Health Canada Santé Canada

Canada

Conducting Climate Change and Health Vulnerability Assessments to Prepare for Climate Change

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Climate Change and Innovation Bureau
Safe Environments Directorate
Health Canada

Clean Air Partnership Workshop
Toronto, ON
November 10, 2017

YOUR HEALTH AND SAFETY... OUR PRIORITY.

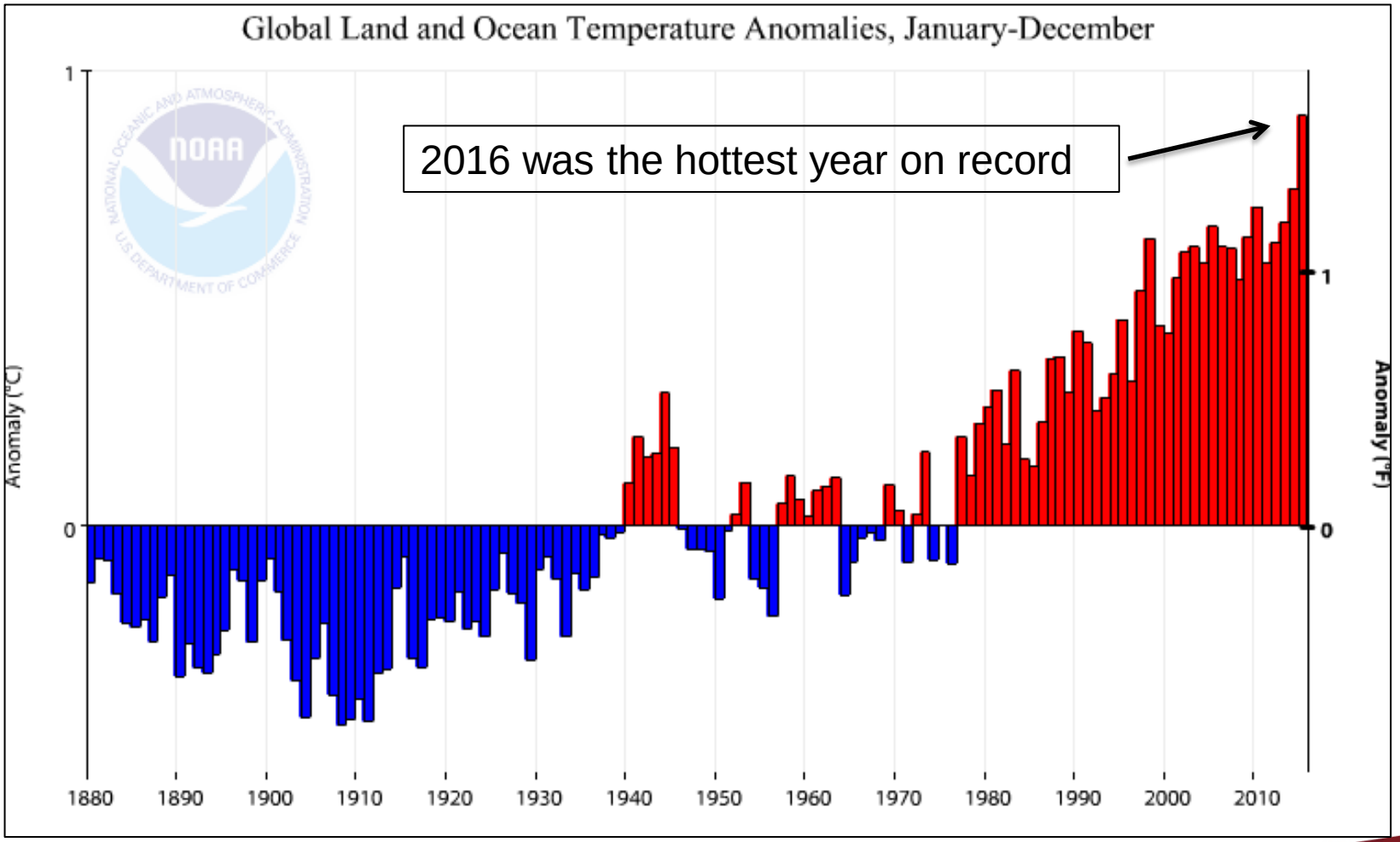
Presentation Overview

- Climate Change Risks to Health
- Vulnerability Assessment Guidance
- Canadian and US Assessment Examples
- Health Canada Support for Partners

CLIMATE CHANGE RISKS TO HEALTH

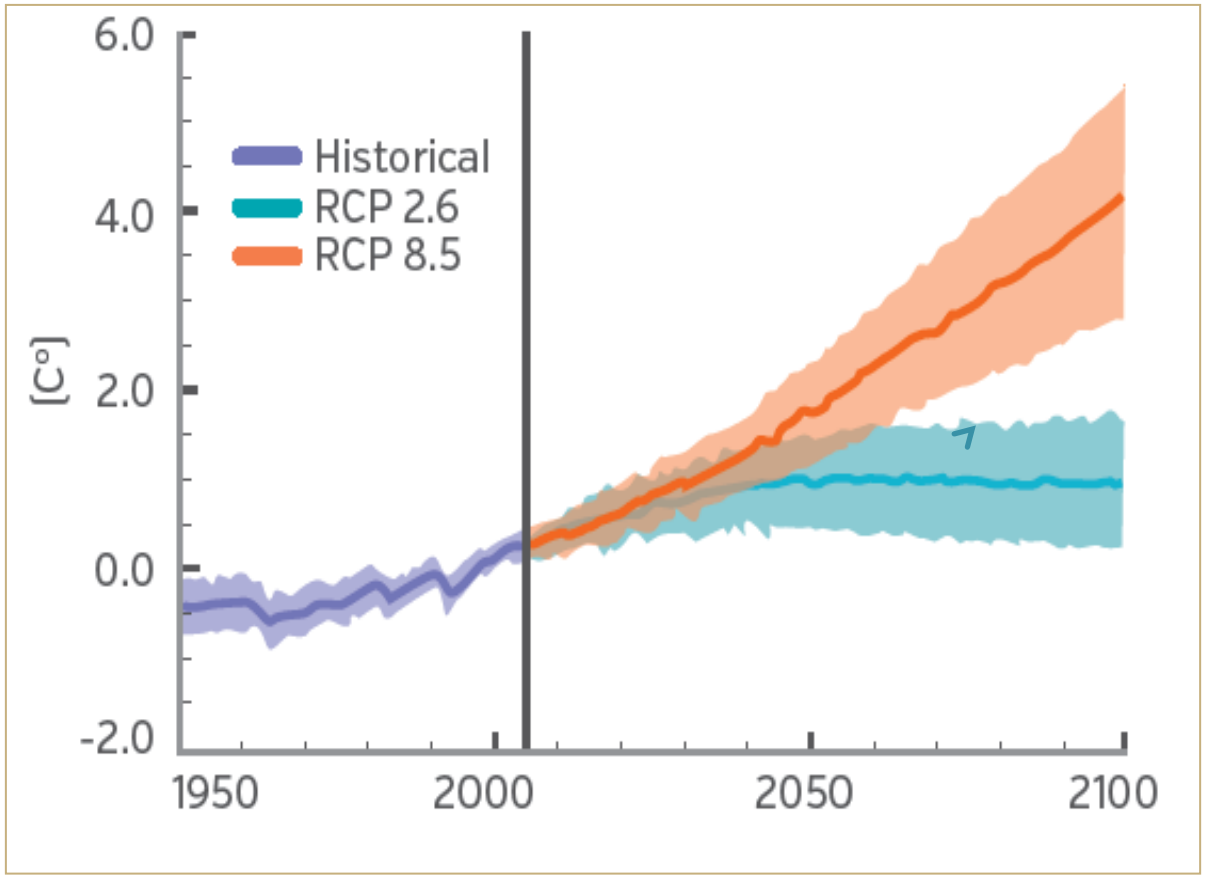
Evidence of Climate Change - “Warming is unequivocal”

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



NOAA, 2017

Projected Global Average Surface Temperature Change



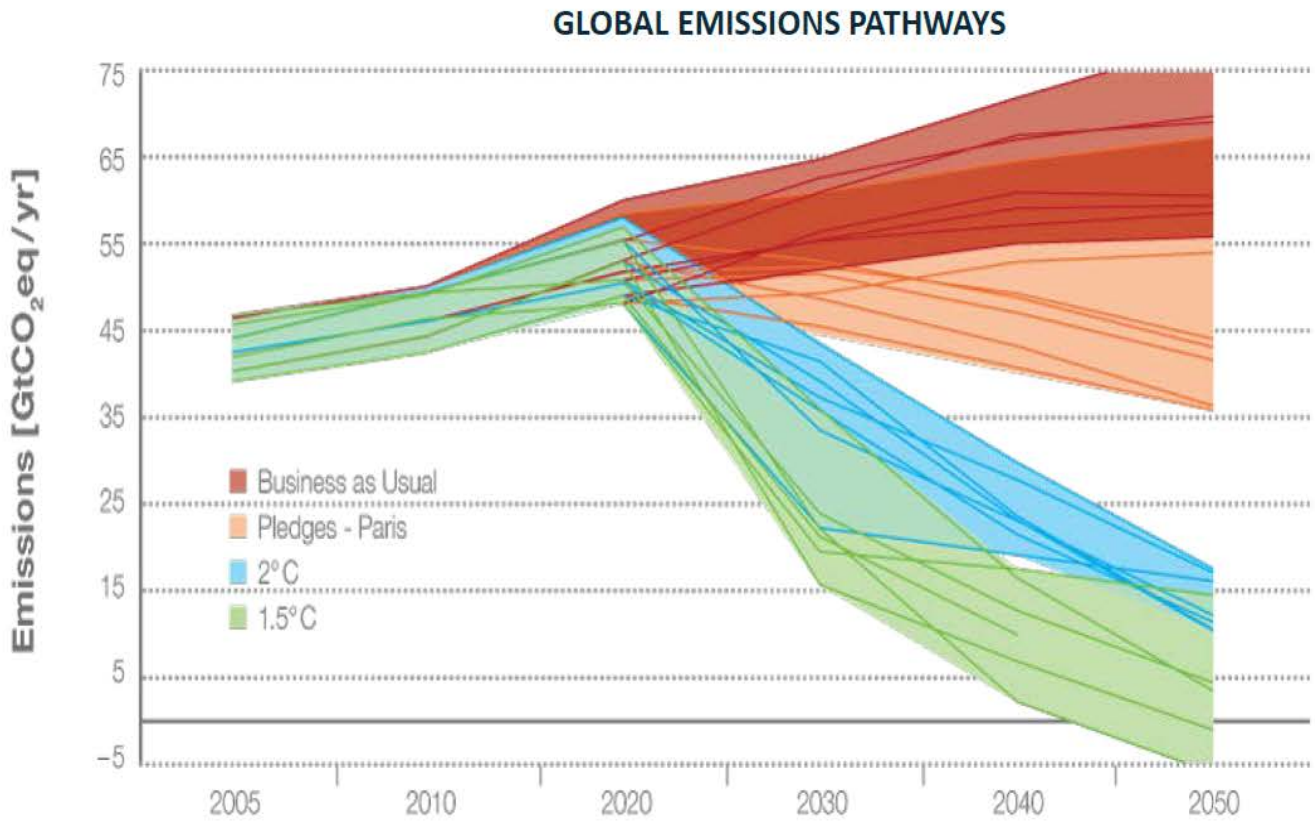
We are locked into an additional 0.7°C warming in the future

(IPCC, 2013)

The current pace of environmental change is largely unprecedented in Earth's history (Schmidt, 2016)

Future Emissions Reductions – Future Warming

Current emissions pathways, assuming countries implement their Paris commitments (pledges), indicate an emissions gap of 7 to 12 Gt CO_2e/yr by 2030, and by 2050, it would go up to 20 to 30 Gt CO_2e/yr for a well-below 2° C goal. For a 1.5° C goal, the gap would be even larger.



By 2100

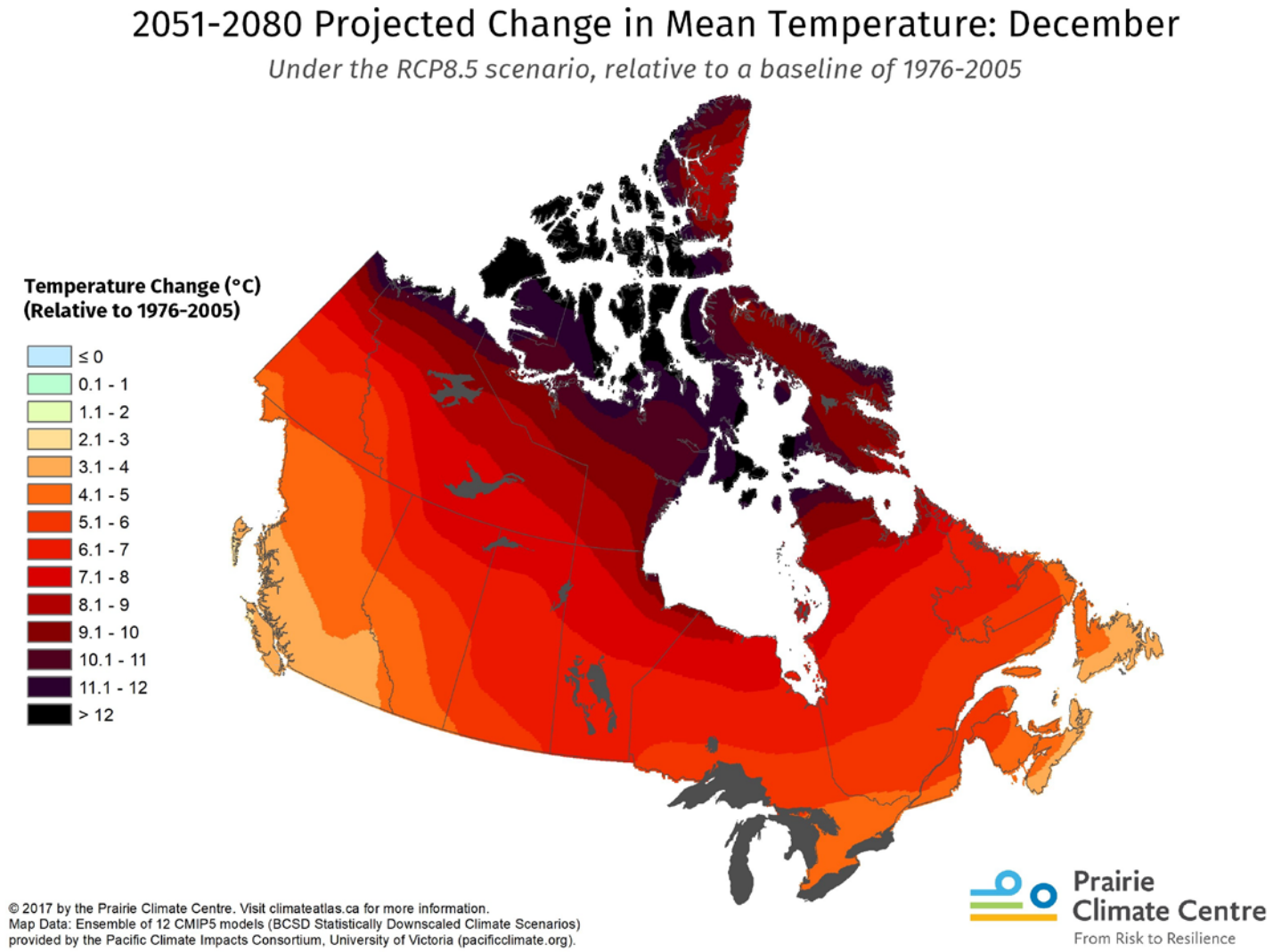
Business as Usual emissions ➔ 4 to 6 °C of warming

Implementation of Paris pledges ➔ 2.9 to 3.2 °C of warming

Business as usual is the scenario in the absence of policies
Note: Uncertainty/overlap between 2/1.5°C pathways due in part to assumptions around negative emissions post-2050

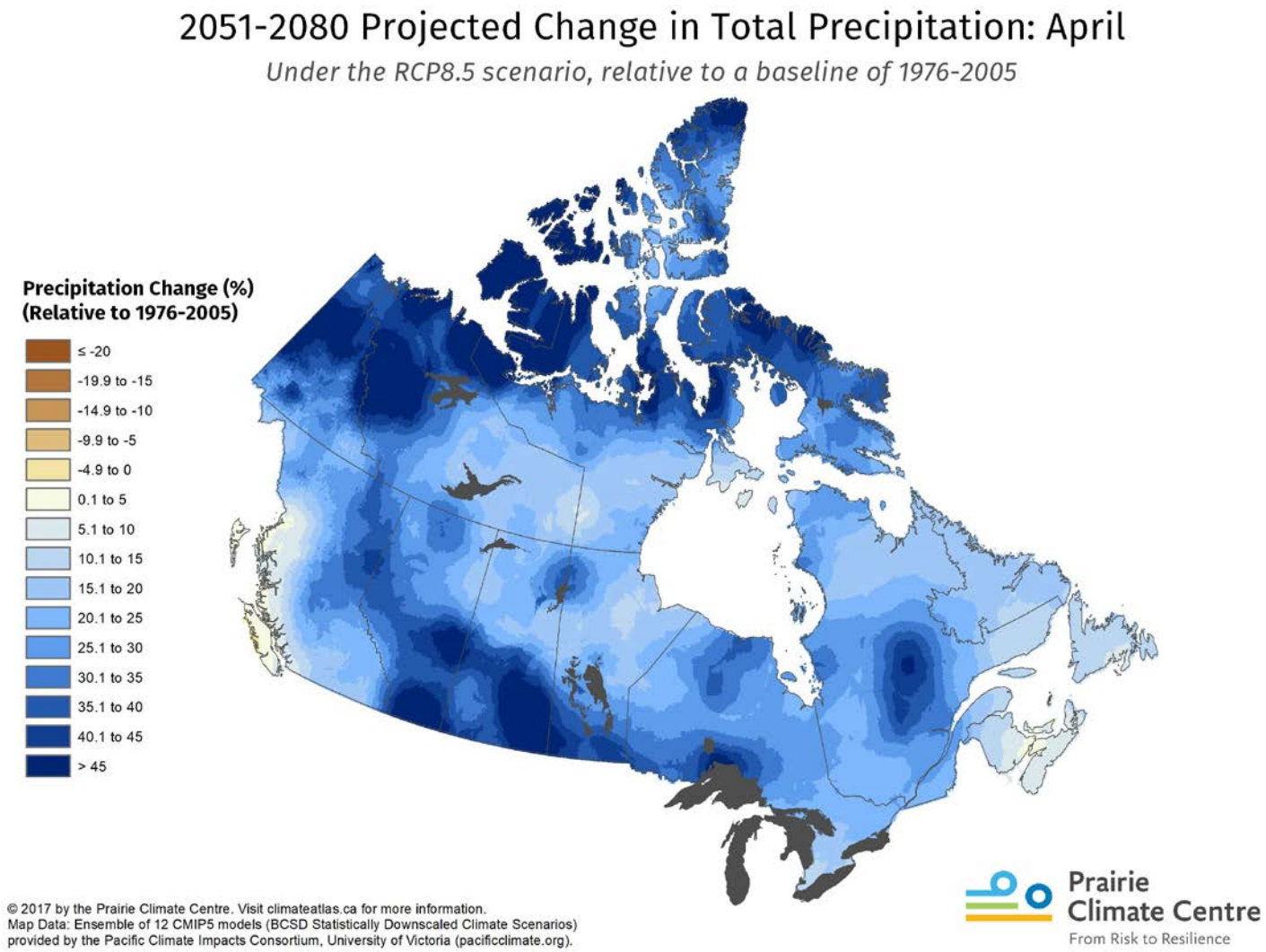
Source: ADVANCE project, Fig. 1.1, From Kriegler et al. 2017

Projected Warming in Northwestern Ontario



https://i0.wp.com/prairieclimatecentre.ca/wp-content/uploads/2017/10/2051-2080-RCP85-Mean-Temp-Delta-January.jpg

Projected Precipitation in Northwestern Ontario - Spring



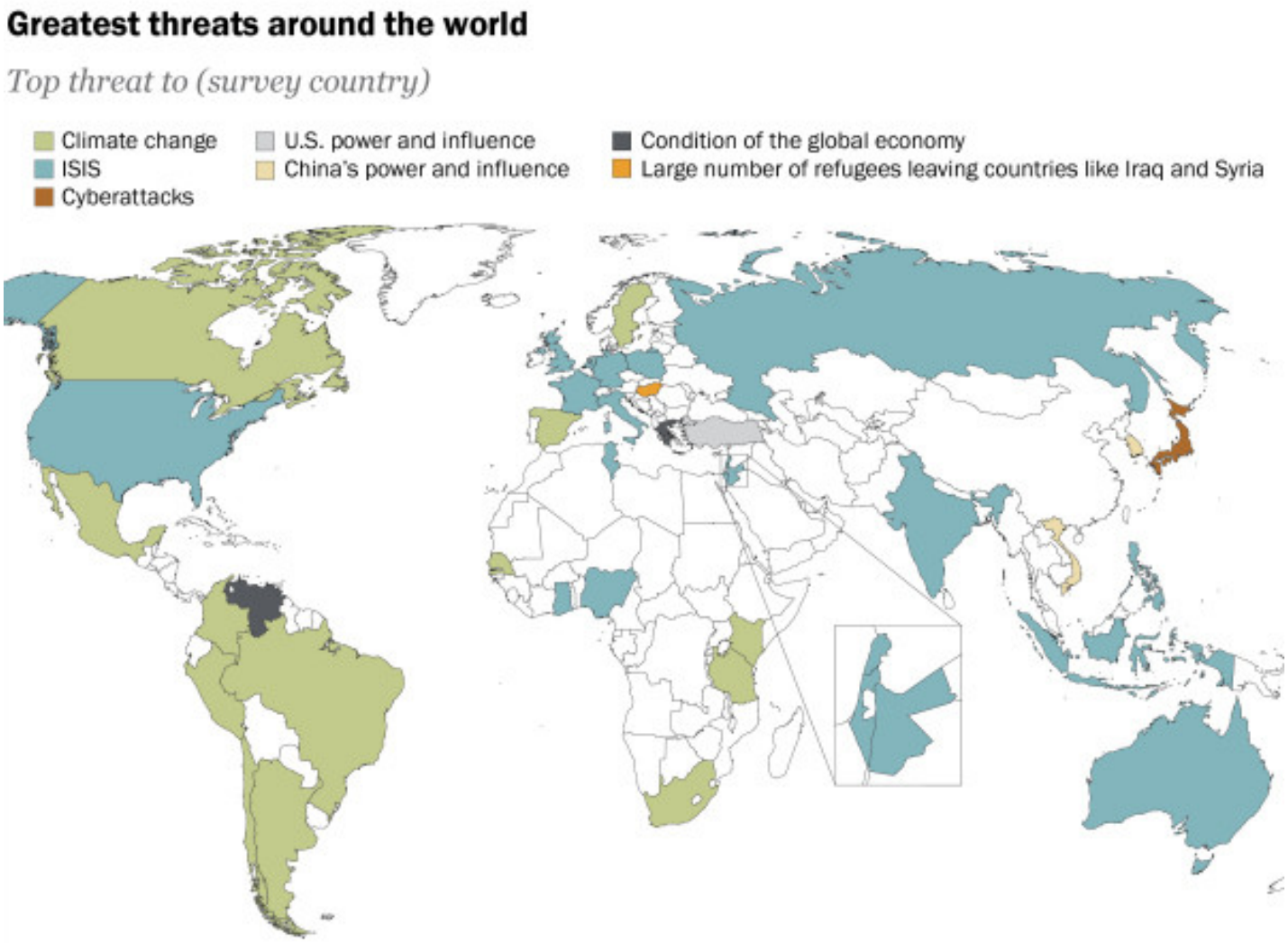
https://i0.wp.com/prairieclimatecentre.ca/wp-content/uploads/2017/10/2051-2080-RCP85-Mean-Temp-Delta-January.jpg

A Call to Action for Health

"The evidence is overwhelming: climate change endangers human health"

Dr. Margaret Chan, Director General, WHO, 2014

Climate Change – Top Threat to Security



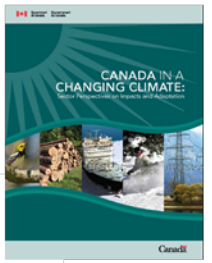
http://www.motherjones.com/environment/2017/08/isis-and-global-warming-are-considered-top-security-threats-by-most-of-the-world/

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

Health Risks in Canada from Climate Change



Dangerous travelling conditions

Permafrost melt damaging infrastructures

Changes in drinking water quality and quantity

Food security - changing animal distributions

Heat–related illnesses and deaths

Health impacts from more severe storms

Psychosocial impacts from droughts

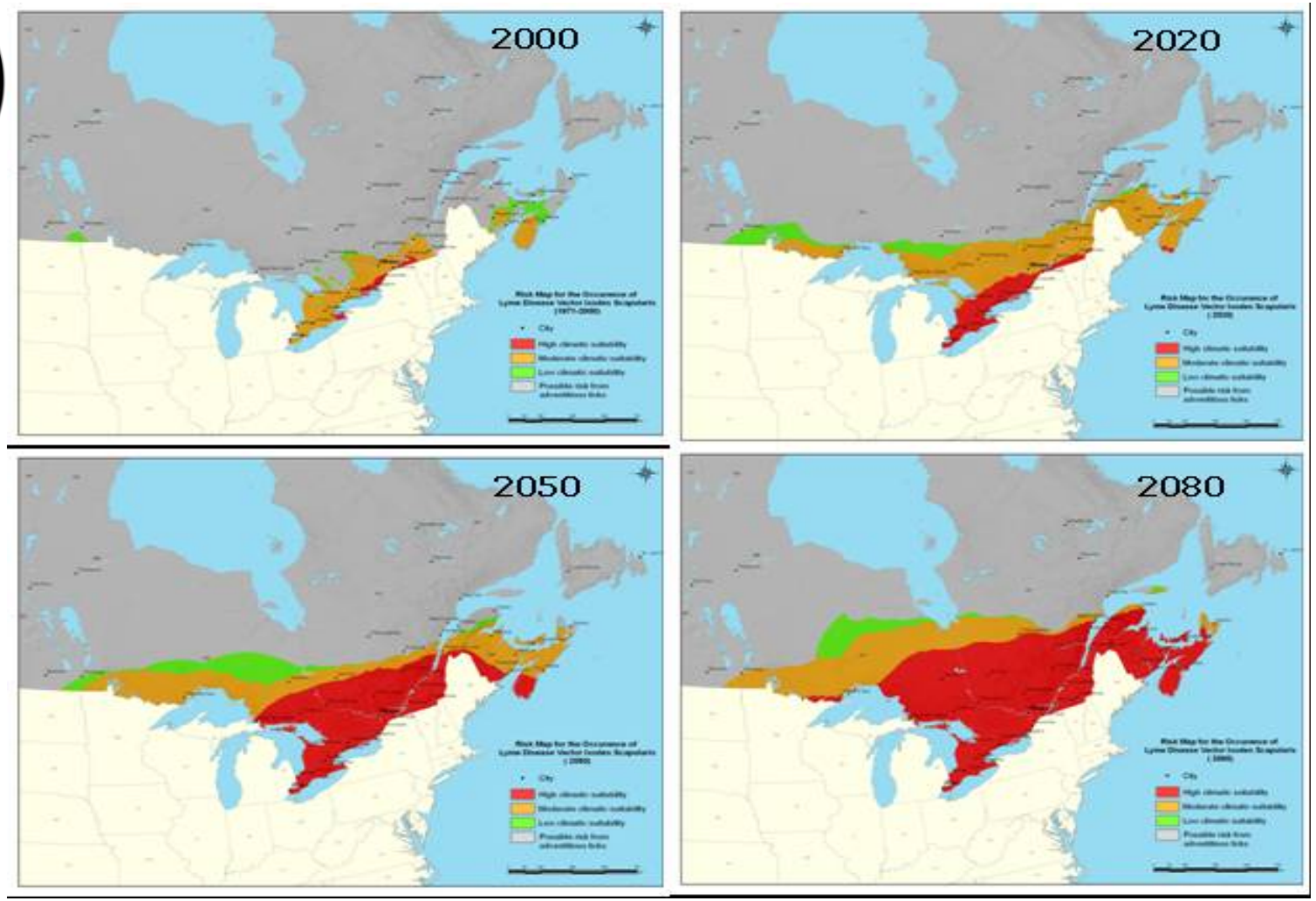
Water-borne diseases from floods

Respiratory illnesses from forest fires

Expansion of Lyme Disease vector

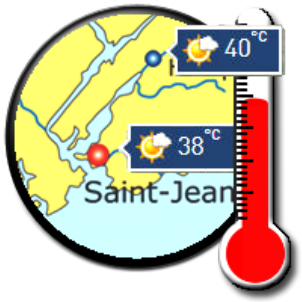
http://www.rncan.gc.ca/environnement/impacts-adaptation/evaluations/10030

Projected Risks from Lyme Disease to Canadians



Ogden et al., 2008

Extreme Heat



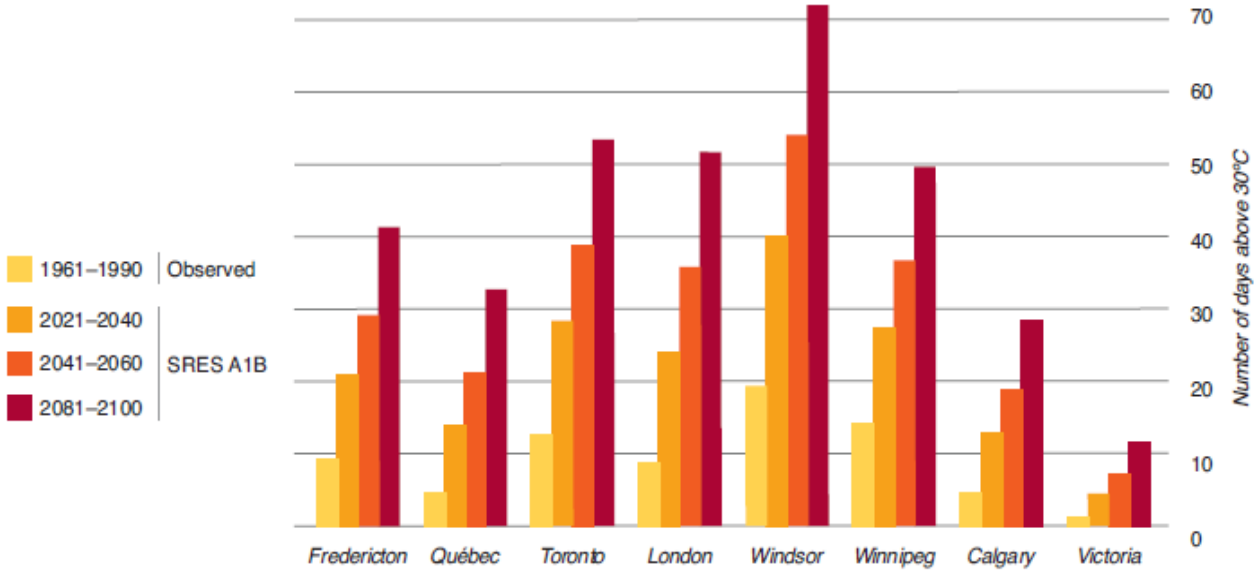
"As the climate changes, the frequency, intensity and duration of these event are expected to increase, as are their related adverse health effects" – Health Canada, 2011

At-risk groups include:

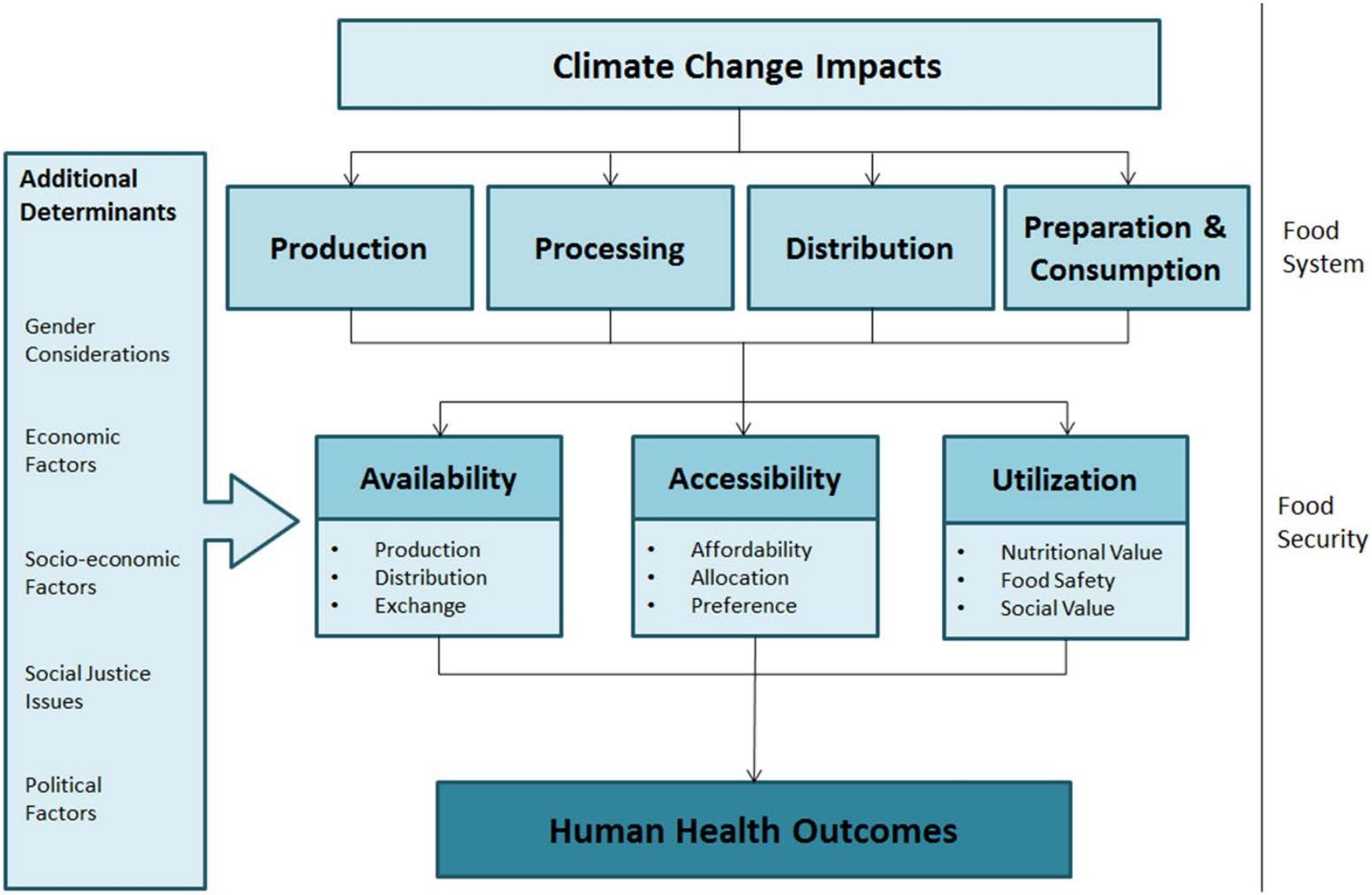
- Older Adults
- Infants and young children
- People with chronic illness
- The physically active
- Low socio-economic status
- Newcomers to Canada and transient populations

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.



Climate Change Impacts on Food Insecurity



Schnitter, 2017

Mental Health Impacts of Climate Change

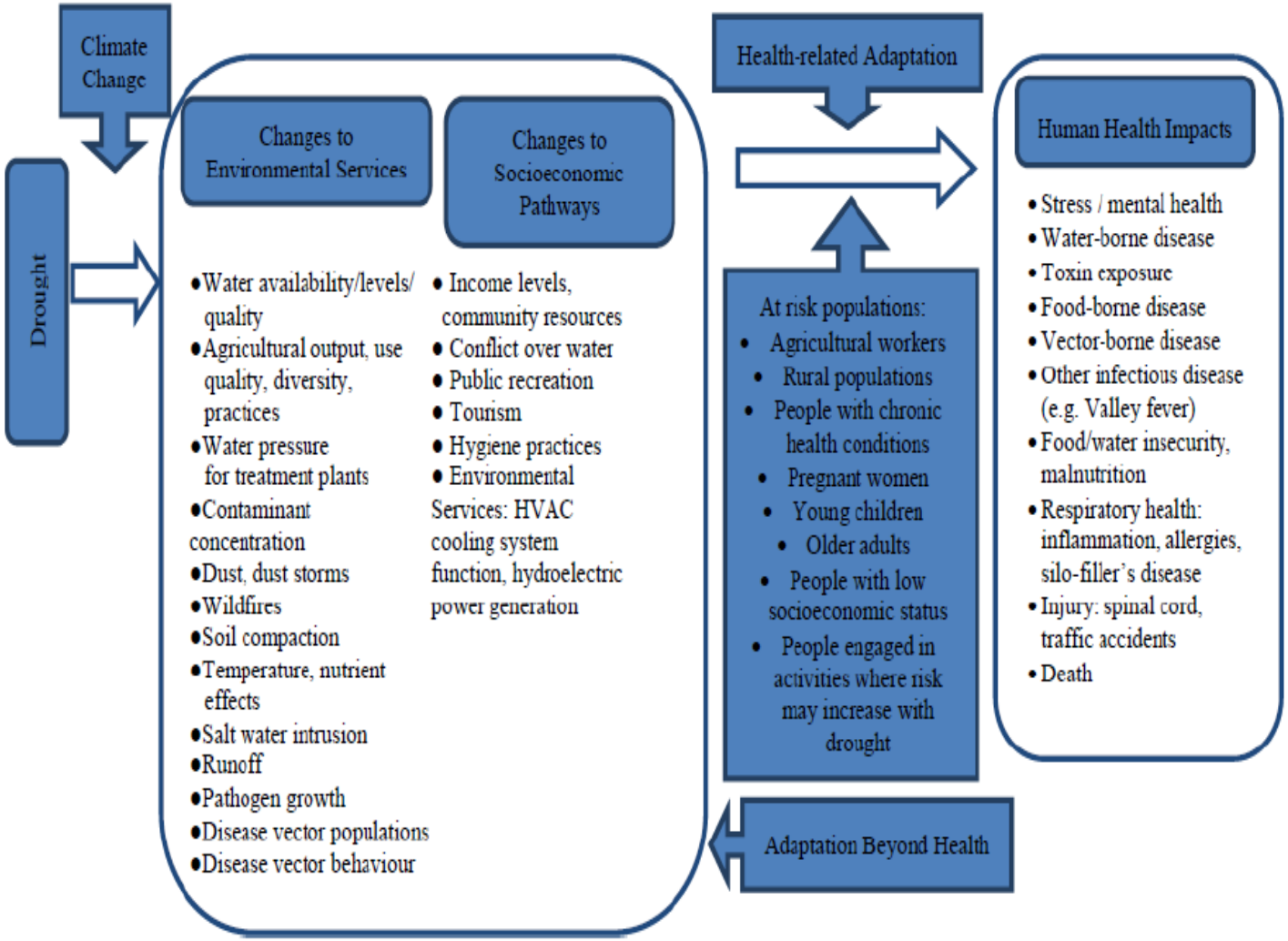
- 1 in 300 year flood
- 1932 people remained evacuated 2 years after the flood

Psychosocial impacts included:

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

Manitoba Flood 2011

Pathways Through Which Drought Impacts Health in the Context of Climate Change



Yusa et al., 2015

Impacts on the Health System

Canadian Health Care Facility Impacts from Climate Hazards

Source: Canadian Coalition for Green Health Care

Catastrophic Climate Events – Hurricane Maria

https://qz.com/1086337/puerto-rico-images-before-hurricane-maria-and-after-show-vast-destruction/

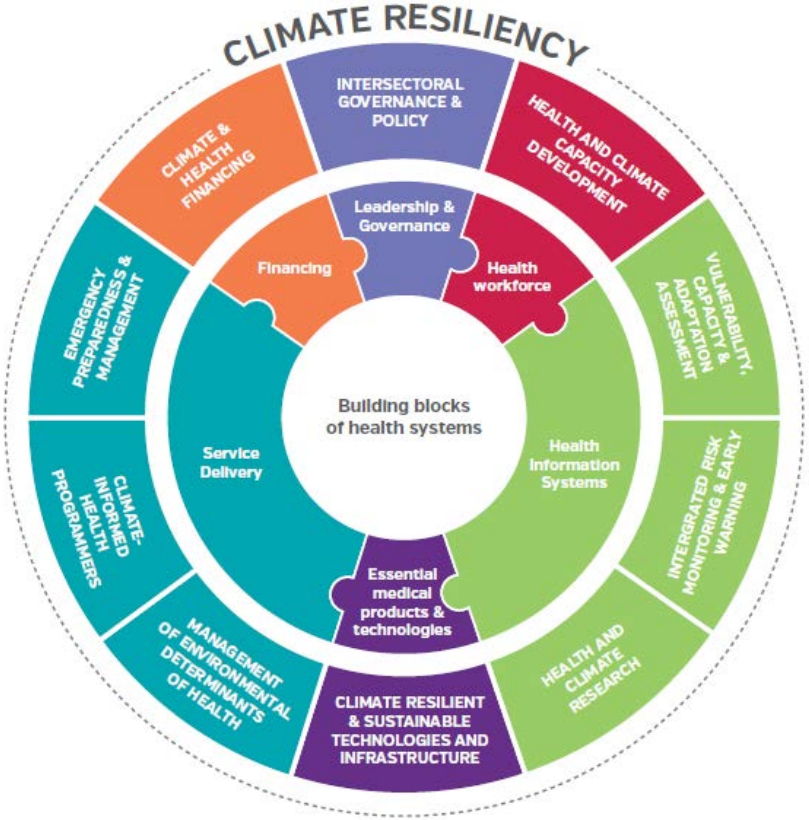
http://www.cnn.com/2017/09/24/americas/hurricane-maria-puerto-rico-aftermath/index.html

100,000 people have left the island – roughly 1800 per day

VULNERABILITY ASSESSMENT GUIDANCE

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?

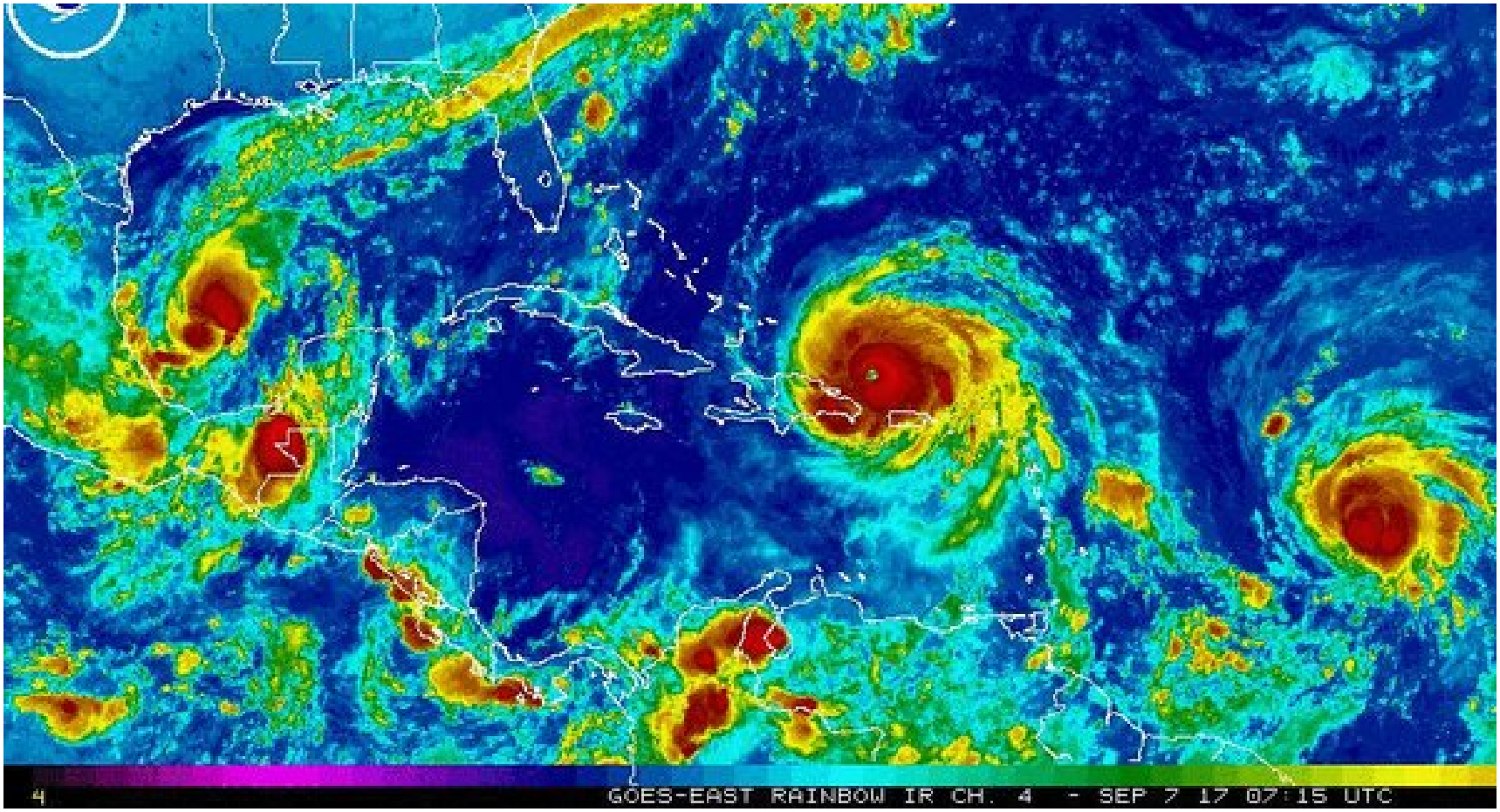
WHERE will health risks be the greatest?

Climate change is transforming environmental health decision making due to:

- Dynamic and complex disease risks (e.g., vector-borne diseases)
- Multiple uncertainties – particularly around management of indirect health effects (e.g., food insecurity)
- Increase probability of “surprises” that can severely impact health (e.g., cascading or complex emergencies)
- Risks of “involuntary” adaptation

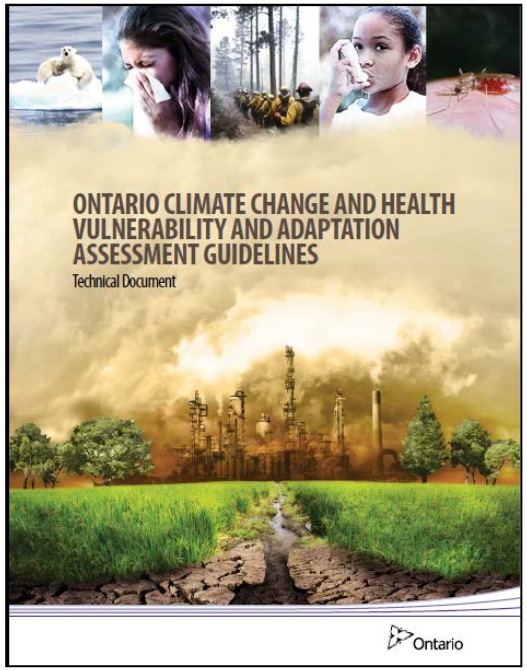
Source: National Institute of Environmental Health Sciences

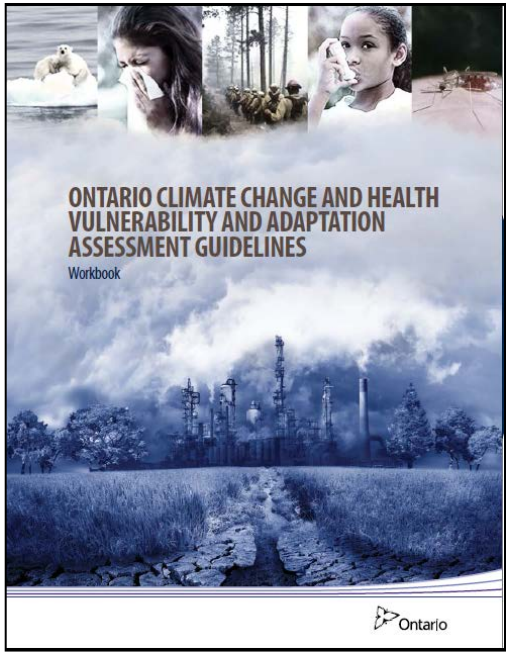
Linear vs Non-linear Climate Change Impacts and Adaptation?

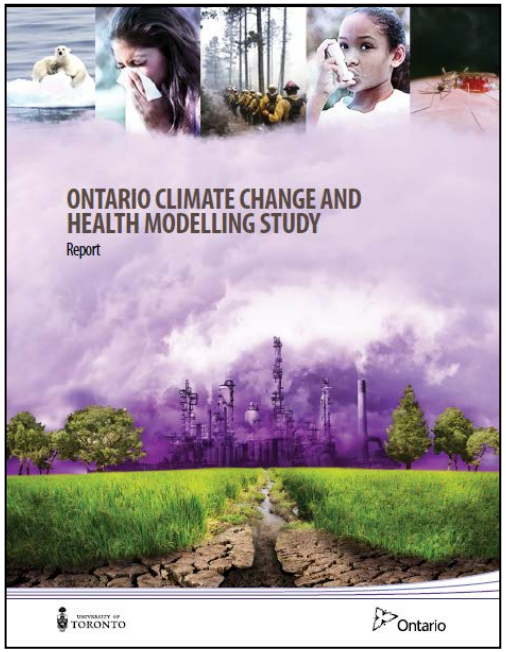


http://www.msn.com/en-ca/weather/topstories/hurricane-scientists-have-never-seen-an-image-like-this-before/ar-AArtK9Q?li=AAggNb9

Ontario Climate Change and Health Toolkit





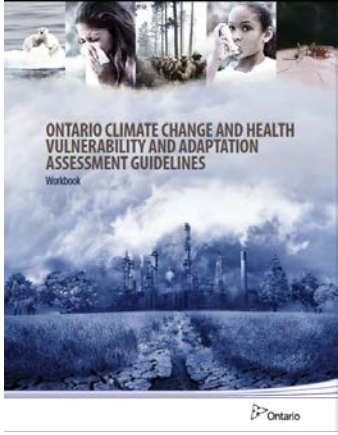


http://www.health.gov.on.ca/en/common/ministry/publications/reports/climate_change_toolkit/climate_change_toolkit.aspx

STEP 2D: VULNERABILITY INDICATORS TEMPLATE

Use the template below to document information on the sensitivity and adaptive capacity of individuals and the community to climate-related health hazards. Many sensitivity and adaptive capacity indicators are relevant for all climate-related health hazards (i.e. provide an indication of vulnerability for all), while others are specific to one or more. Examples of vulnerability indicators are provided in the template to help guide data collection. Data from these indicators will also be useful for monitoring adaptation success. *See Step 5b: Monitoring Indicators Template.*

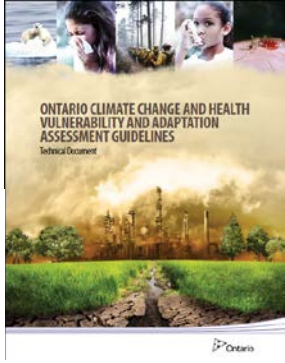
Health Hazards	Health Hazards	Health Hazards
EXTREME TEMPERATURE (heat, cold) **EVENTS**	**EXTREME TEMPERATURE** (heat, cold) **EVENTS**	**EXTREME TEMPERATURE** (heat, cold) **EVENTS**
Vulnerability Category Exposure	**Vulnerability Category** Sensitivity	**Vulnerability Category** Adaptive Capacity
Examples of Vulnerability Indicators • Maximum and minimum temperatures, heat index • Increase in heat alerts/warnings • Projected hot days and warm nights • Projected cold days • Projected air temperature seasonal changes and extremes • Proportion of the population living in an urban heat island	**Examples of Vulnerability Indicators** • Socially and economically disadvantaged populations • Number of people with conditions that inhibit temperature regulation • Number of seniors • Number of children • Heat-related morbidity and mortality • Cold-related morbidity and mortality	**Examples of Vulnerability Indicators** • Health and social services • Proportion of the population without air conditioning • Access to cooling centers • No. of heat wave early warning systems • No. of municipal heat island mitigation plans
Data Source	**Data Source**	**Data Source**
Method(s) of Verifying Efficacy and Appropriateness of Indicators	**Method(s) of Verifying Efficacy and Appropriateness of Indicators**	**Method(s) of Verifying Efficacy and Appropriateness of Indicators**



Vulnerability Indicators Template

http://www.health.gov.on.ca/en/common/ministry/publications/reports/climate_change_toolkit/climate_change_health_va_guidelines.pdf

Useful Resources for Conducting Assessments



Useful Resources

Ontario Ministry of the Environment and Climate Change – https://www.ontario.ca/ministry-environment

Ontario Ministry of Natural Resources and Forestry – *Climate Change Projections for Ontario: Practical Information for Policymakers and Planners* http://www.climateontario.ca/MNR_Publications/276923.pdf

Natural Resources Canada – *Climate Change and the Future Fire Environment in Ontario: Fire Occurrence and Fire Management Impacts CCRR-01* https://cfs.nrcan.gc.ca/publications?id=34351

Environment Canada – *Canadian Climate Data and Scenarios website* http://www.ccds-dscc.ec.gc.ca/

Ontario Centre for Climate Impacts and Adaptation Resources http://www.climateontario.ca/

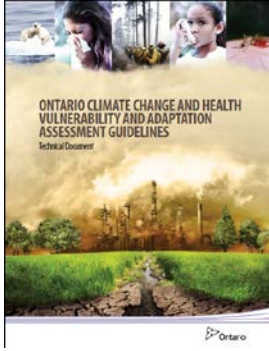
Consortium on Regional Climatology and Adaptation to Climate Change http://www.ouranos.ca/en/

Pacific Climate Impacts Consortium http://www.pacificclimate.org/

See also Box 4

http://www.health.gov.on.ca/en/common/ministry/publications/reports/climate_change_toolkit/climate_change_health_va_guidelines.pdf

Case Studies



Box 12: Air Quality and Climate Change Management Plan, City of Ottawa

The City of Ottawa's *Air Quality and Climate Change Management Plan* (2014) outlines goals, objectives, and recommendations to address climate change over the next 5 years. Included in the Plan are specific goals and activities underway or planned to reduce climate-related health risks. One goal is to adapt to climate change and protect people and property by reducing the risks to public health (e.g. through West Nile and Lyme disease monitoring and prevention programs).

Source: Shutterstock image

This will be achieved through the identification and communication of health risks to Ottawa residents and businesses, continued disease surveillance, education and prevention programs for vectorborne diseases such as West Nile virus and Lyme disease, and increasing the ratio of vegetated to impermeable surfaces to reduce the urban heat island effect. Ottawa Public Health identified a need to continue to invest resources to combat illnesses associated with extreme weather in Ottawa and conduct research and evaluation studies to keep improving the Heat and Smog Action Plan to protect health.

Source: City of Ottawa 2014

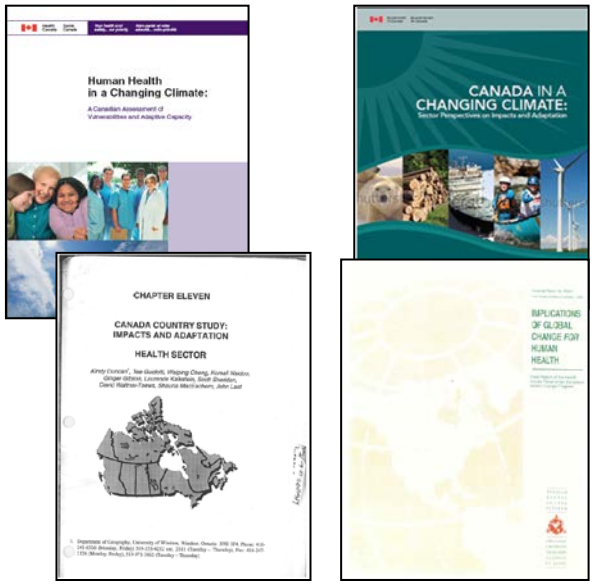
http://www.health.gov.on.ca/en/common/ministry/publications/reports/climate_change_toolkit/climate_change_health_va_guidelines.pdf

EXAMPLES OF CANADIAN AND US ASSESSMENTS

Canadian Health Vulnerability Assessments

National

- 1995 (Royal Society)
- 1998 (GOC)
- 2008 (Health Canada)
- 2014 (GOC)
- 2021 (planned)



Sub-National

- Peel Region (2014)
- Surrey, BC (2014)
- Middlesex – London (2015)
- Simcoe Muskoka (2017)
- Northwestern Health Unit (ongoing)
- York (ongoing)
- Hamilton (ongoing)
- Wellington-Dufferin-Guelph (ongoing)

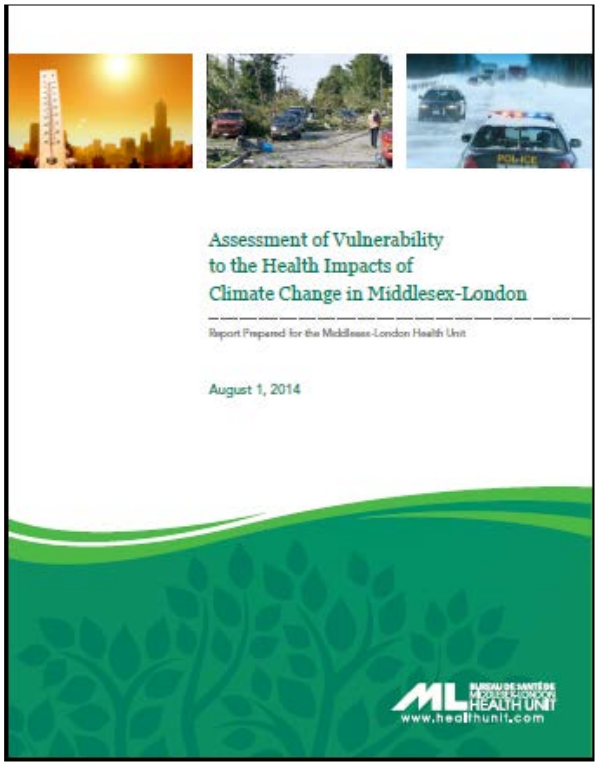
Middlesex-London Vulnerability Assessment

BUREAU DE SANTÉ DE MIDDLESEX-LONDON HEALTH UNIT
www.healthunit.com

Collected data on current risks and adaptations

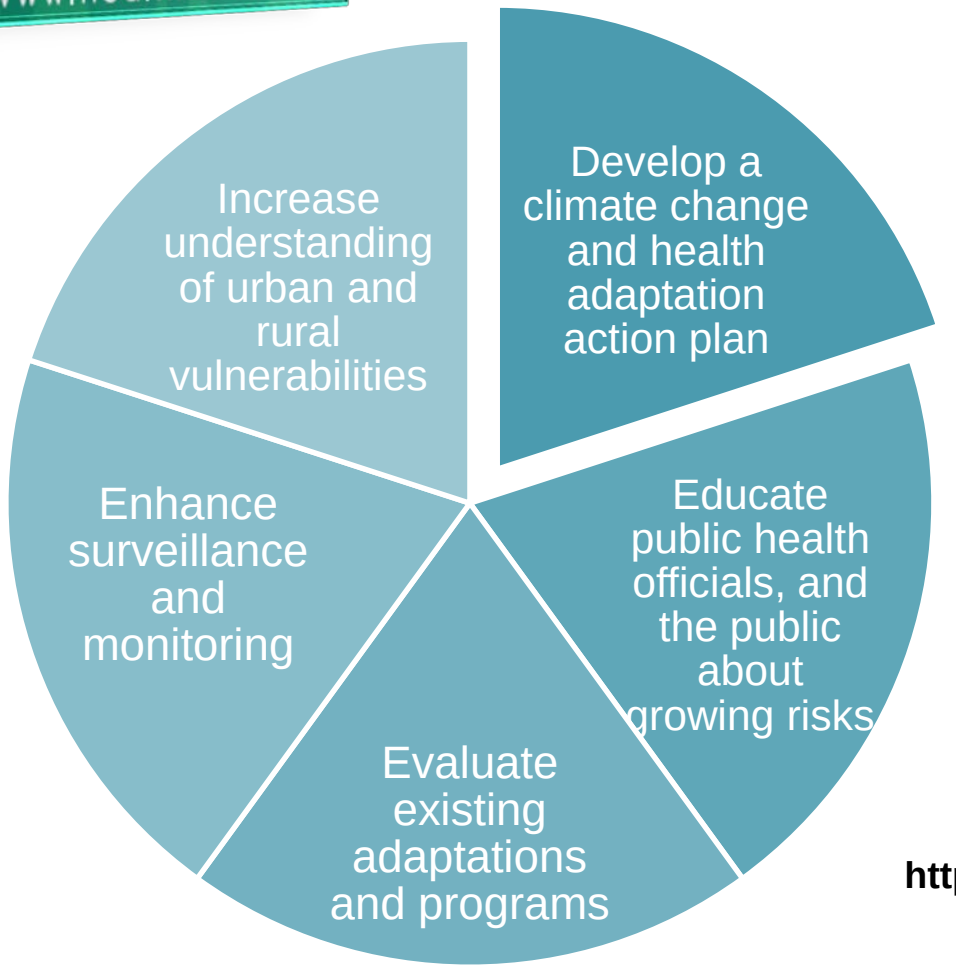
Modeled future risks with climate change

Engaged stakeholders on results and recommendations

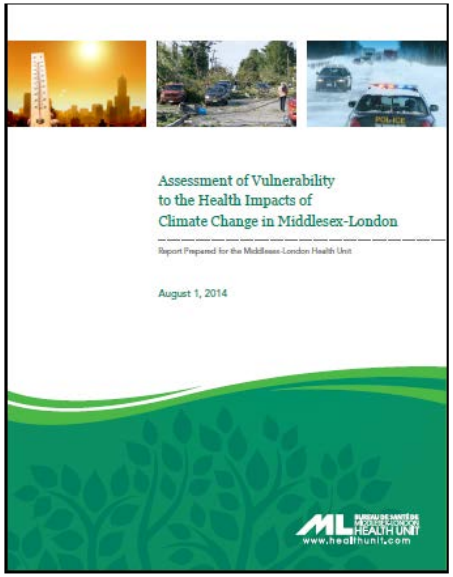


https://www.healthunit.com/climate-change

Middlesex-London Vulnerability Assessment

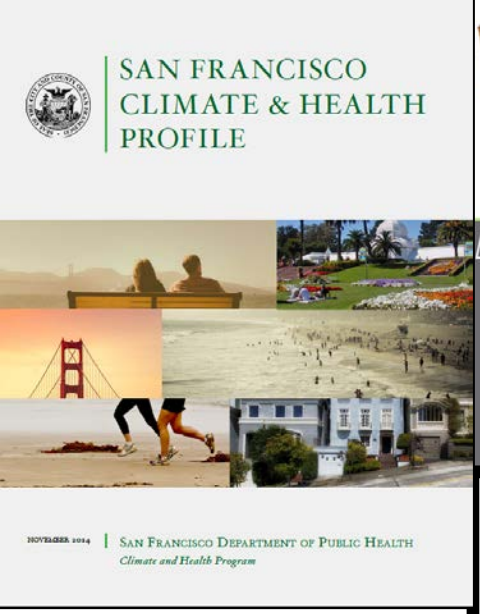


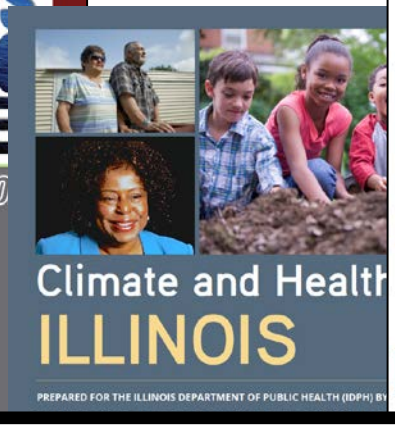
Key Recommendations

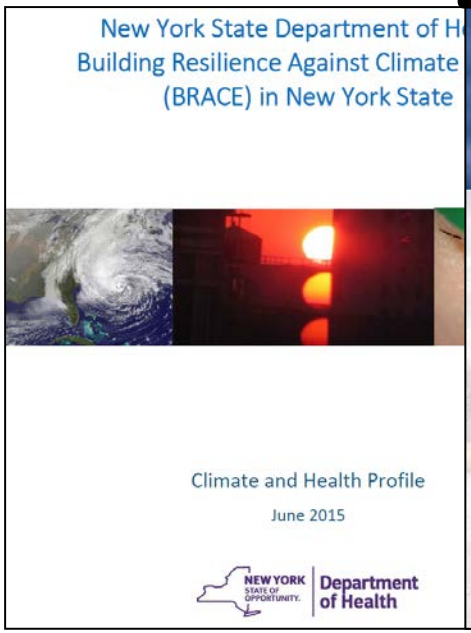


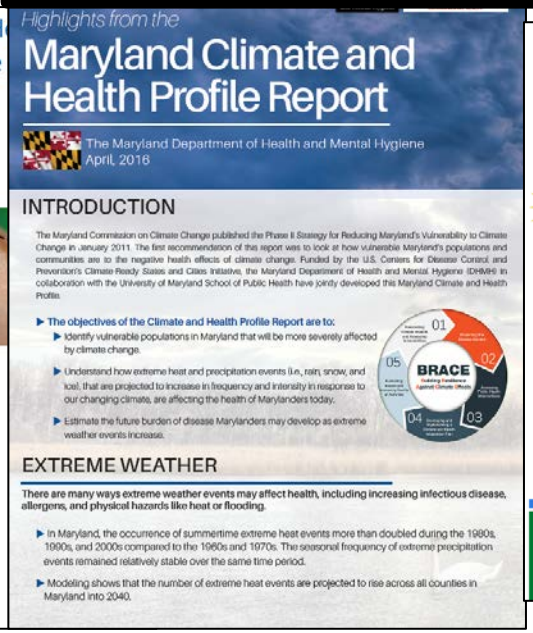
https://www.healthunit.com/climate-change

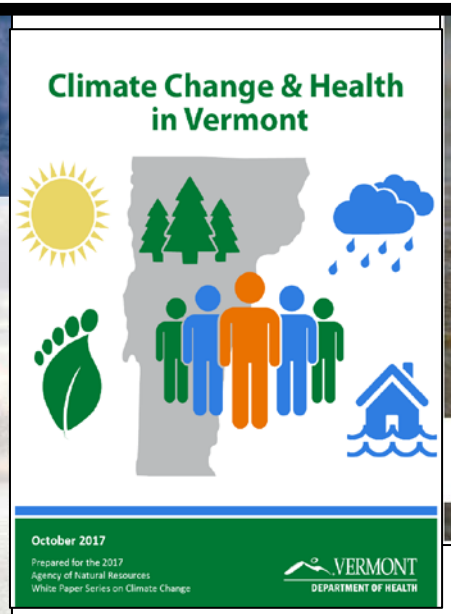
US Assessments

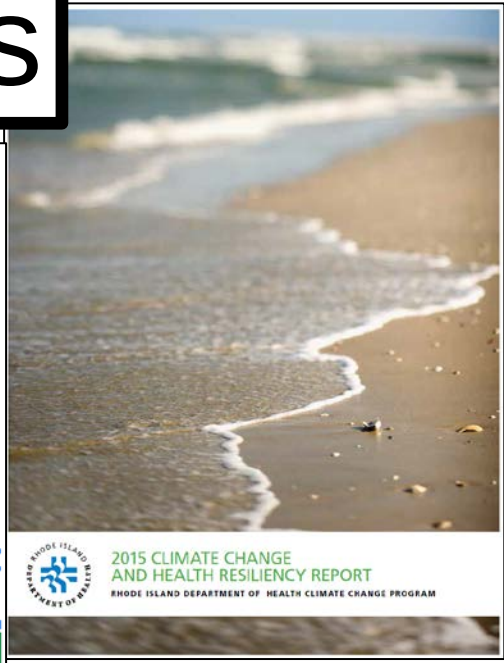












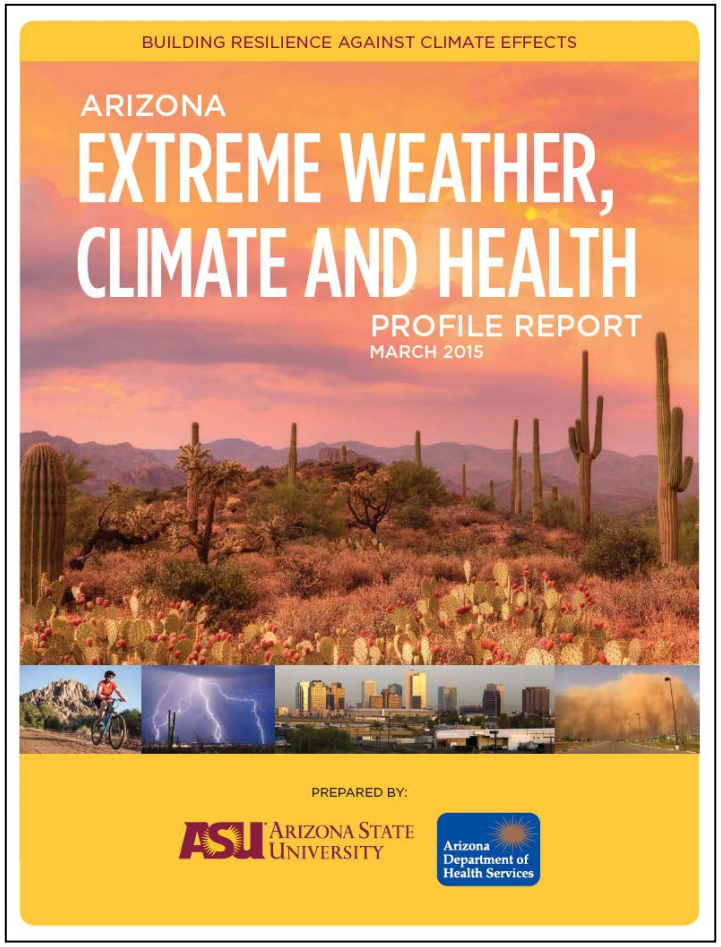
https://www.cdc.gov/climateandhealth/crsci_grantees.htm

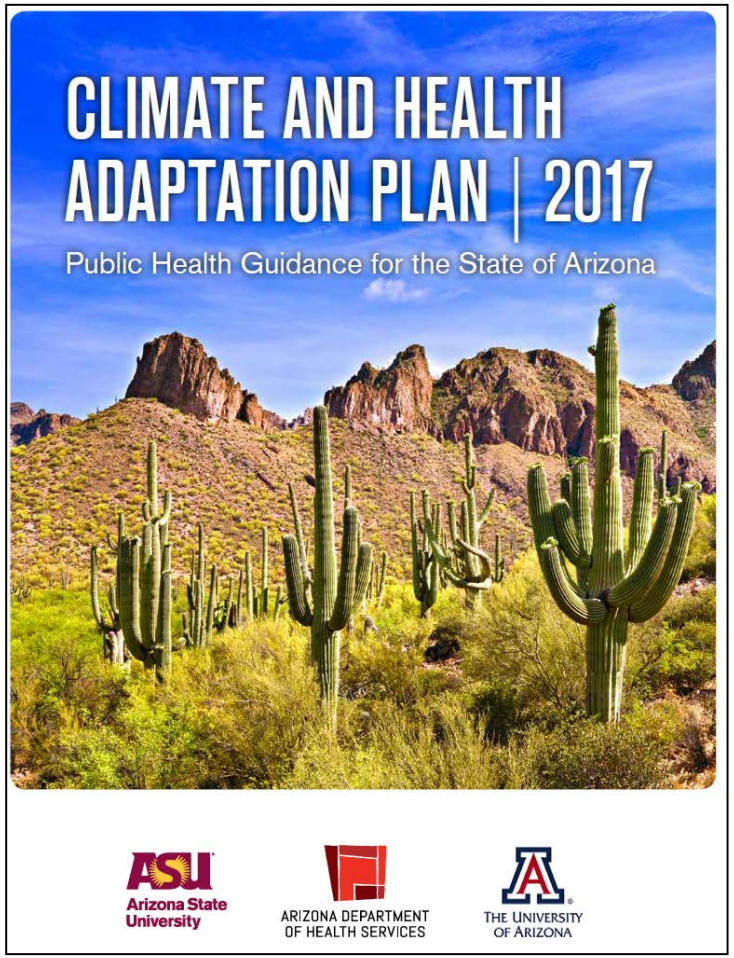
Completed U.S. climate health assessments*

Climate Change Adaptation Plan/Framework Developed and Online	
Arizona	New York State
California	North Carolina
Michigan	Oregon
Minnesota	Rhode Island
New Hampshire – *Northeastern U.S. Climate Impacts Assessment separate from BRACE*	San Francisco
	Wisconsin
Other Adaptation Actions or Next Steps Taken	
Florida (priority hazard profiles and cases; county adaptation plans coming soon)	Maryland (outreach)
Illinois (public health training, heat toolkit)	Massachusetts (climate change preparedness assessment - local boards of public health)
Maine (Syndromic surveillance system for heat, enhanced vector-borne disease monitoring)	New York City (local hazard mitigation plans – extreme heat, resiliency guideline for infrastructure)
	Vermont (public health training)

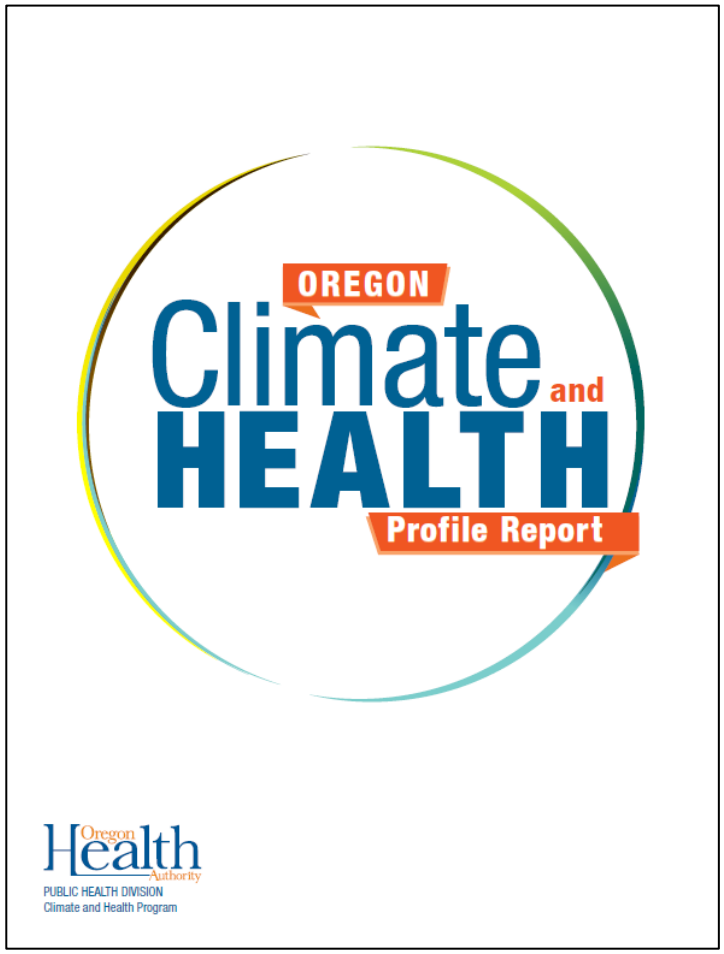
**Based on online scan of US CDC BRACE Climate-Ready States and Cities Initiative grantees*

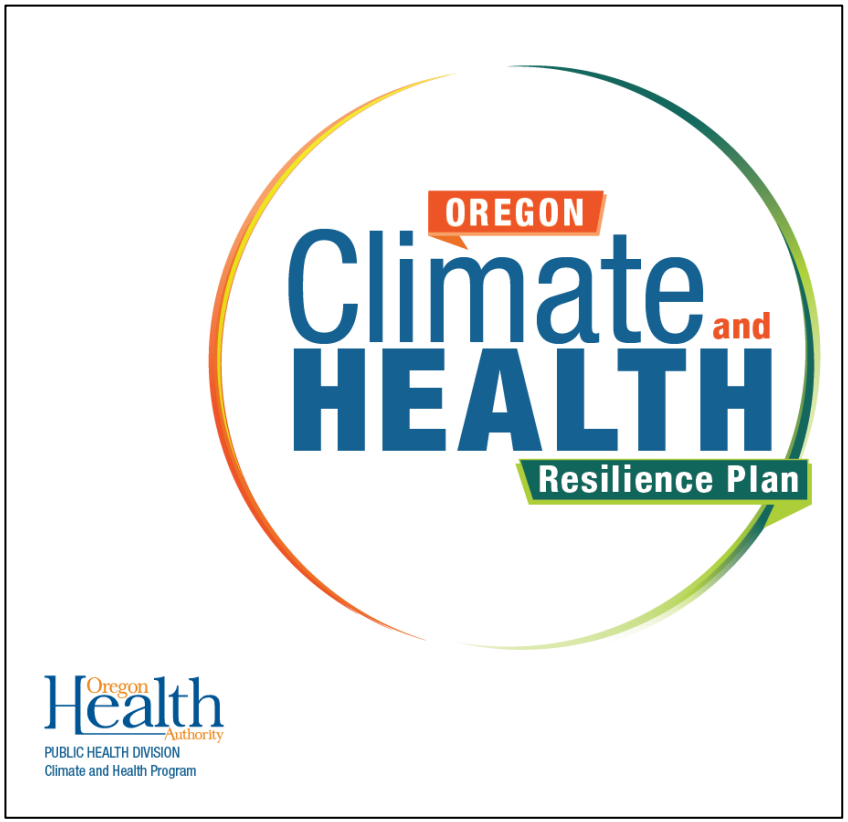
Arizona


BUILDING RESILIENCE AGAINST CLIMATE EFFECTS
ARIZONA
EXTREME WEATHER, CLIMATE AND HEALTH
PROFILE REPORT
MARCH 2015
PREPARED BY:
ASU ARIZONA STATE UNIVERSITY
Arizona Department of Health Services


CLIMATE AND HEALTH ADAPTATION PLAN | 2017
Public Health Guidance for the State of Arizona
ASU Arizona State University
ARIZONA DEPARTMENT OF HEALTH SERVICES
THE UNIVERSITY OF ARIZONA

Oregon


OREGON
Climate and HEALTH
Profile Report
Oregon Health Authority
PUBLIC HEALTH DIVISION
Climate and Health Program

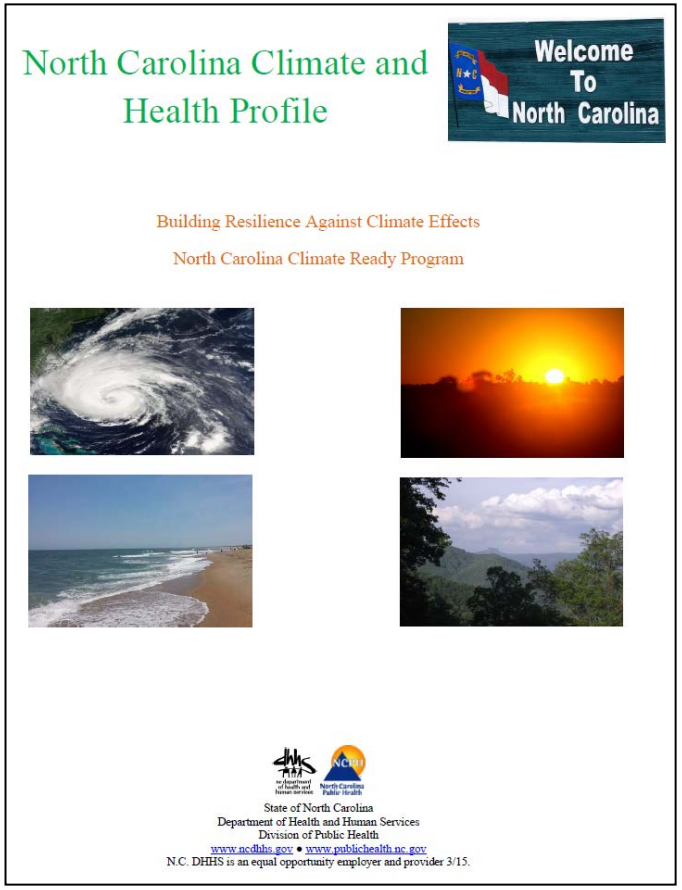

OREGON
Climate and HEALTH
Resilience Plan
Oregon Health Authority
PUBLIC HEALTH DIVISION
Climate and Health Program

North Carolina

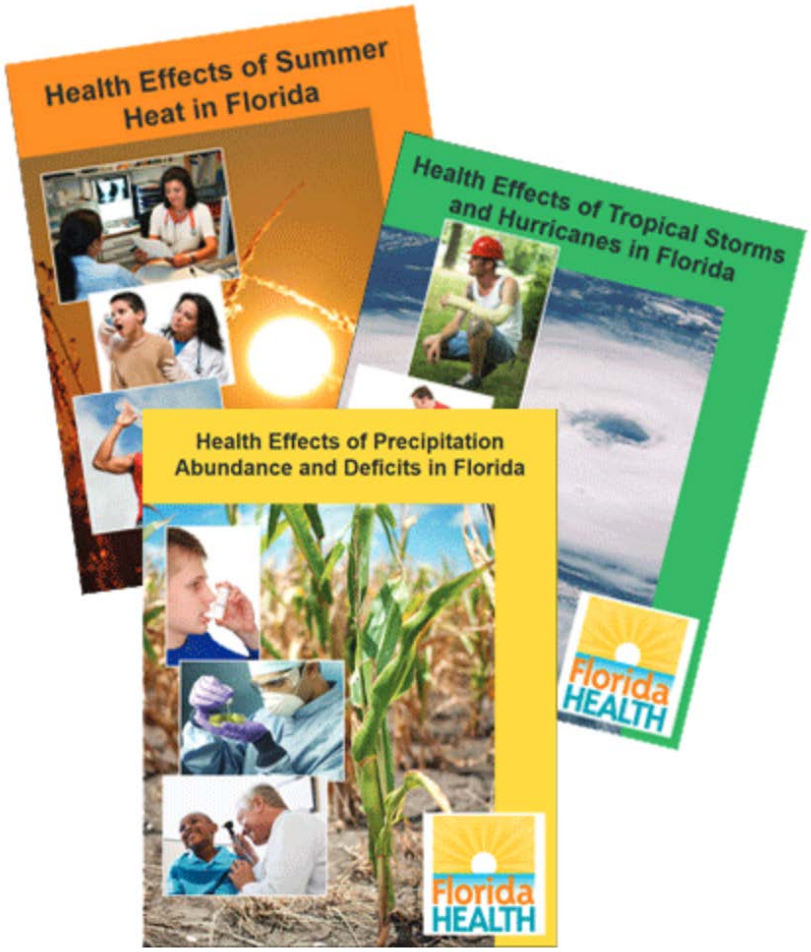
The Profile Report prioritizes the health impacts. The top priorities for North Carolina are:

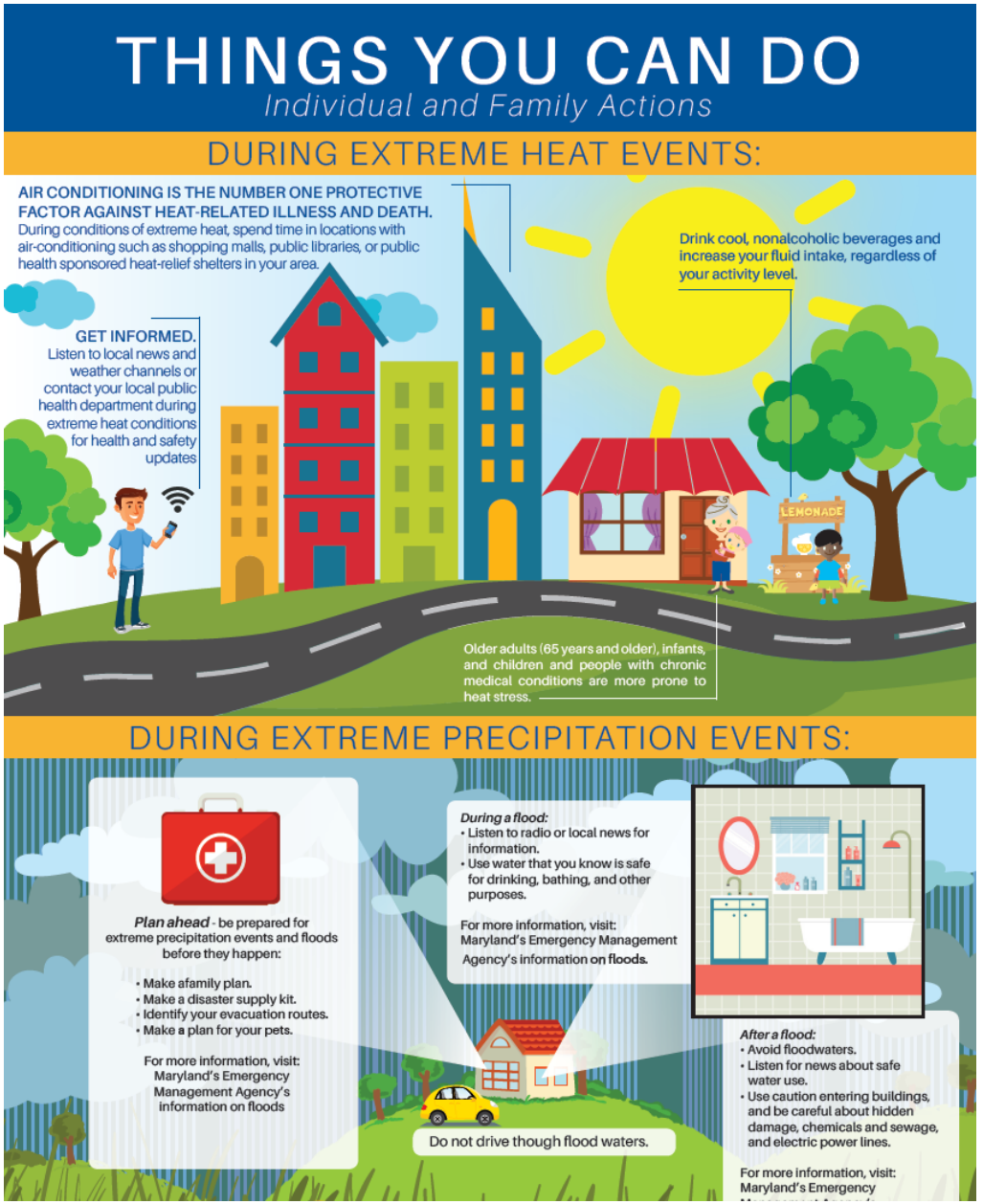
1. Air quality and respiratory disease – focus on wildfire smoke health impacts

2. Heat related deaths and illnesses – focus on emergency department visits

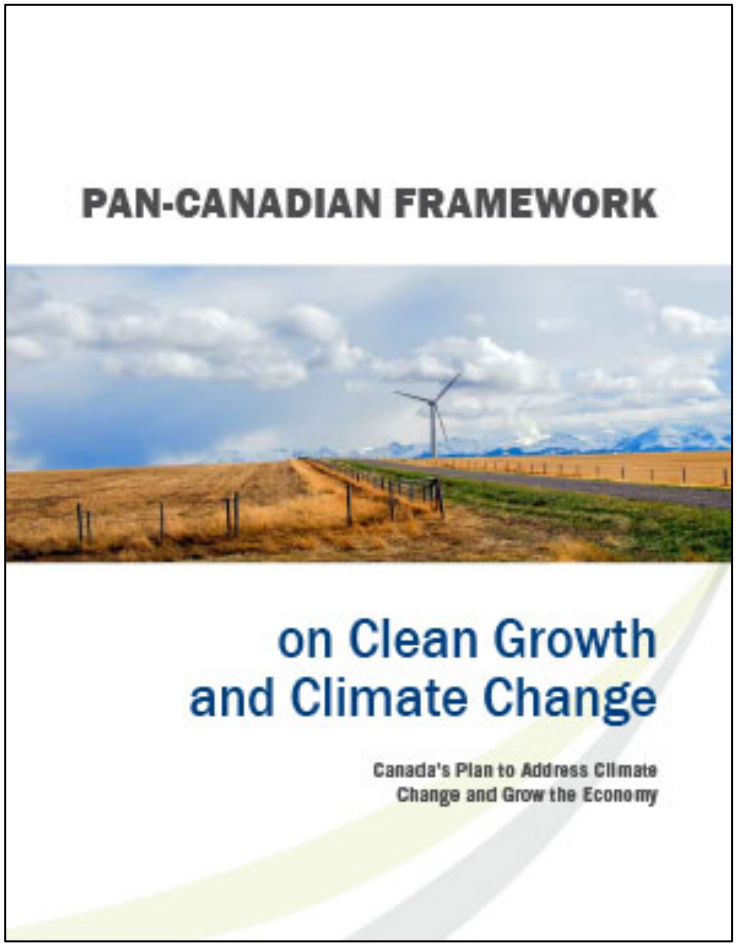


Outreach


Health Effects of Summer Heat in Florida
Health Effects of Tropical Storms and Hurricanes in Florida
Health Effects of Precipitation Abundance and Deficits in Florida
Florida HEALTH
Florida HEALTH


THINGS YOU CAN DO
Individual and Family Actions
DURING EXTREME HEAT EVENTS:
AIR CONDITIONING IS THE NUMBER ONE PROTECTIVE FACTOR AGAINST HEAT-RELATED ILLNESS AND DEATH.
During conditions of extreme heat, spend time in locations with air-conditioning such as shopping malls, public libraries, or public health sponsored heat-relief shelters in your area.
GET INFORMED.
Listen to local news and weather channels or contact your local public health department during extreme heat conditions for health and safety updates
Drink cool, nonalcoholic beverages and increase your fluid intake, regardless of your activity level.
LEMONADE
Older adults (65 years and older), infants, and children and people with chronic medical conditions are more prone to heat stress.
DURING EXTREME PRECIPITATION EVENTS:
Plan ahead - be prepared for extreme precipitation events and floods before they happen:
• Make afamily plan.
• Make a disaster supply kit.
• Identify your evacuation routes.
• Make a plan for your pets.
For more information, visit: Maryland's Emergency Management Agency's information on floods
During a flood:
• Listen to radio or local news for information.
• Use water that you know is safe for drinking, bathing, and other purposes.
For more information, visit: Maryland's Emergency Management Agency's information on floods.
Do not drive though flood waters.
After a flood:
• Avoid floodwaters.
• Listen for news about safe water use.
• Use caution entering buildings, and be careful about hidden damage, chemicals and sewage, and electric power lines.
For more information, visit: Maryland's Emergency

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

Natural Resources Canada

Home ▫ Climate Change ▫ Impacts and Adaptation
▫ Canada in a Changing Climate: Advancing Our Knowledge for Action

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

https://www.nrcan.gc.ca/environment/impacts-adaptation/19918

National Climate Change and Health Technical Assessment 2021

THANK YOU

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