National Collaborating Centre for Environmental Health

Centre de collaboration nationale en santé environnementale

www.ncceh.ca

Heat alert and response systems in Canada: A check-up on preparedness

Rebecca Goulding, MSc., Ph.D.

Environmental Health & Knowledge Translation Scientist

NCCEH webinar

June 26, 2025 - 12 PM PT

Land acknowledgement

I live, work, and play as a white settler and uninvited guest on the ancestral, unceded lands of the Coast Salish peoples, the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations, who have stewarded these lands for countless generations, and continue to do so.

Acknowledgements

- We acknowledge the funding and support provided by Health Canada to conduct this study. The views expressed herein do not necessarily represent the views of Health Canada.

- We would like to thank all the participants for their time and thoughtful contributions during the interviews, which informed this review.

- Thanks to Elizabeth Loftus, Barb Karlen, Jérémie Boudreault, Dr. Juliette O'Keeffe, and Dr. Sarah Henderson at the NCCEH.

Outline:

- Why extreme heat preparedness matters
- About Heat Alert and Response Systems (HARS)
- Findings from NCCEH review of HARS in Canada
- Q&A

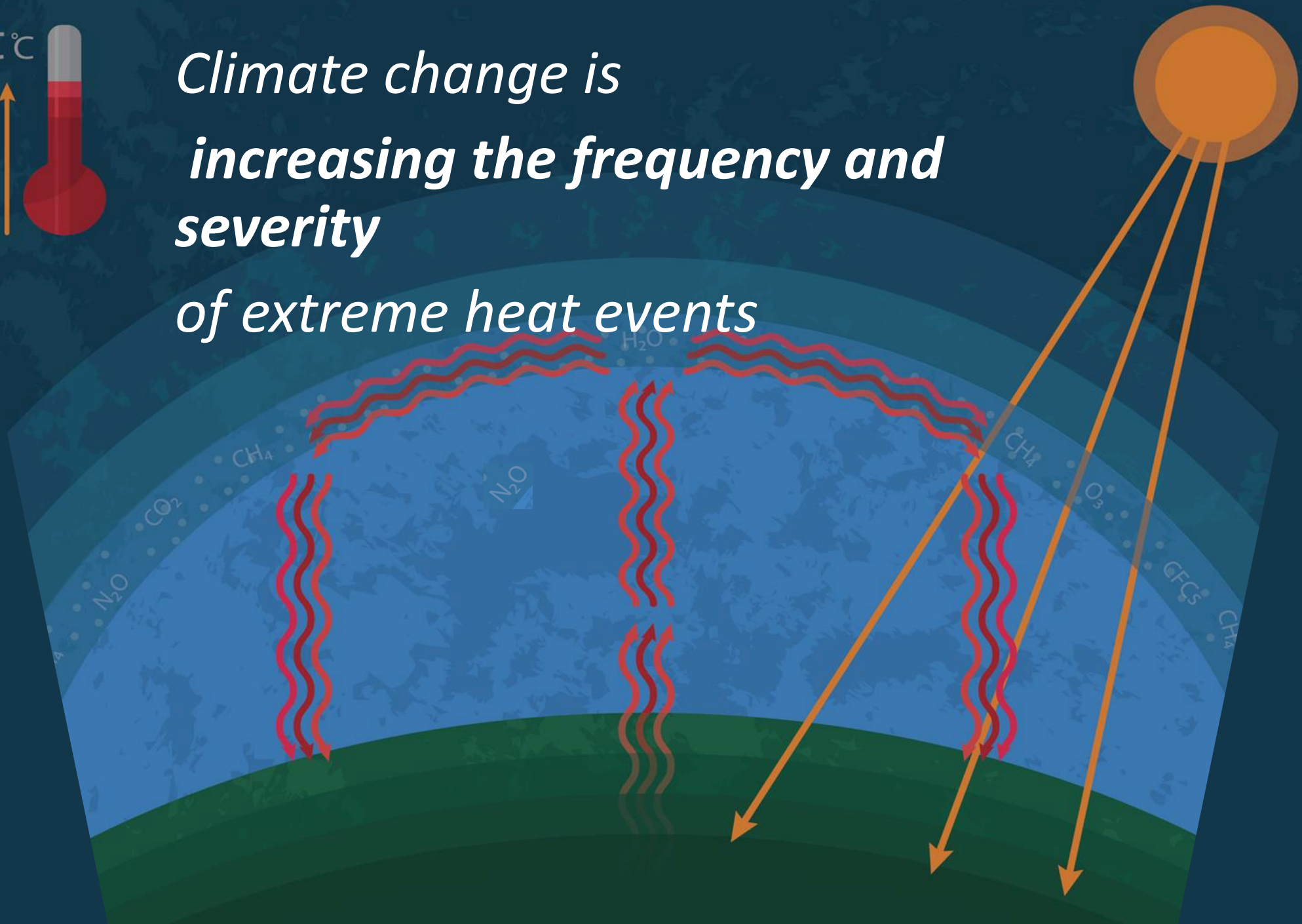
What kind of organization do you work/study at?

https://app.sli.do/event/fLLTzhhQ2ADDtLYfNQf36X

Climate change is

increasing the frequency and severity

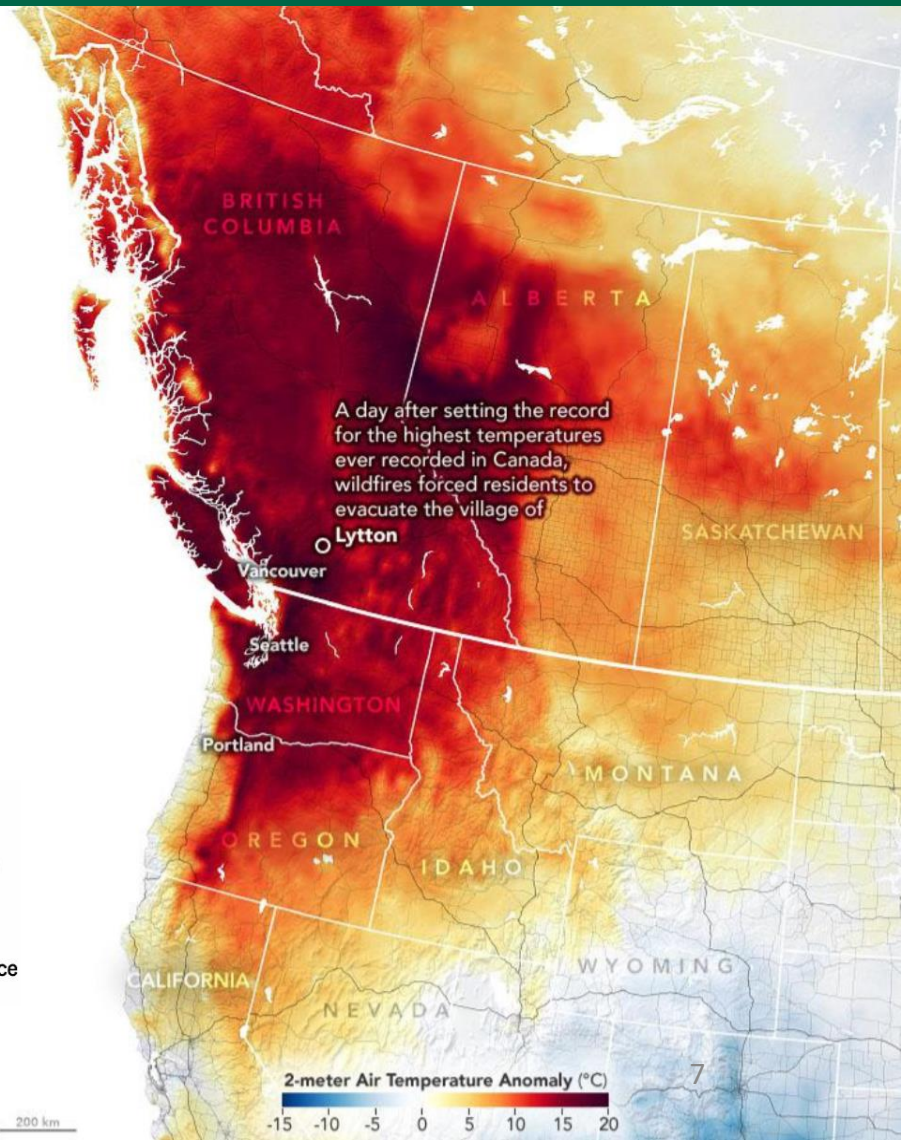
of extreme heat events



Extreme heat is a public health priority

2021 Heat Dome in BC

- 619 deaths
- 98% deaths caused by indoor heat injury in a residence
- 67% were over 70 yrs
- 90% were over 60 yrs
- >50% lived alone



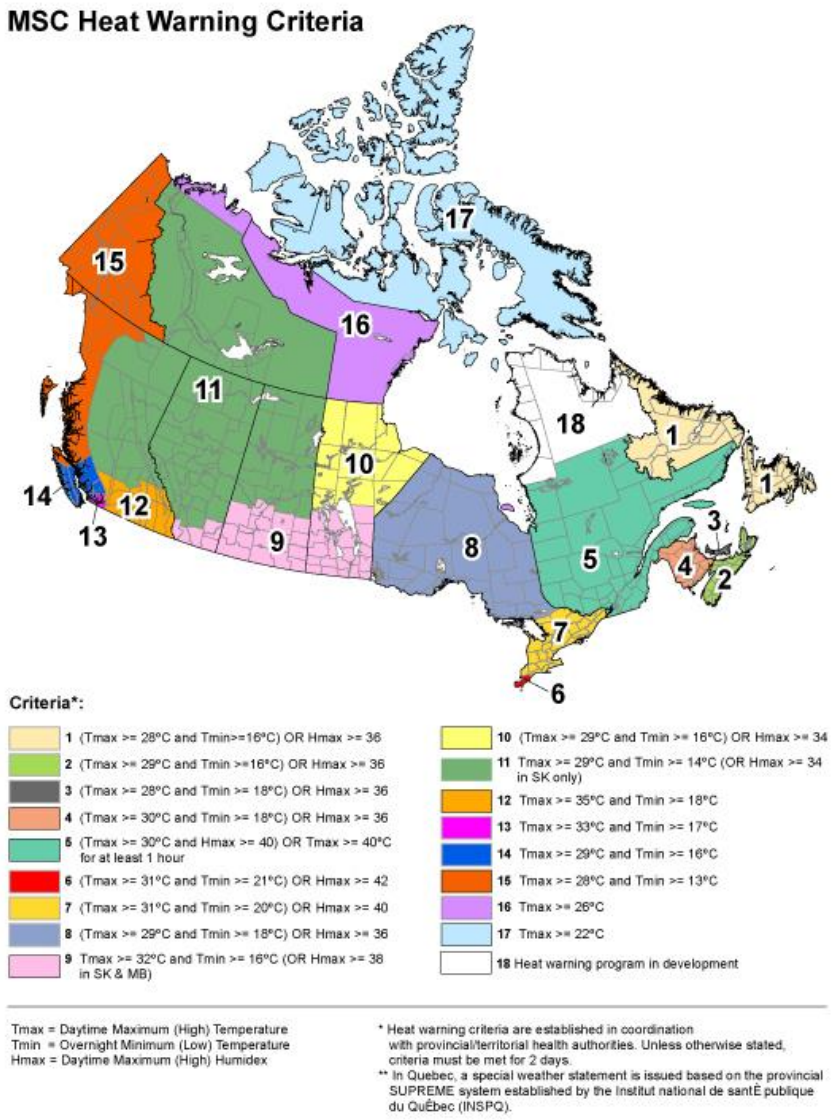
Source: BC Coroner's Service; Extreme Heat Death Review Panel Report, June 2022

Why does extreme heat preparedness matter?

- Heat can be deadly
- Health impacts are often widespread - not localized
- Risk of exposure is increasing due to climate change
- Preparedness reduces harm and builds resilience

Heat warning – a response to a forecast

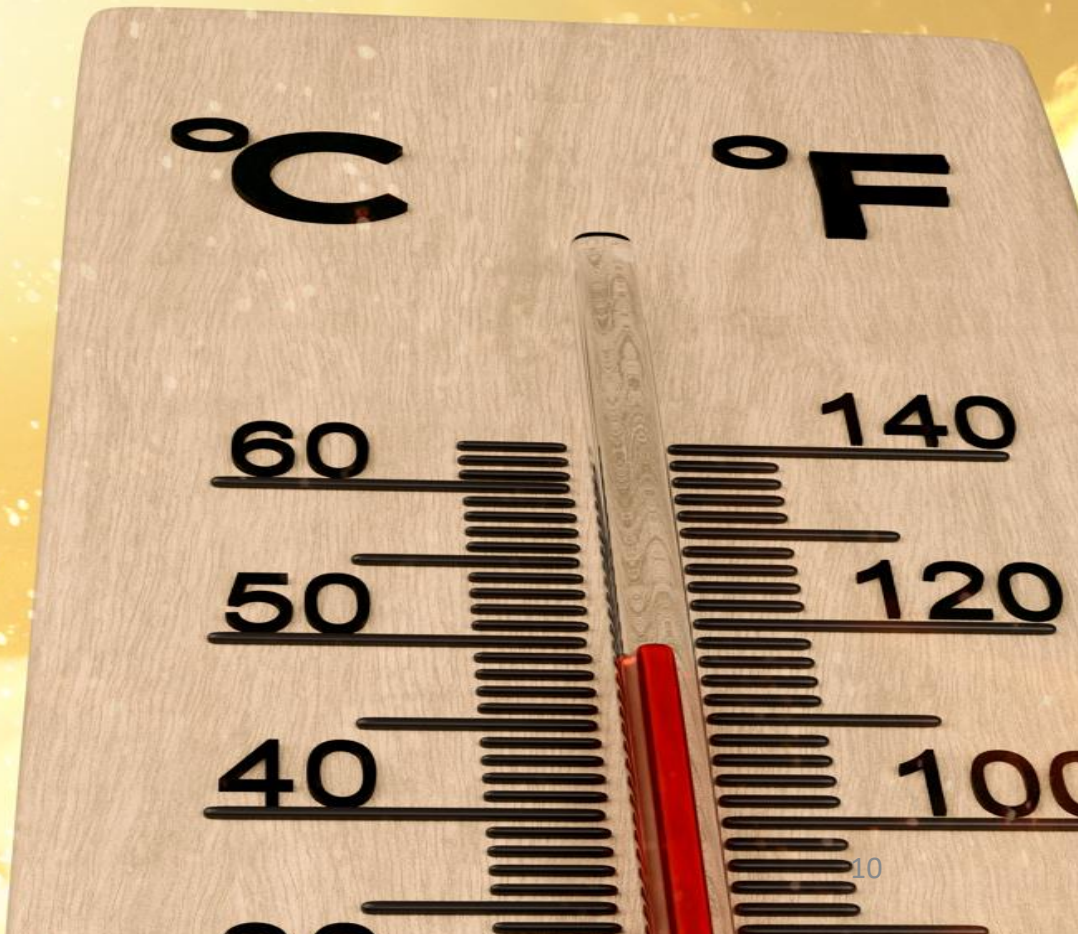
- An official alert issued by Environment and Climate Change Canada (ECCC).
- When specific temperature/humidex thresholds are forecast to be met or exceeded for at least 2 days (region-dependent).
- Triggers public health responses, such as opening cooling centers or issuing public guidance.



Source: Criteria for public weather alerts - Canada.ca

Extreme heat event – a meteorological phenomenon

- A prolonged period (+2 days) of unusually high temperatures, often combined with high humidity.
- Daytime/nighttime temperatures are significantly above the historical average for a given location, rise day over day.
- The impacts are often broader: health effects, infrastructure strain, wildfires, power outages, etc.

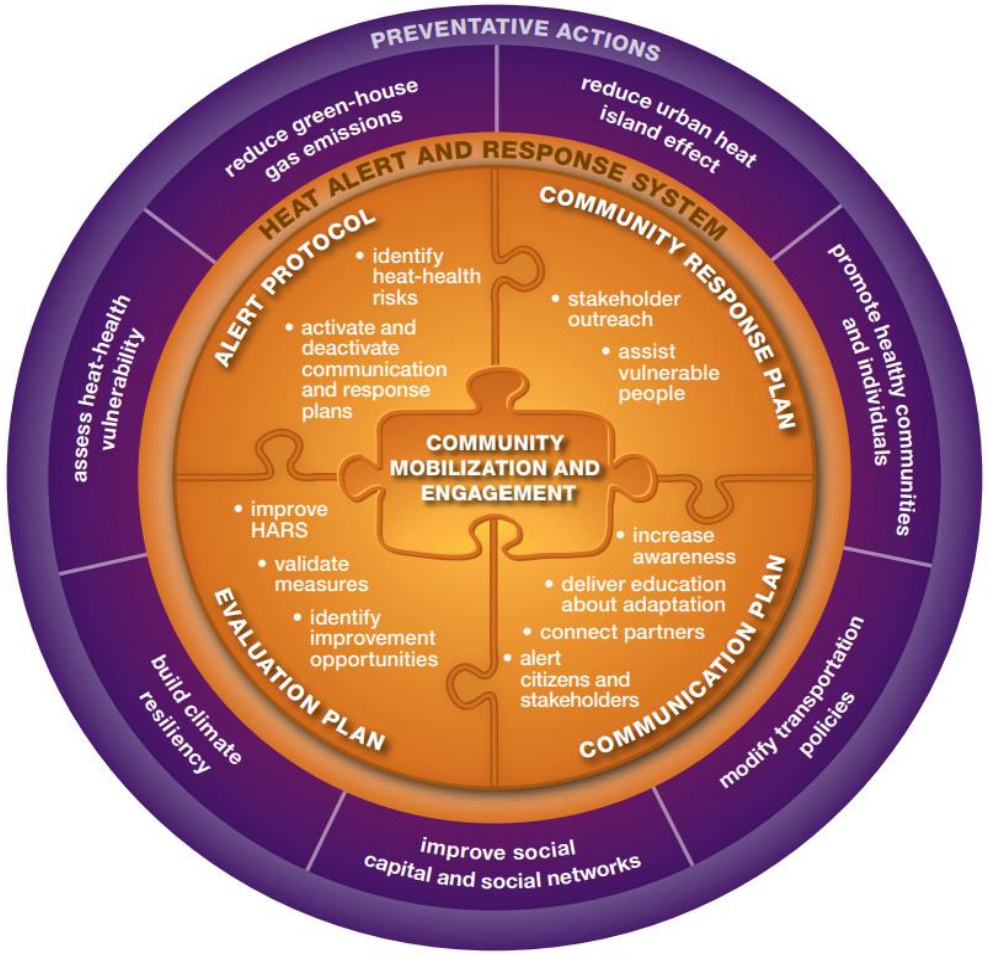


What is a Heat Alert and Response System?

- A comprehensive coordinated adaptation approach to protect public health during extreme heat events.
- Public health and emergency management officials, community health and social service providers, etc.,
- Working together to prepare for, and respond to, dangerous heat.
- Goal: to reduce the health risks associated with extreme heat, particularly for susceptible populations.

Source: Heat Alert and Response Systems to Protect Health: Best Practices Guidebook

HARS best practices guidebook



- **HARS core elements**
  - Community mobilization and engagement pre-season
  - Alert protocol
  - Communication plan
  - Community response plan
  - Evaluation plan

Source: Heat Alert and Response Systems to Protect Health: Best Practices Guidebook

What organizations are involved?

Federal Government

- ECCC
- Health Canada
- Other departments as needed

Provincial/ Territorial Government

- Ministry of Health
- Ministry of Emergency Management
- Public Health Units/Health Authorities
- Emergency Management Offices
- Housing, Infrastructure, and Social Services

Indigenous Governance

- First Nations, Inuit, and Métis Leadership;
- Indigenous government organizations (health/ emergency management)

Municipal/Local /Regional Governments

- Public Health Departments
- Emergency Services (fire, police, EMS)
- Community and Social Services
- Parks and Recreation / Facilities

Community partners

- Community partners
- Nonprofits
- Faith based

HARS core components

	**Community mobilization & engagement**	• Coordinating agency prepares the community before the heat season • Identifies community needs, recruits partners, and develops plans to implement a HARS	FG IG PG LG CP
	**Alert protocol**	• Protocol identifies weather conditions that could result in increased morbidity and mortality in the region. • Protocol is used to alert the public, as well as government officials and partners, who then take pre-determined actions to protect	FG IG PG LG
	**Communication plan**	• Raises awareness about the impacts that heat may have on health • Provides advice through media releases, interviews, and websites on how to reduce health risks.	FG IG PG LG CP
	**Community response plan**	• Facilitates actions by individuals to protect themselves during periods of extreme heat by directing public health interventions aimed at reaching at risk individuals who require assistance.	IG PG LG CP
	**Evaluation plan**	• Assesses HARS activities and facilitates improvements. • Aims to evaluate implemented measures - are they timely, relevant, effective, meet local priorities, and contribute to the reduction of health impacts.	FG IG PG LG CP

*"A HARS is most effective when it is delivered in conjunction with preventative actions that provide **long-term and sustainable protection** from extreme heat events."*

Source: Heat Alert and Response Systems to Protect Health: Best Practices Guidebook

HARS Stocktake – Key questions

- What HARS/HARS plans are in place across health authorities and provinces/territories in Canada?

- What **challenges and barriers** exist that impede development, improvement, or implementation of HARS/HARS plans?

- What **opportunities or solutions** may help to address these challenges and barriers?

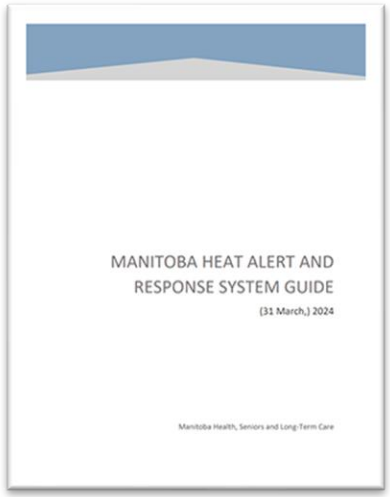
Health authorities in Canada

Project mixed methods

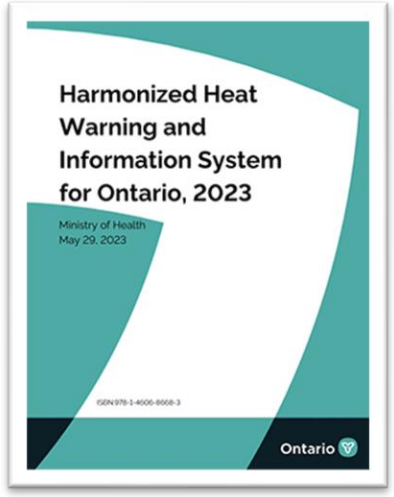
- Web searches
- Surveys
- 45 key informant interviews – semi structured
  - Responses were analyzed in aggregate and reported anonymously.
  - Common themes across interviewees were identified, noting the frequency and additional relevant context.

Web search results – HARS at the P/T level

BC



Manitoba

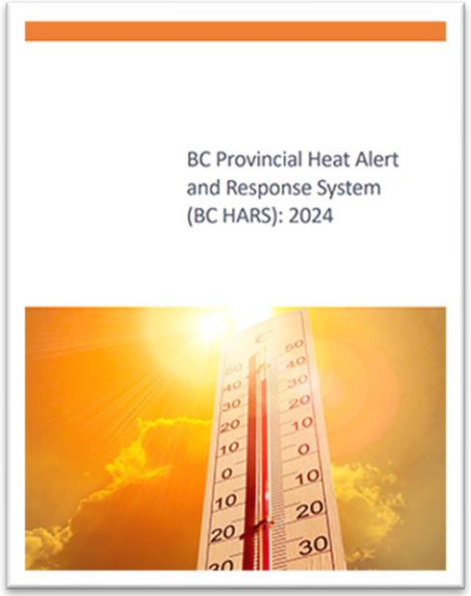


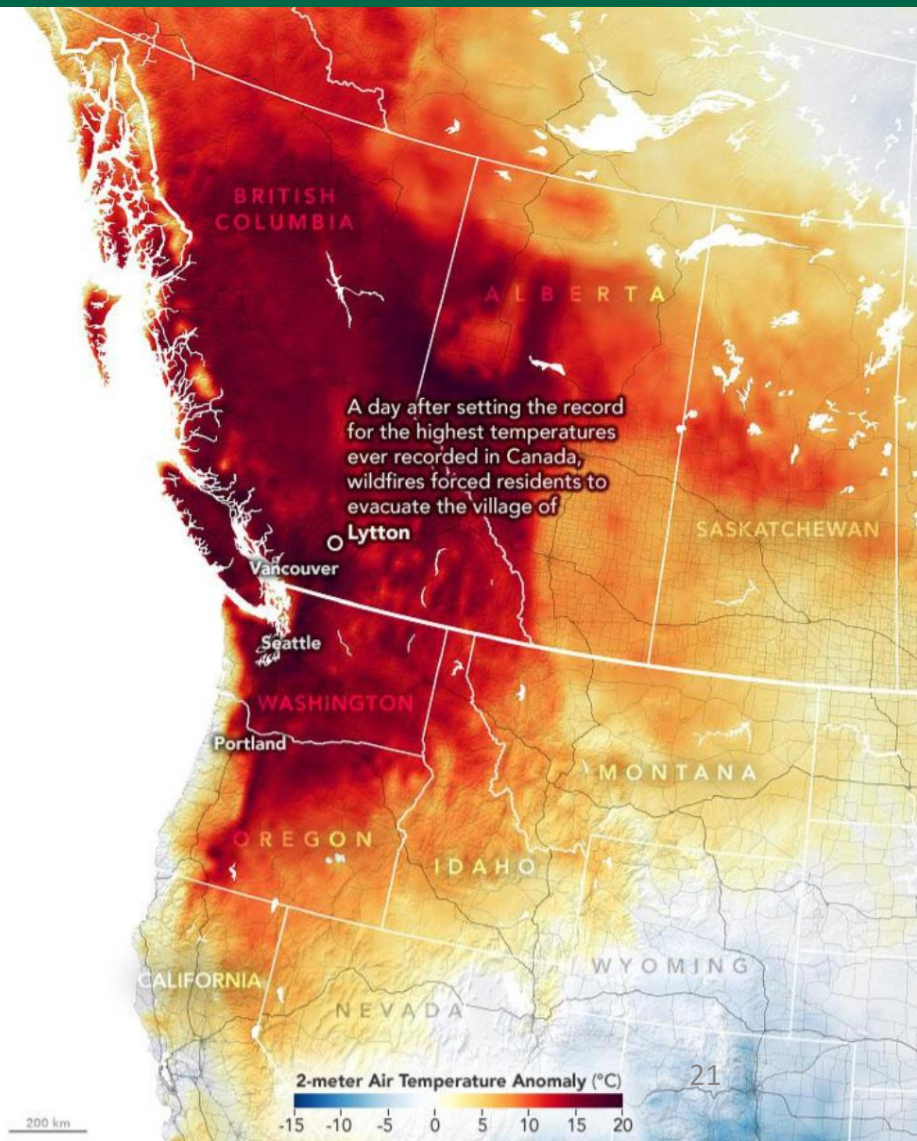
Ontario

Quebec

BC HARS – BC HEAT

- **BC Health Effects of Anomalous Temperatures (HEAT)** Coordinating Committee
  - Led by BC Centre of Disease Control & BC Ministry of Health
  - Health Emergency Management BC (**HEMBC**; house in PHSA)
  - Emergency Management BC (EMBC) (provincial lead agency) and the Ministry of Emergency Management & Climate Readiness (**EMCR**)
  - Environment and Climate Change Canada (**ECCC**)
  - Provincial Health Services Authority (**PHSA**) and Regional Health Authorities
  - Union of BC Municipalities (**UBCM**)





BC HARS – BC HEAT

Tiered alert system

Table 2: Description, Criteria, and Triggers of BC HARS

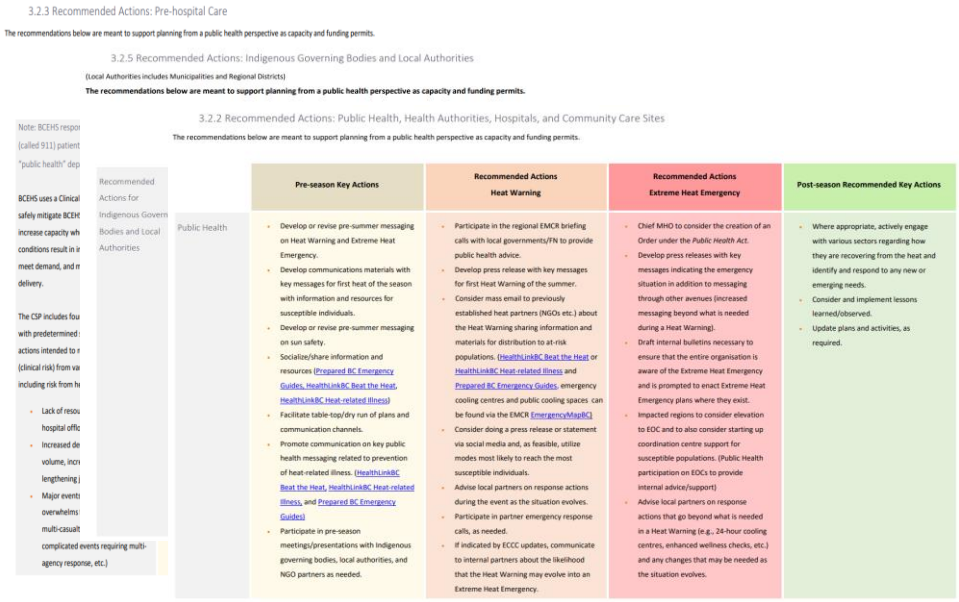
Type of alert	Heat Warning*	Extreme Heat Emergency
Public health risk	Moderate (5% increase in mortality)	Very high (20% or more increase in mortality)
Descriptor	Very hot	Dangerously hot
Historic frequency	1-3 per summer season	1-2 per decade
Criteria (See Table 1 for a description of the geographical regions that fall under the five ECCC defined heat zones that B.C. is divided into)	Southwest = 29-16-29** Fraser/Southwest Inland = 33-17-33** Southeast = 35-18-35** Northeast = 29-14-29** Northwest = 28-13-28**	Heat Warning criteria have been met, and forecast indicates that daily highs will substantively increase day-over-day for three or more consecutive days

*As of May 2023—After the first three heat events of the summer in a given forecast region, the BC HEAT Committee may recommend extending the minimum number of days for Heat Warning criteria in the region to be when three or more consecutive daytime high temperatures are expected to meet or exceed the regional Tmax value and the overnight low is expected to reach or exceed the regional Tmin value for two or more consecutive nights.

* As of May 2024—For the first hot weather event (in May or early June), ECCC may issue a public-facing Special Weather Statement (SWS) at temperatures lower than the Heat Warning thresholds. The criteria for an Extreme Heat Emergency remain unchanged.

**°C Tmax ≥ daytime high, Tmin ≥nighttime high, Tmax ≥ daytime high (high - low - high)

Tables of key messages and recommended actions across organizations



3.2.3 Recommended Actions: Pre-hospital Care

The recommendations below are meant to support planning from a public health perspective as capacity and funding permits.

3.2.5 Recommended Actions: Indigenous Governing Bodies and Local Authorities

(Local Authorities includes Municipalities and Regional Districts)

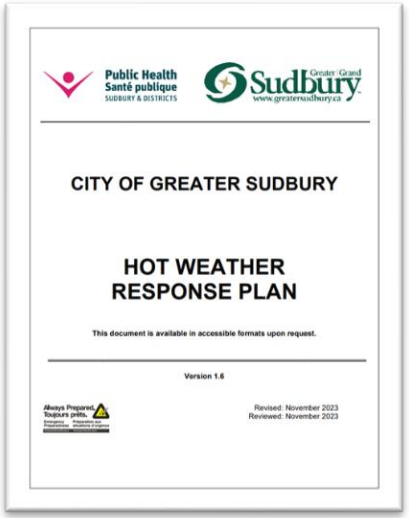
The recommendations below are meant to support planning from a public health perspective as capacity and funding permits.

3.2.2 Recommended Actions: Public Health, Health Authorities, Hospitals, and Community Care Sites

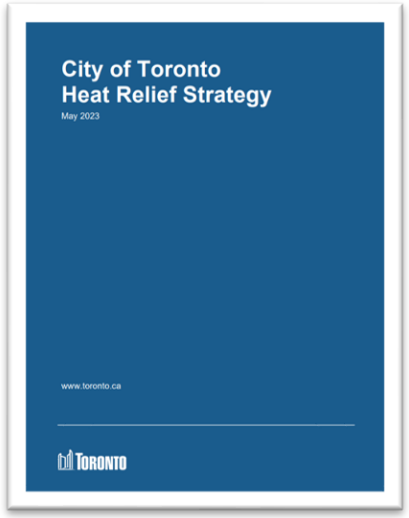
The recommendations below are meant to support planning from a public health perspective as capacity and funding permits.

	Pre-season Key Actions	Recommended Actions Heat Warning	Recommended Actions Extreme Heat Emergency	Post-season Recommended Key Actions
Public Health	• Develop or revise pre-summer messaging on Heat Warning and Extreme Heat Emergency. • Develop communications materials with key messages for first heat of the season with information and resources for susceptible individuals. • Develop or revise pre-summer messaging on sun safety. • Socialize/share information and resources (Prepared BC Emergency Guides, HealthLinkBC Beat the Heat, HealthLinkBC Heat-related Illness) • Facilitate table-top/dry run of plans and communication channels. • Promote communication on key public health messaging related to prevention of heat-related illness. (HealthLinkBC Beat the Heat, HealthLinkBC Heat-related Illness, and Prepared BC Emergency Guides) • Participate in pre-season meetings/presentations with Indigenous governing bodies, local authorities, and NGO partners as needed.	• Participate in the regional EMCR briefing calls with local governments/FN to provide public health advice. • Develop press release with key messages for first Heat Warning of the summer. • Consider mass email to previously established heat partners (NGOs etc.) about the Heat Warning sharing information and materials for distribution to at-risk populations. (HealthLinkBC Beat the Heat or HealthLinkBC Heat-related Illness and Prepared BC Emergency Guides, emergency cooling centres and public cooling spaces can be found via the EMCR EmergencyMapBC) • Consider doing a press release or statement via social media and, as feasible, utilize modes most likely to reach the most susceptible individuals. • Advise local partners on response actions during the event as the situation evolves. • Participate in partner emergency response calls, as needed. • If indicated by ECCC updates, communicate to internal partners about the likelihood that the Heat Warning may evolve into an Extreme Heat Emergency.	• Chief MHO to consider the creation of an Order under the *Public Health Act*. • Develop press releases with key messages indicating the emergency situation in addition to messaging through other avenues (increased messaging beyond what is needed during a Heat Warning). • Draft internal bulletins necessary to ensure that the entire organisation is aware of the Extreme Heat Emergency and is prompted to enact Extreme Heat Emergency plans where they exist. • Impacted regions to consider elevation to EOC and to also consider starting up coordination centre support for susceptible populations. (Public Health participation on EOCs to provide internal advice/support) • Advise local partners on response actions that go beyond what is needed in a Heat Warning (e.g., 24-hour cooling centres, enhanced wellness checks, etc.) and any changes that may be needed as the situation evolves.	• Where appropriate, actively engage with various sectors regarding how they are recovering from the heat and identify and respond to any new or emerging needs. • Consider and implement lessons learned/observed. • Update plans and activities, as required.

Web search results – HA associated

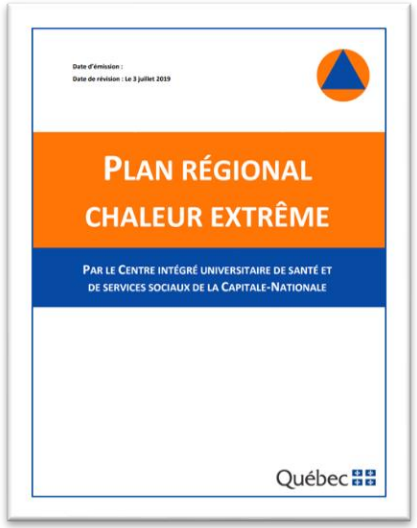


Sudbury



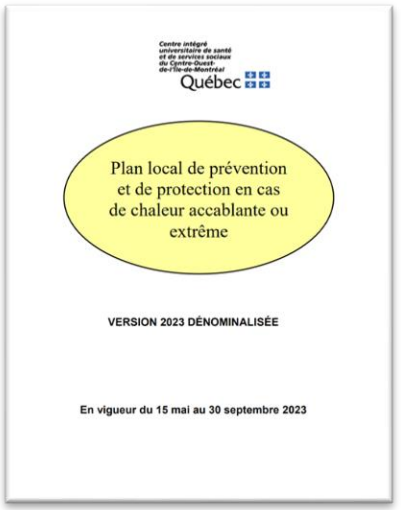
Toronto

Laurentians



Quebec City

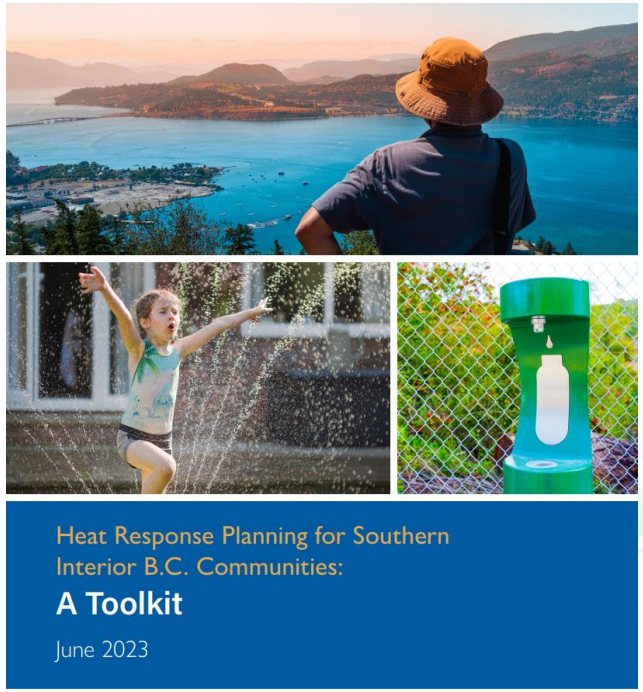
West Island Montreal



West-Central Montreal

Also in the report…

- *Examples of publicly available extreme heat resources shared by PT governments and health authorities*

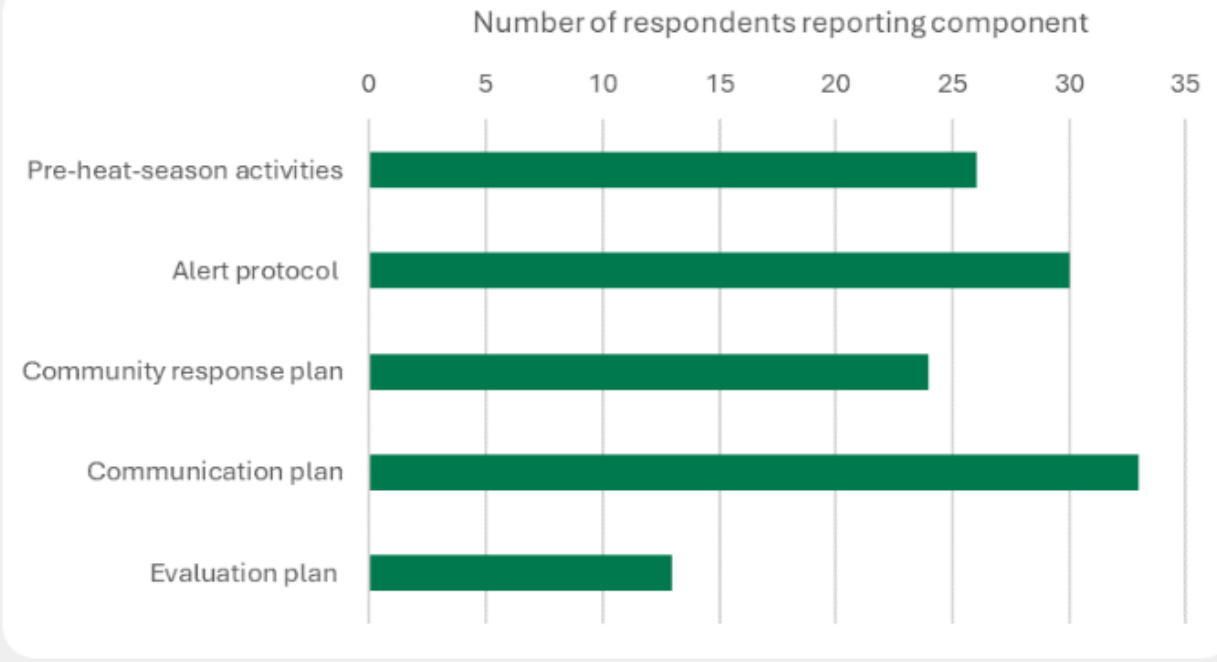


Surveys

- Ontario pilot survey
- Pan-Canadian survey
- Types of questions we asked:
  - Do you have HARS plans?
  - What core components are covered by your HARS plans?
    - What kinds of activities do you carry out during extreme heat events?

Core components represented in HARS plans (Combined surveys; N = 38 organizations)

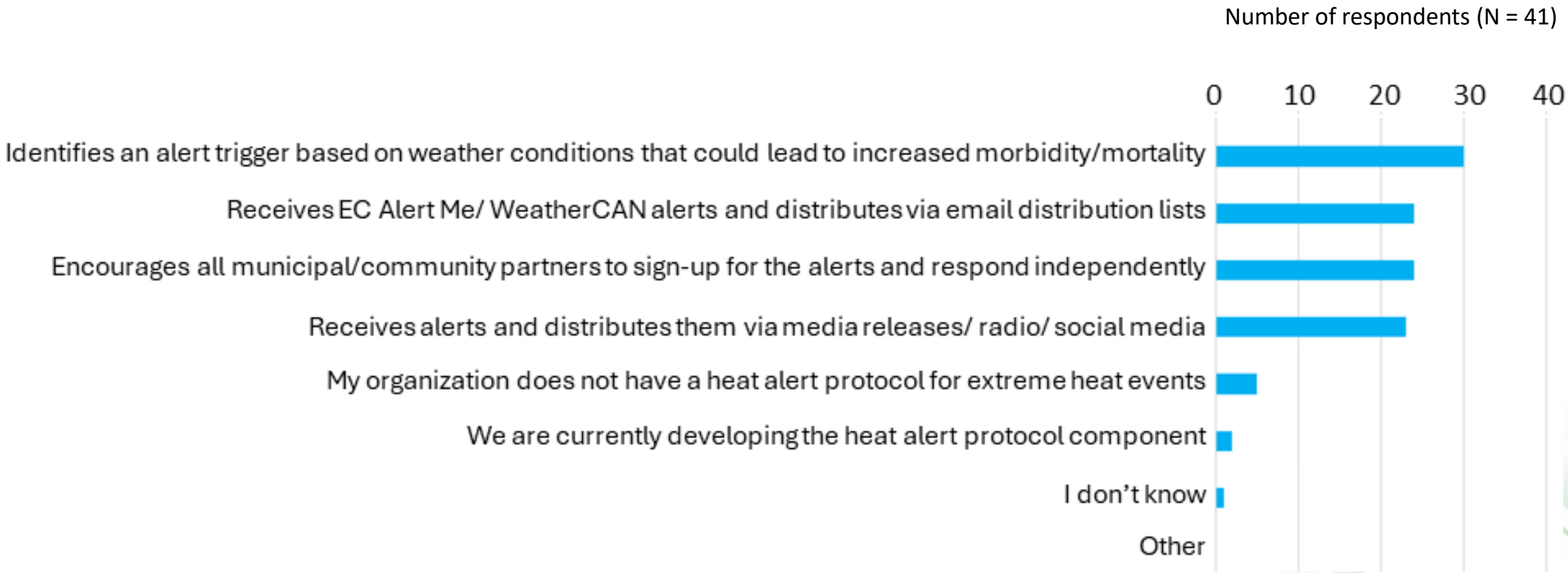
- 70% of respondents (48/66) reported that their organizations had existing HARS plans
- 38 health authorities, emergency management organizations, and provincial/territorial governments.



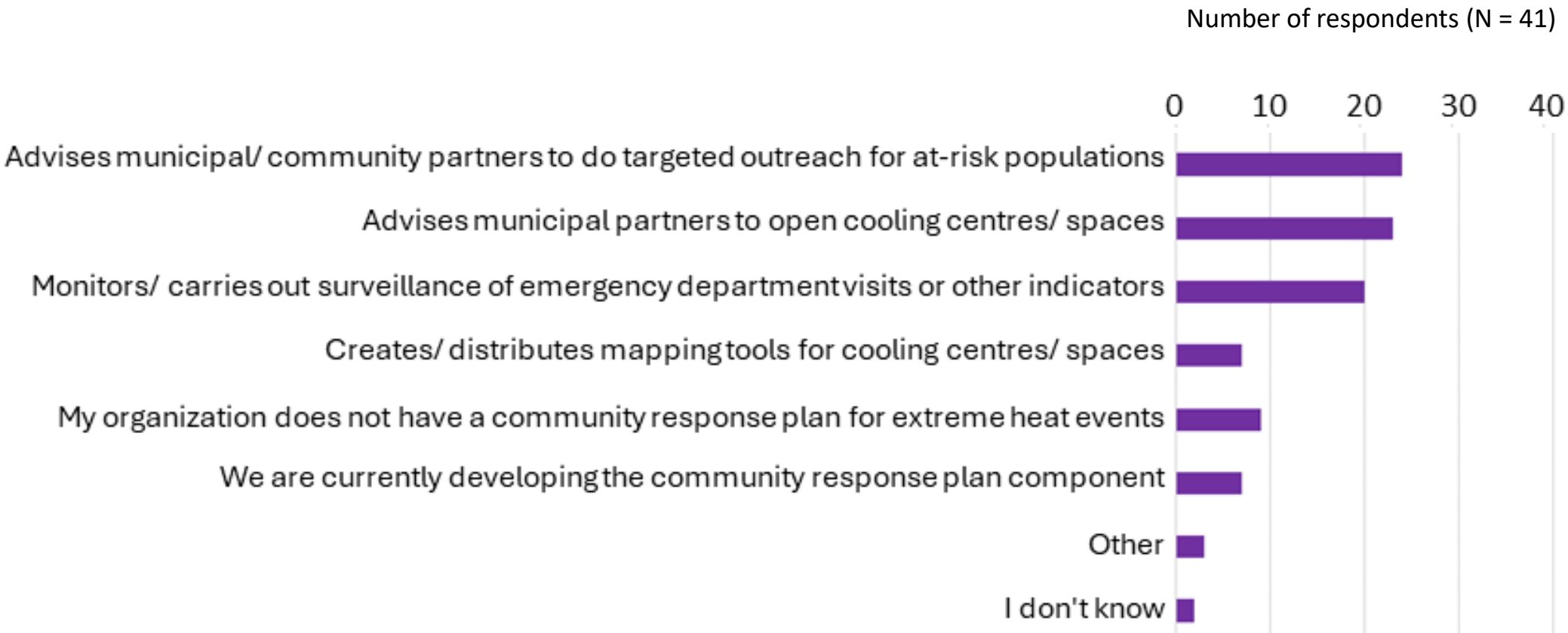
Notes: N refers to 38 health authority, emergency management, and provincial/territorial government organizations across Canada who responded in the surveys; "pre-heat-season activities" refers to community mobilization and engagement implemented prior to when the heat season begins, typically before April or May in many parts of Canada.

Pre-season activities

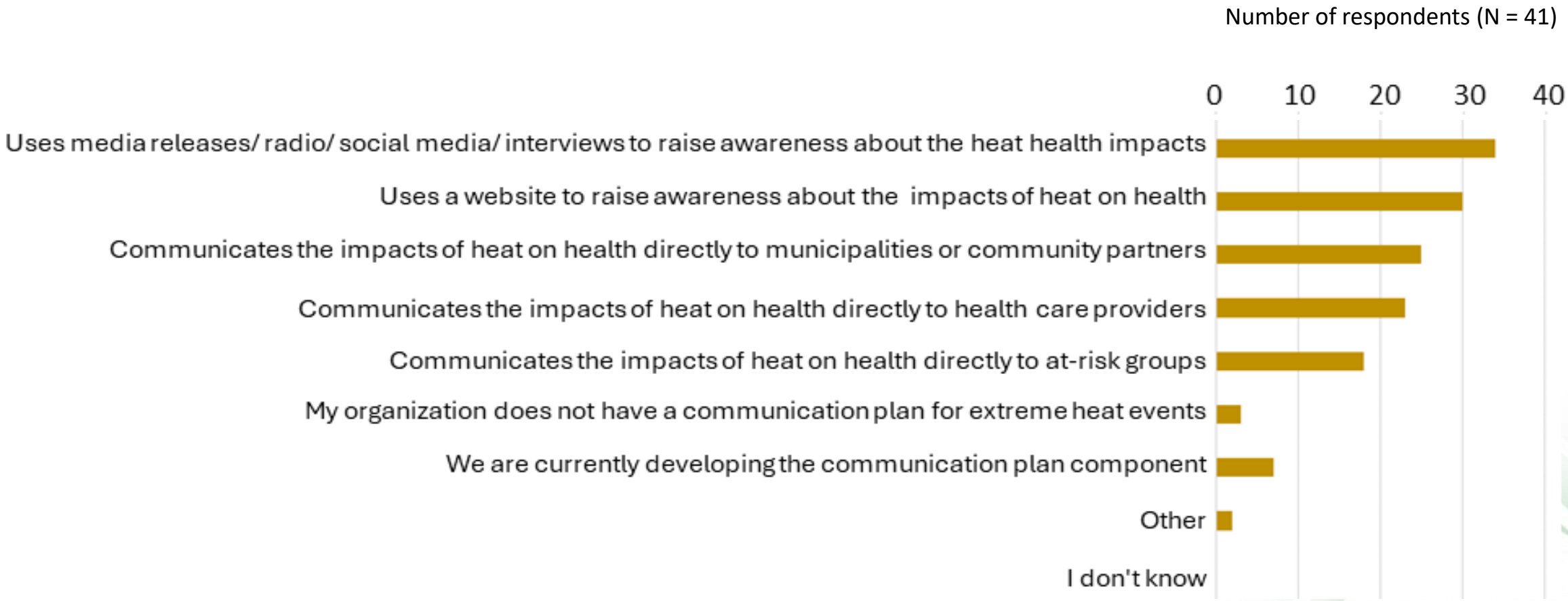
Alert protocol



Community response plan

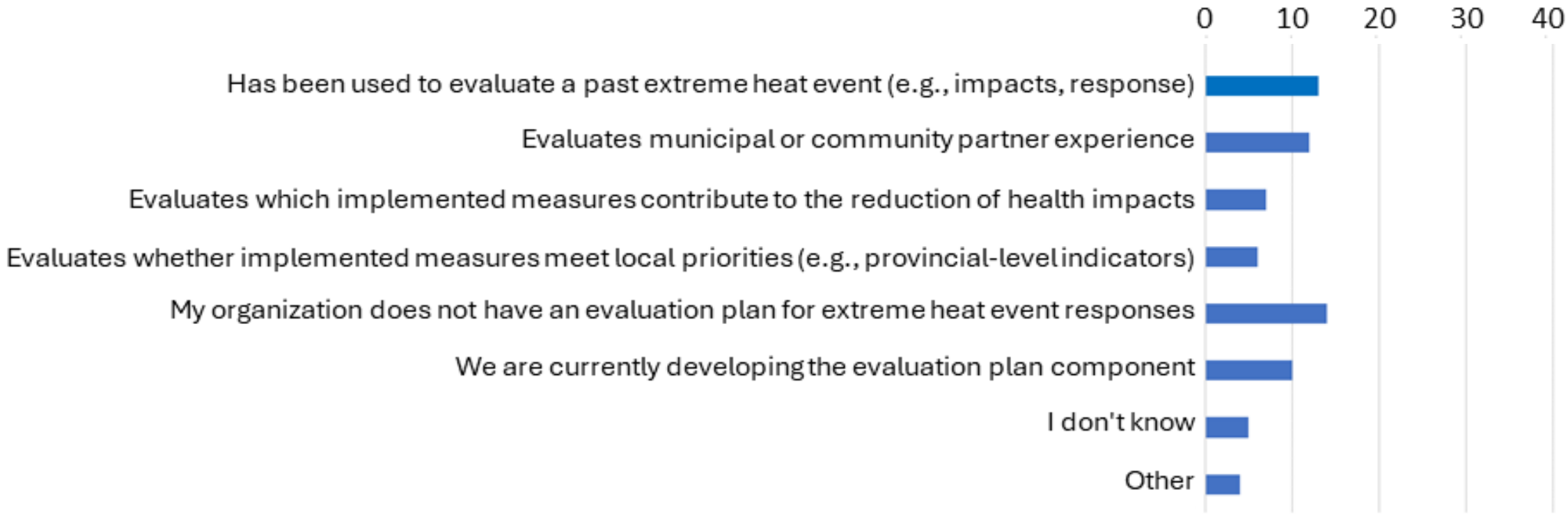


Communication plan



Evaluation plan

Number of respondents (N = 41)



Interviews

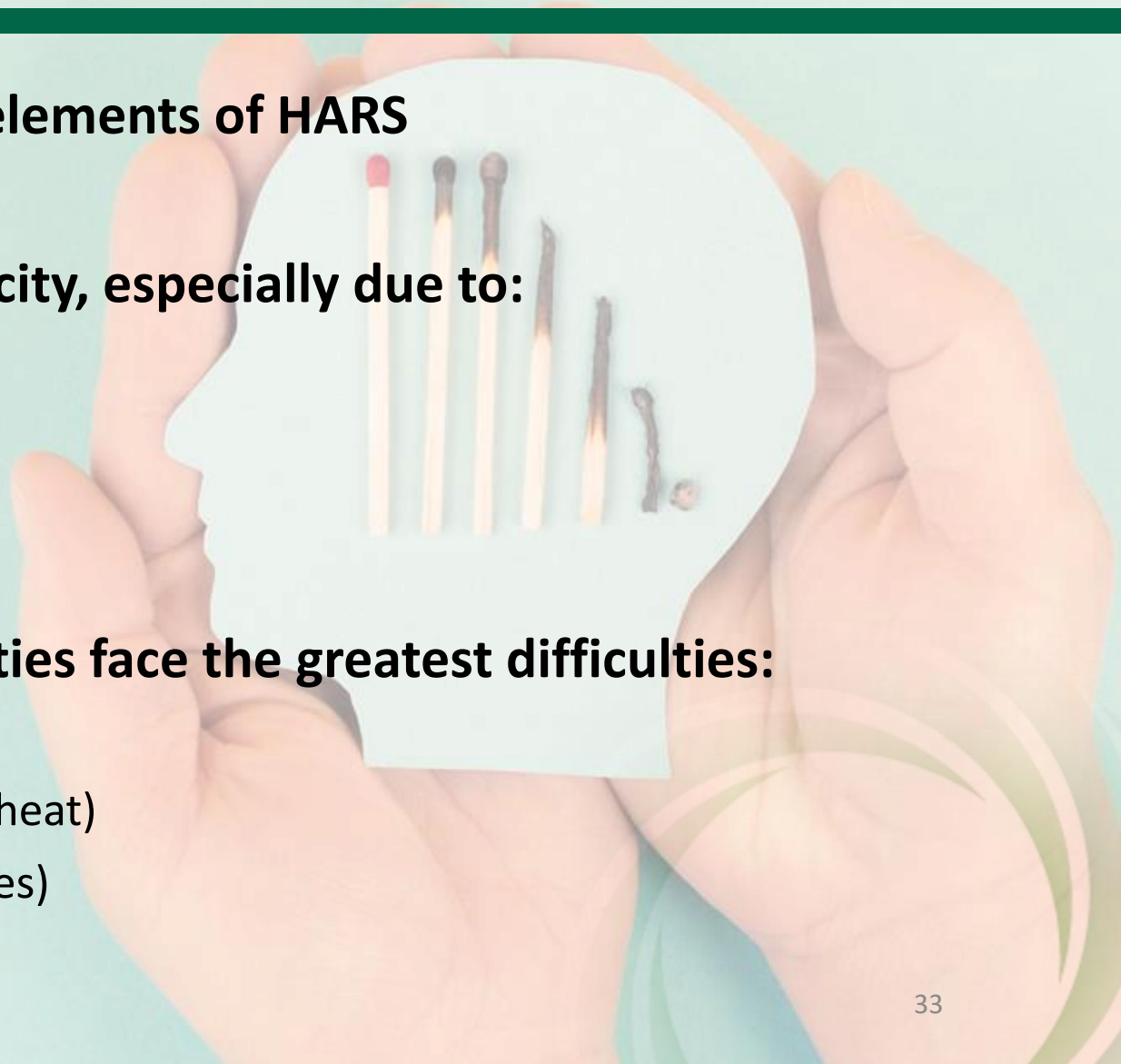
- 36 key informant interviews (33 in English and 3 in French) with 45 individuals from health authorities, emergency management organizations, and PT governments
- Semi-structured - questions focusing on **challenges and solutions** with developing and implementing HARS
- A lot of good work being done on HARS!

Limited capacity and resources

- **Lack of capacity and funding impact all elements of HARS**

- **Many municipalities lack sufficient capacity, especially due to:**
  - Limited staff and resources
  - High staff turnover
  - Shifting priorities or portfolios

- **Indigenous, rural, and remote communities face the greatest difficulties:**
  - Disproportionate climate impacts
  - Overlapping emergencies (e.g., fires, floods, heat)
  - Limited infrastructure (e.g., few cooling spaces)



Challenges pre-season/planning

- **Need for clarification of roles and responsibility**
  - Lack of clear mandates hinders HARS planning and response

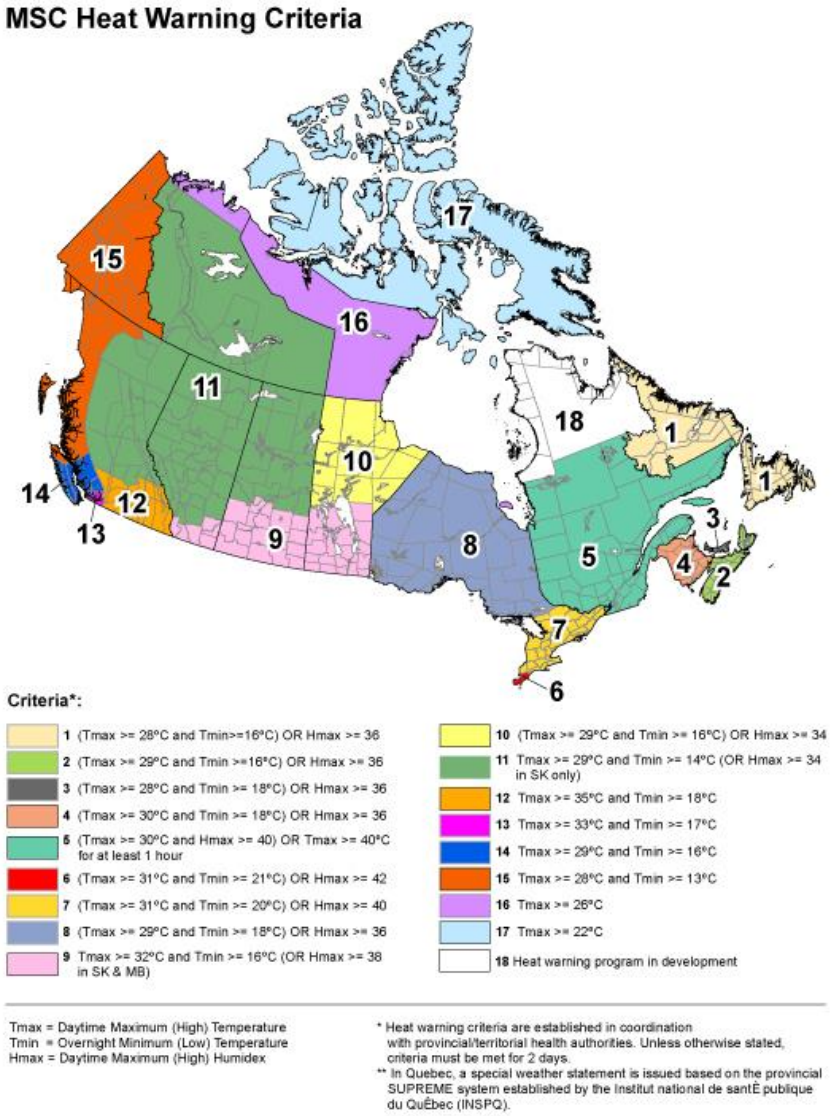
*"[T]rying to delineate, […] what all these different programs and plans are, and to **what level and who's leading them** has been a little bit of a challenge as we navigate forward and trying to communicate that up through the political policy process as well […]."*

Challenges pre-season/planning

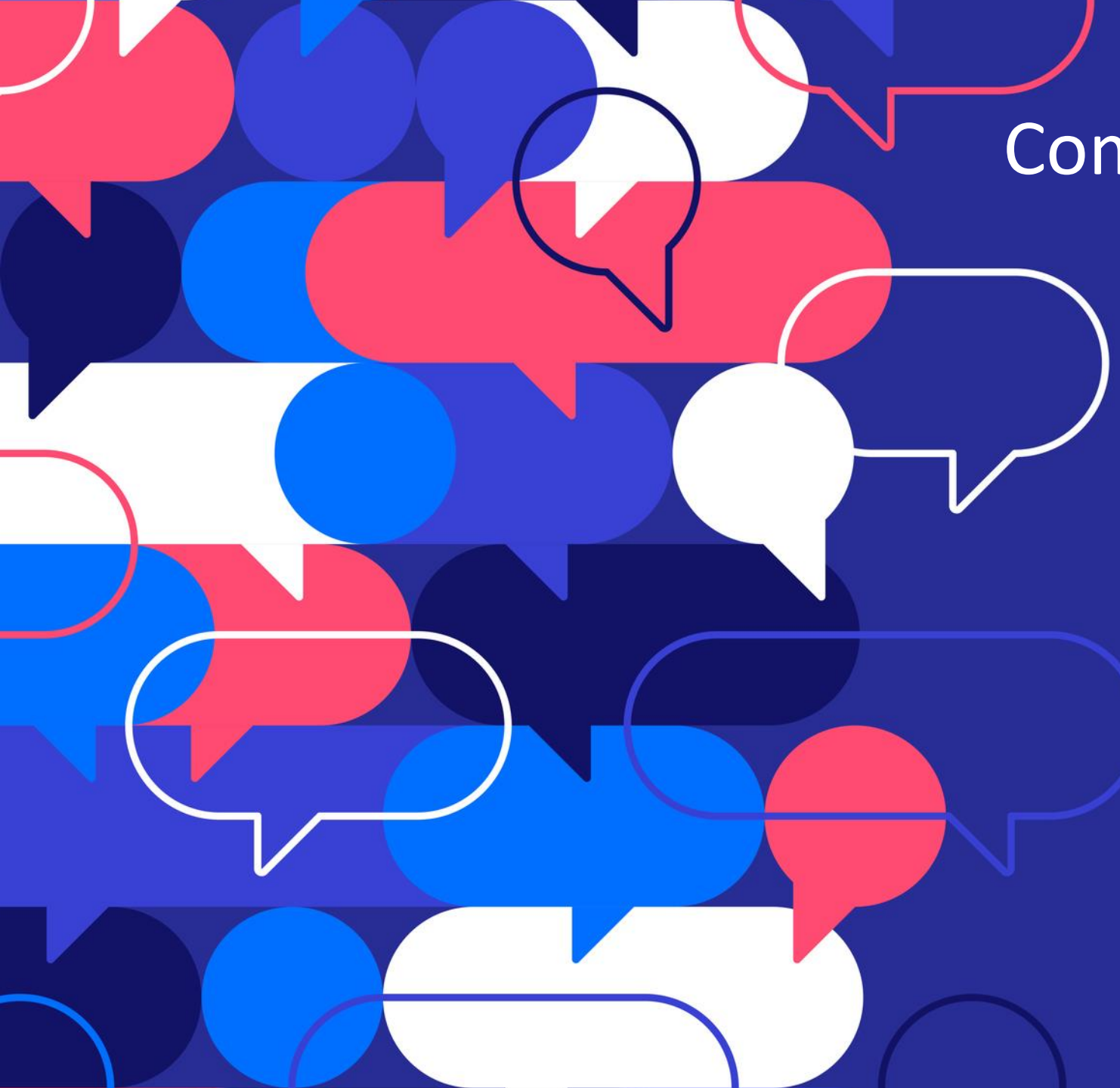
- **Lack of data on at-risk populations**
  - Limits targeted communication and effective community response during heat events
- **Need for templates, standards, and guidance**
  - Cascading and compound hazards – heat with wildfires or power outages, complicating HARS
  - <u>Solutions:</u> Guidance on compound hazards, stronger knowledge sharing, standardized adaptable templates,

*"…local governments and non-profits **like things that are just for them** – they don't like having to comb through what's for them versus what's not."*

Challenges with alert protocol



- Sometimes ECCC heat warning threshold **does not align** with health risk
- Decision making is challenged by heat alerts that occur outside of typical business hours
- Alert terminology
- <u>Solutions:</u> earlier, clearer, impact-based considerations would be helpful



Communication challenges

- **Heat messages may not reach high-risk groups** – such as isolated seniors, non-digital users, non-English/French speakers
- **Complex language and unclear alerts** reduce effectiveness; message fatigue is a concern
- Solutions: More accessible, translated, and printed resources are needed, along with pre-approved messages

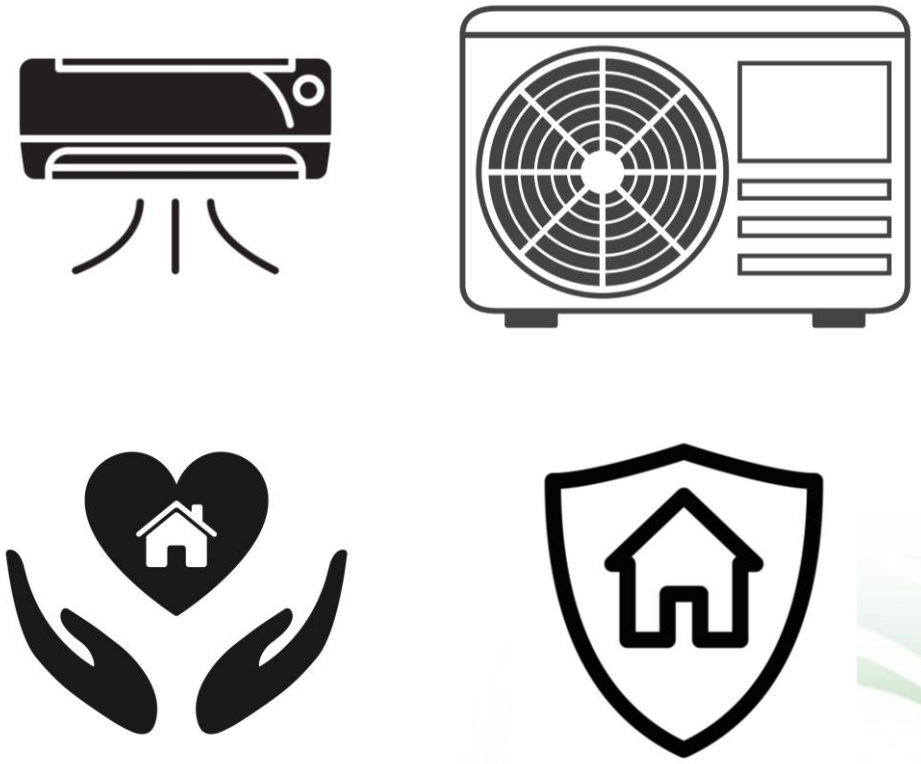
Community response

- Many people **can’t or won’t** access cooling centres: mobility, stigma, or lack of appeal.
- Remote communities often **lack infrastructure to offer cooling spaces.**
- Staffing cooling centres, especially on weekends, is a major challenge.
- Funding tied to heat warnings causes unstable “yo-yo” operations.
- Solution: Public spaces (e.g., libraries, malls) can serve as alternative cooling options in urban areas, but this isn’t feasible in remote regions with limited infrastructure.

“In a remote community of 1000 or less, you don't have a library, you don't have a shopping centre, you don't have any other private space or public space which can be used as a cooling centre.”

Making people safe in their homes

- Most people want to be in their homes
- <u>Solution:</u> Conducting check-ins and fostering social connection
- <u>Indoor heat key mitigation strategies</u>:
  - Implementing maximum indoor temperature bylaws for rental properties
  - Promoting cooling retrofitting initiatives for existing buildings
  - Expanding passive cooling measures in home design and renovation



“Our homes are where we find safety. Our homes are a prerequisite for health. Our homes are a place for recovering from health issues. Our homes are what need to be climate safety zones. The way that we've thought about equity in terms of climate safety is to make public spaces climate friendly. And I think what we've learned is that public spaces [aren’t] where people go for safety.”

Evaluation challenges

- Evaluation of partner experience? Is the public receiving communications?
- Is HARS protecting people?
- Real-time health surveillance data
  - The relative rarity of extreme heat events further complicates the evaluation of interventions
- Sharing evaluation indicators could be a solution!

“I think it would be great for us to do more systematic evaluation, but I also struggle with being confident that that would tell us whether we're succeeding or not.”

Limitations for this review

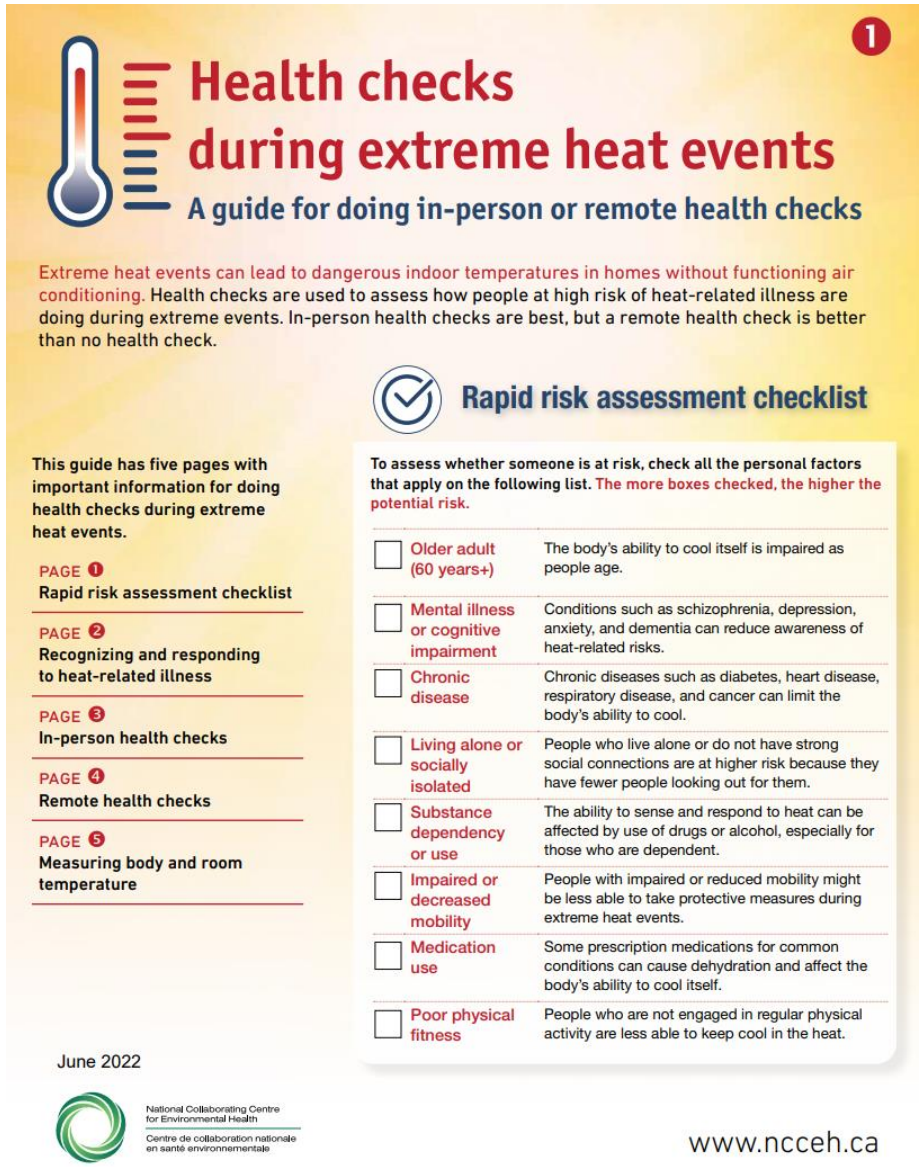
- Response rate for surveys and interviews
- Many plans are not public
- We did review local government/municipal plans and collaboration
- Updates to webpages, new plans in development

Key takeaways

- Six jurisdictions (BC, MB, NB, NS, ON, QC) have PT government-level HARS
- Other publicly available health-authority heat response plans in Ontario and Quebec; additional plans that are not public
- Key informants face challenges in developing a HARS framework and HARS plans:
  - Funding shortages & staff turnover
  - Unclear roles & responsibilities
  - Limited data on at-risk groups, language/access challenges, alert fatigue
  - Challenges are elevated in rural, remote, & Indigenous contexts
- Key informants recommend these solutions:
  - Secure dedicated funding & clarify governance roles
  - Foster collaboration & data-sharing across sectors
  - Develop guidance for multi-hazard events
  - Promote cooling strategies (temperature bylaws, passive design)
  - Support community cohesion models (check-ins, social networks)

What do you think the **next steps** should be to help improve development and implementation of HARS framework/plans in Canada?

https://app.sli.do/event/fLLTzhhQ2ADDtLYfNQf36X



Health checks during extreme heat events

A guide for doing in-person or remote health checks

Extreme heat events can lead to dangerous indoor temperatures in homes without functioning air conditioning. Health checks are used to assess how people at high risk of heat-related illness are doing during extreme events. In-person health checks are best, but a remote health check is better than no health check.

This guide has five pages with important information for doing health checks during extreme heat events.

PAGE 1 Rapid risk assessment checklist

PAGE 2 Recognizing and responding to heat-related illness

PAGE 3 In-person health checks

PAGE 4 Remote health checks

PAGE 5 Measuring body and room temperature

Rapid risk assessment checklist

To assess whether someone is at risk, check all the personal factors that apply on the following list. The more boxes checked, the higher the potential risk.

☐ Older adult (60 years+)	The body's ability to cool itself is impaired as people age.
☐ Mental illness or cognitive impairment	Conditions such as schizophrenia, depression, anxiety, and dementia can reduce awareness of heat-related risks.
☐ Chronic disease	Chronic diseases such as diabetes, heart disease, respiratory disease, and cancer can limit the body's ability to cool.
☐ Living alone or socially isolated	People who live alone or do not have strong social connections are at higher risk because they have fewer people looking out for them.
☐ Substance dependency or use	The ability to sense and respond to heat can be affected by use of drugs or alcohol, especially for those who are dependent.
☐ Impaired or decreased mobility	People with impaired or reduced mobility might be less able to take protective measures during extreme heat events.
☐ Medication use	Some prescription medications for common conditions can cause dehydration and affect the body's ability to cool itself.
☐ Poor physical fitness	People who are not engaged in regular physical activity are less able to keep cool in the heat.

June 2022

National Collaborating Centre for Environmental Health
Centre de collaboration nationale en santé environnementale

www.ncceh.ca

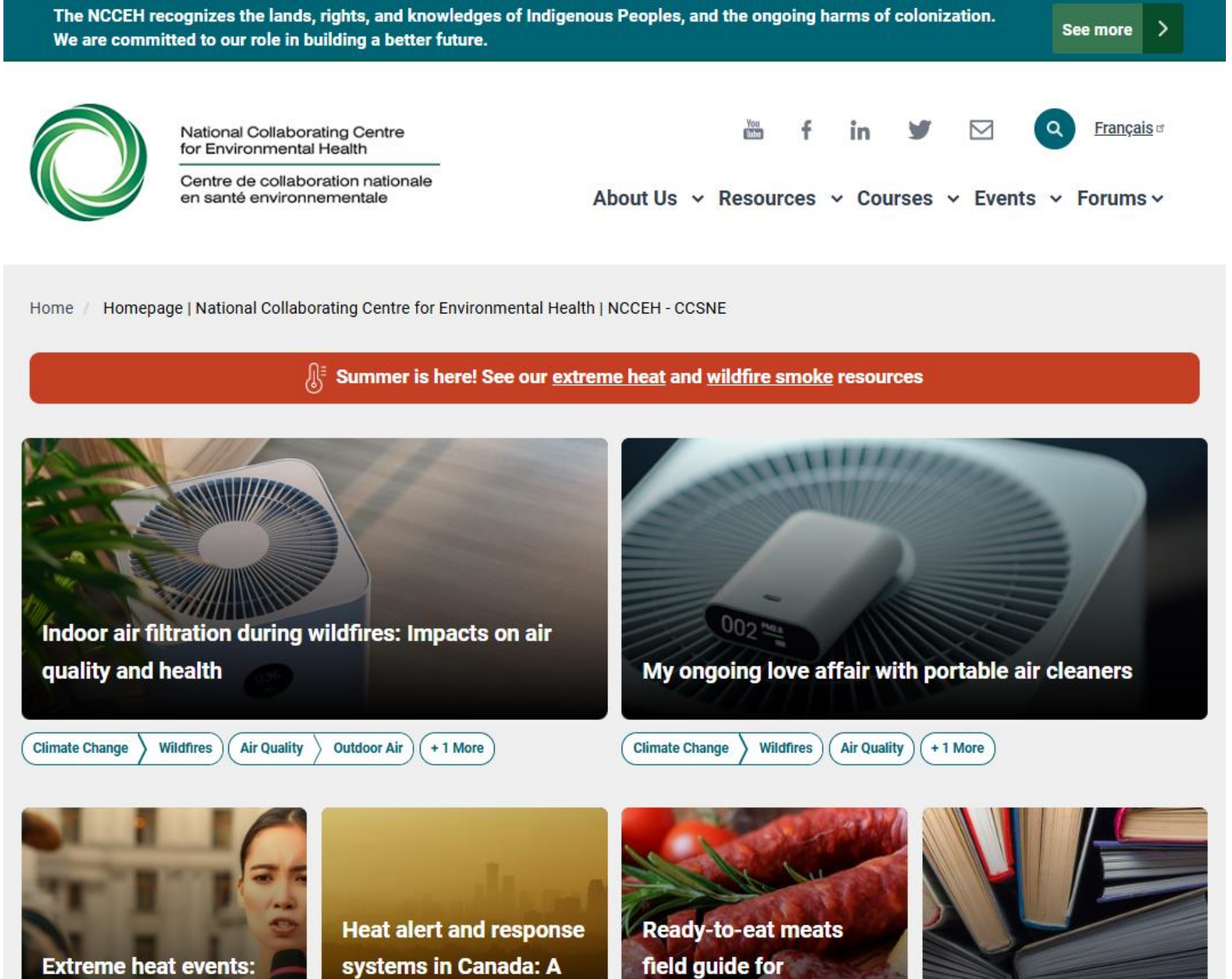
Are you already aware of the NCCEH

Extreme Heat

Health Check Tool?

https://app.sli.do/event/fLLTzhhQ2ADDtLYfNQf36X


Health Checks
during extreme heat events
NCCEH



ncceh.ca | ccnse.ca


Thank you!

National Collaborating Centre for Environmental Health

Centre de collaboration nationale en santé environnementale

www.ncceh.ca

Please reach out!

rebecca.goulding@bccdc.ca

www.ncceh.ca ‖ *www.ccnse.ca*

We would like to acknowledge the generous funding and support from **Health Canada**. Without this contribution, this work would not have been possible. The views expressed herein do not necessarily represent the views of **Health Canada**.

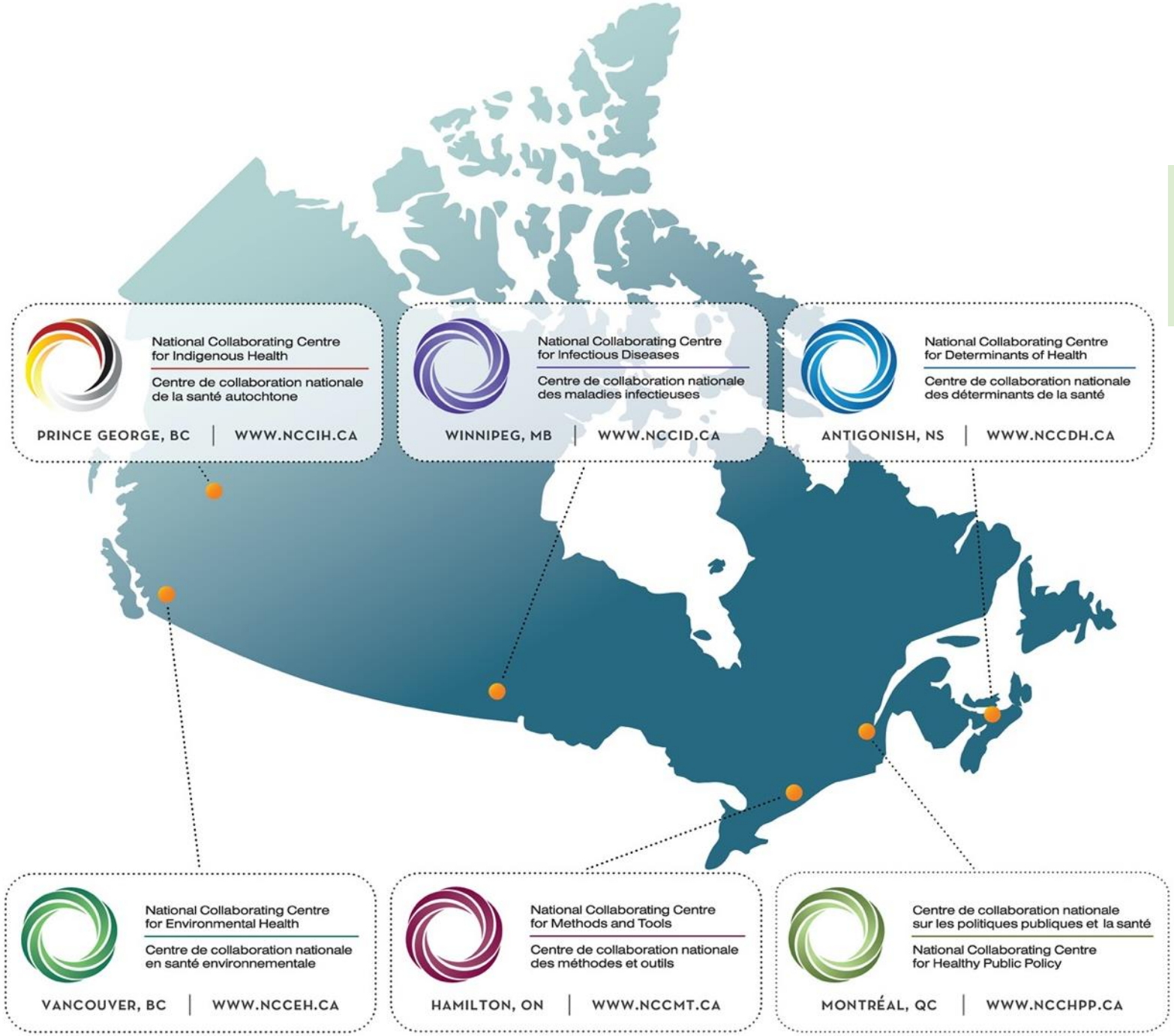
Production of this document has been made possible through a financial contribution from the **Public Health Agency of Canada**.

Resources in this presentation

- BC Coroner's Service; Extreme Heat Death Review Panel Report, June 2022
- Criteria for public weather alerts - Canada.ca
- Heat Alert and Response Systems to Protect Health: Best Practices Guidebook
- Heat alert and response systems in Canada: A check-up on preparedness
- Staying safe in extreme heat: A quick guide to health checks [Video]
- BC Heat Alert and Response System (BC HARS)
- Manitoba Heat Alert and Response System
- New Brunswick Heat Alert and Response System (NB HARS)
- Nova Scotia's Heat Alert and Response System
- Harmonized Heat Warning and Information System for Ontario (HWIS)
- Plan ministériel de gestion des épisodes de chaleur extreme Quebec

Resources in this presentation

- City of Greater Sudbury Hot Weather Response Plan
- City of Toronto Heat Relief Strategy
- Plan de prévention et de protection en cas de chaleur extrême des Laurentides
- Plan régional de chaleur extreme
- Chaleur accablante ou extrême - Plan de traitement du risqué
- Plan local de prévention et de protection en cas de chaleur accablante ou extrême



Evidence-based knowledge synthesis and translation

Identify knowledge gaps

Foster networks, build capacity for Canada's public health system