



A CHANGING CLIMATE:

ASSESSING HEALTH IMPACTS & VULNERABILITIES DUE TO CLIMATE CHANGE WITHIN SIMCOE MUSKOKA

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**simcoe
muskoka**
DISTRICT HEALTH UNIT

WHY DOES PUBLIC HEALTH NEED TO ACT?

*“For public health, climate change is the **defining issue for the 21st century.**”*



Dr. Margaret Chan,
Former Director-General of the
World Health Organization

MANDATE

Ministry of Health and Long-Term Care

Healthy Environments and Climate Change Guideline, 2018

- Assess health impacts related to climate change
- Engage with partners to promote healthy built environments
- Develop strategies to reduce exposure and enhance healthy environments



HEALTHY ENVIRONMENTS STANDARD

“To reduce exposure to health hazards and promote the development of healthy built and natural environments that support health and mitigate existing and emerging risks, including the **impacts of a changing climate**”

URGENT PUBLIC HEALTH ISSUE

“...identify priority public health issues that require a coordinated and comprehensive agency response”

Strategic Direction 2012-16

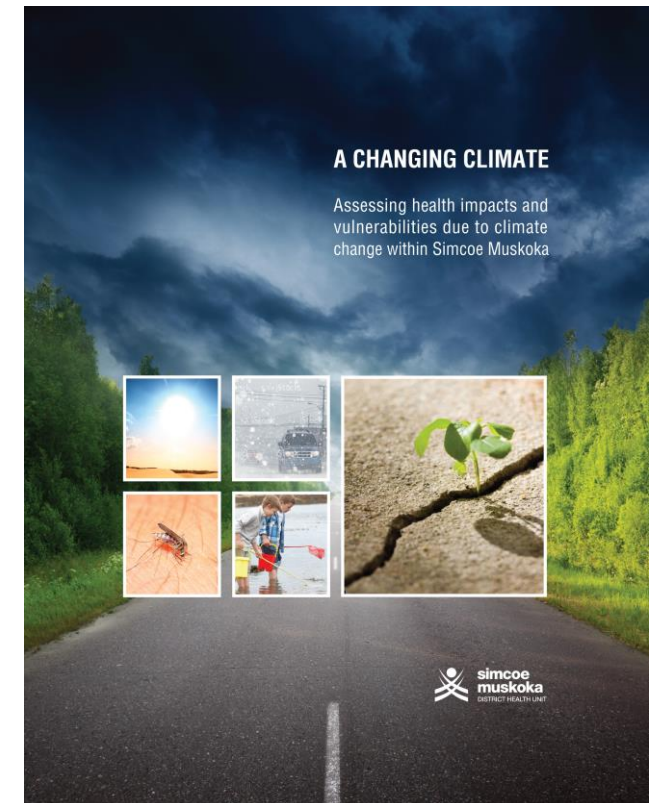
“Implement the agency wide action plan to address climate change”

Strategic Direction 2016-18

STRATEGIC PLAN TO ACTION PLAN

Creation of Climate Change Action Plan

- Internal consultations with key stakeholders
- Evolved from previous mitigation and adaptation actions
- Decisions supported by Steering Committee
- Action plan backgrounder to enhance knowledge of climate change and public health
- Main deliverable for Phase 1 was Vulnerability Assessment



SMDHU CLIMATE CHANGE ACTION PLAN

Action Plan Goal:

Communities in Simcoe Muskoka are resilient to, and have reduced negative health outcomes and inequities associated with climate change.

Phase 1

- Analysis of Current Environment (2015 – 2017)
(Key deliverable: vulnerability assessment which identifies risk)

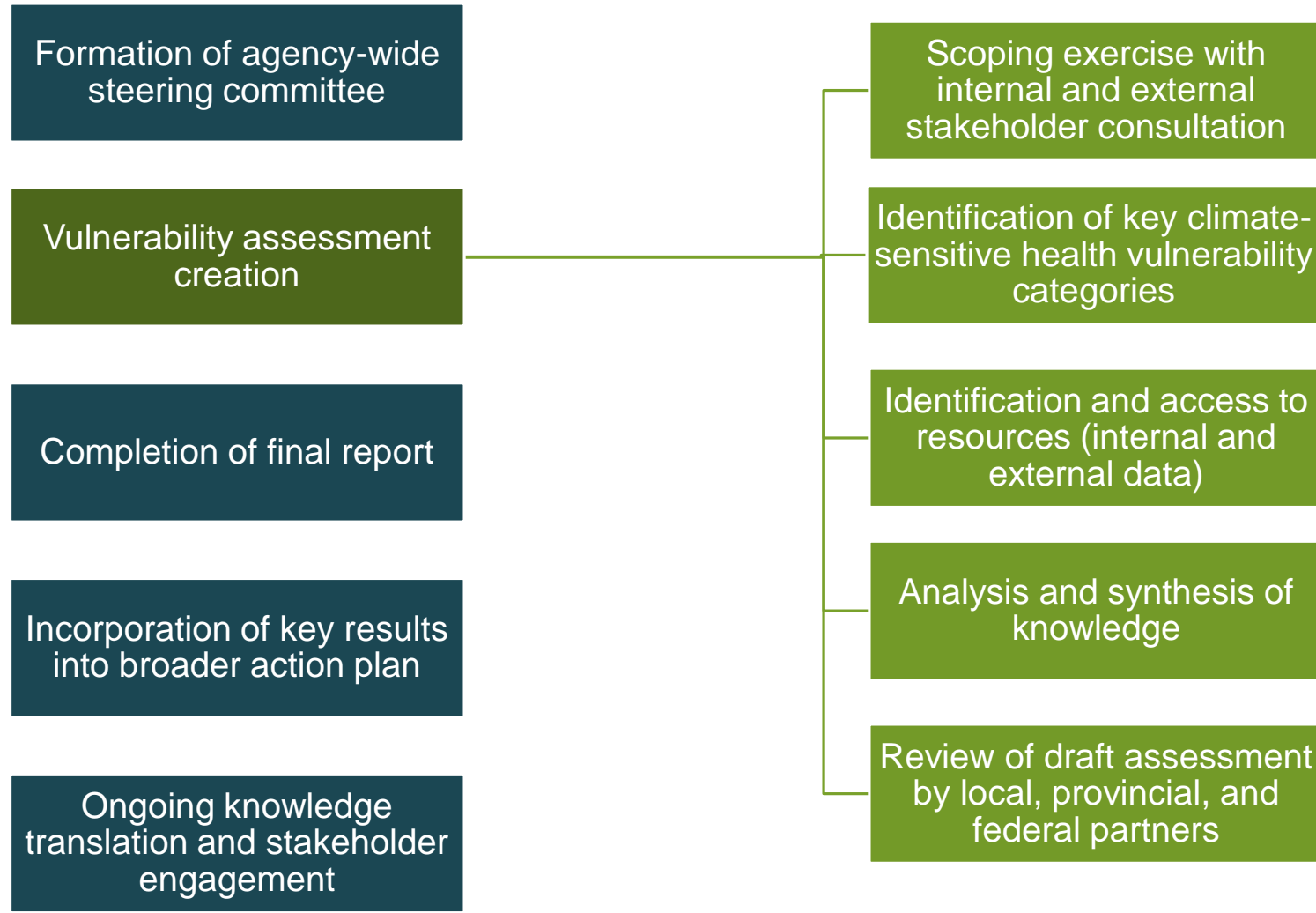
Phase 2

- Health Promotion and Stakeholder Engagement (2017 - 2018)
(Will support programming with community partners)

Phase 3

- Integration into Programs (2018 and beyond)
(Allows for continued support in health unit work)

GETTING STARTED ON THE VA: CREATING THE FRAMEWORK



GETTING STARTED ON THE VA: HUMAN RESOURCES

Steering Committee (All departments)

- Provided consultation and supported decision making
- Reviewed all chapters of the assessment

Report Creation Team (Public Health Promoter, HH/VBD Manager, and Epidemiologist)

- Responsible for writing all sections
- Other relevant departments as needed (Food, Water, Chronic Disease Prevention, Communicable Disease)
- External GIS consultant

External Reviewers

- Included local, provincial, and federal expertise

VULNERABILITY ASSESSMENT

**Increase
Understanding**

**Support
Resilience**

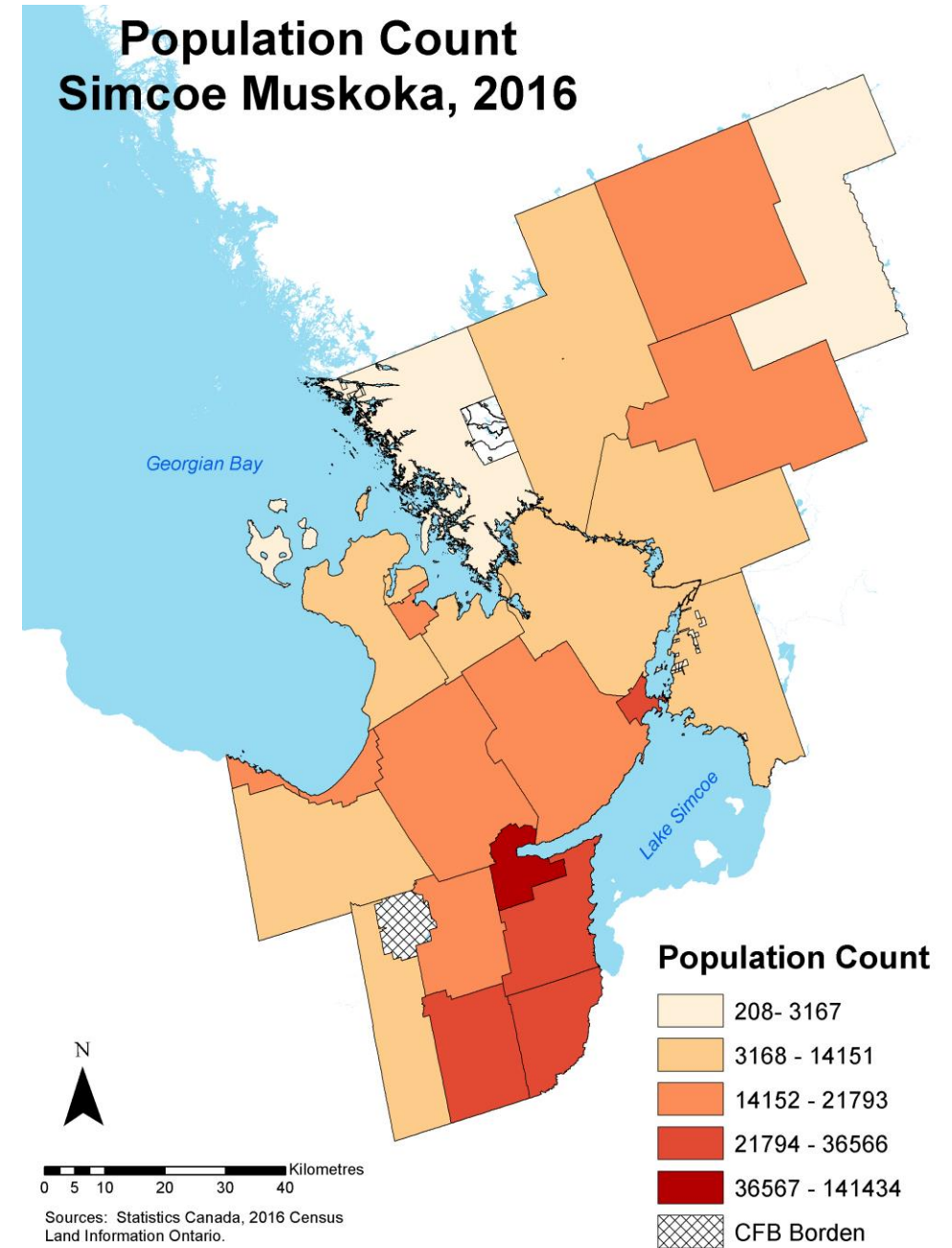
Exposure

Sensitivity

Adaptive
Capacity





SIMCOE MUSKOKA DISTRICT HEALTH UNIT

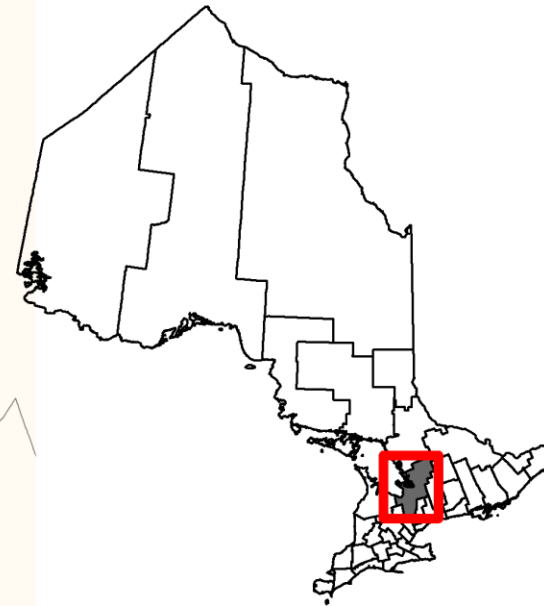
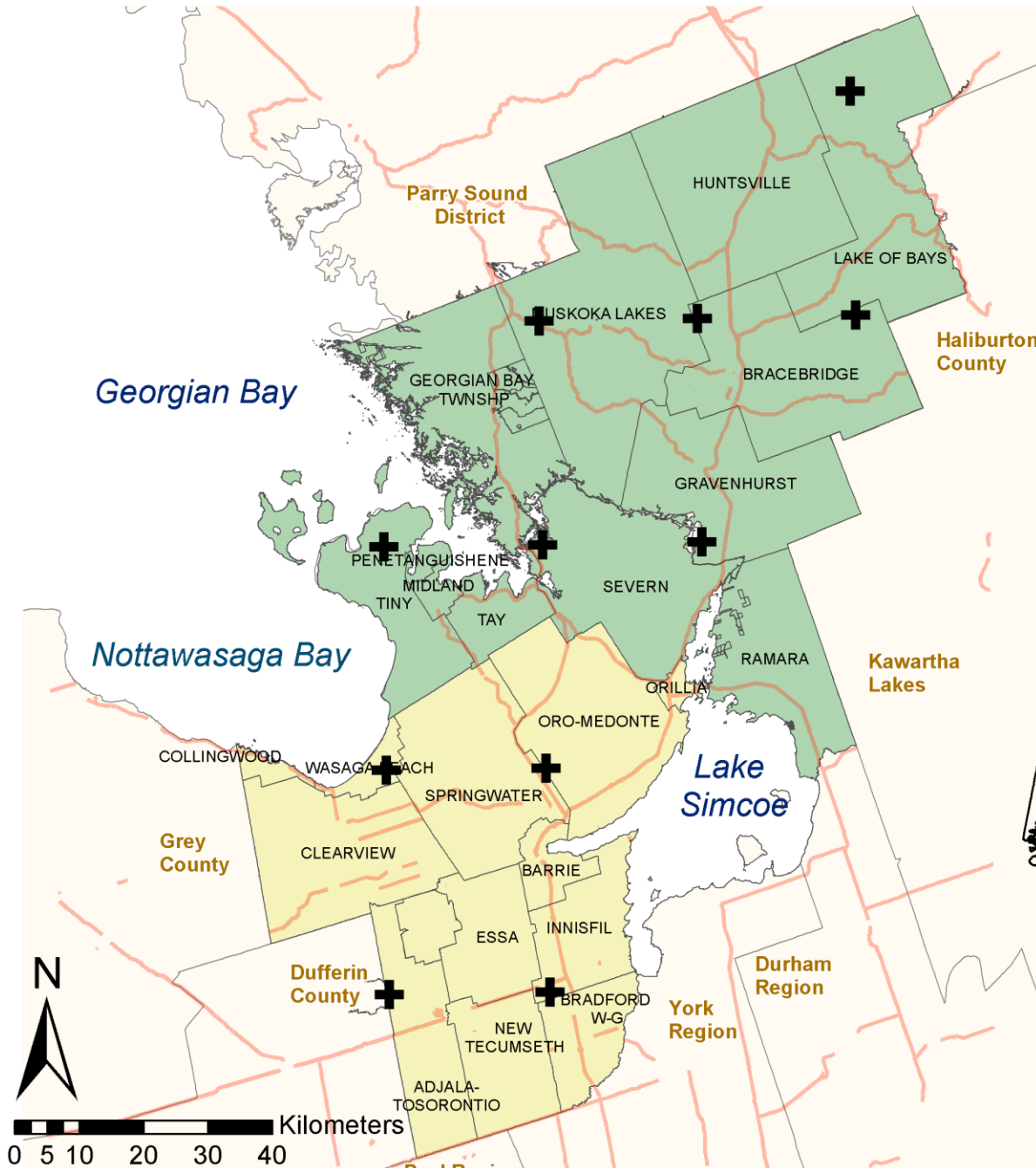
- Independent Board of Health
- 8,800 square kilometers
- Servicing 540,249 people
- Population increase to 740,073 by 2041
- 26 municipal councils



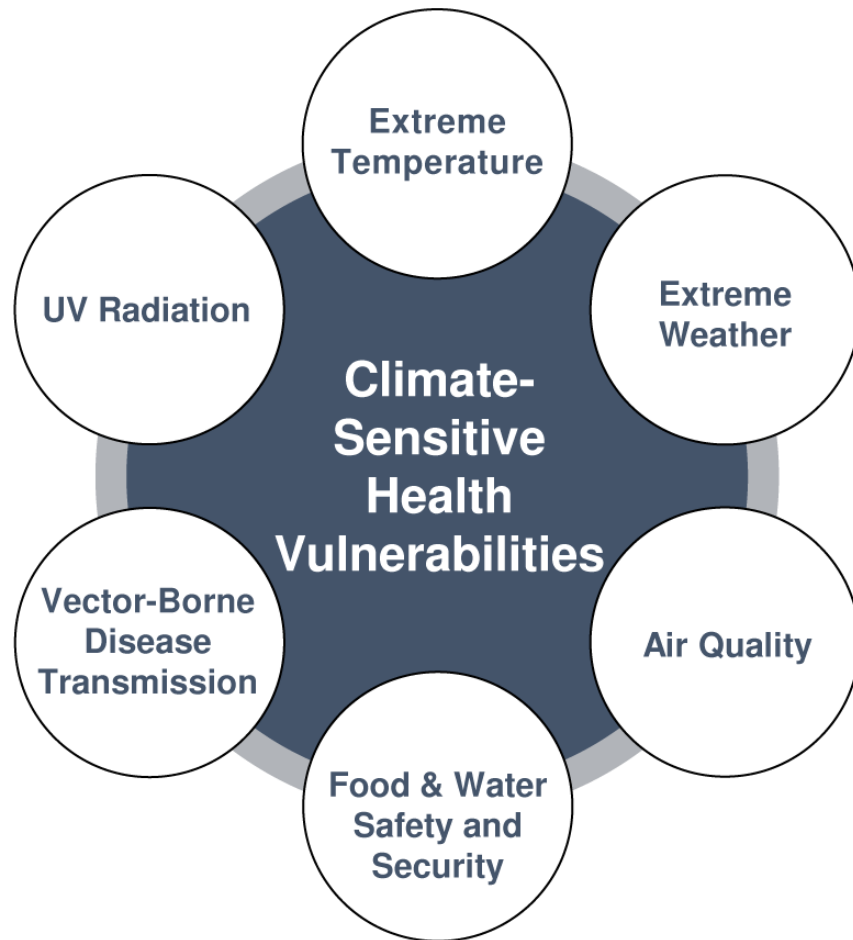
Boundaries of the Northern and Southern Regions of Simcoe Muskoka and Grid Points for Climate Projections

Legend

-  Climate Projection Grid Points
-  Highways
-  Northern Region
-  Southern Region



CLIMATE VULNERABILITIES IN SIMCOE MUSKOKA



Identified through:

- Literature Review
- Stakeholder consultation
 - MOHLTC & MOECC
 - Focus groups
 - Key informant interviews
 - Expert advisors
- Other Vulnerability Assessments
- A priori knowledge

DATA IDENTIFICATION

To describe **exposures**, **sensitivity** and **potential impacts** in the SMDHU population from climate-sensitive health vulnerability categories, data was required for:

- Current and projected local climate (i.e., temperature and precipitation);
- Current and projected population distributions;
- Current and historic prevalence of climate-sensitive health outcomes; and
- Prevalence of behaviors that modify the sensitivity to these climate sensitive health outcomes (e.g., sun safety behaviors).

DATA IDENTIFICATION & COLLECTION

External Data

Climate Projections, Census, Literature, Local Survey Data, ER visits

Internal Surveillance

VBD, Water Testing, Foodborne Illness

Stakeholder Engagement

22 Focus Groups
15 Key Informant Interviews

DATA SOURCES

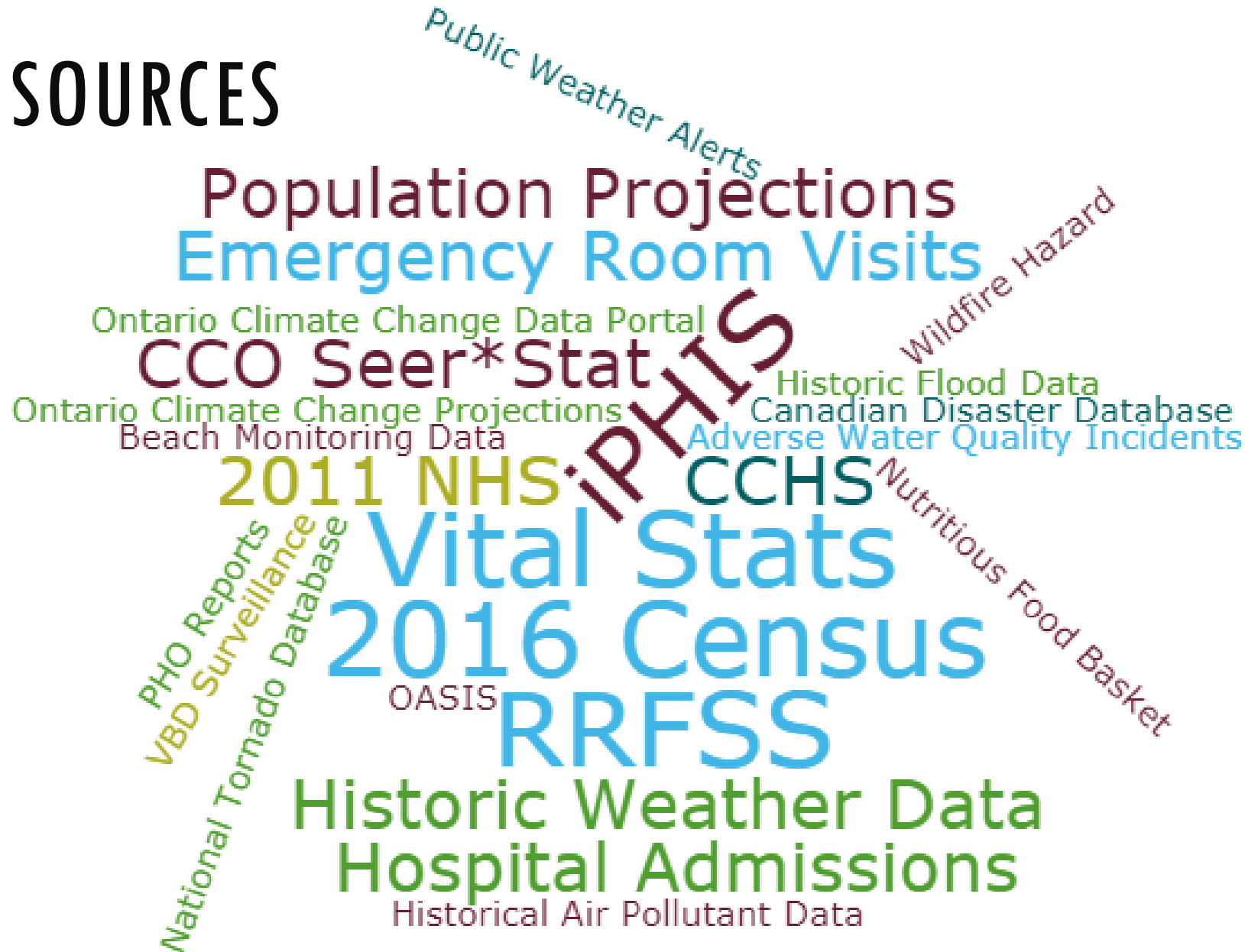


Table 2. Data types and associated sources included within the SMDHU climate change and health vulnerability assessment.

Data Type	Data Sources
Climate projections	Downscaled IPCC AR5 RCP8.5 projections [37] Local intensity-duration-frequency (IDF) curves using A1B emissions scenario [42] Projected ozone exceedances [28]
Historic climate data	Historical air quality data [43] Historical extreme weather events [44,45] Historical flood data [46,47] Historical weather data [48] Ice cover [49] Observed surface temperatures [50] Public weather alerts [51] Traffic-related air pollution [52] Wildfire risk [53]
Demographic data	2011 National Household Survey [54] 2016 Census of Population [55] Live births [56] Population estimates and projections [57,58]
Health data	Asthma prevalence [59] Canadian Community Health Survey [60] Cancer incidence, prevalence and mortality [61,62] Emergency room visits [63] Infectious diseases surveillance [64]
Risk and protective behaviors	Canadian Community Health Survey [60] Nutritious Food Basket Survey [65] Rapid Risk Factor Surveillance System [66]
Other data sources	Adverse water quality incidents [67] Beach monitoring data [68] Land use [69] Mosquito and tick surveillance [70]

CLIMATE PROJECTIONS

Climate Projections

Baseline (1990s)

- Near Future (2020s)

- Short Term Future (2050s)

- Long Term Future (2080s)

Ontario Climate Change Projections

Downscaled IPCC Projections
using RCP8.5

Ontario Climate Change Data Portal

A1B projections for Intensity-
Duration-Frequency (IDF
Curves)

BURDEN OF ILLNESS

Extreme Heat/Cold	<ul style="list-style-type: none">• ER visits
Air Quality	<ul style="list-style-type: none">• Asthma-related ER visits
Food and Waterborne Illness	<ul style="list-style-type: none">• Monthly average cases (associated with temperatures)• Number of outbreaks
Vector-Borne Disease	<ul style="list-style-type: none">• WNV incidence rate• Lyme disease incidence rate
UV exposure	<ul style="list-style-type: none">• Malignant melanoma incidence rate• Malignant melanoma mortality rate

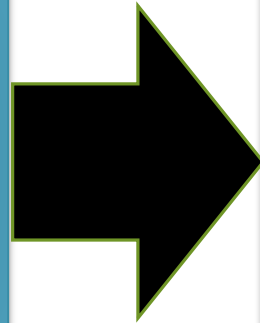
RESULTS



PROJECTED TEMPERATURES

↑ annual mean temperatures above baseline (1990s) by:

- 1°C (2020s)
- 3.5°C (2050s)
- 5.7°C (2080s)



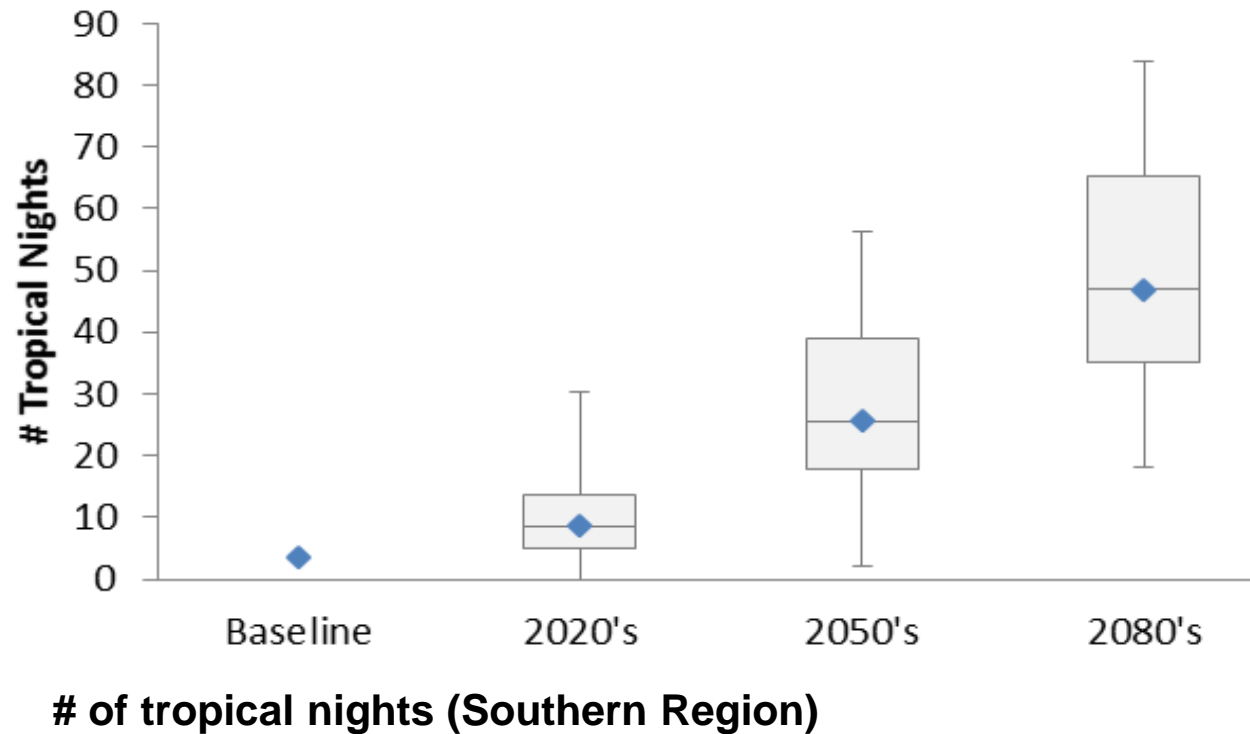
2020s
climate similar to Ohio

2050s
climate similar to Kentucky

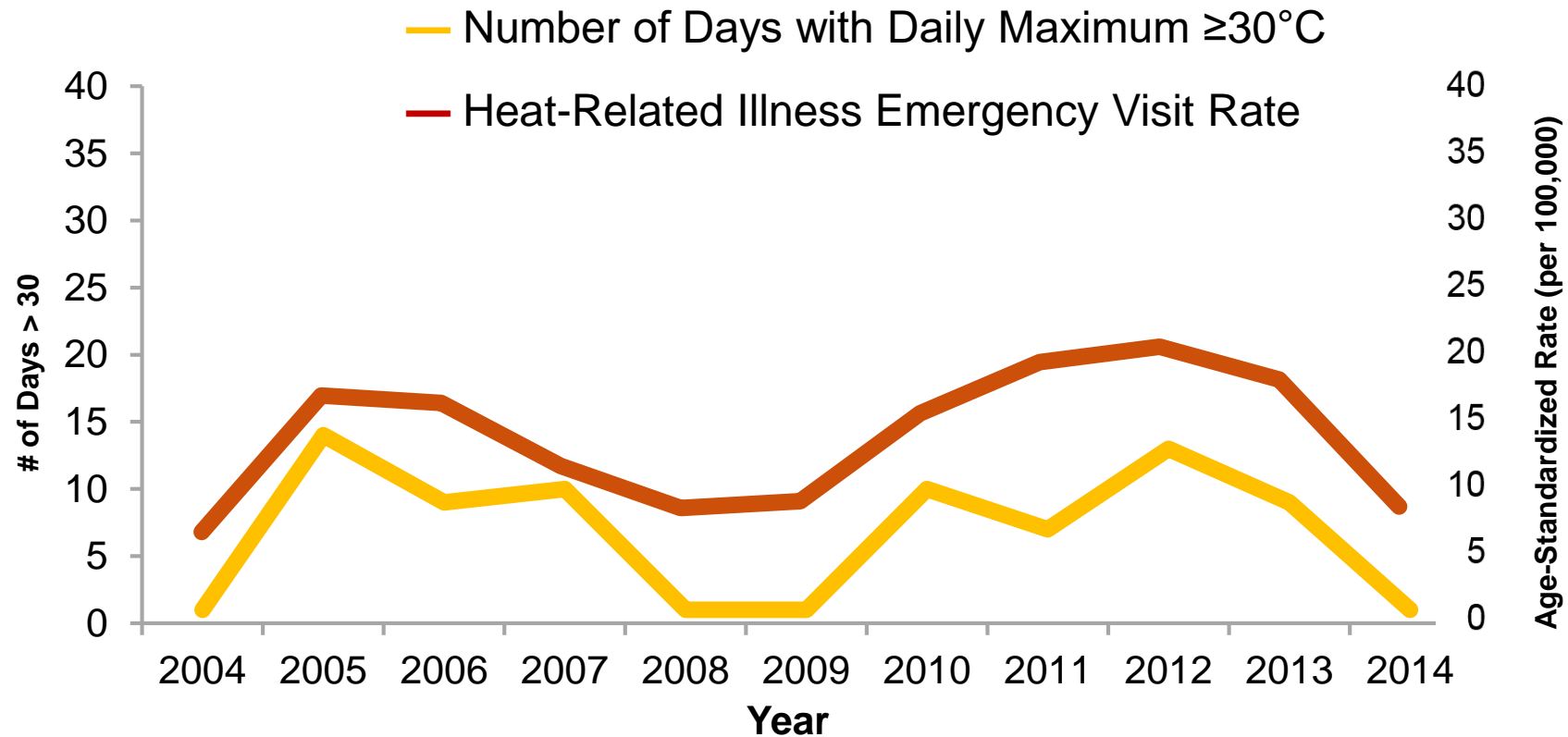
2080s
climate similar to Mississippi



CLIMATE PROJECTIONS — EXTREME HEAT



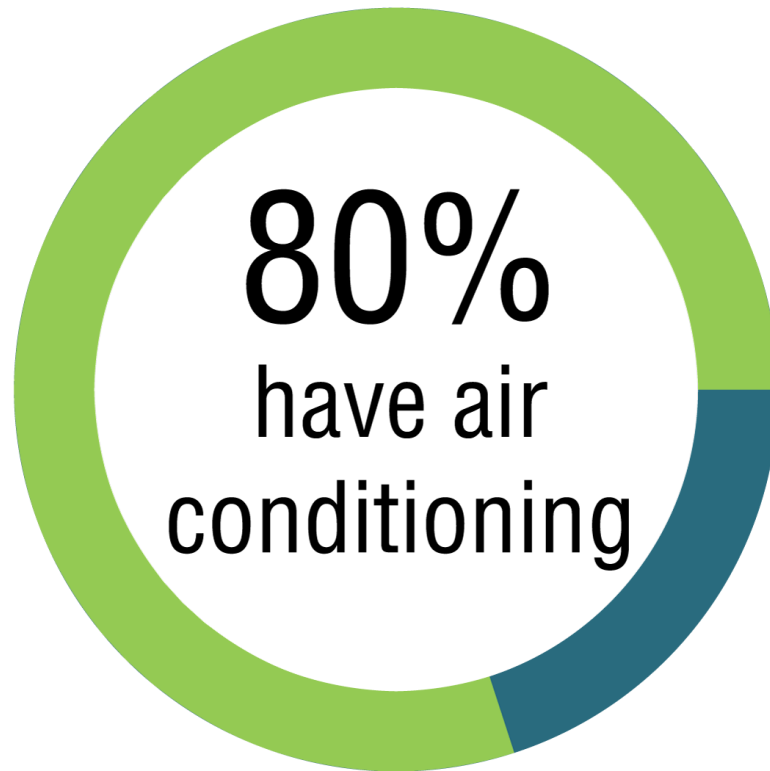
HEAT-RELATED ILLNESS



WHY DOES IT MATTER?

- Increased frequency and duration of heat waves
- Lack of respite
- Varying exposures
- More heat-related illness

AIR CONDITIONING



WHO IS MOST VULNERABLE?

- **Elderly**
- **Children**
- **Pregnant women**
- **Individuals with pre-existing illnesses**
- **Individuals living on low income**
- **Homeless and underhoused**
- **Individuals without social networks**



DISSEMINATION OF RESULTS

Communication of key findings to three priority groups:

- Health unit staff
- Provincial public health practitioners
- Local and municipal community stakeholders

Has led to:

- Increased **awareness** of local health impacts and community resiliency
- Supported enhanced **collaboration** including creation of adaptation plans and regional climate strategies
- Inclusion of climate change and health considerations in **public policy**



Int. J. Environ. Res. Public Health 2018, 15(10), 2237;
<https://doi.org/10.3390/ijerph15102237>

Development of a Climate Change Vulnerability Assessment Using a Public Health Lens to De-Local Health Vulnerabilities: An Ontario Health Experience

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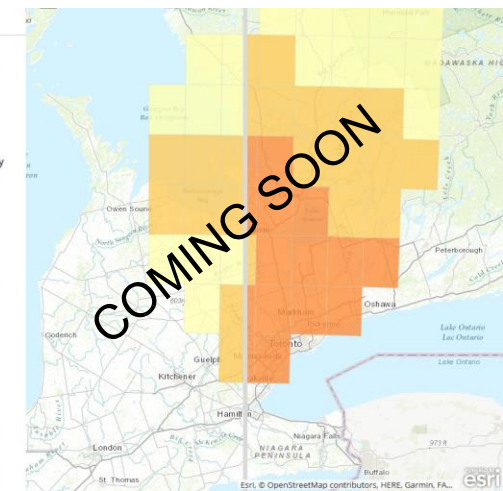
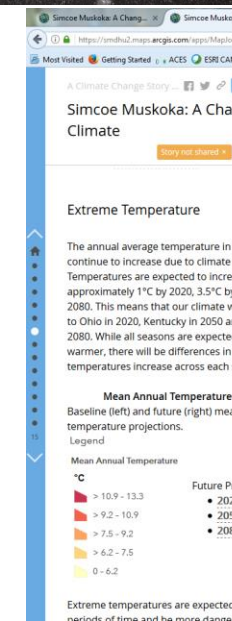
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 2018

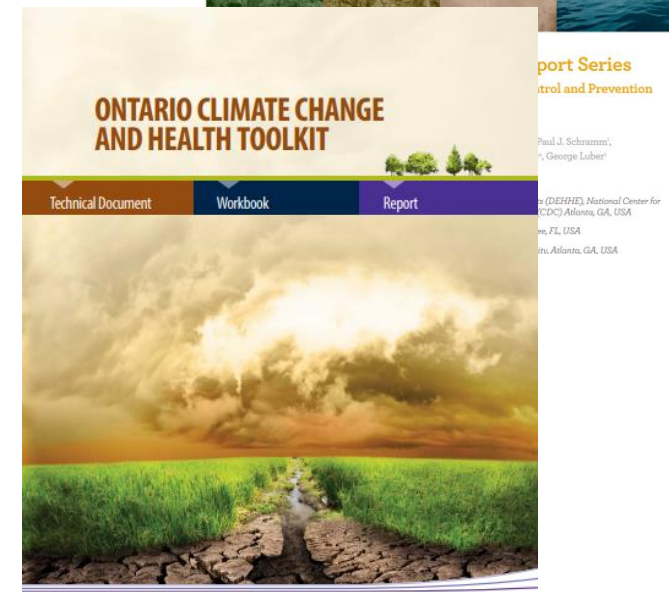
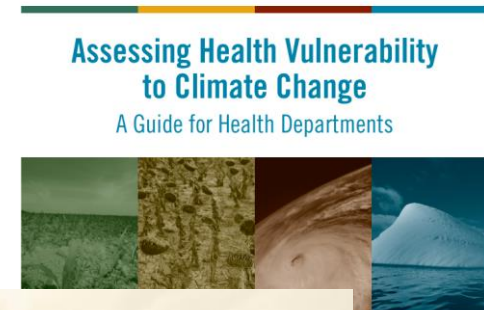
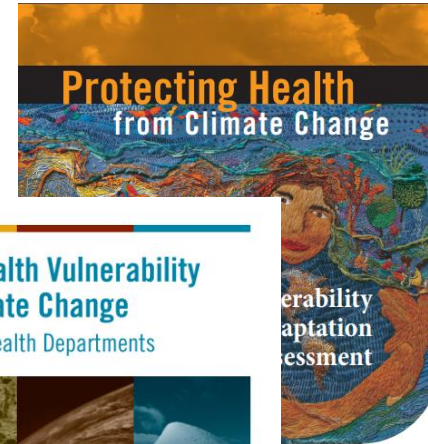
(This article belongs to the Special Issue Climate Change and Health Vulnerability and Assessments)

Full-Text | PDF [1172 KB, uploaded 12 October 2018] | Figures



CHALLENGES

- Lack of availability of provincial VA guidelines (at the time)
 - MOHLTC Toolkit
- Large learning curve
- Local data and research availability
- Need for internal capacity for understanding climate literature and models



LESSONS LEARNED

- Stakeholder consultation and focus groups helped to individualize VA for local needs and context
- Snowballing led to new ideas and key partnerships
- SMDHU already doing many activities that support adaptive capacity and enhance resiliency
- Supported the identification of local impacts (e.g., forest fires, bathing beaches, SDWS)



QUESTIONS?

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