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*Votre santé et votre
sécurité... notre priorité.*

Climate Change Resilient Health Care Facilities in Canada

10th Annual Canadian Risk and Hazards Network Symposium

November 6th, 2013

Jaclyn Paterson
Climate Change and Health Office,
Safe Environments Directorate,
Health Canada



Canada

Outline

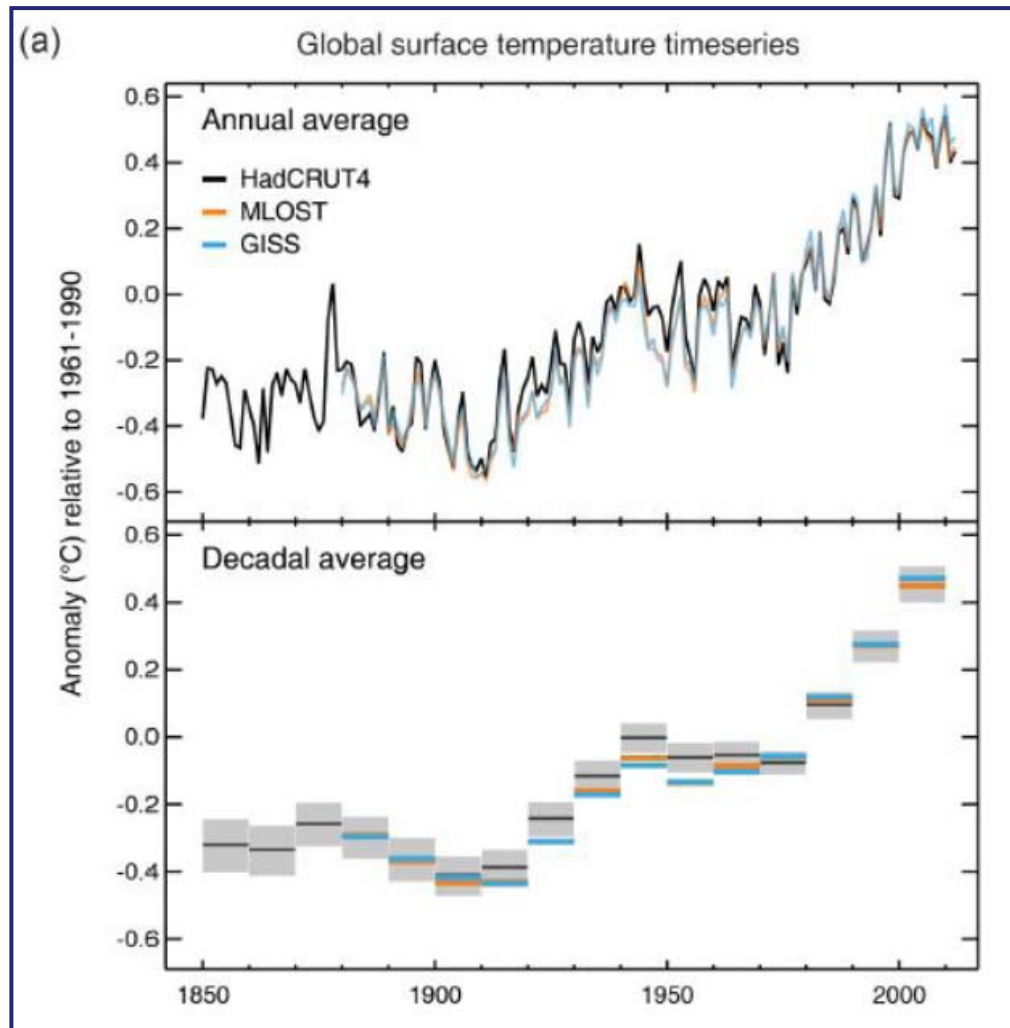
- Climate change impacts on the health of Canadians.
- Climate change impacts to health systems and the need to adapt.
- Health care facilities in Canada resilient to climate change impacts.
- Actions by Health Canada to prepare Canadians.
- Questions and discussion.



CLIMATE CHANGE IMPACTS ON THE HEALTH OF CANADIANS



Our Rapidly Warming Planet



“Warming in the climate system is unequivocal.”



Climate Change 2013: The Physical Science Basis
<http://www.ipcc.ch/>



Climate Change:

Why Should the Health Sector Care?

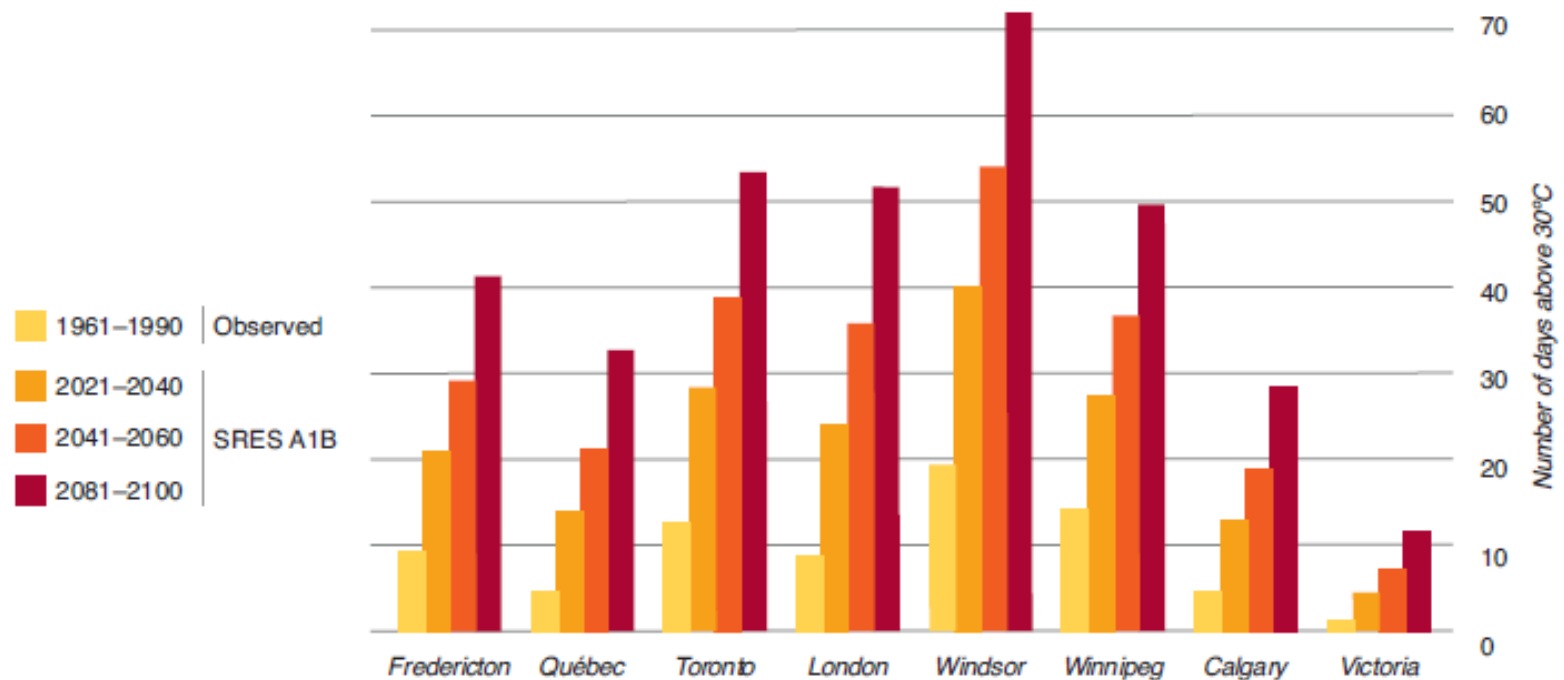
Health Risks in Canada from Climate Change



Projected Number of Hot Days in Canadian Cities

Figure 1: Current and projected number of days exceeding 30°C/86°F for Canadian cities

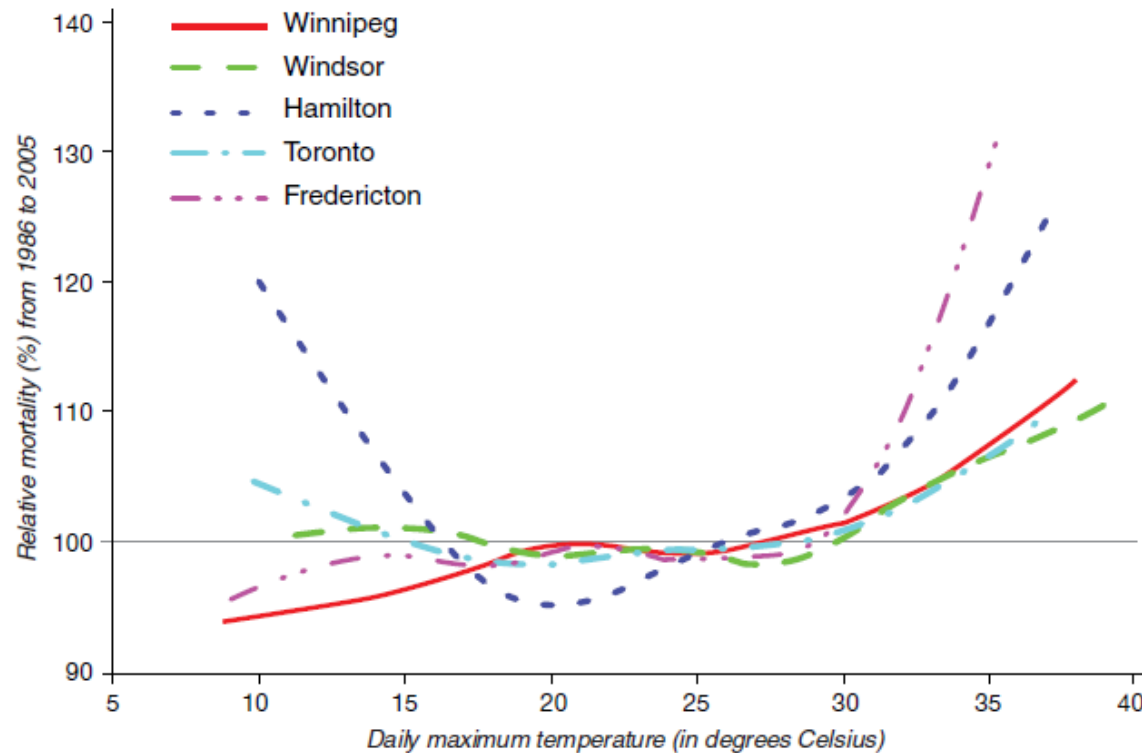
The number of hot days for each city is based on the observed temperature data between 1961 and 1990, and projected for 2021–2040, 2041–2060 and 2081–2100.



Heat-Health Risks in Canadian Cities

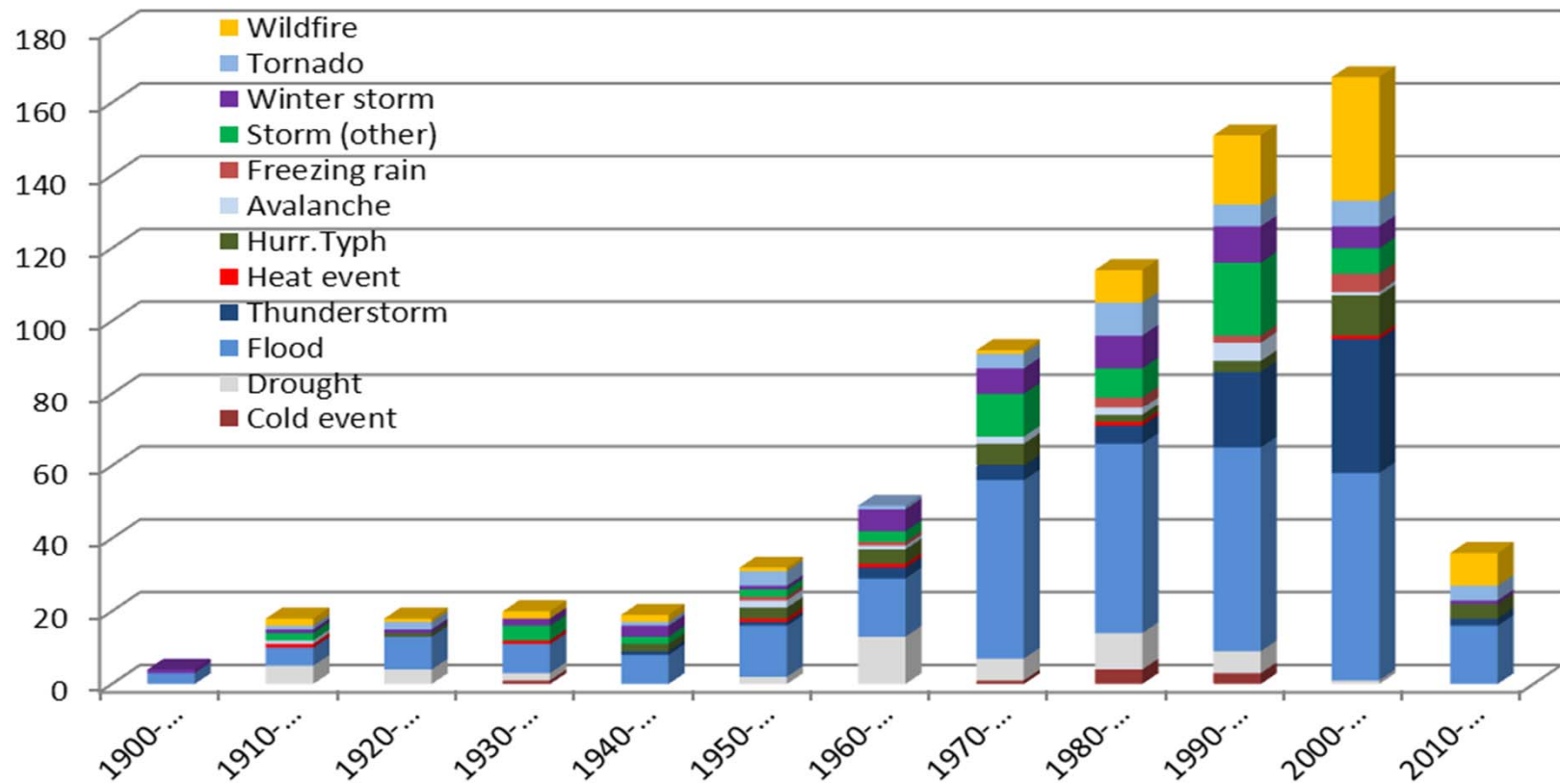
Figure 2: Relationship between daily maximum temperatures in June, July and August, and all non-traumatic deaths for selected Canadian cities, 1986–2005

Daily maximum temperatures during June, July and August from 1986 to 2005 were correlated with all non-traumatic deaths using the Generalized Additive Statistical Model.^{48,49,c,d}



Source: Adapted from B. Casati and A. Yagouti, *in press*.⁵⁰

Weather-Related Disasters in Canada 1900-2011

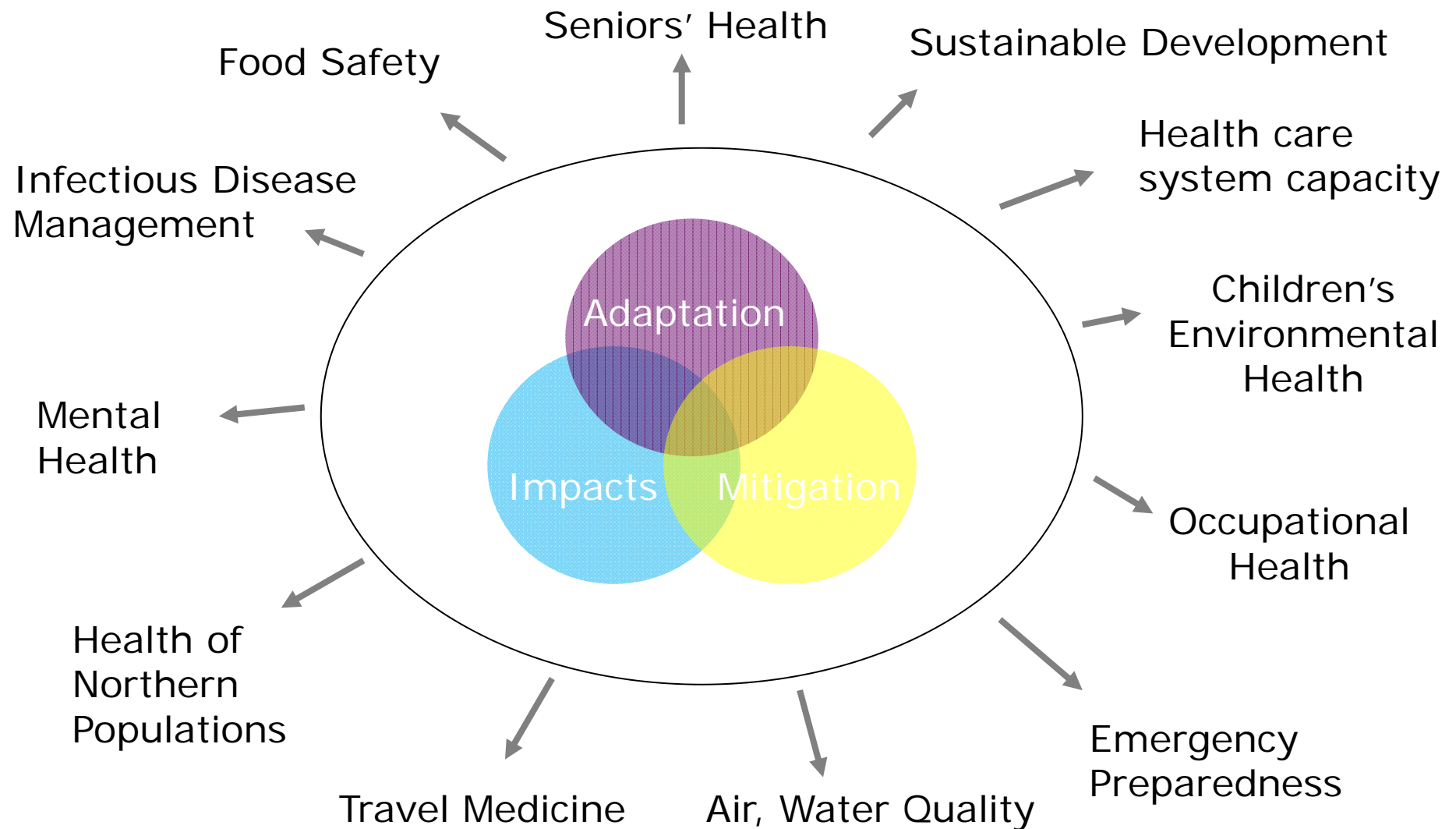


Canadian Disaster Database, 2012

CLIMATE CHANGE IMPACTS TO HEALTH SYSTEMS AND THE NEED TO ADAPT

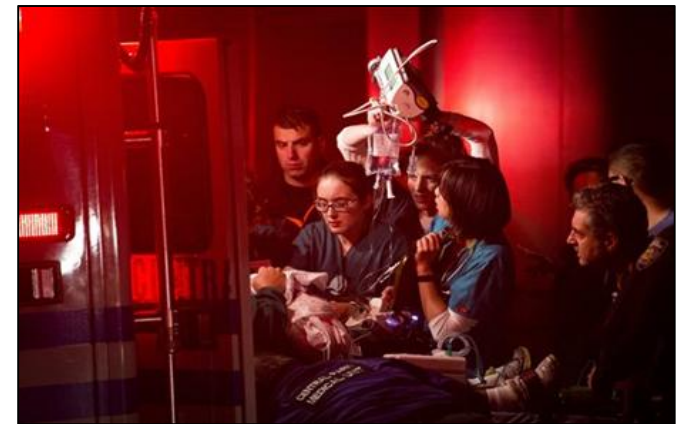


Climate Change Impacts on Health Programs



Impacts to Health Care

- **Damage to health infrastructures** such as hospitals, clinics and nursing homes.
- **Inadequately trained personnel** or lack of an emergency plan.
- **Hospitals that contract out** certain essential services (e.g. laundry and food) may have them interrupted during an emergency.
- **Overcrowding in emergency shelters** during a disaster may increase exposure to infectious diseases (e.g. influenza) of health care workers.
- **Electronic medical records** could face access delays of up to days or weeks in the event of a power outage during a disaster.



Source for Text: Health Canada, 2008

Climate-Related Hazards Impact Hospitals

Extreme temperatures

Drought

Wildfires

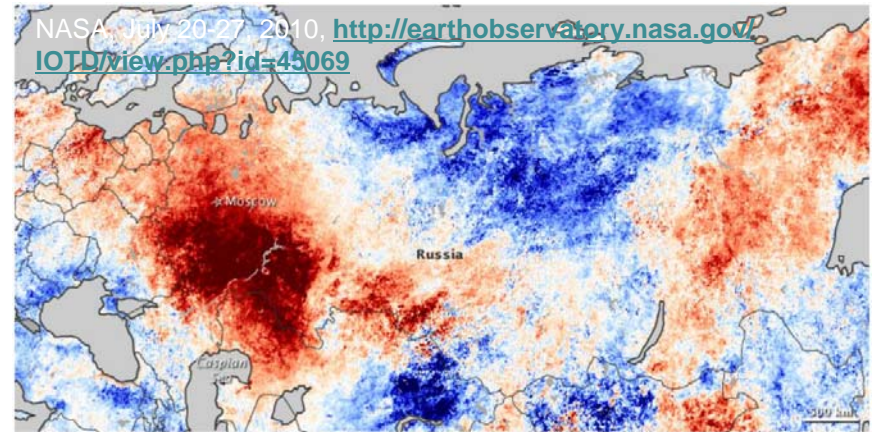
Poor air quality

Water-borne contamination

Food-borne contamination

Vector-borne diseases

Extreme weather (e.g. storms)



Climate-Related Hazards Impact Hospitals

Extreme temperatures

Drought

Wildfires

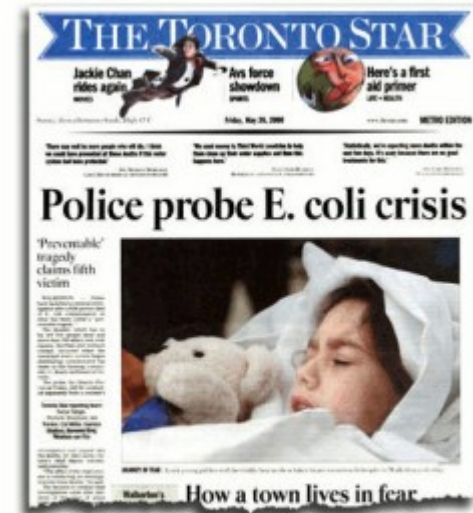
Poor air quality

Water-borne contamination

Food-borne contamination

Vector-borne diseases

Extreme weather (e.g. storms)



<http://planksandnails.hubpages.com/hub/The-Walkerton-Incident>

Climate-Related Hazards Impact Hospitals

Extreme temperatures

Drought

Wildfires

Poor air quality

Water-borne contamination

Food-borne contamination

Vector-borne diseases

Extreme weather (e.g. storms)



<http://www.worldculturepictorial.com/blog/content/freezing-snow-threatens-shut-down-uk-is-it-caused-30-reduction-warm-ocean-currentsdiscovered>

Hurricane Juan, Nova Scotia (2003)

- **Hurricane Juan** (category 2) passed through Nova Scotia in late September 2003.
- Deadliest aspects of hurricanes:
 - Preceding storm surge (cause 9/10 deaths)
 - Winds
 - Psychosocial impacts
- Major hospitals were affected.



Photo Credits: Peter Young

Damage from Hurricane Juan, 2003

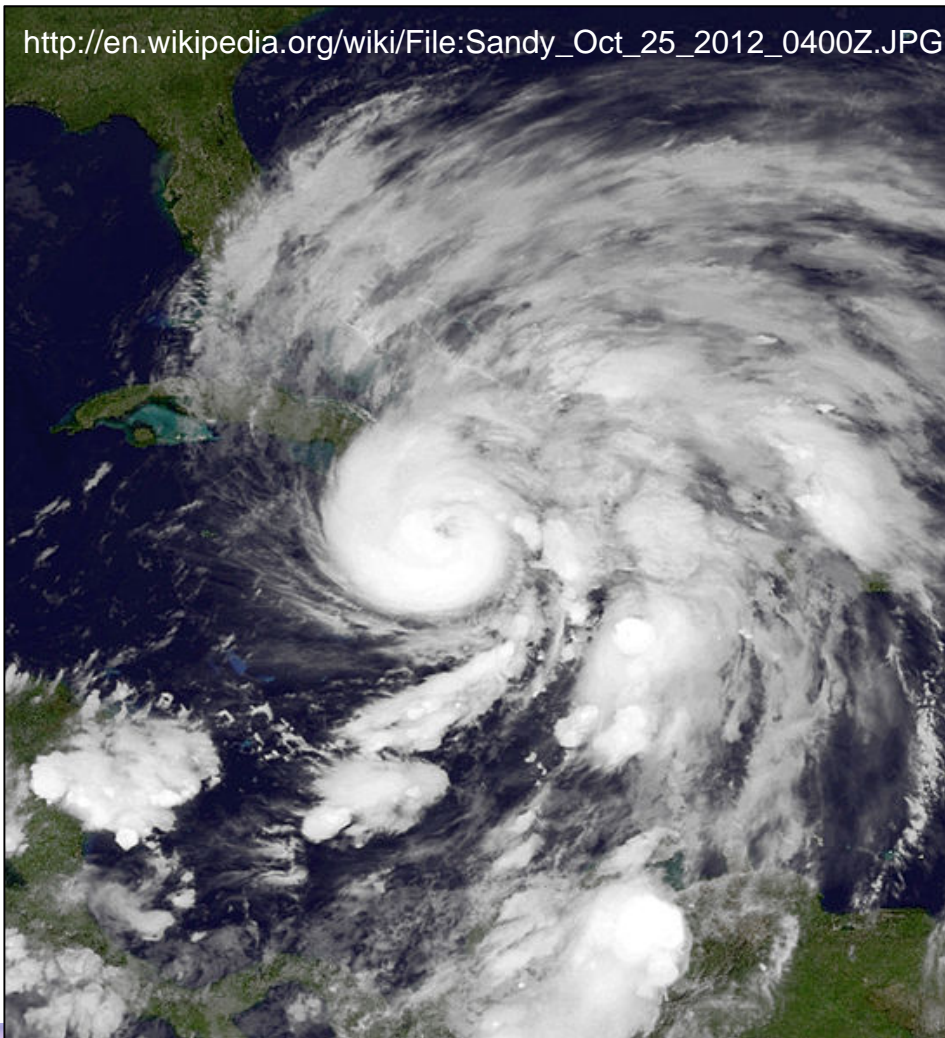
Victoria General Hospital

- Part of roof ripped off
- Flooding and water damage to 8 floors
- 200 patients relocated
- Operating theatres closed for 4 weeks
- 78% scheduled surgeries cancelled



Hurricane Sandy, June 2013

http://en.wikipedia.org/wiki/File:Sandy_Oct_25_2012_0400Z.JPG



New York Daily News, 2013 , <http://www.nydailynews.com/new-york/date-set-r17-open-hospitals-evacuated-hurricane-sandy-article-1.1200359>
Huff post Parents, 2012: http://www.huffingtonpost.com/2012/11/01/babies-born-during-hurricane-sandy_n_2050462.html

Alberta Floods Impacted Health Care Facilities

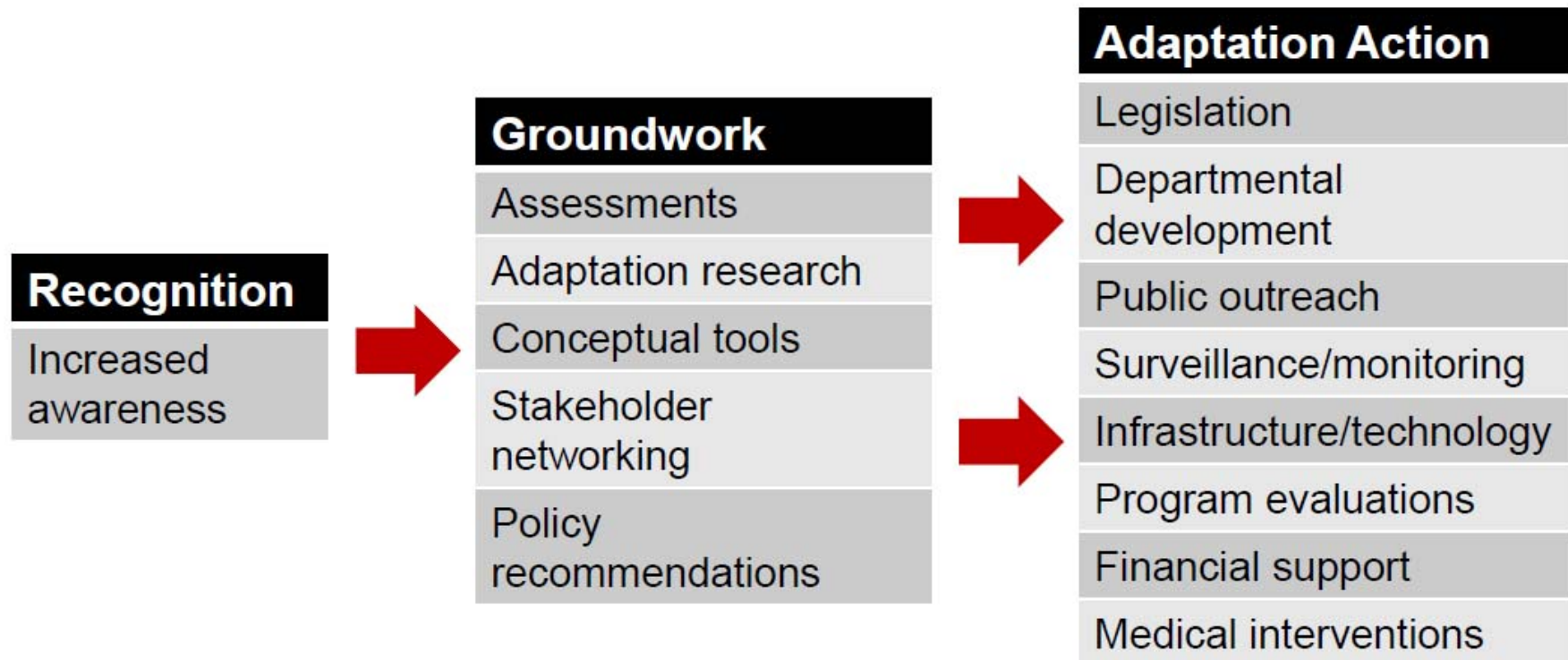
Flood waters surround a Canmore Hospital on June 21, 2013.



National Post, June 21, 2013, <http://news.nationalpost.com/2013/06/20/pictures-and-videos-of-massive-flooding-in-canmore-and-southern-alberta/>

Calgary Herald, August 28, 2013, <http://www.calgaryherald.com/clinics+leaving+flood+damaged+Holy+Cross+good/8840473/story.html>

Health Sector Adaptation Options



Lesnikowski et al., 2011

EM With and Without Adaptation

EM Action		EM + Adaptation
HRVA		HRVA integrating climate change + CC assessments
Disaster mitigation		Disaster mitigation informed by CC drivers (e.g, UHI)
Disaster planning		Disaster plans – informed by CC (eg., simultaneous events)
Table top exercises		TTX with CC scenario
Surveillance		Monitoring new health risks
Response and recovery		Training staff on climate risks
Increasing planning capacity		Partners with CC knowledge, staff aware of CC risks

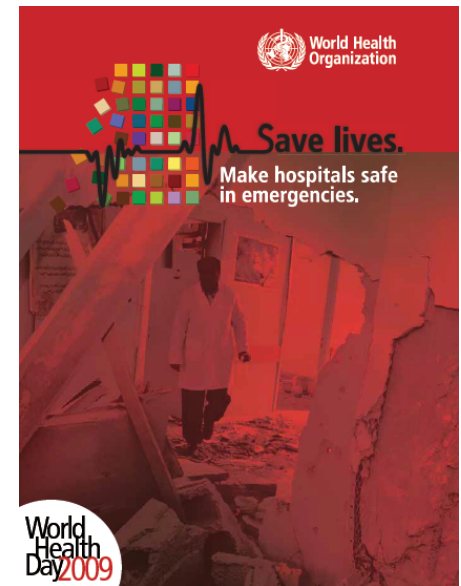


Berry, 2013

Climate Resilient Indicators for Health Care Facilities

Make hospitals safe in emergencies (WHO, 2009)

- Develop and implement plans, policies, programs
- Select a safe site for healthcare facilities
- Design and construct safe hospital facilities
- Assess the safety of existing health facilities
- Protect health workers, equipment and supplies
- Ensure that health facilities receive essential services
- Test and update response plans with drills and exercises
- Train the health workers to respond to emergencies
- Develop partnerships between health facilities and the community
- Develop an emergency risk management programme for each facility
- Evaluate and learn lessons from past emergencies and disasters



Climate Resilient Indicators for Health Care Facilities

Addressing climate change in healthcare settings (WHO, 2009)

Energy efficiency

Green building design

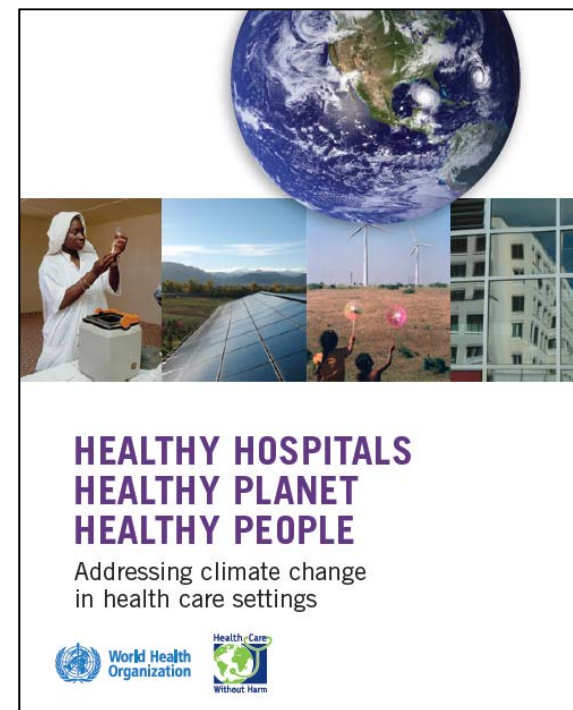
Alternative energy generation

Transportation

Food

Waste

Water



HEALTH CARE FACILITIES IN CANADA RESILIENT TO CLIMATE CHANGE IMPACTS



Health Care Facilities Resilient to Climate Change

Project Objectives:

- Increase awareness of the impacts of climate change on health care facilities in Canada
- Develop a toolkit to enable health care facility officials to assess resiliency to climate change
- Develop resources and best practices to help health care facilities become more resilient to climate change



Health Care Facilities Resilient to Climate Change

Methods & Activities

- Advisory Committee
- Literature Review
- Developed a resiliency toolkit
- Expert Reviewers
- Tested the toolkit with 6 pilot health care facilities
- Ground-truthing workshop



Defining Climate Change Resiliency for Hospitals

CREATIVITY	RESISTANCE		RECOVERY
Assess and Evaluate Learn and Innovate	Primary Prevention & Mitigation	Secondary Prevention & Preparation	Tertiary Prevention
The ability to continually learn about climate related impacts and to transform knowledge into a more advanced level of functioning. Creativity actions not only include assessing and evaluating existing initiatives, but building upon existing knowledge and activities to better mitigate, prevent and prepare for climate related impacts.	The ability to withstand climate related adverse event(s) and their consequences. Resistance actions reduce climate exposures (e.g. greening infrastructure to reduce exposure to extreme heat and air pollution) and thereby prevent or mitigate impacts. Secondary prevention includes actions taken to detect early evidence of change(s) (e.g. surveillance of infectious diseases) followed by targeted action (e.g. development of emergency response plans and protocols).		The ability to bounce back to original levels of functioning following a climate related adverse event. Recovery activities are short and long term action taken to lessen morbidity and mortality caused by the adverse event (e.g. treating climate-related diseases, providing psycho-social support).



Indicators

<i>Climate Risk</i>	CREATIVITY	RESISTANCE		RECOVERY
		PP & M	SP & P	
Extreme Weather (EW) Emergency	<ul style="list-style-type: none"> -Assess EW risks & response capacity* -Learn & increase EW awareness* -Budget for EW 	<ul style="list-style-type: none"> -Install HVAC system -Build partnerships* -Climate proof buildings, protect critical assets -Diversify energy sources -Environmentally preferable purchasing 	<ul style="list-style-type: none"> -Emergency management program with EW plans* -Secure back-up supplies for EW emergencies -EW emergency training -Receive or monitor EW warnings 	<ul style="list-style-type: none"> -Adopt ICS for EW emergencies and mainstream EW into color code responses* -Protect vulnerable* -Health surveillance* -Mutual aid/support*
Food –borne Contamination (FBC)	<ul style="list-style-type: none"> -Assess risks associated with FBC emergencies -Learn and raise awareness of sustainable food options 	<ul style="list-style-type: none"> -Adopt sanitary food service practices (food handling, preparation and storage) and sustainable food waste practices -Procure local food and produce food on-site 	<ul style="list-style-type: none"> -Develop FBC response plans and integrate into EM program -Diversify food suppliers -Receive or monitor FBC outbreaks, receive warnings of food recalls 	<ul style="list-style-type: none"> -Implement FBC plan -Diagnose, treat and report FBIs -Monitor food supply [in an emergency]



Indicators

<i>Climate Risk</i>	CREATIVITY	RESISTANCE		RECOVERY
		PP & M	SP & P	
Water-borne Contamination (WBC)	<ul style="list-style-type: none"> -Assess WBC risks and response capacity -Conduct a water-use audit -ID conservation measures 	<ul style="list-style-type: none"> -Implement water conservation strategies -Establish sustainable waste management practices to protect water resources 	<ul style="list-style-type: none"> -Develop an emergency water restriction plan and WBC response plan -ID water supply options -Receive or monitor WBC alerts and water-use restrictions 	<ul style="list-style-type: none"> -Implement plans to de-contaminate water -Diagnose, treat and report WBI cases -Monitor water resources
Air Quality (AQ)	<ul style="list-style-type: none"> -Assess AQ health risks -Learn strategies to improve AQ and health -Set targets 	<ul style="list-style-type: none"> -Establish green-space -Support mass transit, car-pooling, telehealth, active transportation -Use clean energy 	<ul style="list-style-type: none"> -Develop a smog plan -Receive smog advisories -Monitor indoor air quality and ensure proper maintenance of HVAC system 	<ul style="list-style-type: none"> -Minimize risks to vulnerable patients (reduce exposure) -Implement a smog strategy and notify staff/patients/visitors
Infectious Diseases (ID)	<ul style="list-style-type: none"> -Assess ID risks and response capacity -Learn of new and emerging IDs -Evaluate plans 	<ul style="list-style-type: none"> -Minimize ID infections via building design (e.g. sanitation, isolation) and control of vector breeding sites -Vaccinate staff/patients 	<ul style="list-style-type: none"> -Develop an ID plan -Secure access to vaccines, medications and critical supplies -Train staff & practice routine infection control 	<ul style="list-style-type: none"> -Implement infection control plan (e.g. isolation, staff PPE) -Diagnose, treat and report WBI cases



Climate Change Resilient Health Care Facilities

Health Care Facility Resiliency Toolkit:

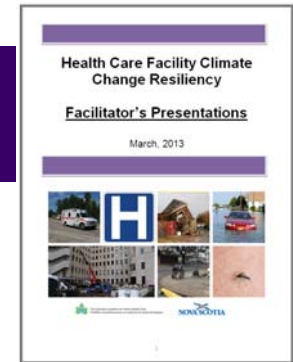
Facilitator Presentation

The Resiliency Checklist

Resources



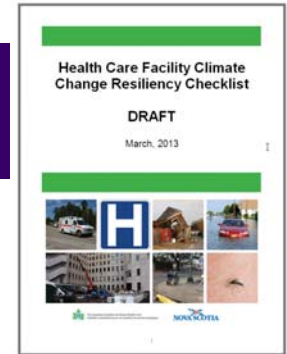
Facilitator Presentation



- Power-point presentation for hospital facilitator
- How facilitators can use the presentation
- Benefits of assessing health care facility resiliency to climate change
- Introduction to climate change impacts on health care facilities
- Guidance on how to complete the health care facility resiliency assessment checklist and use of results



The Resiliency Checklist



- General (4 questions)
- Assessing Climate Related Risks (19 questions)
- Risk Management to Reduce Climate Related Risks (45 questions)
 - Procurement of health care resources and supplies
 - Notifications, monitoring, and surveillance
 - Clinical risk management
 - Infrastructure and systems risk management
 - Energy supply and use
- Building Capacity to Adapt to Climate Change (14 questions)
 - Sustainable health care and climate change mitigation



Climate Change Resilient Health Care Facilities

GENERAL INFORMATION

1. Please record your name and role in the table below after completing the checklist.

Name	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

It is recommended that the facilitator invites senior level officials (e.g. directors or managers) to participate in reviewing and completing this tool. Individuals in the following areas may be best suited to participate:

- Emergency Management
- Human Resources
- Occupational Health and Safety
- Pharmaceuticals, Medications and Vaccines
- Director of nutrition and food services
- Public Health Representation
- Green Team Director / Manager
- Environmental waste management
- Electrical manager
- Logistical services (managing supply flow in)
- Waste management (managing waste flow out)
- Director of purchasing
- Clinical services
- Housekeeping and laundering
- Green team / sustainability



Climate Change Resilient Health Care Facilities

ASSESSING CLIMATE RELATED RISKS

1. Current and future climate variability can pose a variety of risks to people and infrastructure that could affect continuity of care at your health care facility. Please indicate if your health care facility considers the following climate-related hazards when conducting risk assessments.

Climate Risk	Yes	No	Not Sure	Not Applicable	Other
a. Extreme heat					
b. Extreme cold					
c. Extreme rain and snowfall					
d. Drought					
e. Wildfire					
f. Extreme weather – tornado					
g. Extreme weather – freezing rain, ice storm, hailstorm					
h. Extreme weather – thunderstorm, lightning					
i. Extreme weather – hurricane and related storms					
j. Extreme weather – avalanche, rock-, mud- and landslide, debris flow					
k. Poor air quality and smog					
l. Food-borne contamination and/or diseases					
m. Water-borne contamination and/or diseases					
n. Vector- and rodent-borne diseases					
o. New and emerging infectious diseases					

Consult the **Resources Guidebook** and with climate change experts who have knowledge of current and future climate related impacts in your region.

Climate Change Resilient Health Care Facilities

ASSESSING CLIMATE RELATED RISKS

4. Increasing resilience to climate change is an iterative process. Resilience today does not provide a guarantee that a facility will be resilient in the future under changing weather patterns. When identifying hazards that could pose a risk to your health care facility, is uncertainty around changing weather patterns, including future climate variability (e.g. use of future climate projections) a concern?

☐ Yes

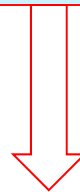
☐ Somewhat

☐ No

☐ I don't know

Use the comments fields to provide information on:

- ✓ Information gaps
- ✓ Status of activities
- ✓ Other key stakeholders that may have primary responsibility
- ✓ Other pertinent information you wish to record



COMMENTS:

Climate Change Resilient Health Care Facilities

RISK MANAGEMENT TO REDUCE CLIMATE RELATED RISKS

30. In recent years, health care facilities in North America have been impacted by extreme weather events and will continue to be impacted by climate-related hazards. Health care facilities can learn from each other by sharing lessons learned and best practices. Does your health care facility collect best practices and lessons learned from other health care facilities that have experienced climate-related disasters?

☐ Yes

☐ Somewhat

☐ No

☐ I don't know

COMMENTS:

Climate Change Resilient Health Care Facilities

RISK MANAGEMENT TO REDUCE CLIMATE RELATED RISKS

37. Do you participate in activities (e.g. drills, committee meetings, planning exercises) in the community that enhance your ability to respond to a community wide, climate-related disaster?

☐ Yes

☐ Somewhat

☐ No

☐ I don't know

COMMENTS:



Climate Change Resilient Health Care Facilities

BUILDING CAPACITY TO ADAPT TO CLIMATE CHANGE

66. Many jurisdictions in Canada have begun to address climate change by developing climate change plans and initiatives may have roles. Is your health care facility addressing climate change in your jurisdiction and how?

- ☐ Yes
- ☐ Somewhat
- ☐ No
- ☐ I don't know

Best Use of Results

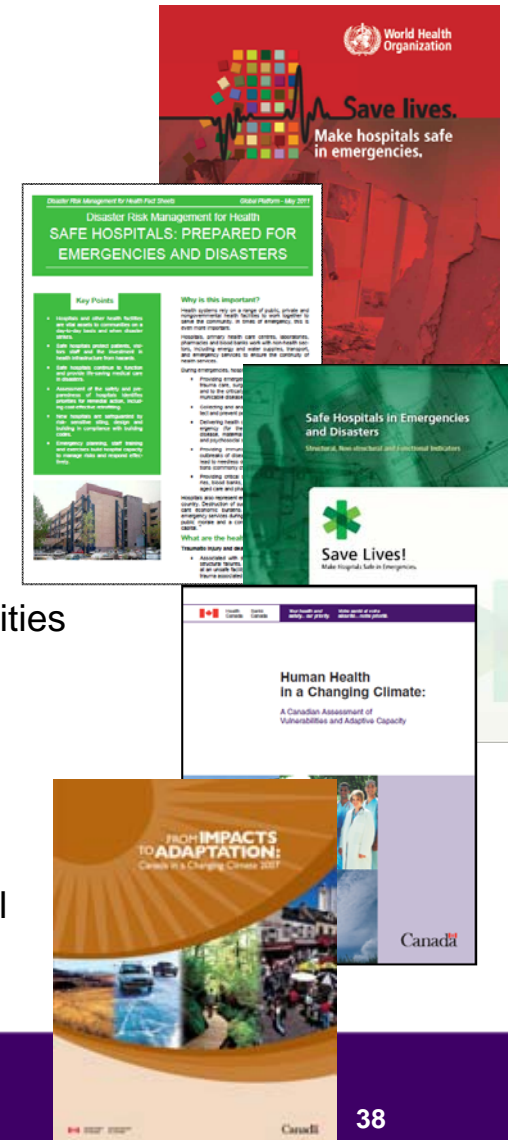
- Use your resiliency score to inform gaps and needs
- For resiliency areas where you need more information:
 - ✓ Exchange information with other facilities
 - ✓ Seek information from experts
 - ✓ Refer to the Canadian Coalition for Green Health Care
 - ✓ Use Resource Guide

COMMENTS:



Resources

- Hospital Safety Index (WHO, 2009)
http://new.paho.org/disasters/index.php?option=com_content&task=blogcategory&id=907&Itemid=884
- Make Hospitals Safe in Emergencies (WHO, 2009)
- Disaster Risk Management for Health – Safe Hospitals: Prepared for Emergencies and Disasters (WHO, 2011)
http://www.who.int/hac/events/drm_fact_sheet_safe_hospitals.pdf
- Addressing climate change in healthcare settings (WHO, 2009)
- Safe Hospitals in Emergencies (ISDR, 2010)
http://www.wpro.who.int/emergencies_disasters/documents/SafeHospitalsinEmergenciesandDisastersweboptimized.pdf
- Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity (Health Canada, 2008) <http://www.hc-sc.gc.ca/ewh-semt/climat/eval/index-eng.php>
- From Impacts to Adaptation: Canada in a Changing Climate 2007 (Natural Resources Canada, 2008) <http://www.nrcan.gc.ca/earth-sciences/climate-change/community-adaptation/assessments/132>
- Update: From Impacts to Adaptation: Canada in a Changing Climate (Natural Resources Canada, available in 2014)




Raising Awareness

planningriskmanagement

HEALTH CARE PROVIDERS PREPARE FOR EXTREMES


Climate Change Factors into Facilities Planning



By Kent Waddington, Linda Varangu, Peter Berry and Jaclyn Paterson

CANADA'S HEALTH CARE facilities are becoming more vulnerable to the impacts of climate change, which can disrupt facility services and care. Extreme weather events (e.g. floods, wildfires, heat waves) can compromise access to critical services (e.g. medical supplies and equipment, transportation, food, water) threatening the safety of patients and staff.

24 September 2013 | Canadian Property Management




PREPARING FOR THE IMPACTS OF CLIMATE CHANGE

How ready is your health care organization?

By Kent Waddington, Linda Varangu, Peter Berry, and Jaclyn Paterson

Canada's health care facilities are vulnerable to the impacts of climate change. The World Health Organization has reported that extreme weather events happen when an extreme weather event occurs. Several hospitals and tertiary care facilities were shut down due to the flooding in June, 2013 in and around Calgary. Alberta Health Services closed the hospital in High River and ordered an evacuation; no injury nursing services were offered at the fire hall. Surgery schedules had to be cancelled. Residents from a number of area facilities were transferred to safer, operational facilities until the hospital was able to reopen. In it appears over 100,000 Albertans were forced from their homes due to the flooding. Three residents of High River lost their lives. It was reported by the Canadian Press that the Cammore hospital was entirely surrounded by a moat and the basement



Canadian Risk & Hazards Network
(Knowledge and Practice)
www.crhnet.ca
HazNet

Réseau canadien d'étude des risques et dangers
(connaissances et pratiques)

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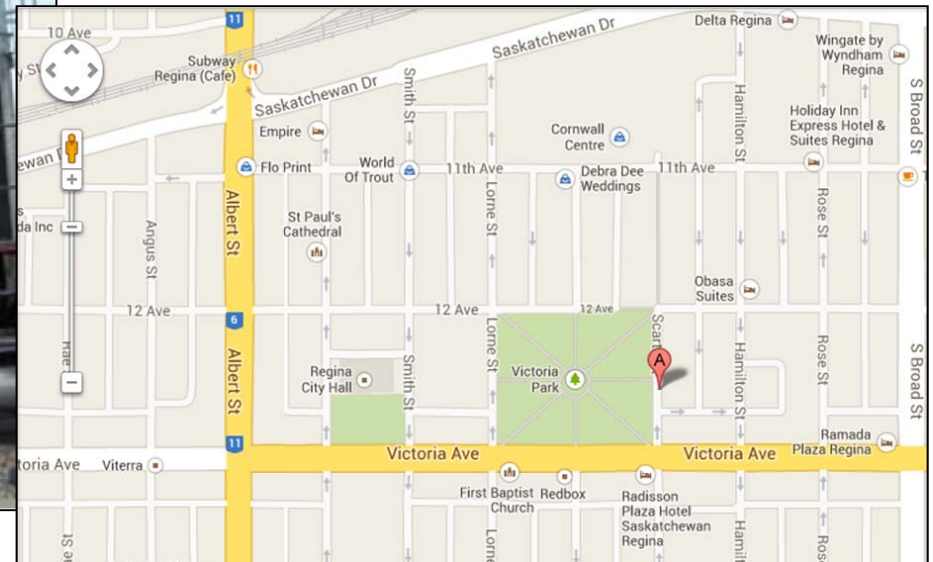
Assessing the Resiliency of Health Care Facilities in Canada to the Impacts of Climate Change..... 44



Health Care Facilities Building Resiliency



"In Saskatchewan, during the summer months we have historically one or two periods of high temperatures. Our building could ride through them without developing any significant adverse reactions. Unfortunately, these events now have a tendency to last much longer."
-Regina Health Official



Health Care Facilities Building Resiliency



The Nanaimo Regional General Hospital includes extensive use of day lighting and natural light which helps decrease reliance on electricity. Research also shows natural lighting helps improve patient outcomes, and reduces staff stress.



Health Care Facilities Building Resiliency

- 1 of 3 hospital beds in **New York State** is located in a flood zone.
- **Post Hurricane Sandy**, New York City Coney Island Hospital's recovery efforts are estimated to be \$1 billion. Recovery funding has shifted from restoration to rebuilding its emergency department on raised platforms to protect the facility from floods.
- The Veterans Affairs New York Harbor Healthcare System flood preparation strategy includes relocating its primary care facility from flood vulnerable lower levels to the ninth floor.



Evans, Melanie (October 26, 2013). N.Y. hospitals shift focus to preparing facilities for future super storms. Modern Healthcare.

WHAT IS HEALTH CANADA DOING TO PROTECT CANADIANS



Mainstreaming Climate Change

Integrating Climate Change into Canadian Hazard, Risk and Vulnerability Assessments

The Province of Manitoba, in collaboration with Health Canada developed an online Hazard, Risks and Vulnerability Assessment tool that addresses risks from current climate variability and future climate change.

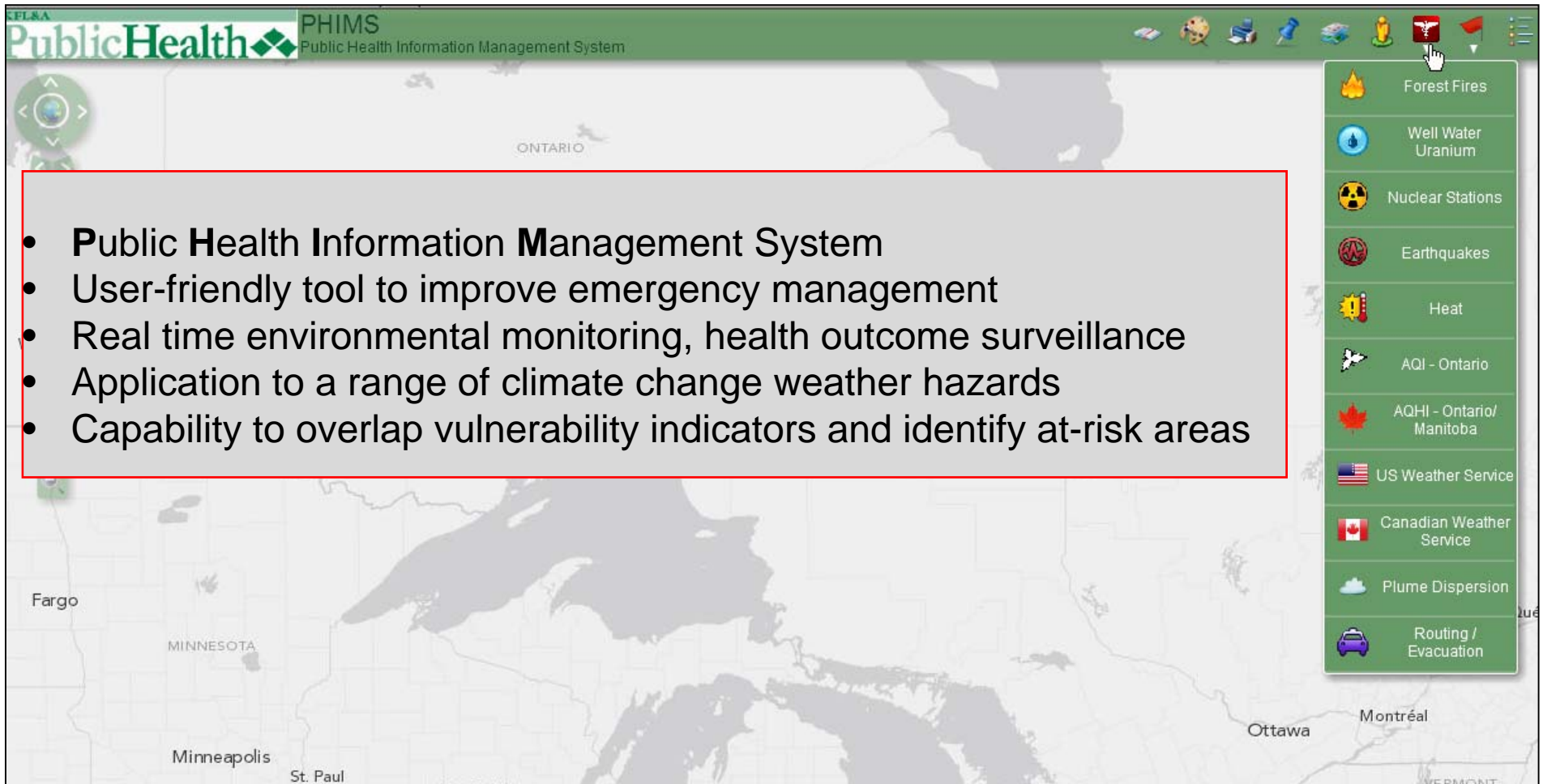


Health Care Facility Resiliency Project - Phase II

- Health Canada, in collaboration with Manitoba Office of Disaster Management and the Canadian Coalition for Green Health Care is building on the "Health Care Facility Resiliency Toolkit" by tailoring it specifically towards smaller health facilities.
- The ***Long Term Care Resiliency Tool (LTCRT)*** will be a checklist for use by on-site long term care providers and officials.
- The checklist will be based on:
 - ✓ A wide-ranging consultation process with LTC providers & officials
 - ✓ Disaster Management and components of the original checklist
 - ✓ A LTCRT pilot phase lead



PHIMS

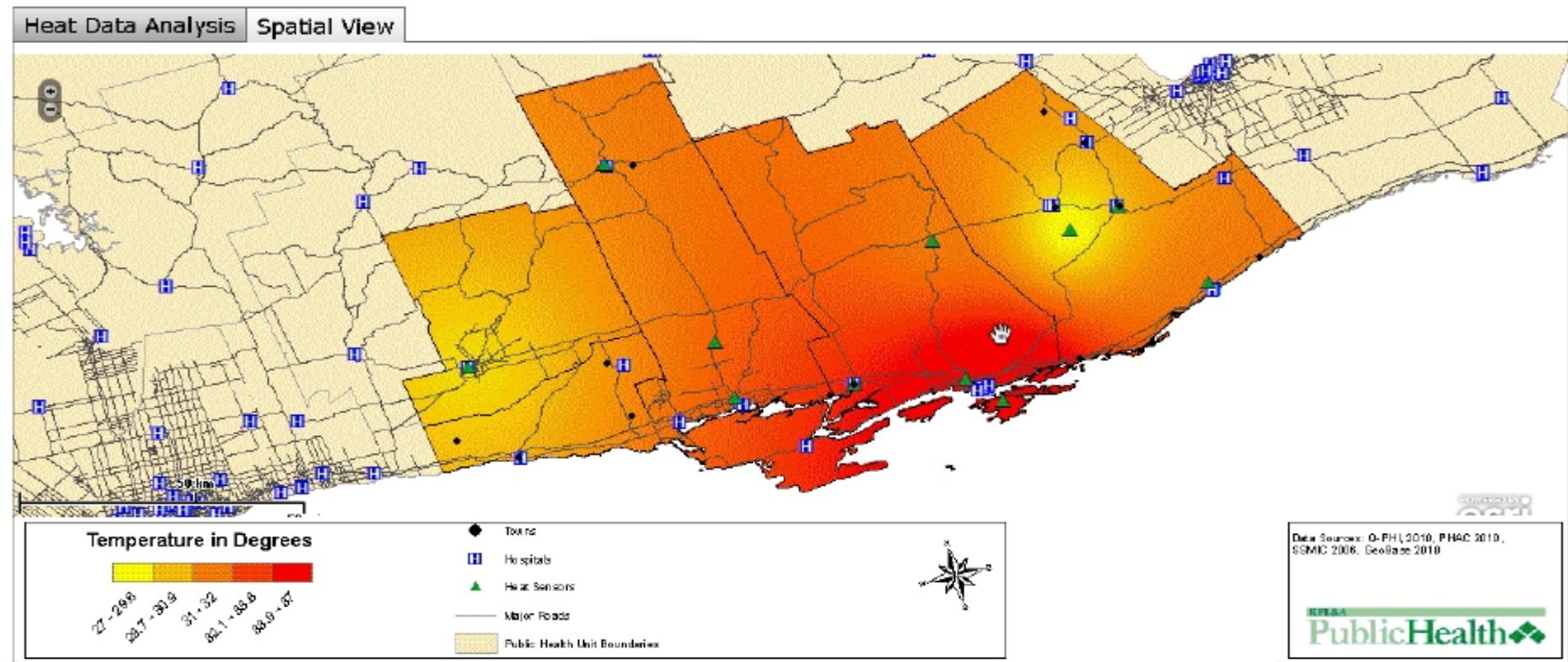


- **Public Health Information Management System**
- User-friendly tool to improve emergency management
- Real time environmental monitoring, health outcome surveillance
- Application to a range of climate change weather hazards
- Capability to overlap vulnerability indicators and identify at-risk areas



Acute Care Enhanced Surveillance

Heat Related Illness Monitoring System



May, June and July 2010: A total of **70**, **37** and **80** visits to Emergency Departments were attributed to a heat related cause, respectively



15 EHMSs for spatial heat monitoring
11 Hospitals in the KLF&A area ⁴⁷

Addressing Heat-Health Risks to Canadians



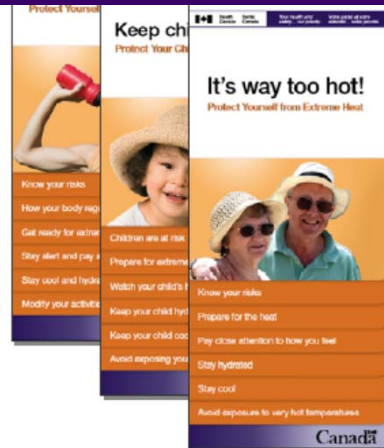
Extreme Heat Events Guidelines

Technical Guide for Health Care Workers

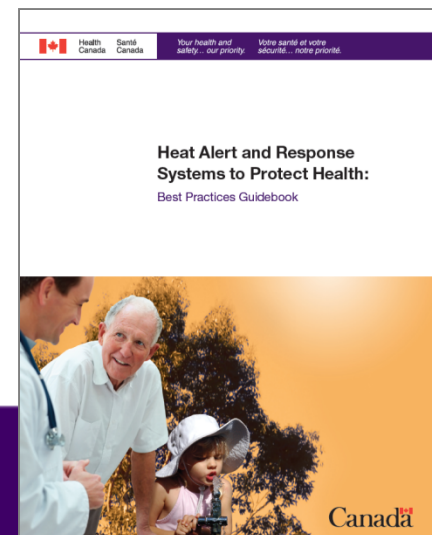
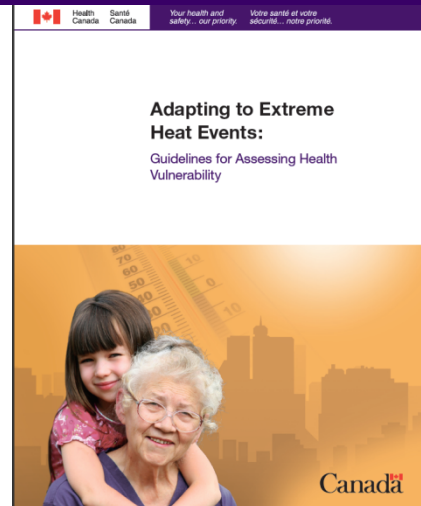


Communicating the Health Risks of Extreme Heat Events:

Toolkit for Public Health and Emergency Management Officials



Heat-Health Adaptation Resources



Evaluating Health Canada Products

- A survey was developed in order to evaluate the effectiveness of these products.
- The survey can be accessed at:
 - EN: http://surveys-sondages.hc-sc.gc.ca/s/heat_resiliency/langeng/
 - FR: http://surveys-sondages.hc-sc.gc.ca/s/heat_resiliency/langfra/
- We would appreciate your feedback.



THANK-YOU

For more information, please contact:

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