2007c. *Climate Change 2007: The Physical Science Basis* (Table SPM.2, p.8)

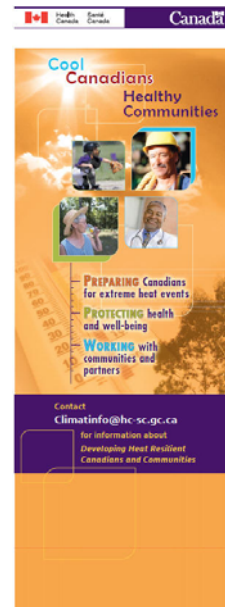
Hot extremes and heat waves will continue to become more frequent

Current and projected number of hot days above 30°C for selected cities in Canada (Kharin, CCCma, pers. comm.)

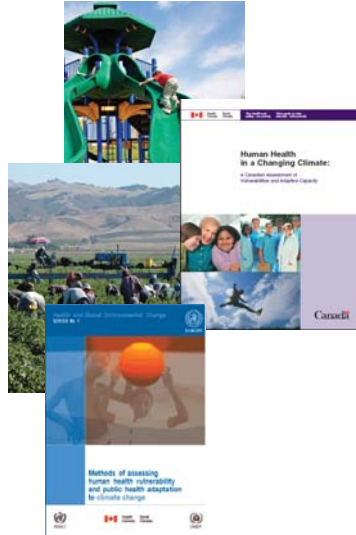


Developing Heat Resilience... An Overview

- **Four Key Deliverables:**
 1. Pilot Heat Alert and Response Systems in four communities
 2. Best Practices Guide
 3. Health Care Worker Guidelines on Heat
 4. National Conference in 2011



Other Vulnerability Assessments



- Public Health Impacts of Climate Change in California: Community Vulnerability Assessments and Adaptation Strategies

- Methods of Assessing Human Health Vulnerability and Public Health Adaptation to Climate Change

- Human Health in a Changing Climate: A Canadian Assessment of Vulnerability and Adaptive Capacity

Heat Health Vulnerability Assessments

Objectives:

- **To better understand the vulnerability of urban and rural residents to the health effects of heat and the collaborations and capacity needed by community partners to reduce these risks**
- **Test the applicability of climate change and health vulnerability assessment guidelines for heat within the Canadian context (PAHO and WHO)**
- **Inform development of HARS in the 4 pilot communities**
- **Determine whether a new or revised set of guidelines is required for assessing vulnerability to the health impacts of extreme heat within Canada**

Canadian Application of Guidelines



Urban Community, Winnipeg

Population in 2006: 633,451

Demographics

- Median population age: 38.7
- Population 65+ years: (14%)
- Population 75+ years: (7%)
- Population 85+ years: (2%)

Housing

- Single detached houses, percentage: 59.4
- Apartments (<5 stories), percentage: 17.6
- Apartments (>5 stories), percentage: 13.6

Climate:

- ~11 days above 30°C a year
- ~1-2 days above 35°C a year



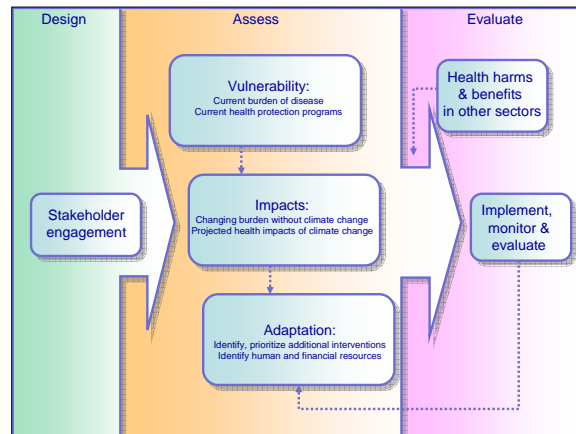
Rural Community, Melita

- Population in 2006: 1,051
- Demographics
 - Median population age: 44.6
 - Population 65+ years: 27%
 - Population 75+ years: 17%
 - Population 85+ years: 6%
- Housing
 - Single detached houses: 84.4%
 - Apartments (<5 stories): 12.5%
 - Apartments (>5 stories): 13.6%
- Climate:
 - ~16 days above 30°C a year
 - ~2 day above 35°C a year



PAHO/ WHO Guidelines

“...to describe an approach for conducting a vulnerability and adaptation assessment to identify, prioritize, and implement public health and selected health care interventions to address the current and projected health risks of climate change.”



(PAHO & WHO, 2009)

■ Who needs to be involved?

Identify key community partnerships for protecting health

- Government Departments and Agencies
 - Federal (i.e. Health Canada, Statistics Canada, Environment Canada)
 - Provincial (i.e. Health, Emergency Preparedness)
 - Municipal (i.e. Planning, Community Services, Health Unit)
- Non-Governmental Organizations
 - health associations, environmental organizations
 - sensitive population interest groups (i.e. seniors groups)
- Social Services and Community Groups
 - mental health and homeless service providers
 - sporting and athletic associations
 - homecare providers, nursing homes, seniors residences
- Academia
 - universities, research institutes

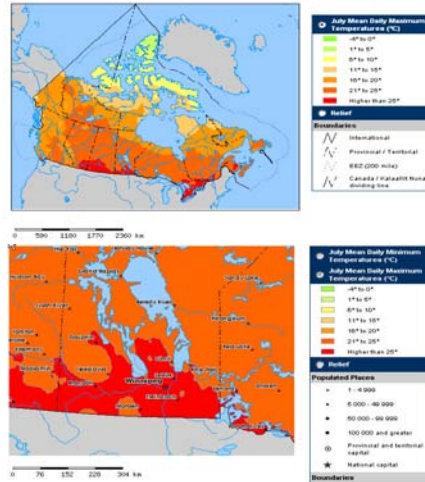
- **What characteristics make your community vulnerable to extreme heat events?**

- **Community heat exposure**
 - Average and maximum summer temperatures
 - Maximum day and minimum night temperatures
 - Number of days with temperatures over 30°C per year
 - Number of heat events per year
 - Urban heat island effect

Community exposure to heat

Temperature:	Jun	Jul	Aug	Sep
Daily Average (°C)	17	19.5	18.5	12.3
Standard Deviation	1.8	1.5	1.8	1.4
Daily Maximum (°C)	23.3	25.8	25	18.6
Daily Minimum (°C)	10.7	13.3	11.9	6
Extreme Maximum (°C)	37.8	37.8	40.6	38.8
Date (yyyy/dd)	1995/ 17	1939/ 12+	1949/ 07	1983/ /02
Extreme Minimum (°C)	-3.3	1.1	0.6	-7.2
Date (yyyy/dd)	1964/ 03	1972/ 03	1965/ 28	1965/ /26

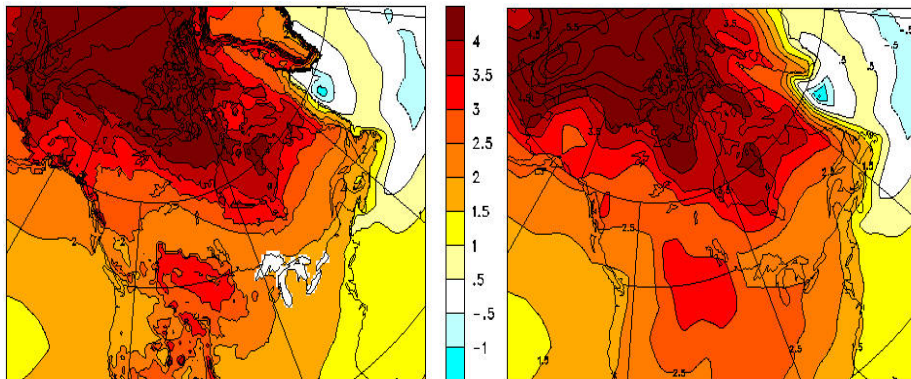
(Environment Canada, 2009)



(NRCan, 2007)

Future exposure to heat

Change in annual mean screen temperature in 2041-2060 relative to 1971-1990 simulated by CRCM 3.6.1 (left panel) and CGCM 2 (right panel).



(Canadian Center for Climate Modelling and Analysis, 2005)

■ **Community Sensitivity**

- Locations of sensitive populations within community
 - Number and nature of outdoor events that occur in the summer
 - % of population that work outdoors or in occupations with high heat exposure (i.e. bakers, dry cleaners)
 - Materials used in building structures
 - (i.e. types of roofs, shutters on windows, screen doors)
 - Buildings with air conditioning
 - (i.e. libraries, malls, nursing homes, daycares, hospitals)
 - Number and location of swimming pools
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- ## ■ **Who in your community is at risk to extreme heat events?**
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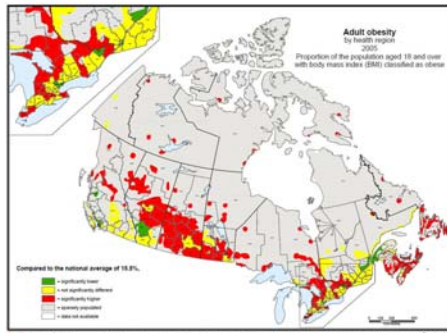
Individual Sensitivity

- over 75 years of age
- cardiovascular disease
- compromised health status
- social isolation / living alone
- absence of air conditioning in homes
- obesity



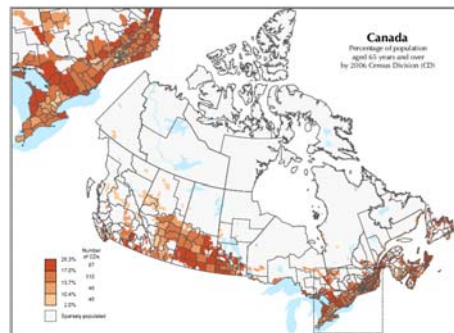
Individual sensitivity to heat

Obesity Statistics



(Statistics Canada, 2006)

Population 65+



(Statistics Canada, 2007)

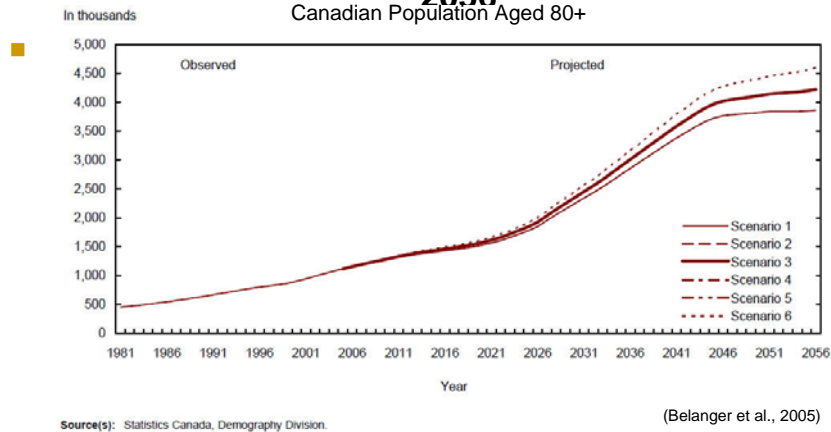
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- **How might health risks change in the future?**
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Changing burden of climate-sensitive health outcomes

- changing demographics and health status trends
 - socio-economic projections
 - changing urban environment
 - changes in coping capacity
-

Changing Demographics

■ Projections for Number of Older Canadians, 2006-2056



**What programs or activities
Are currently in place to manage
health risks?**

**How effective are they in protecting
health from extreme heat?**

- **Inventory programs and activities that address risks from extreme heat**

- Heat-specific programs and activities

- heat alert and response systems (HARS)
- heat outreach programs / activities
- evaluation of past heat-health interventions

- General programs, activities, and services

- emergency response systems
 - community health services
 - communications systems / capabilities
 - public and volunteer organizations
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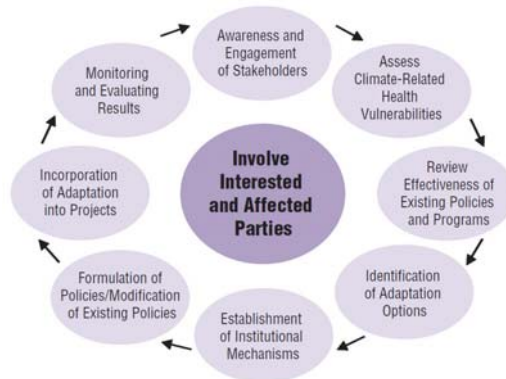
- **What options are there to reduce current and projected health risks?**

■ Identify and prioritize adaptation options

- Identify all reasonable adaptation options to address the current and projected health risks related to extreme heat

- Evaluate their effectiveness, and assess key factors that may be barriers and processes for overcoming these barriers

- Understand that adaptation is a process requiring continual adjustment to changes in the degree and rate of climate change



(Berry, 2008)

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- **What adaptation or mitigation measure are being implemented in other sectors that may reduce the health risks?**

Adaptation and mitigation measures implemented in other sectors



- Housing and Public Buildings
 - building codes, design standards, air conditioning
 - Land-Use Planning, Urban Planning
 - green spaces, urban heat island measures
 - Communications
 - system stability, communication methods (messaging, outreach)
 - Critical Infrastructure
 - energy and technology (grid security / stability), water resources
 - Industry and Transportation
 - community industrial mix, air pollution, transportation infrastructure
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Vulnerability Assessment Final Report

- What will the final document look like?
 - Who is the audience?
 - Use of technical language
 - Use of maps, GIS and other graphs
 - Drawing conclusions
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Thank You

Kaila-Lea Clarke
Climate Change and Health Office
Health Canada
