Five years after the 2021 heat dome: Building evidence to motivate action

Sarah B. Henderson, PhD
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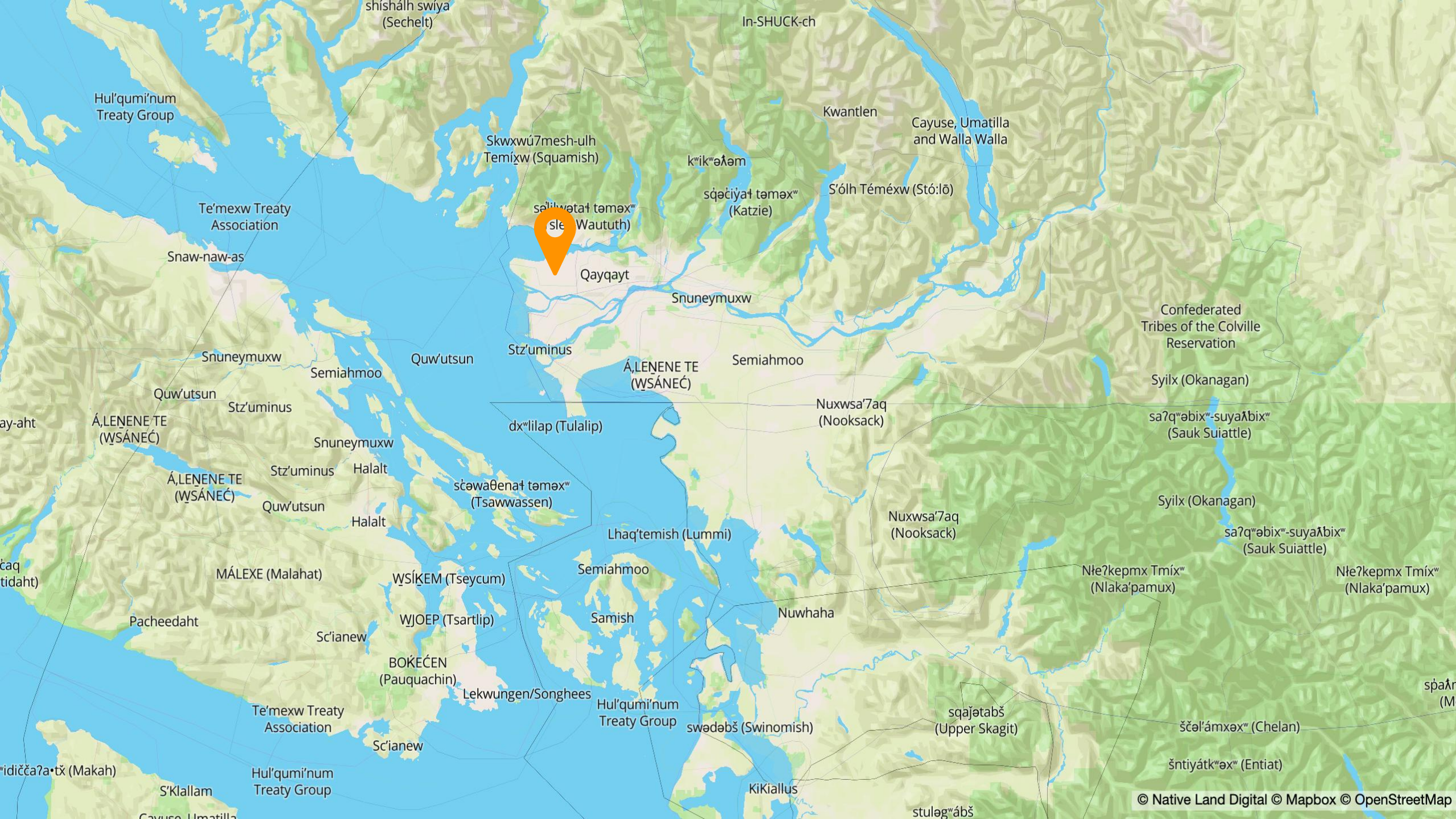
National Collaborating Centre for Environmental Health Webinar
June 11, 2026

BC Centre for Disease Control

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

THE UNIVERSITY OF BRITISH COLUMBIA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In-SHUCK-ch
Hul'qumi'num
Treaty Group
Kwantlen
Cayuse, Umatilla
and Walla Walla
Skwxwú7mesh-ulh
Temíx̱w (Squamish)
kʷikʷəƛəm
S'ólh Téméxw (Stó:lō)
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Treaty Group
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(Upper Skagit)
šč̓əl'ámxəxʷ (Chelan)
šntiyátkʷəxʷ (Entiat)
S'Klallam
KiKiallus
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Nuts a maht.

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Cheryl Peters
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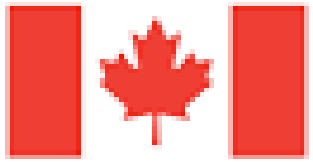
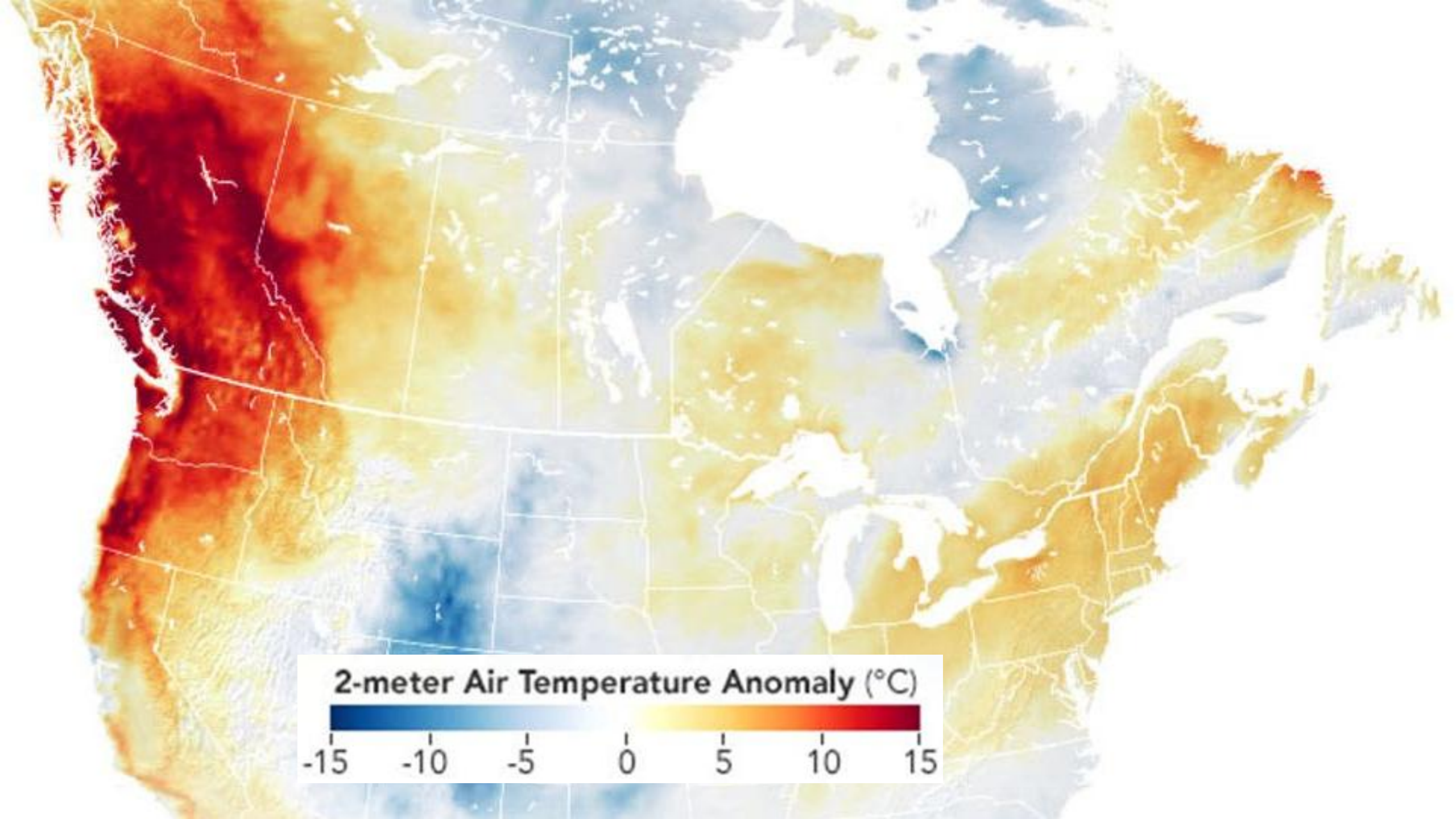
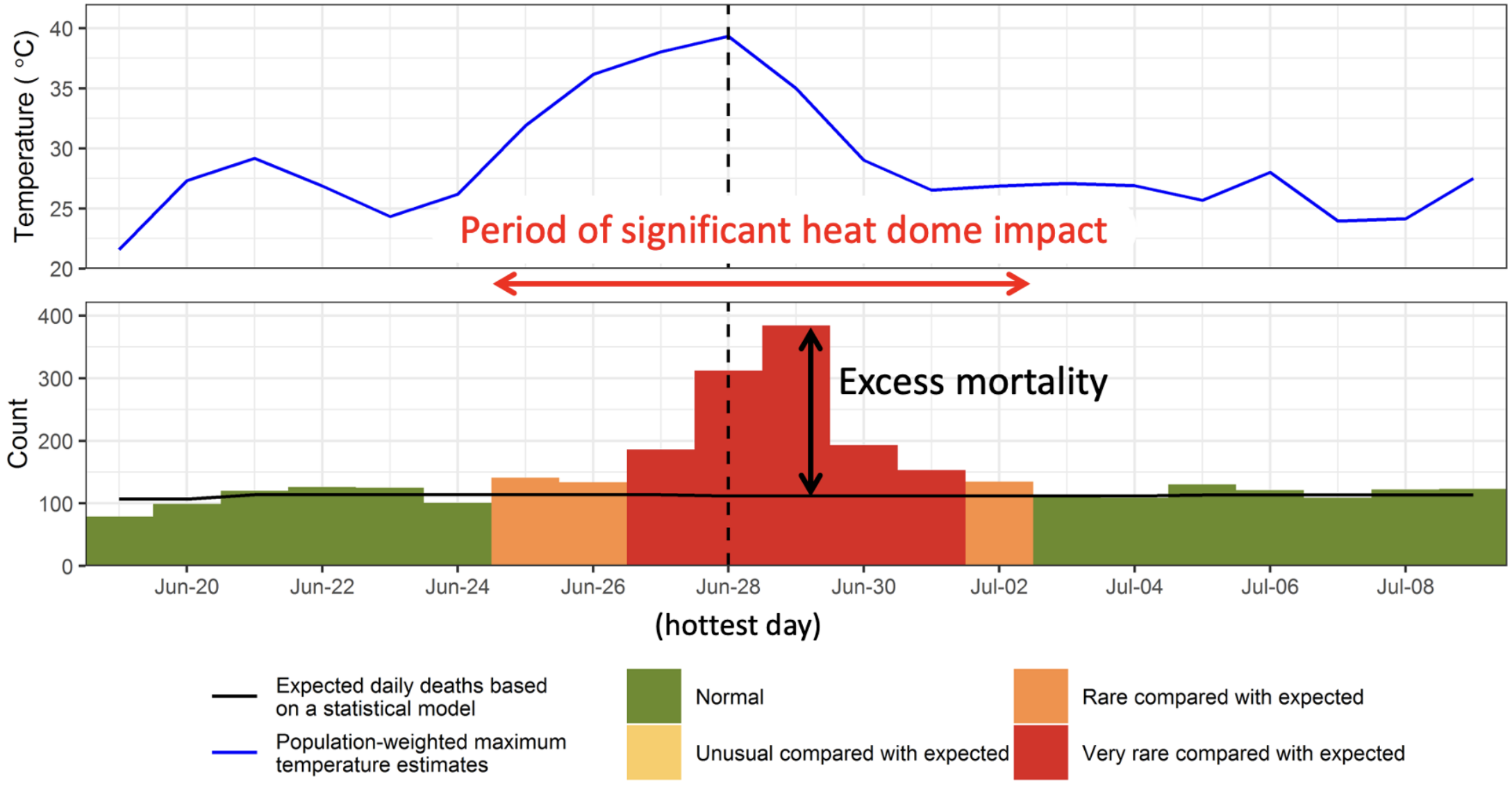
BC HEAT Coordinating Committee



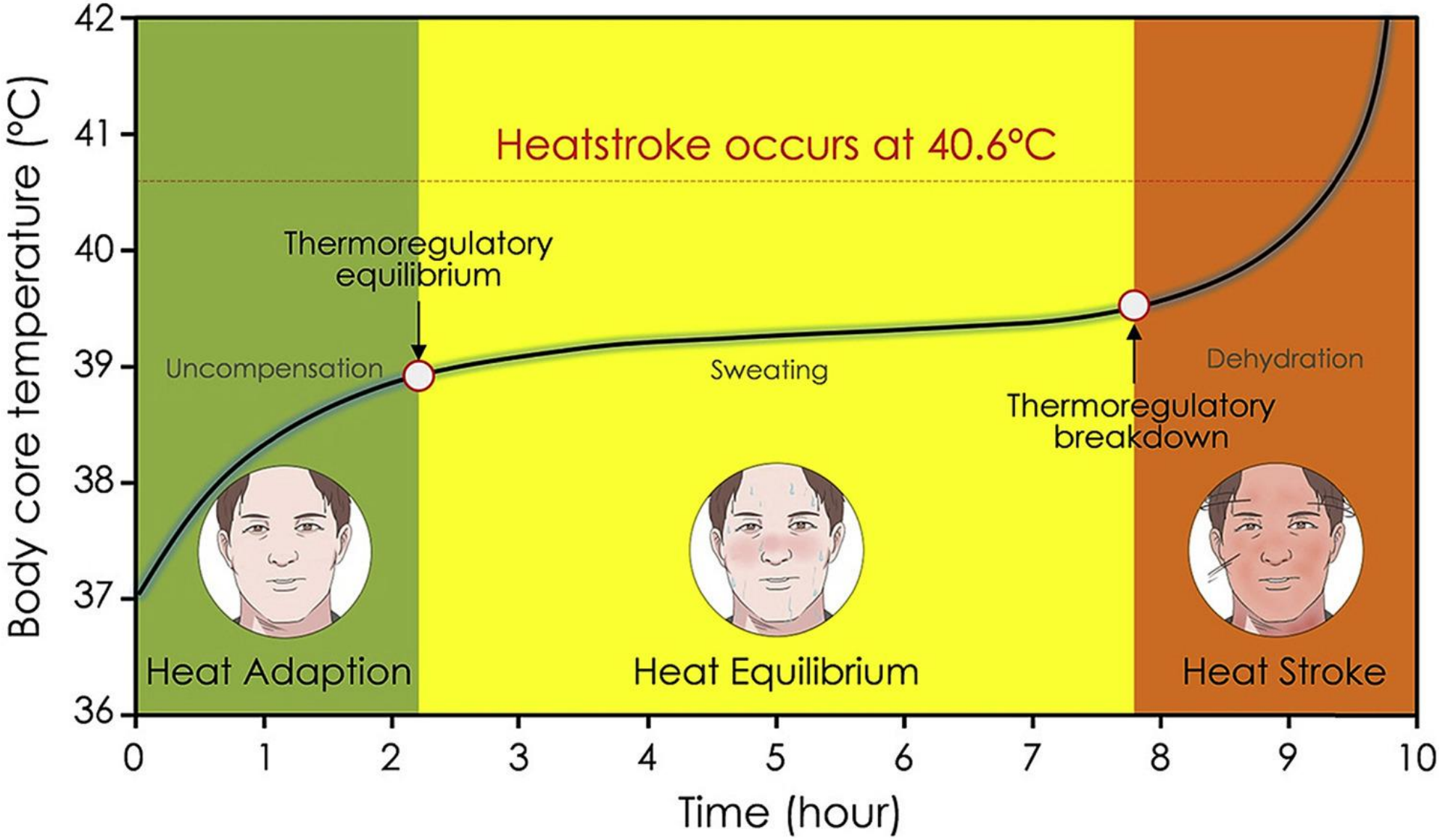
Health Canada
Santé Canada


2-meter Air Temperature Anomaly (°C)
-15
-10
-5
0
5
10
15

The 2021 heat dome was one of the **deadliest weather events** in Canadian history. 740 excess deaths, 619 heat-related deaths.

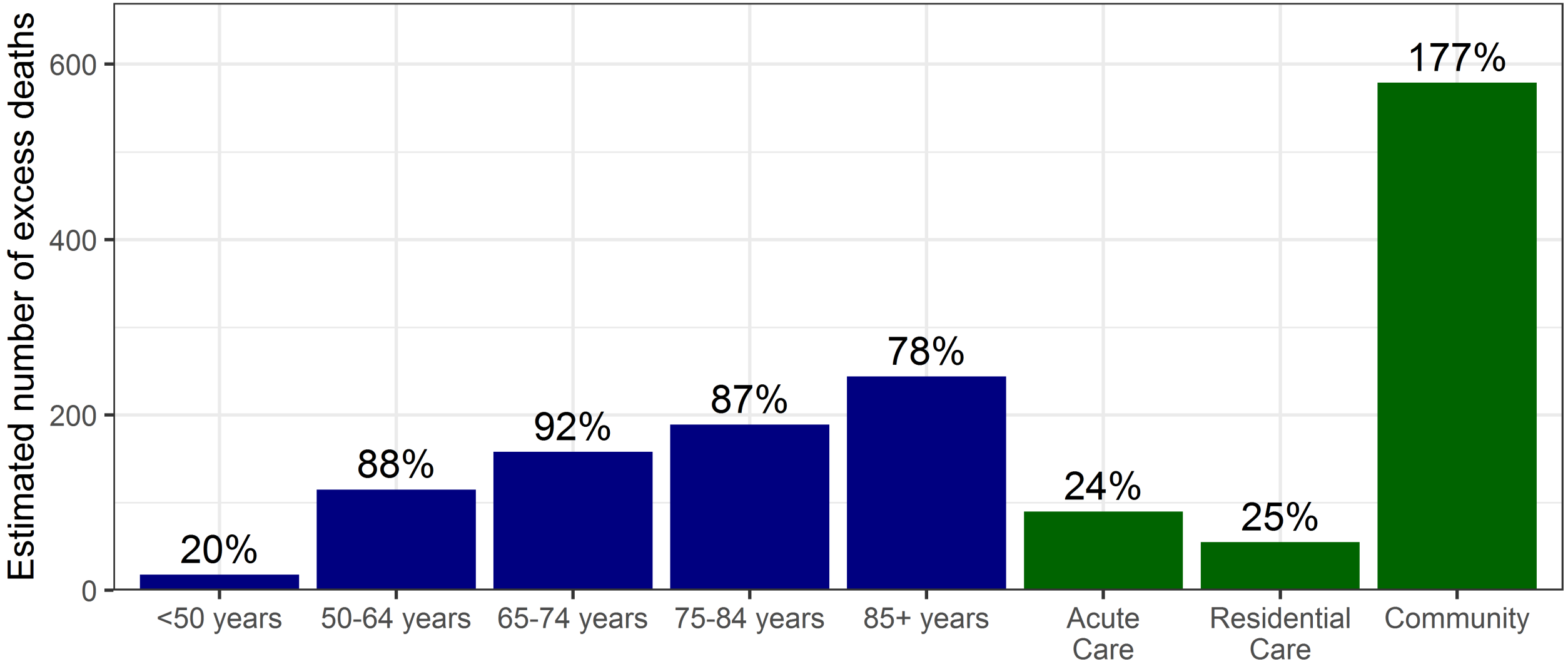


Heat-related deaths are **preventable** if we protect people from getting too hot. They occur when thermoregulation breaks down.

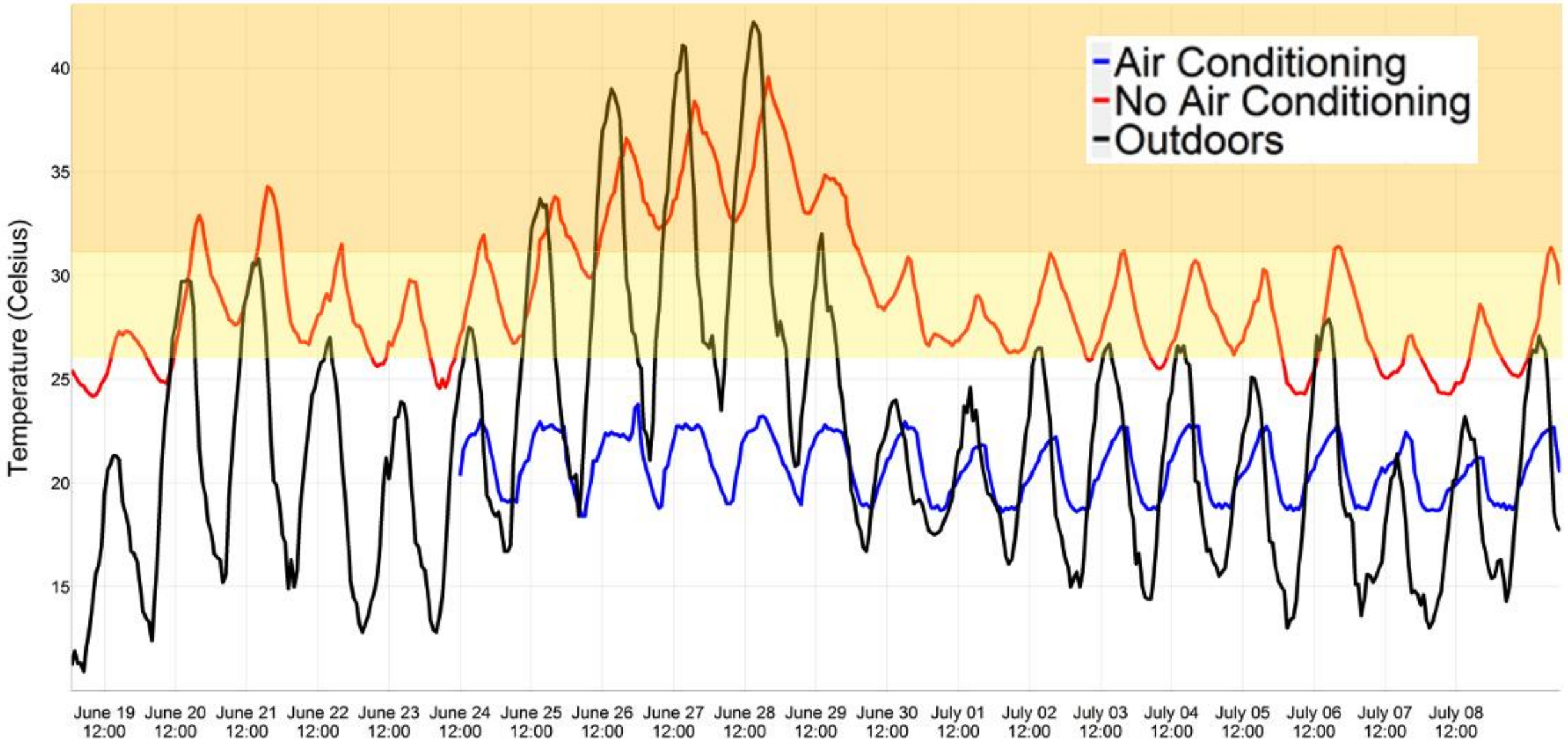


https://www.sciencedirect.com/science/article/abs/pii/S036013231830221X

Most excess deaths occurred in the community, and 98% of the fatal heat-related injuries happened indoors, most in **private homes**.



Indoor overheating occurs when the indoor environment gains heat during the day and does not lose heat overnight.



10 studies published or submitted so far that were led by the BCCDC:

1) Community deaths in greater Vancouver (Henderson, 2022)
2) Case-only analysis of chronic diseases (Lee, 2023)
3) Indoor overheating in acute care (**Dickson**, 2023)
4) Case-only analysis of chronic diseases and poverty (McLean, 2024)
5) Medications and heat-related mortality risk (**Boudreault**, 2025)
6) Risk factors among people with schizophrenia (**Chen**, 2025)
7) Changes in ER patient characteristics (Paul, 2026)
8) Statistical methods for examining extreme event risk (Lee, 2026)
9) Schizophrenia health services pilot study (**Zhao**, under review)
10) Buildings and fatal heat-related injuries (**Chinowsky**, under review)

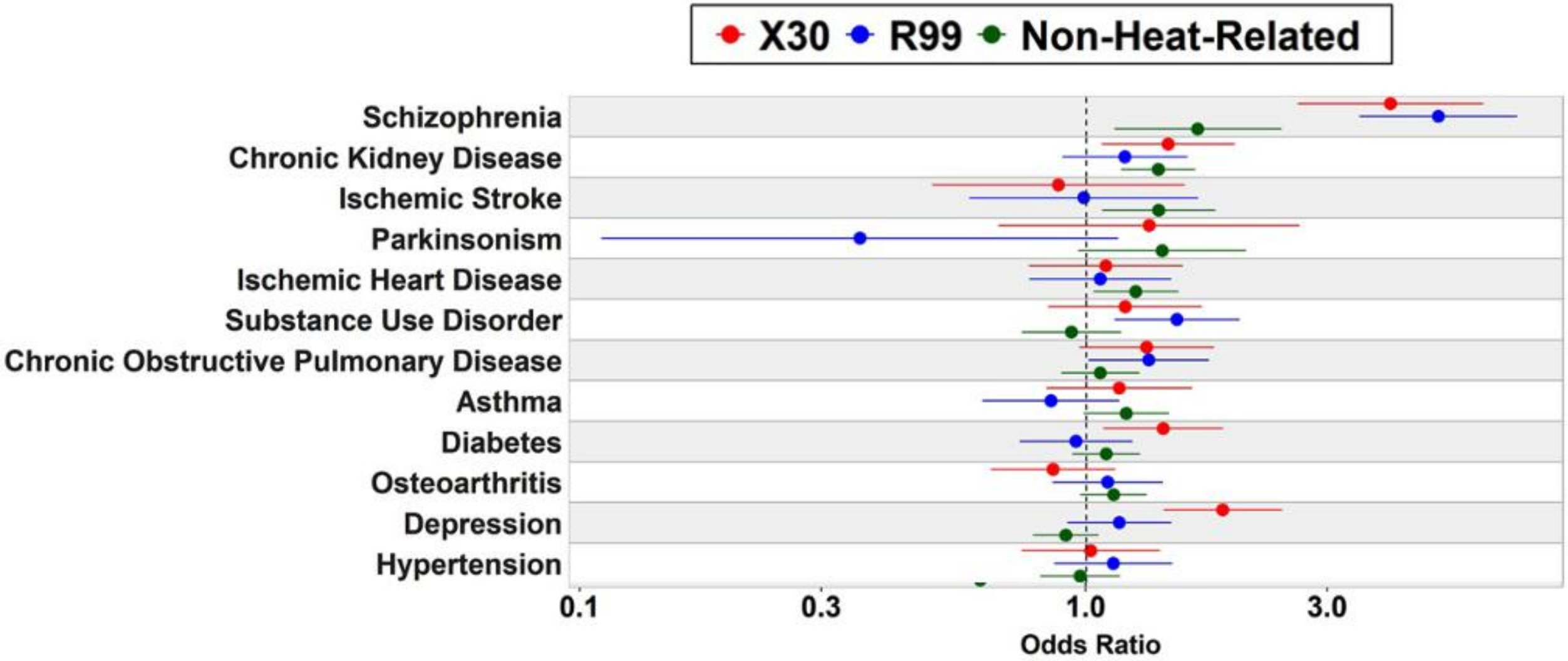
The BCCDC team has also contributed to many other studies.

Study #1: Higher risk of community deaths in areas with higher social and material deprivation, and lower surrounding greenness.

Variable (adjusted model)	Odds Ratio [95% CI]
Materially and socially privileged	0.92 [0.53, 1.59]
Average material and social deprivation	Reference
Materially privileged, socially deprived	1.53 [0.98, 2.40]
Materially deprived, socially privileged	1.89 [1.21, 2.95]
Materially and socially deprived	2.88 [1.85, 4.49]
Higher greenness within 100 m	0.78 [0.64, 0.91]
5% more tree canopy in 100 m	0.91 [0.84, 0.98]

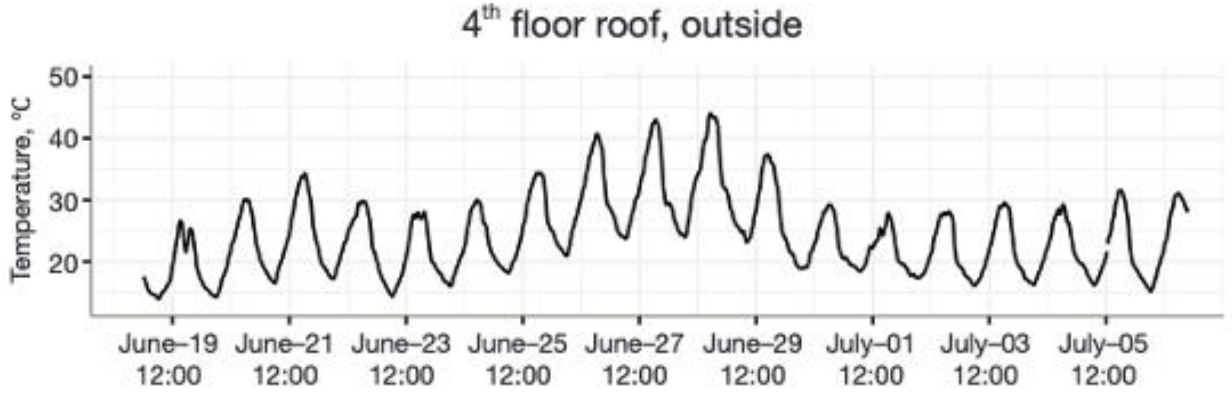
https://journals.lww.com/environepidem/fulltext/2022/02000/Analysis_of_community_deaths_during_the.8.aspx1

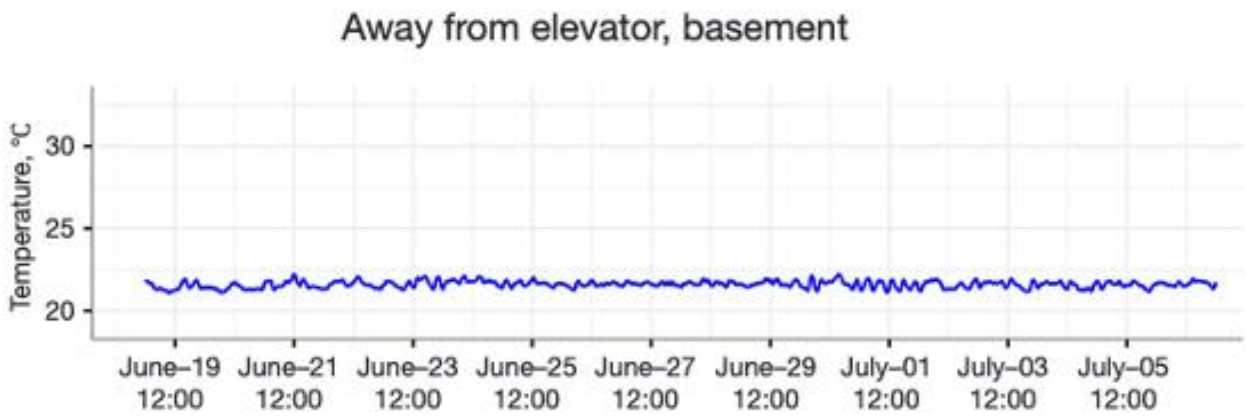
Study #2: When heat dome deaths compared with other summer deaths, schizophrenia was the biggest difference between groups.

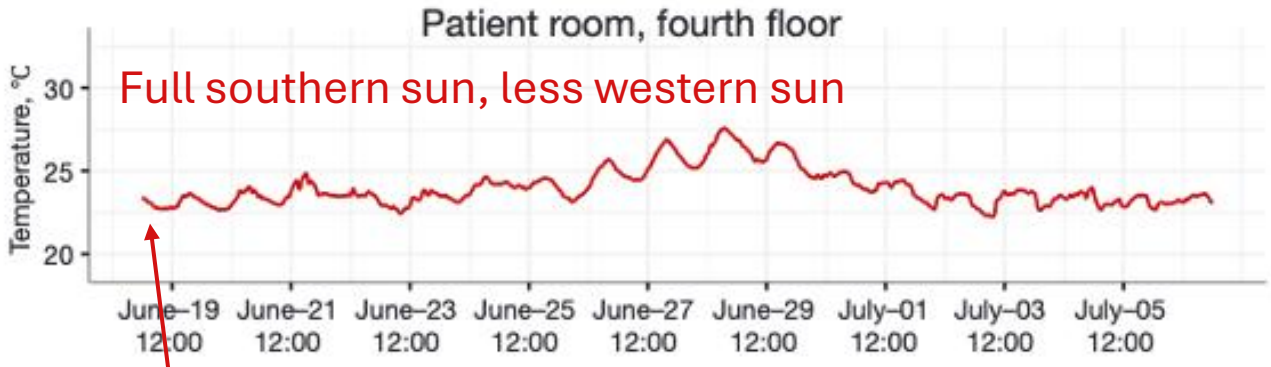


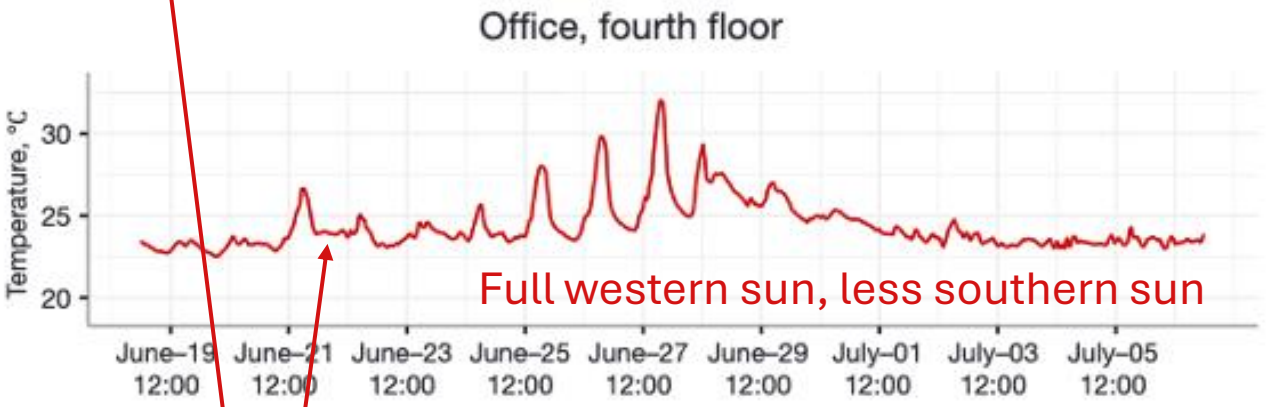
https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2022GH000729

Study #3: Even acute care facilities with climate control can overheat on upper floors, putting susceptible patients at risk.



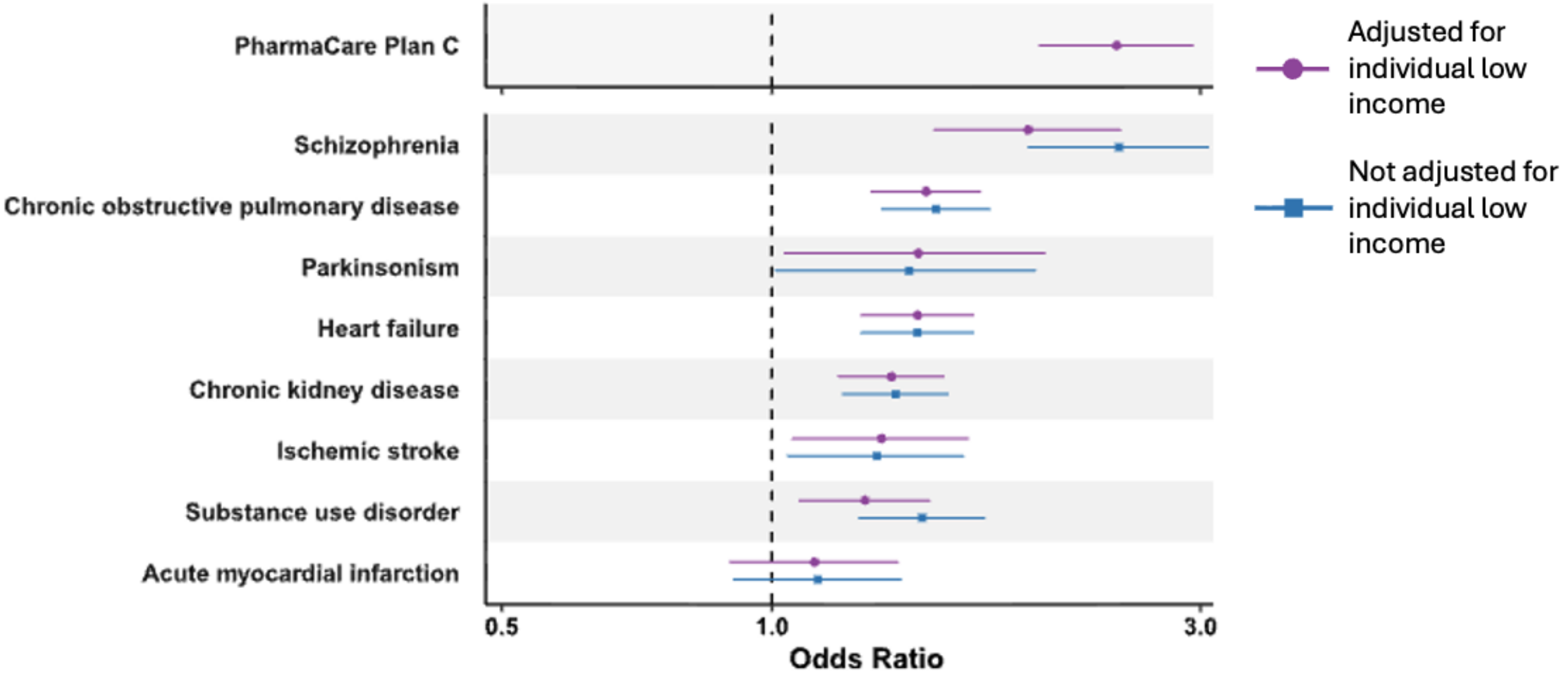






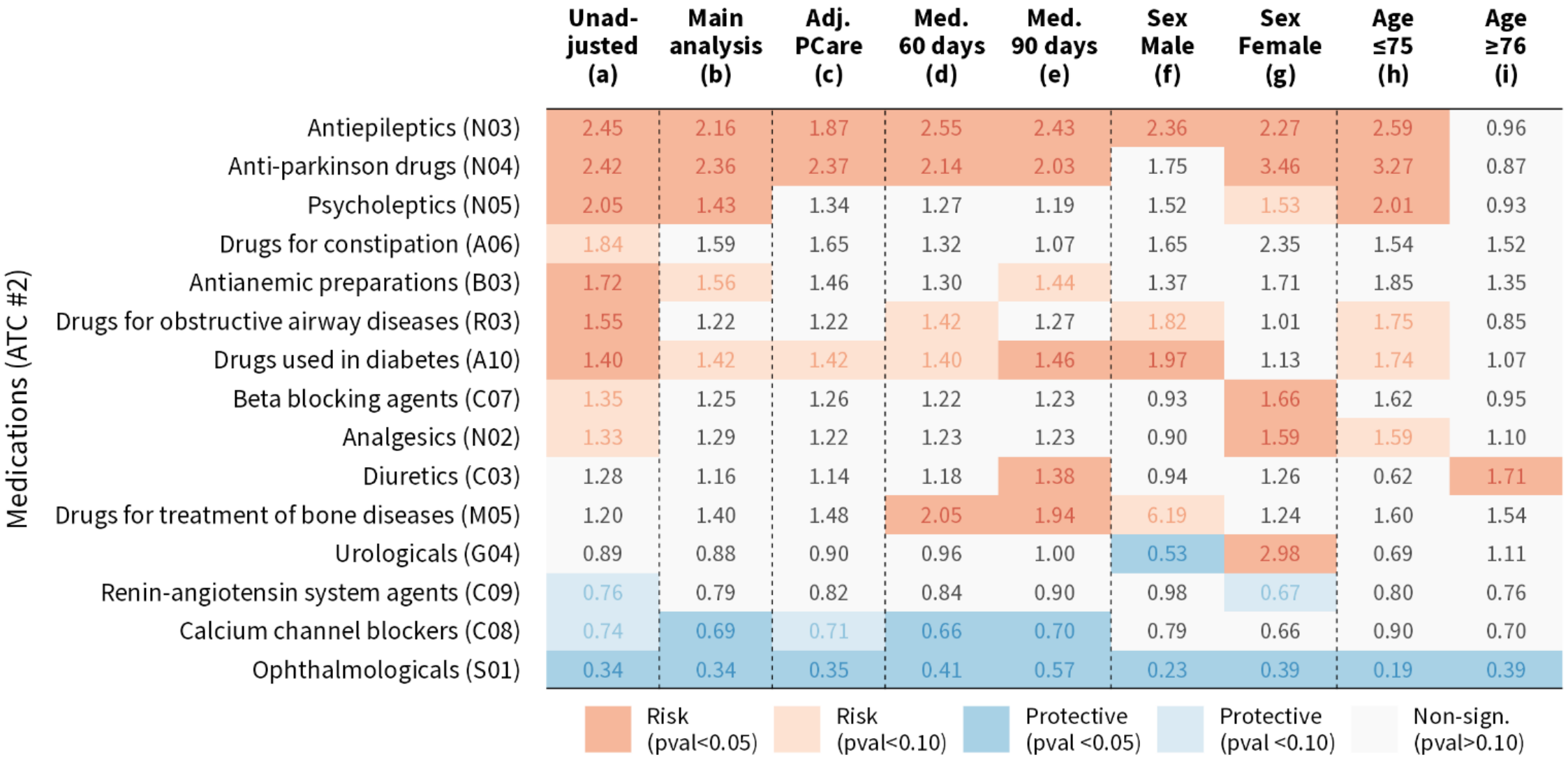
https://jhmhp.amegroups.org/article/view/8312/html

Study #4: Comparing those who died during the heat dome with similar survivors, poverty and schizophrenia were the biggest risks.



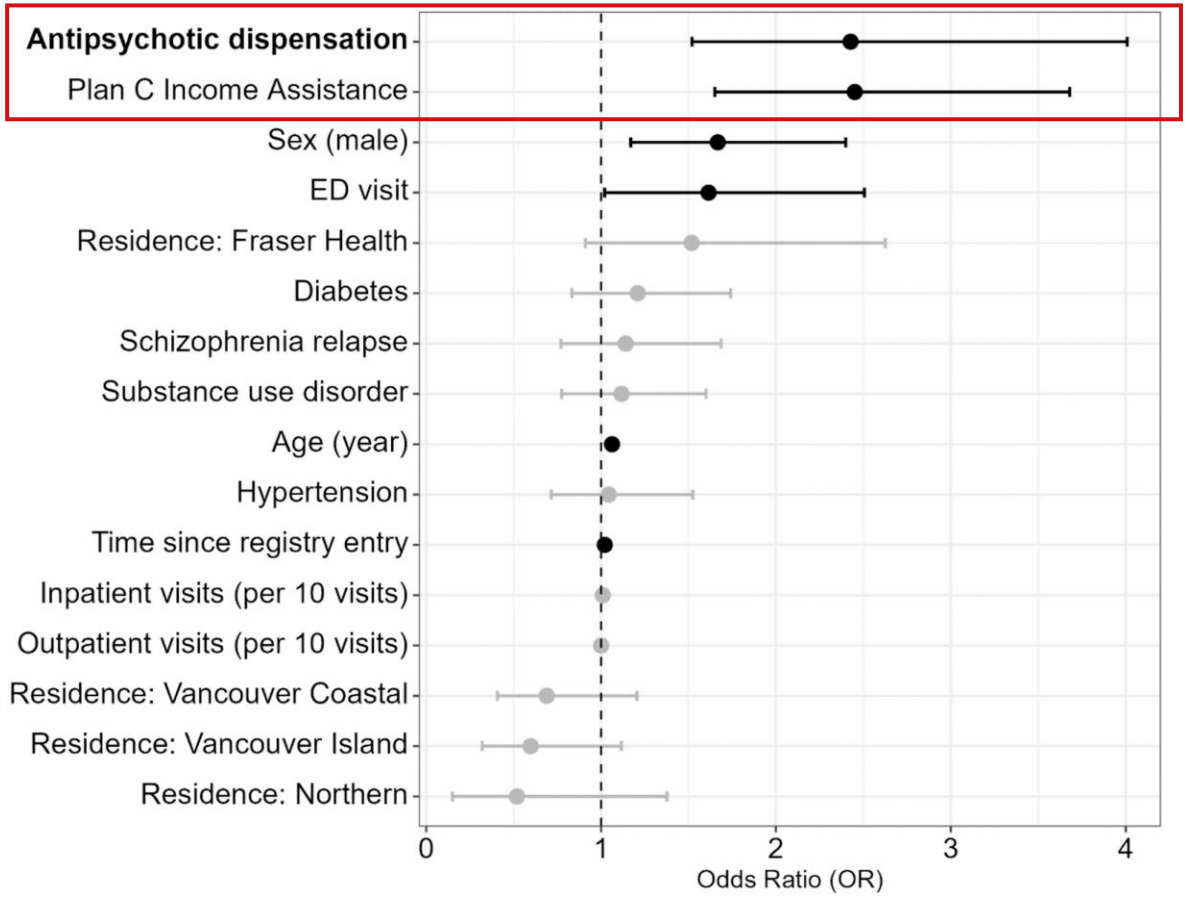
https://iopscience.iop.org/article/10.1088/2752-5309/ad5eac/meta

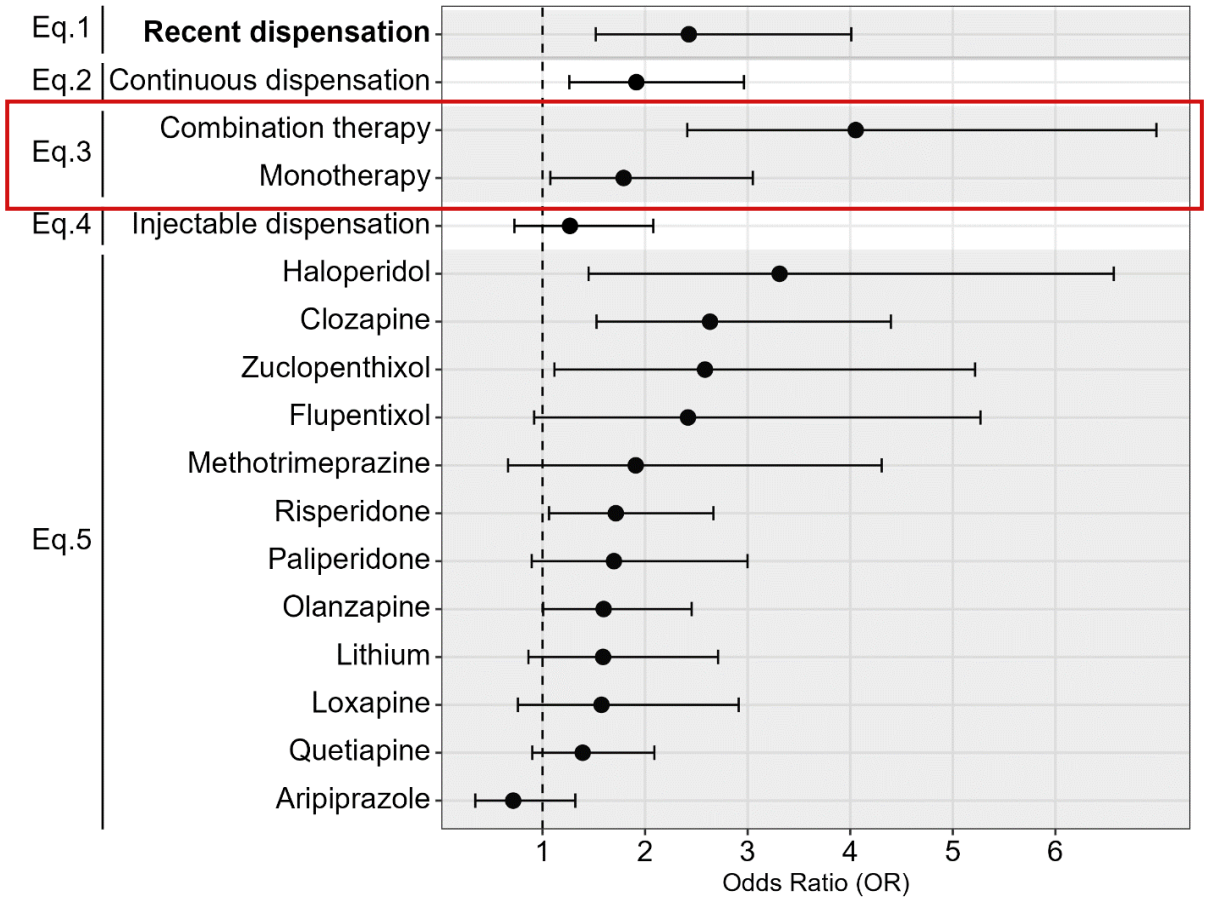
Study #5: Among community heat-related deaths, antiepileptic and anti-Parkinson drugs were associated with the highest risks.



https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964(25)00232-4/fulltext

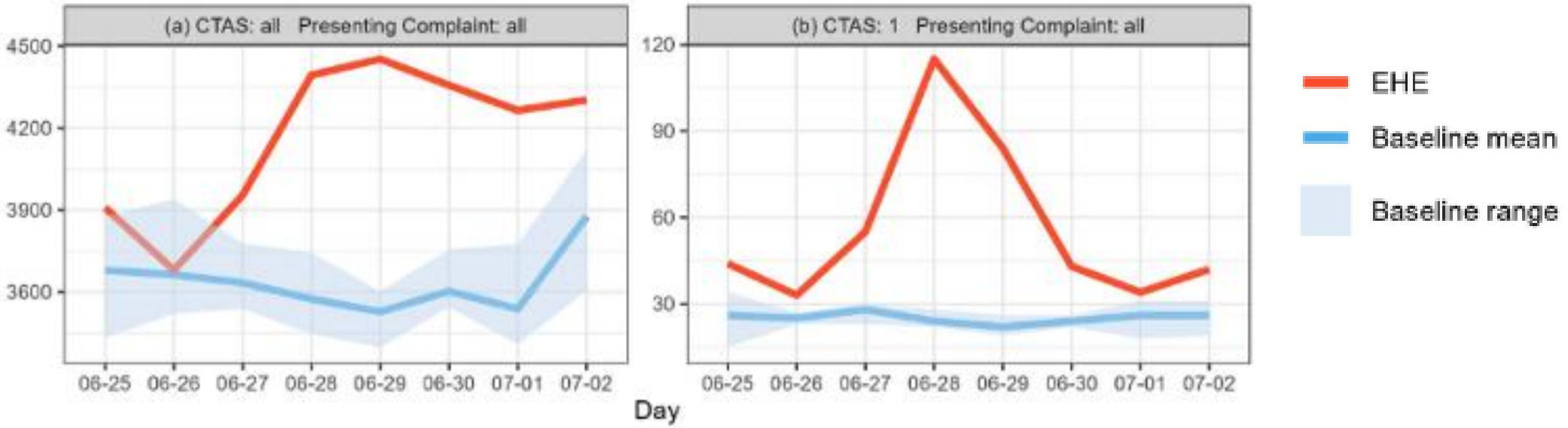
Study #6: Among people with schizophrenia, the biggest risk factors were poverty and antipsychotics, especially combination therapy.

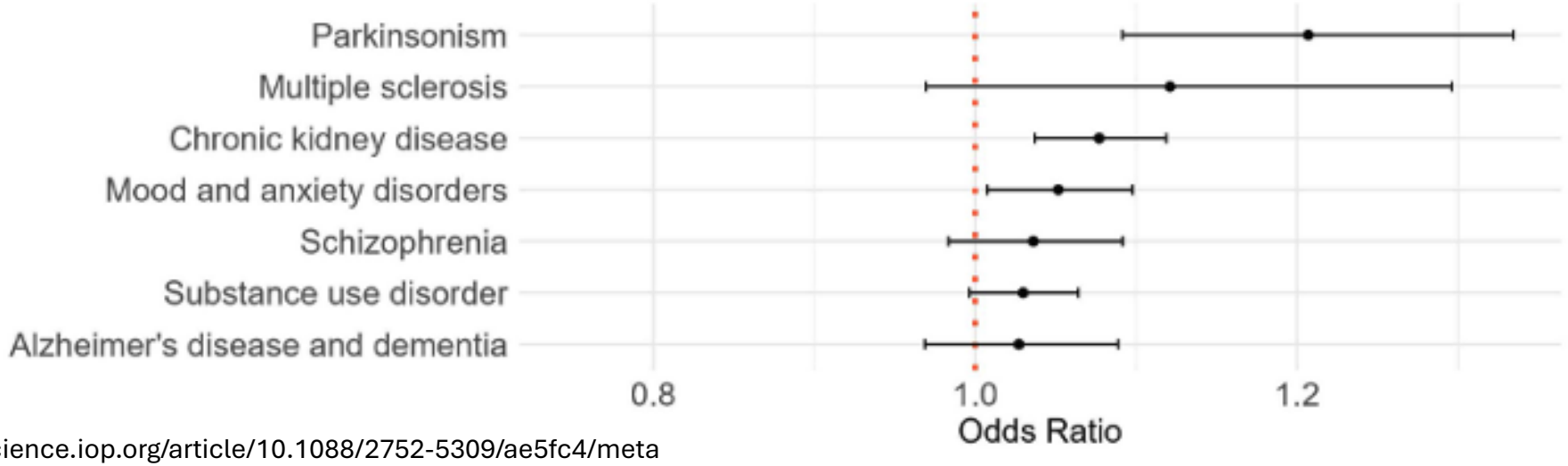




https://www.nature.com/articles/s41598-025-17591-0

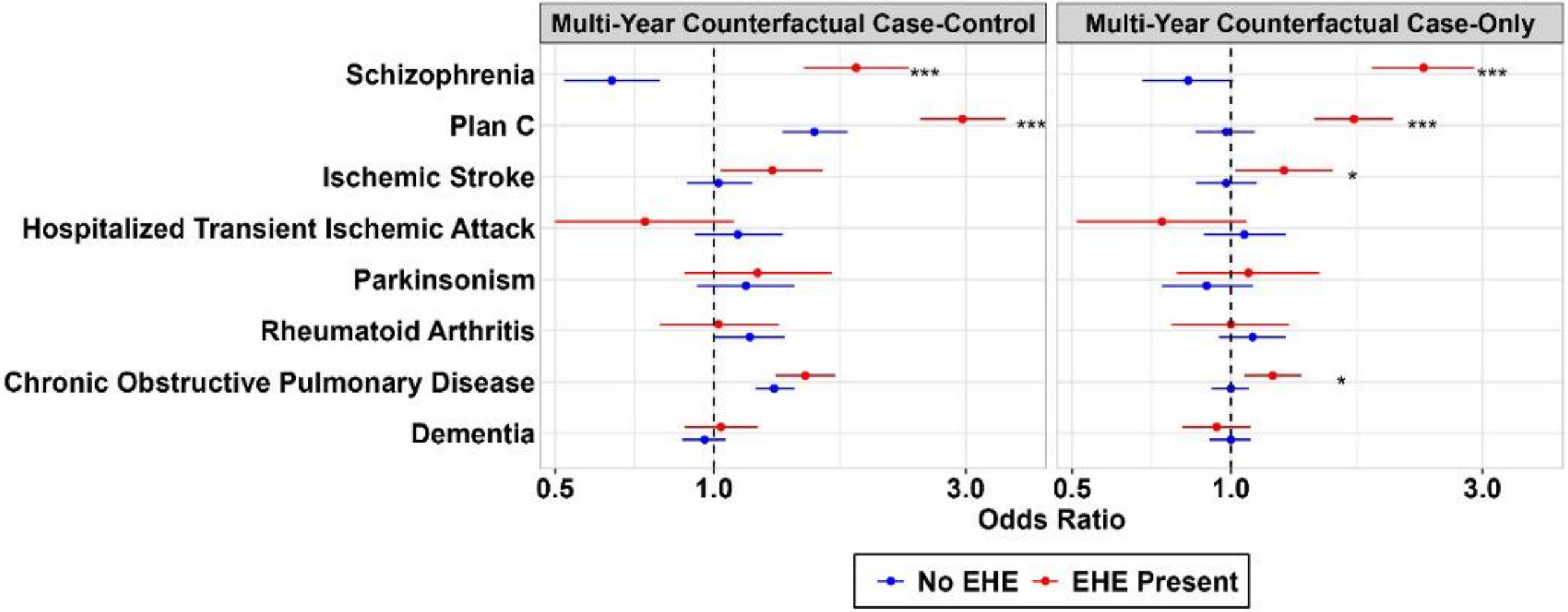
Study #7: The volume and acuity of ED visits was increased, with a somewhat different chronic disease profile than heat-related deaths.





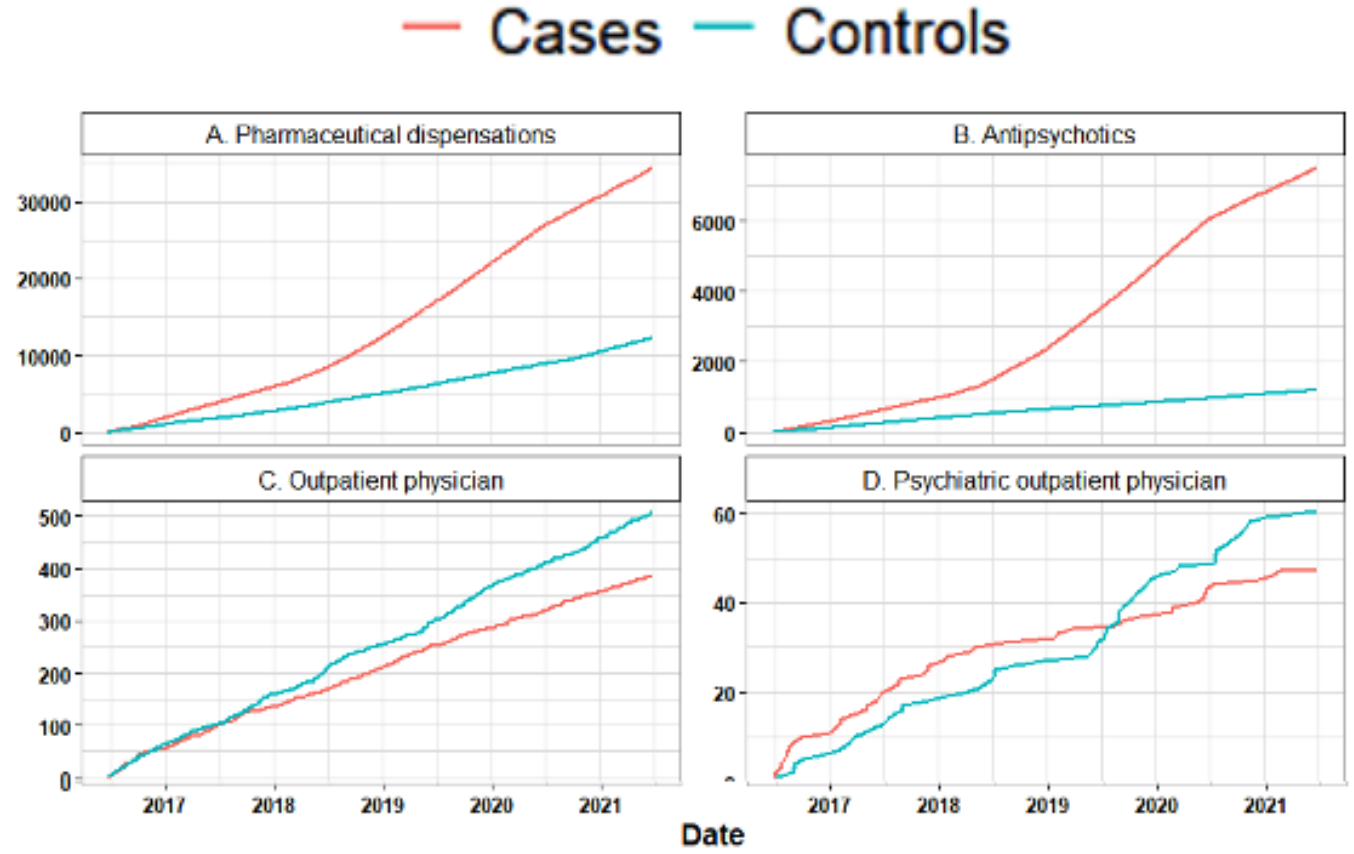
https://iopscience.iop.org/article/10.1088/2752-5309/ae5fc4/meta

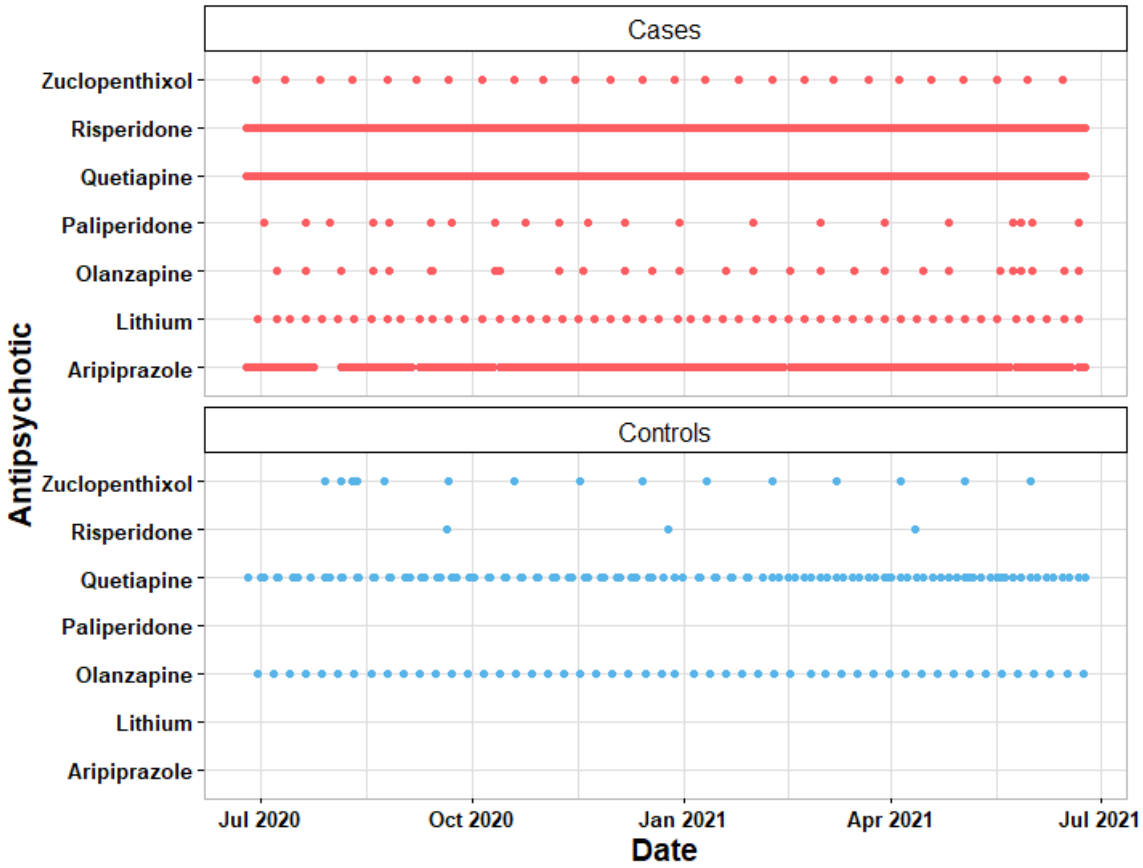
Study #8: When using a causal inference approach, schizophrenia and poverty were the risk factors most specific to extreme heat.



Accepted in Environmental Research: Health

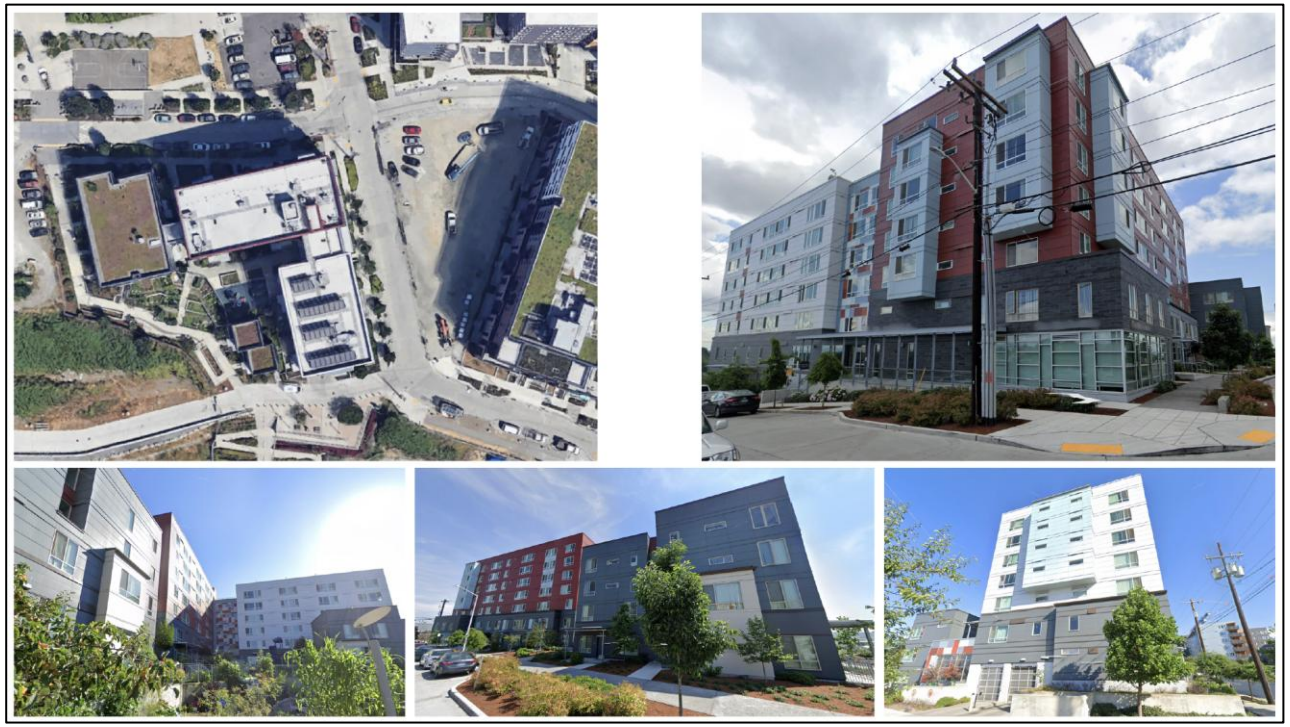
Study #9: Those who died with schizophrenia had different patterns of health services use and antipsychotic dispensations.



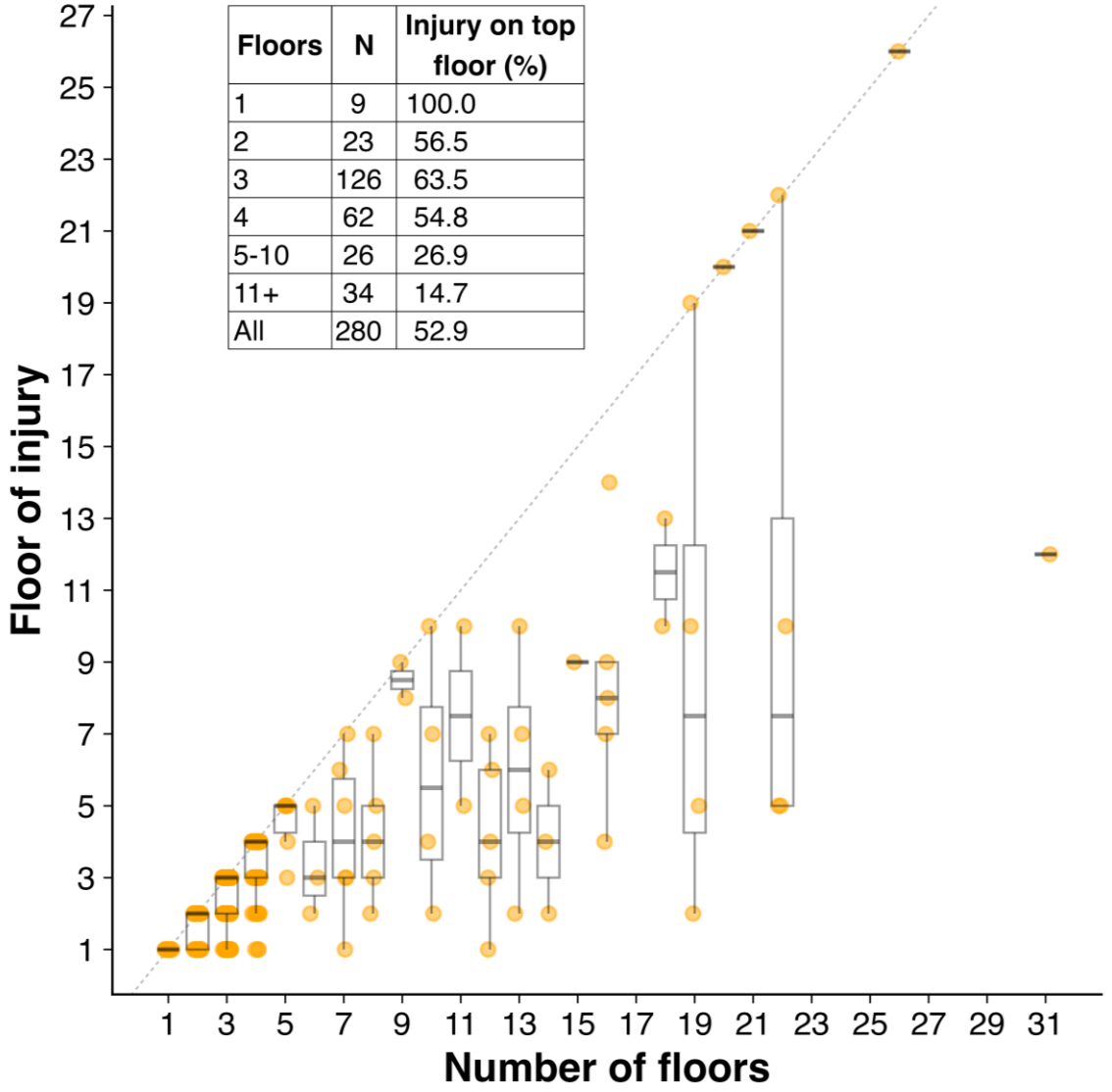


Under review at Canadian Journal of Psychiatry

Study #10: Fatal heat-related injuries disproportionately occurred in mobile homes, low-rise apartments, and areas without green space.



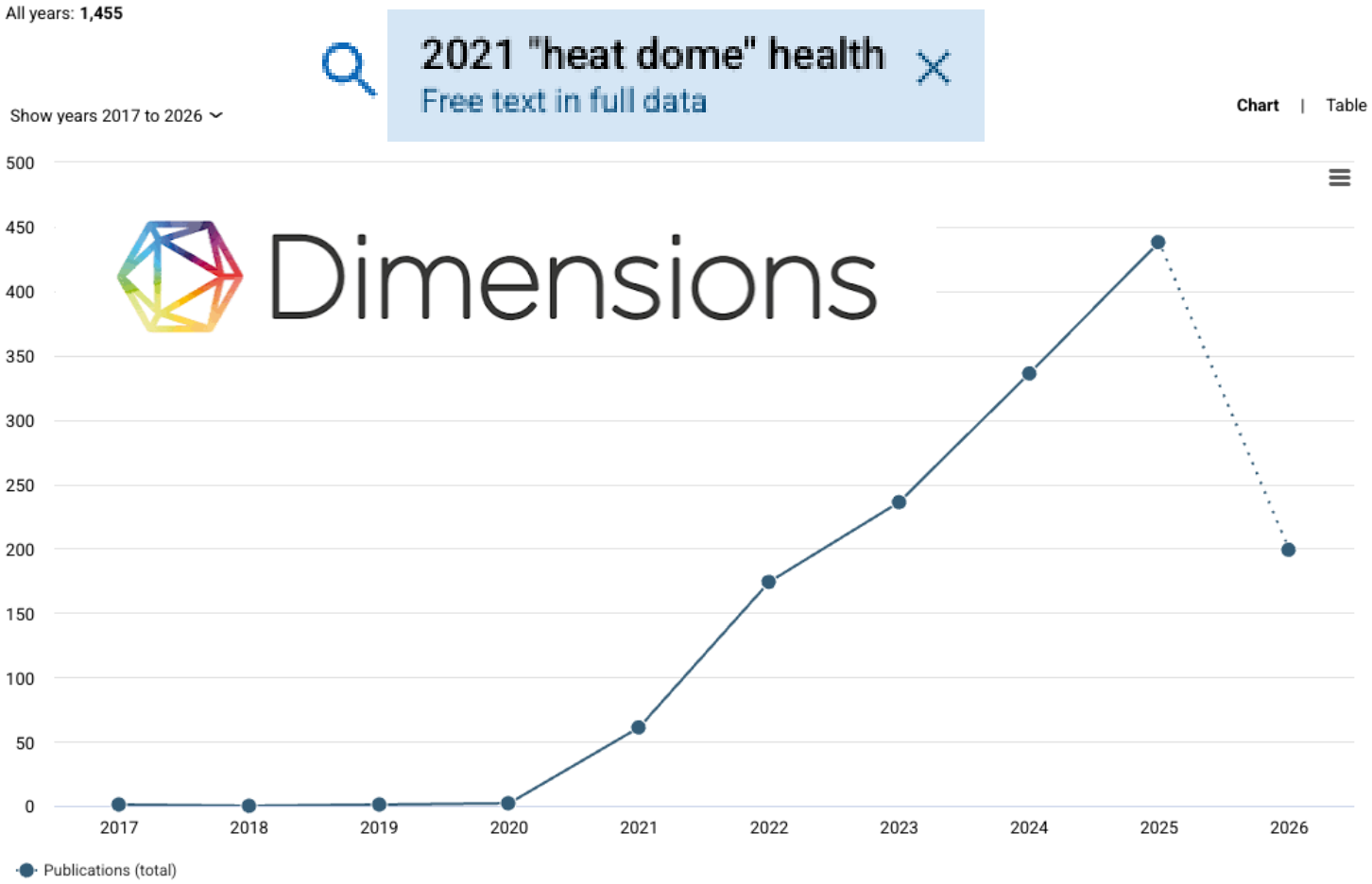
Floors	N	Injury on top floor (%)
1	9	100.0
2	23	56.5
3	126	63.5
4	62	54.8
5-10	26	26.9
11+	34	14.7
All	280	52.9



https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0448608?o=6

We currently have two more studies planned:

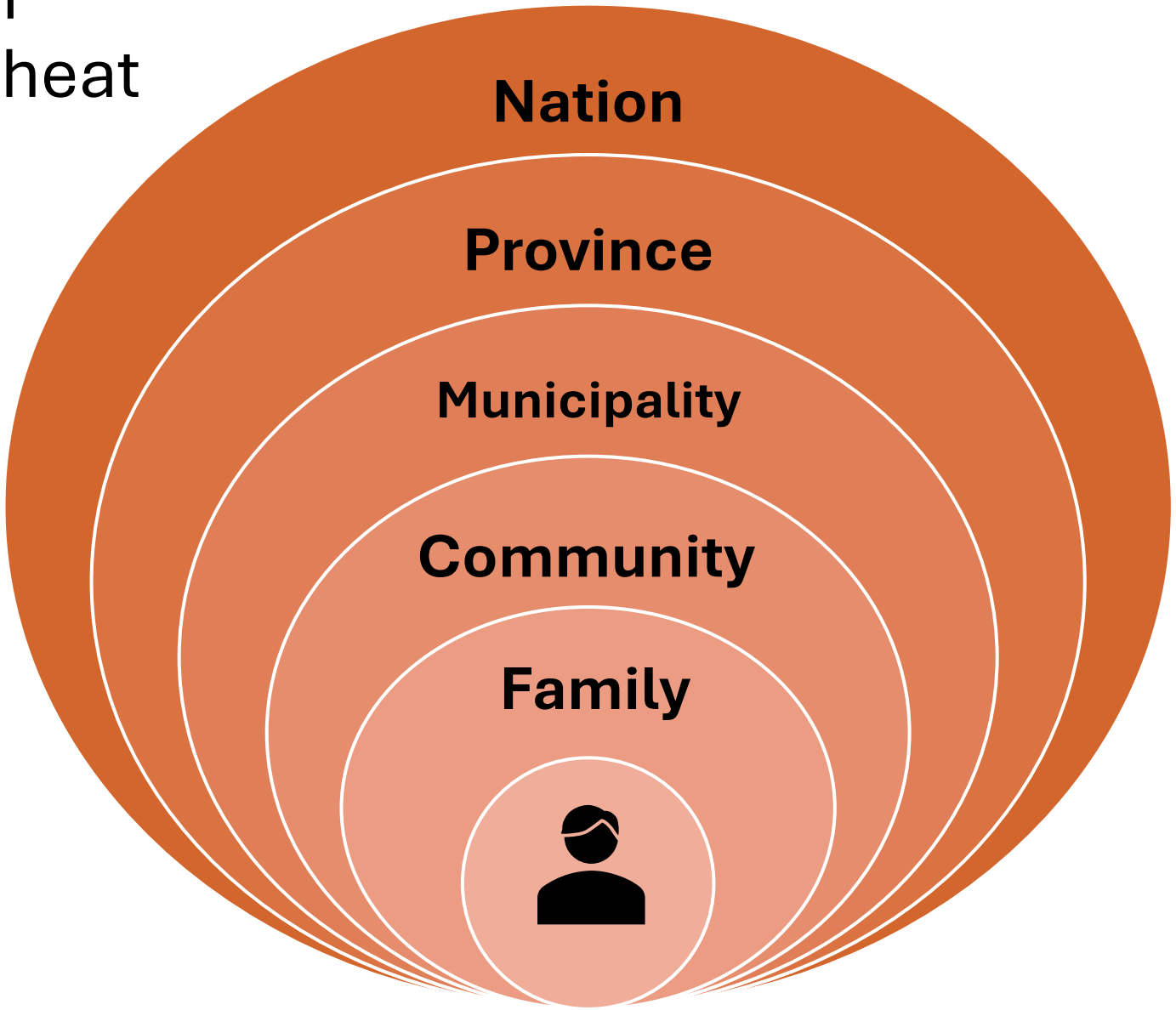
1) Longer-lasting effects of the heat dome on those who survived
2) Applying causal inference methods to prescribed medications



Name Organization, Country	↓Publications
Glen Patrick Kenny University of Ottawa, Canada	45
Robert Douglas Meade University of Ottawa, Canada	26
Emily Jeanne Tetzlaff University of Ottawa, Canada	22
Sarah B Henderson BC Centre for Disease Control, Canada	18
Fergus K O'Connor Griffith University, Australia	17
James Jeremy Mccormick University of Ottawa, Canada	13
Melissa Gorman Health Canada, Canada	12

There is no simple solution when it comes to extreme heat preparedness

- Requires preparation and cooperation from individual to national level
- BCCDC research has informed policy, programs, and practices at all levels



Most of the policy, program, and practice work done since 2021 has required multi-agency, intersectoral partnerships and collaboration.

Work done by BC HEAT with partner support	Work done by partners with BC HEAT support
Extreme heat preparedness guide	Indoor temperature network
BC Heat Alert and Response System	Free air conditioner program
Situational awareness dashboard	Municipal by-law changes
	Provincial building code change
	National building code proposal
	National mortality reporting
	Much, much more…

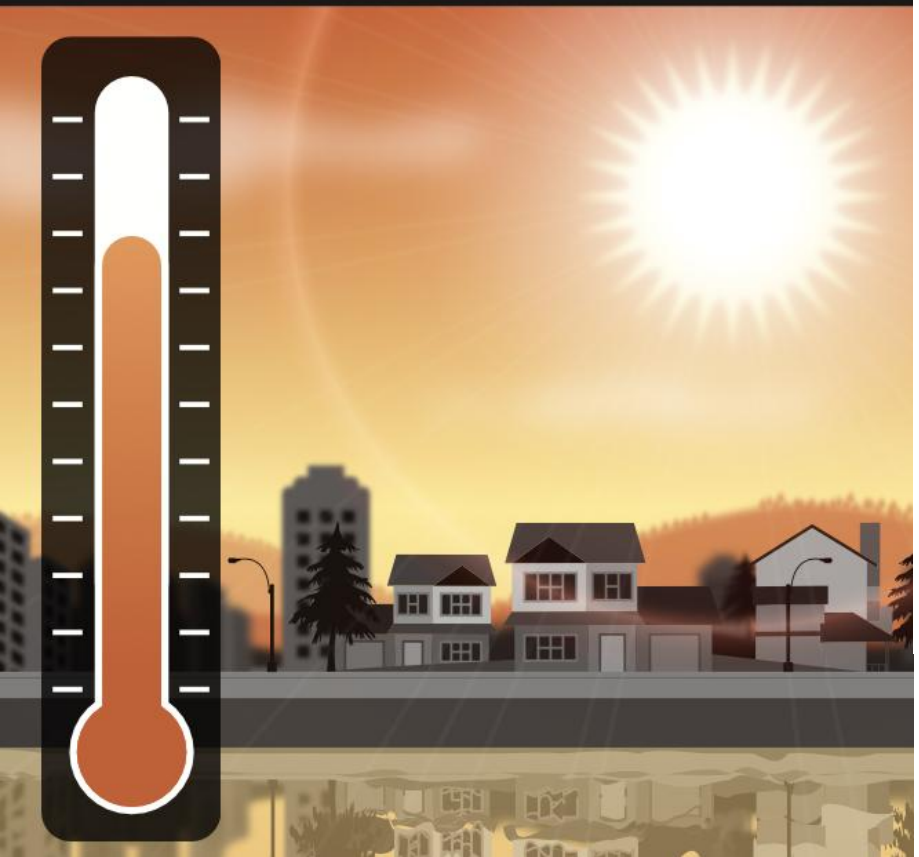
The BC Health Effects of Anomalous Temperatures (BC HEAT) Coordinating Committee was officially established in January 2022.

- Ministry of Health (co-chair)
- BCCDC (co-chair)
- Provincial Health Officer
- Emergency management
- BC Housing
- Ambulance service
- Government communications
- Environment Canada
- Health Canada
- Regional health authorities
- First Nations Health Authority
- Metis Nation BC
- HealthLink BC
- WorkSafe BC
- Union of BC Municipalities
- Coroners service (ad hoc)
- BC Hydro (ad hoc)

Summer 2022

BRITISH COLUMBIA | PreparedBC

Extreme Heat Preparedness Guide



Before Summer

There are many things you can do to prepare for an Extreme Heat Emergency.

The following section walks you through basic readiness steps and heat specific considerations for your emergency plan. Discuss them with your family, friends, and members of your household and use the spaces provided to write notes.

TIP: You can also find and download our fill-in-the-blanks emergency plan at: **preparedbc.ca/emergencyplan**. It will have you covered for any emergency.

1. IDENTIFY THOSE WHO ARE AT RISK

While everyone can benefit from planning and preparing for extreme heat emergencies, the following people are especially at-risk if they do not have access to air conditioning and need to be prepared and supported:

- seniors aged 65 years or older
- people who live alone
- people with pre-existing health conditions such as diabetes, heart disease or respiratory disease
- people with mental illness such as schizophrenia, depression, or anxiety
- people with substance use disorders
- people who are marginally housed
- people who work in hot environments
- people who are pregnant
- infants and young children

2. EVALUATE IF YOU CAN STAY AT HOME

If you know you live in a building or residence that gets very hot, with inside temperatures of 31°C or higher, plan to go elsewhere during an Extreme Heat Emergency.

3. EVALUATE YOUR HOME'S COOL ZONES

Some areas of your residence may stay cooler than others. During an Extreme Heat Emergency, you should prepare to stay in the coolest part of the residence and focus on keeping that one location cool.

Start by identifying a room that's typically coolest and consider how you can modify the layout to support sleeping and day-to-day living for the duration of the heat event.

4. IDENTIFY OTHER LOCATIONS TO GET COOL

If it is not safe for you to stay at home, consider staying with friends or family that have air conditioning or cooler spaces. Alternatively, identify places in your community you can visit to get cool such as:

- libraries
- community centres
- shopping malls
- movie theatres
- religious centres
- parks and other shaded green spaces

You can also contact your First Nation or local government to find out if cooling centres will be available in your area (see contact info on **page 13**).

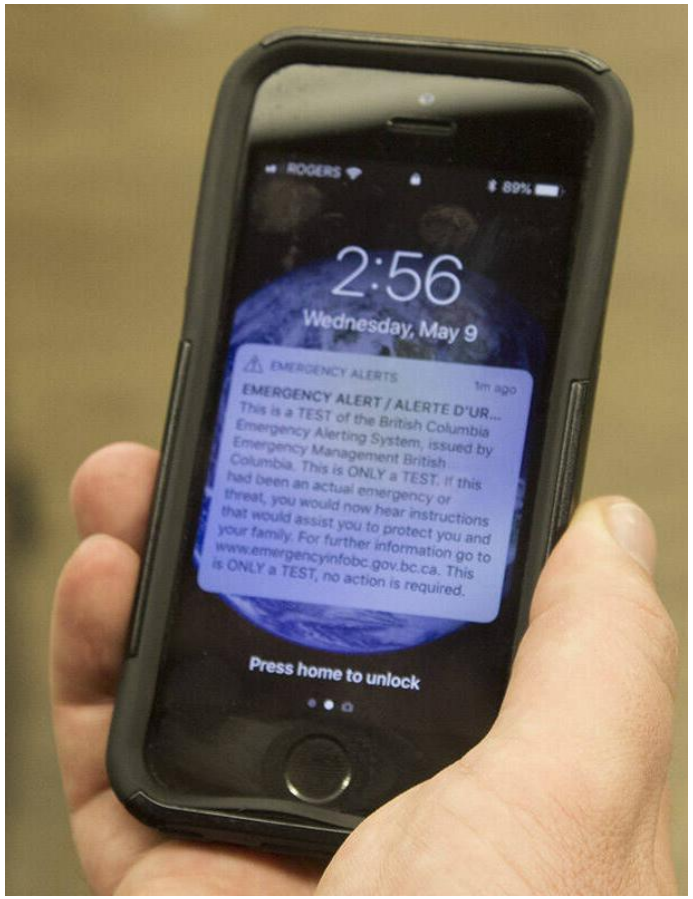
https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/preparedbc/preparedbc-guides/preparedbc_extreme_heat_guide.pdf

The BC Heat Alert and Response System (BC HARS) was first established in 2022 and has been updated every year since.

Table 1 BC HARS: 2026 Description of Guidelines and Thresholds

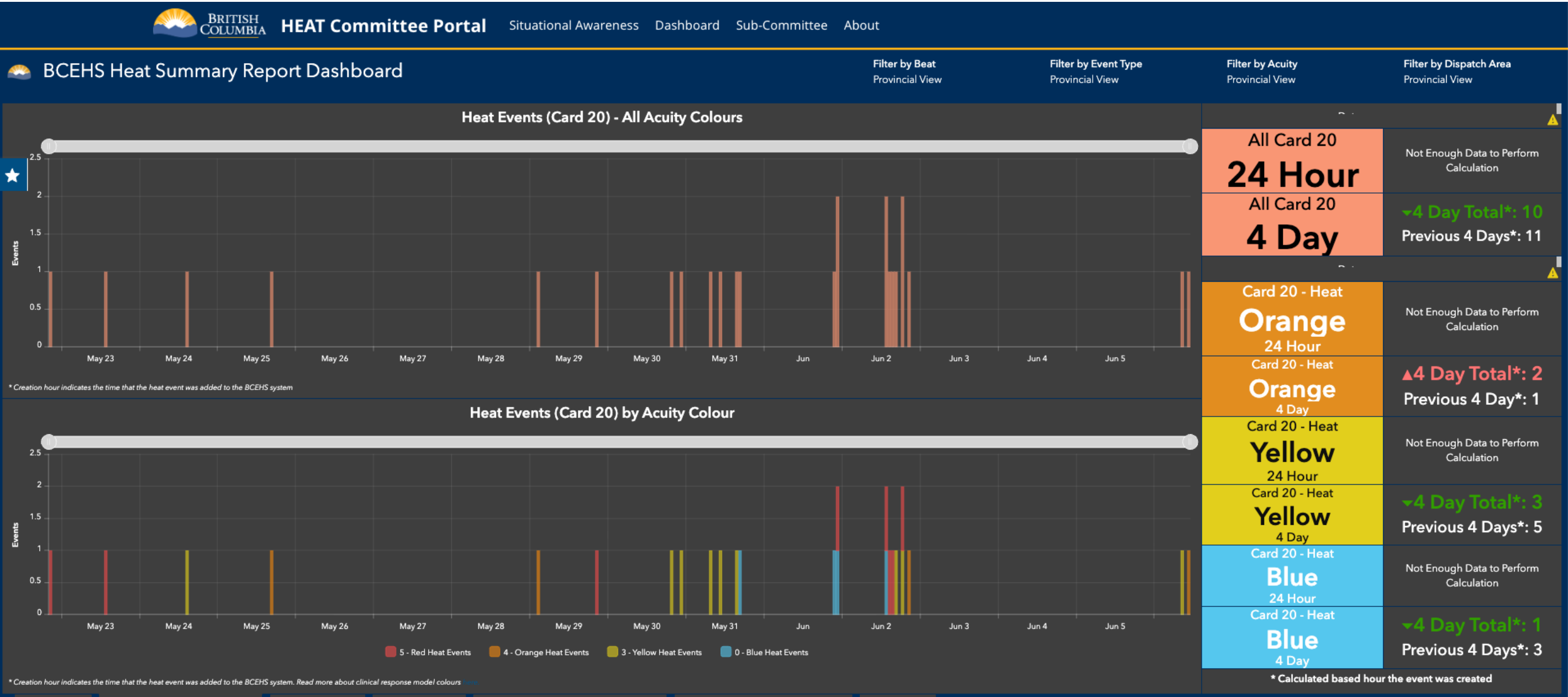
Warning level	Yellow Warning - Heat	Orange Warning - Heat	Red Warning - Heat–
General Criteria	**Unusually high** daytime and overnight temperatures for **2+ days** (see Figure 4 for temperature ranges and zones)	**Very high** daytime and overnight temperatures for **3+ days** (**exceeding temperature** ranges in Figure 4)	Orange warning conditions with a pattern of **substantive day-over-day temperature increases** for **3+ days**
Expected frequency	Approximately 3 per summer (this is the most common warning)	Approximately 1 per summer (this is an uncommon warning)	Approximately 1 per decade (this is a rare warning)

Note: No minimum temperature (Tmin) will be considered for issuing the first Yellow Warning – Heat if it is prior to mid-June.

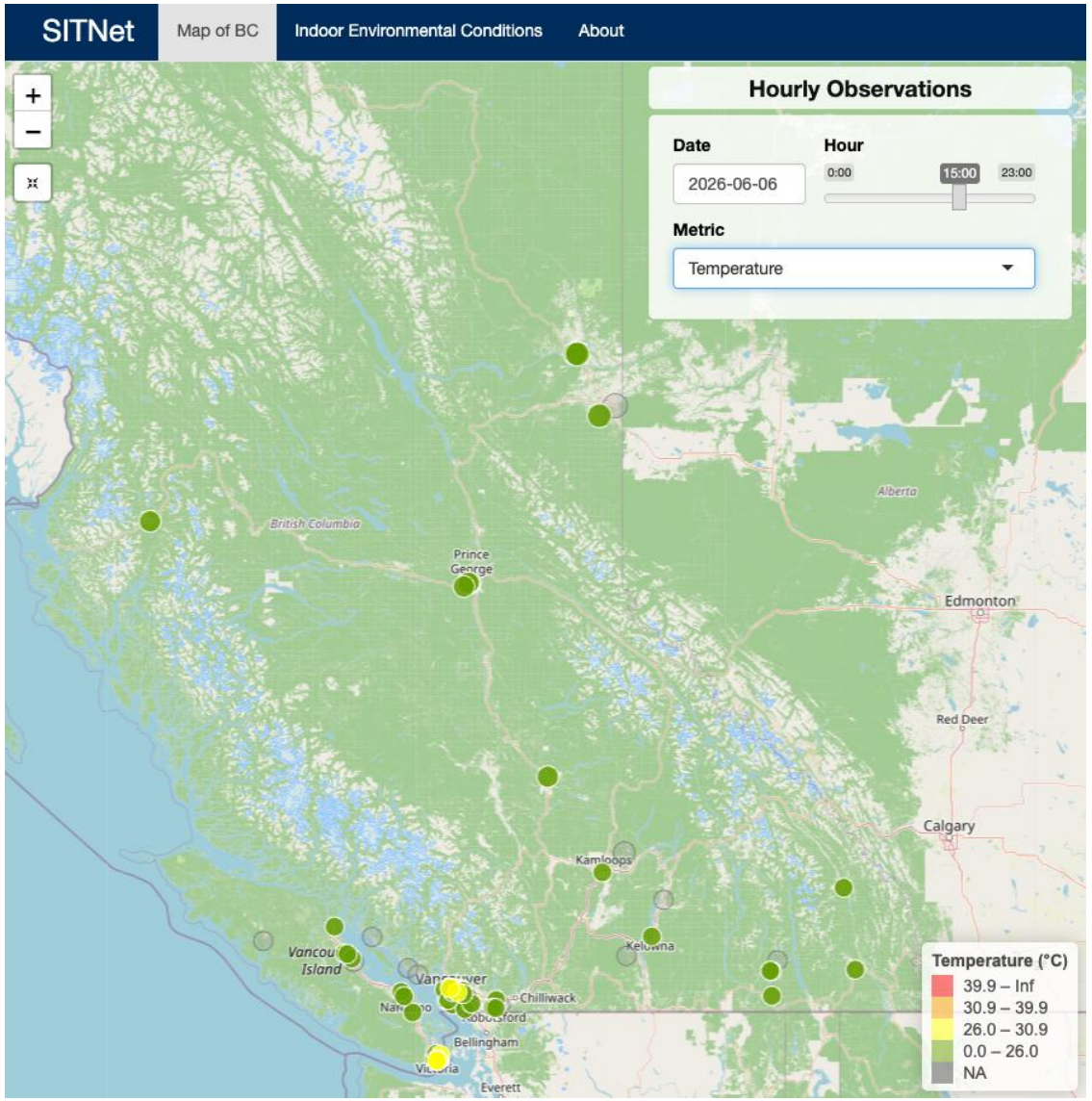


Canada

BC HEAT situational awareness dashboard first launched in 2023, updated every year since (ED, ambulance, temperature data).



The BCCDC Sentinel Indoor Temperature Network (SITNet) pilot launched with 25 sites in 2024, 100 sites added in 2025.



SITNet65

Location: West End

Temperature

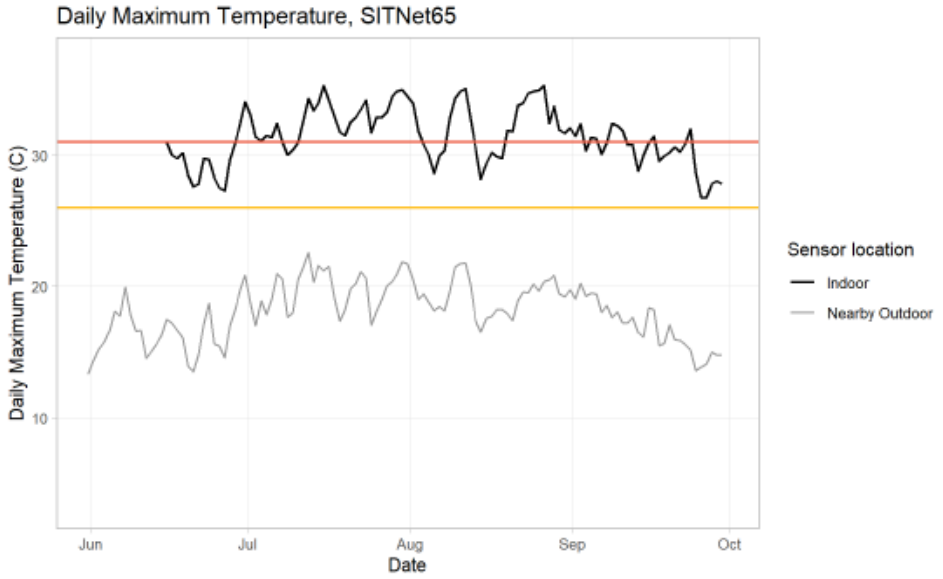


Figure: Daily maximum indoor (black) and outdoor (gray) temperatures. Yellow line = 26°C, red line = 31°C.

Table 115: Indoor temperature summary (hourly data)

Temperature Range	Percent of Hours (%)	Number of Hours
Below 26C	2.9	74
26C to 31C	71.4	1819
Above 31C	25.7	654

Province launches new initiative to protect people during extreme heat emergencies

Updated June 28, 2023

Translations

- 简体中文
- 繁體中文
- ਪੰਜਾਬੀ
- Tagalog

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News Release

Vancouver
Tuesday, June 27, 2023 3:05 PM

Media Contacts

Ministry of Health
Communications
250 952-1887 (media line)

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Vancouver Mandates Air Conditioning in All New Homes

July 25, 2024

English فارسی

Starting in 2025, Vancouver mandates built-in air conditioning for all new homes to combat rising temperatures and protect residents. This move aims to enhance safety and comfort amid increasing climate challenges.

https://www.artemissaffari.com/blog/vancouver-mandates-air-conditioning-in-all-new-homes

NEWS ARCHITECTURE & DESIGN DEVELOPMENT URBANIZED

Liveable homes: BC government to require new buildings to not exceed 26°C for living space

Kenneth Chan | Dec 6 2023, 3:55 pm

https://dailyhive.com/vancouver/bc-government-building-code-changes-cooling-accessibility-seismic

Submit a comment

Proposed Change 2061

Code Reference(s):	**NBC20 Div.B 1.1.3.1. (first printing)** **NBC20 Div.B 6.2.1. (first printing)** **NBC20 Div.B 9.33.2.1. (first printing)** **NBC20 Div.B 9.33.3. (first printing)** **NBC20 Div.B 9.33.5. (first printing)**
Subject:	Overheating
Title:	Overheating in New Dwelling Units
Description:	This proposed change requires new dwelling units to be provided with mechanical cooling in locations where the outside summer design temperature exceeds 26°C.

Establishing 26°C as the maximum indoor air temperature aligns with recommendations from the BC Centre for Disease Control (report to the chief coroner), studies by the University of Ottawa and the National Research Council, and is supported by the World Health Organization as an appropriate threshold for the protection of vulnerable populations.

Multiple studies and guidelines highlight the link between indoor temperature control and the reduction of heat-related illness and mortality. Keeping indoor temperatures below this limit helps reduce cardiovascular strain, prevent dehydration, and limit heat build-up in buildings, and thereby lowers the risk of heat exhaustion or heat stroke.

British Columbia

Landlords must ensure apartments don't get too hot under new New West bylaw

City will require landlords to keep at least 1 room in a rented apartment at or below 26 C

Lauren Vanderdeen · CBC News ·
Posted: Apr 02, 2026 7:00 AM PDT | Last Updated: April 2

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Estimated 4 minutes

Vancouver landlords to face $1,000 fines for prohibiting air conditioners

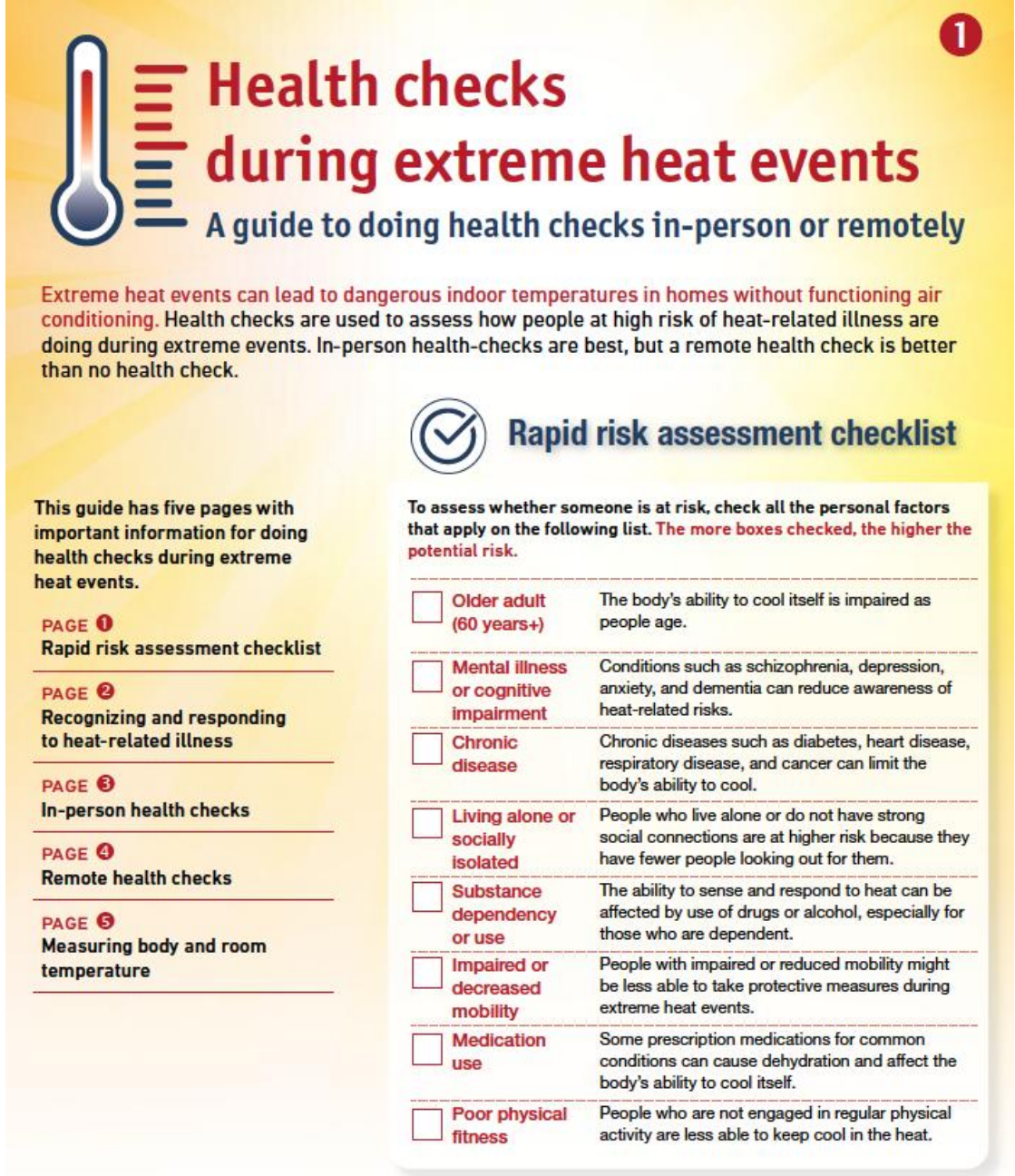
By unanimous council vote, Vancouver follows other municipalities in Canada and the United States that have established regulations supporting renters' access to cooling.

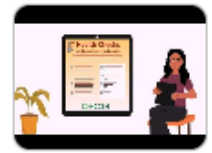
By Dan Fumano

Published Jun 03, 2026 2 minute read 18 Comments

The Canadian Heat-Attributable Mortality Planning Symposium (CHAMPS)

- A national dialogue about investigating and attributing heat-related mortality
- Presentations, panel discussions, and conversations
- Coroners and medical examiners froma ll provinces and territories invited to attend in Ottawa, May 2027
- Fully funded by Health Canada HeatADAPT
- Hosted by BC Coroners Service and BCCDC





Staying safe in extreme heat: A quick guide to health checks [Video]

June 18, 2025

Video and Tools

We prepared this animated video on health checks during extreme heat to accompany our Extreme heat health check tool, which is available in English, French, Chinese (Traditional and Simplified)...

Climate Change | Extreme Weather

Extreme heat events: Media communication with impact

May 08, 2025

Evidence Review

Key Messages Media reporting on extreme heat events can affect public perception of risk and the protective measures people take in response. Interviews were...

Climate Change | Extreme Weather

Public Health Fundamentals | Health Promotion And Protection

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

March 31, 2025

Evidence Review

Key messages Context: Extreme heat events are increasing in number, duration, and intensity due to climate change. Heat alert and response systems (HARS)...

Climate Change | Extreme Weather

Thank you!

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BC Centre for Disease Control

National Collaborating Centre for Environmental Health

Centre de collaboration nationale en santé environnementale

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