Climate, Health & Sustainable Care

Inaugural Symposium

UNIVERSITY OF TORONTO

COLLABORATIVE CENTRE FOR Climate, Health + Sustainable Care

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Mental Health & the Climate Crisis: *Population risk exposures and promising directions for interventions*

Daniel Rosenbaum, Eric Brown, Siqi Xue

Moderator: Sean Kidd

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CLIMATE, HEALTH & SUSTAINABLE CARE INAUGURAL SYMPOSIUM

22 October 2024

Extreme heat and people with Severe & Persistent Mental Illness

Daniel Rosenbaum, MD, FRCPC

Project ECHO®

Disclosures

Relevant relationships with commercial entities

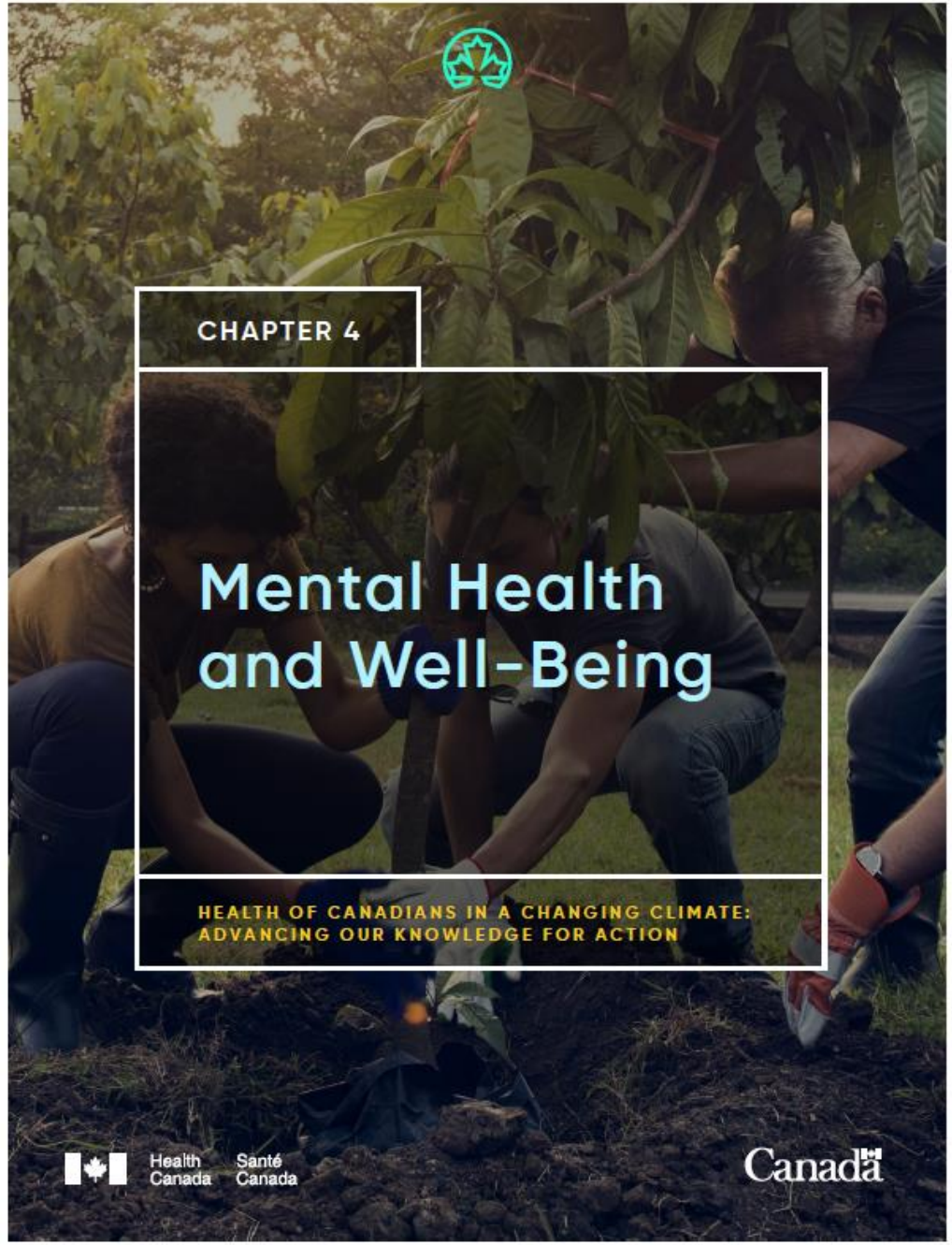
- None

Potential for conflicts of interest within this presentation

- None

Steps taken to review and mitigate potential

- n/a


CHAPTER 4
Mental Health and Well-Being
HEALTH OF CANADIANS IN A CHANGING CLIMATE: ADVANCING OUR KNOWLEDGE FOR ACTION
Health Canada
Santé Canada
Canada

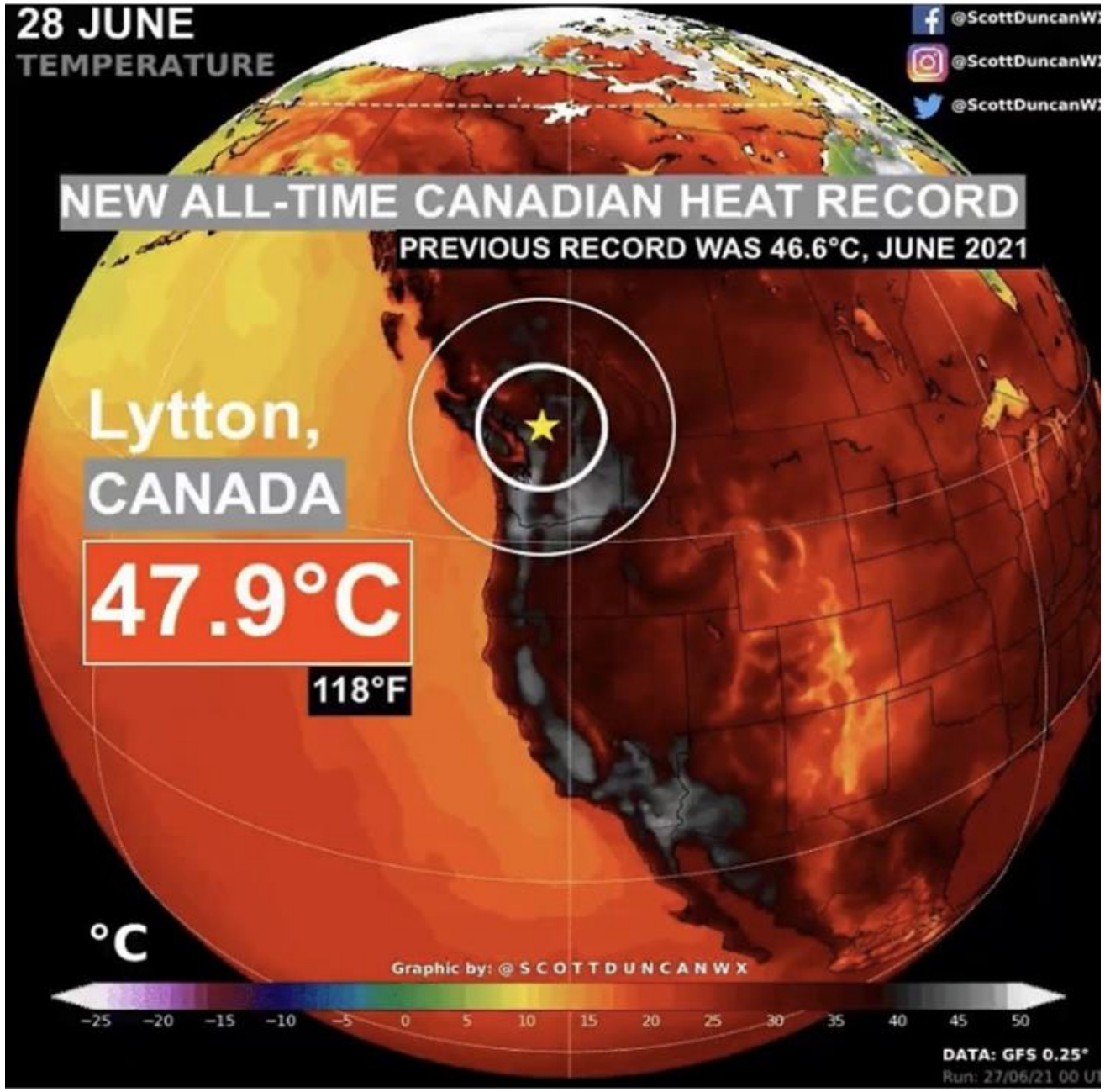
Climate crisis as “**threat amplifier**”

- Disproportionate impact on marginalized and vulnerable populations

- More vulnerable the person, less power in the face of climate crisis
  - True within and across borders/jurisdictions

Heat & mental health

- “Because of their rapidly growing frequency, duration, and intensity, **heat waves** are of particular concern, with strong evidence linking their occurrence to **increases in population distress, hospital psychiatric admissions, and suicides**” (Lancet report 2018)
- Increased risk of aggression, violence, and suicide (Hayes et al 2021)
- Increased ambulance calls, ED visits, calls to telehealth, and/or increases in people seeking outpatient MH care (Hayes et al 2021)
- Statistical effect size of hot days on population mental health approximates that of unemployment (Berry 2018)



GeoHealth

Research Article | Open Access

Chronic Diseases Associated With Mortality in British Columbia, Canada During the 2021 Western North America Extreme Heat Event

Michael Joseph Lee, Kathleen E. McLean, Michael Kuo, Gregory R. A. Richardson, Sarah B. Henderson

First published: 15 March 2023 | https://doi.org/10.1029/2022GH000729 | Citations: 1

Commentary

The Canadian Journal of Psychiatry / La Revue Canadienne de Psychiatrie
1-3

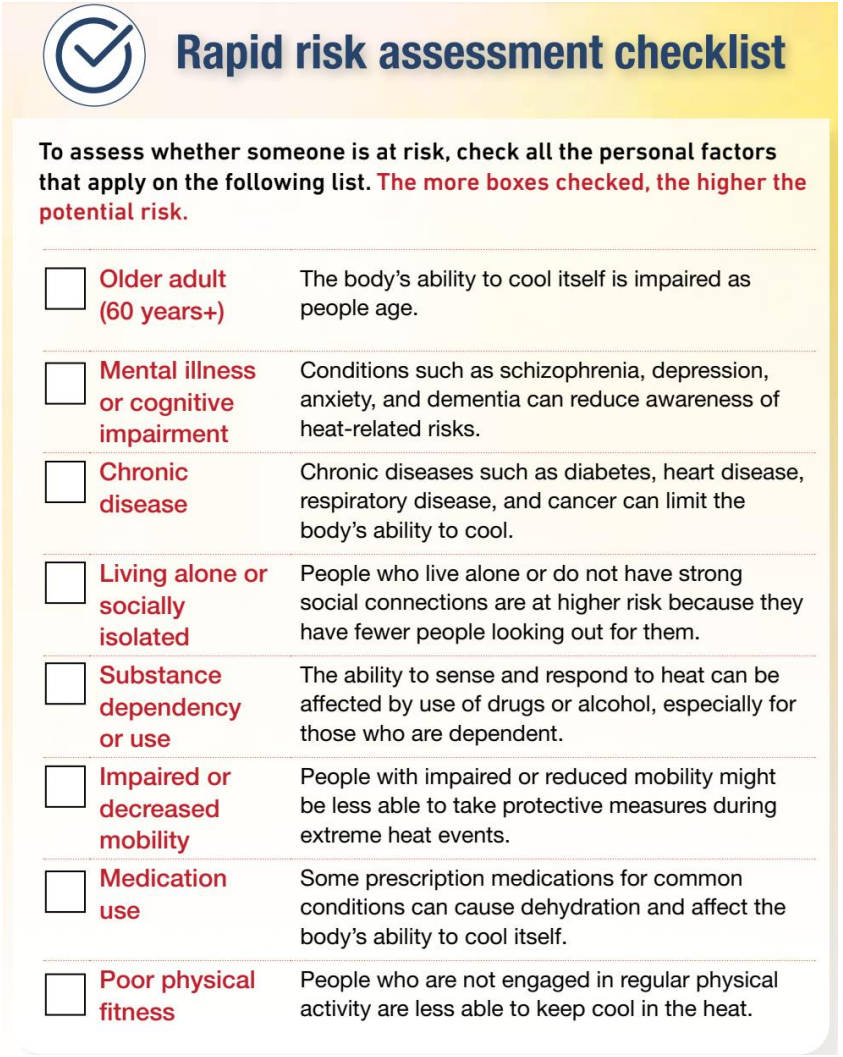
DOI: 10.1177/07067437231220797
TheCJP.ca | LaRCP.ca
Sage

Heat Resilience and Severe & Persistent Mental Illness

Samantha Green, MD CCFP[1,2], Daniel Rosenbaum, MD FRCPC[3] and Michaela Beder, MD FRCPC[3]

Who is at risk?

1. **HEAT-EXPOSED GROUPS**: workers, urban inhabitants, homeless individuals, occupants of poorly heat-adapted housing (e.g prisons)
2. **HEAT-SENSITIVE GROUPS**: seniors, children, pregnant persons, chronic illness patients (asthma, diabetes), those with mental health issues, PWUDs, users of heat-sensitizing medications (e.g., beta blockers, antihistamines, antidepressants, antipsychotics, diuretics).
3. **RESOURCE OR INFORMATION-LIMITED GROUS:** people living in poverty, homeless individuals, residents of racialized or impoverished communities, individuals with language barriers.



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.

Risk factors for people with SPMI

- Positive and negative symptoms
- Cognitive symptoms
- Poor insight into health status
- Redundant clothing
- Medications
- Substance use
- Malnutrition
- Housing status

Arnold VK, Rosenthal TL, Dupont RT, Hilliard D. Redundant clothing: a readily observable marker for schizophrenia in the psychiatric emergency room population. *J Behav Ther Exper Psychiatry.* 1993;24:45–47

How can we prevent heat-related illness in people with Severe & Persistent Mental Illness?

Drs. Daniel Rosenbaum, Samantha Green, Michaela Beder, Sarah Levitt, Talveer Mandur, Palika Kohli, and Grace Kuang

Mild heat-related illness

Mild heat-related illness can rapidly become severe heat-related illness. Immediate cooling is important to prevent progression.

Signs and symptoms

Any of the following can be signs of **mild** heat-related illnes:

- Feeling unwell
- Dizziness
- Headache
- Irritability
- Fatigue
- Thirst
- Skin feels very warm and sweaty
- Increase in resting heart rate
- Reduced urine output

Moderate heat-related illness

Moderate heat-related illness can rapidly become severe heat-related illness. Immediate cooling is important to prevent progression.

Signs and symptoms

Any of the following can be signs of **moderate** heat-related illness:

- Nausea
- Light-headedness
- Weakness
- Extreme fatigue, malaise
- Very thirsty or dry mouth
- Difficulty swallowing
- Heat rash, unusual swelling, or cramps
- Rapid heart rate
- Body temperature >38°C (100°F)
- Reduced, dark urine output

Severe heat-related illness

Severe heat-related illness is a life-threatening emergency. Act immediately to get help and start emergency cooling measures.

Signs and symptoms

Any of the following can be signs of **severe** heat-related illness:

- Fainting or loss of consciousness
- Unusual confusion or disorientation
- Severe nausea and vomiting
- Difficulty speaking
- Unusual coordination problems
- Hot, flushed skin or very pale skin
- Not sweating
- Rapid breathing and faint, rapid heart rate
- Body temperature >39°C (102°F)
- Very low, dark urine output

Reducing body temperature

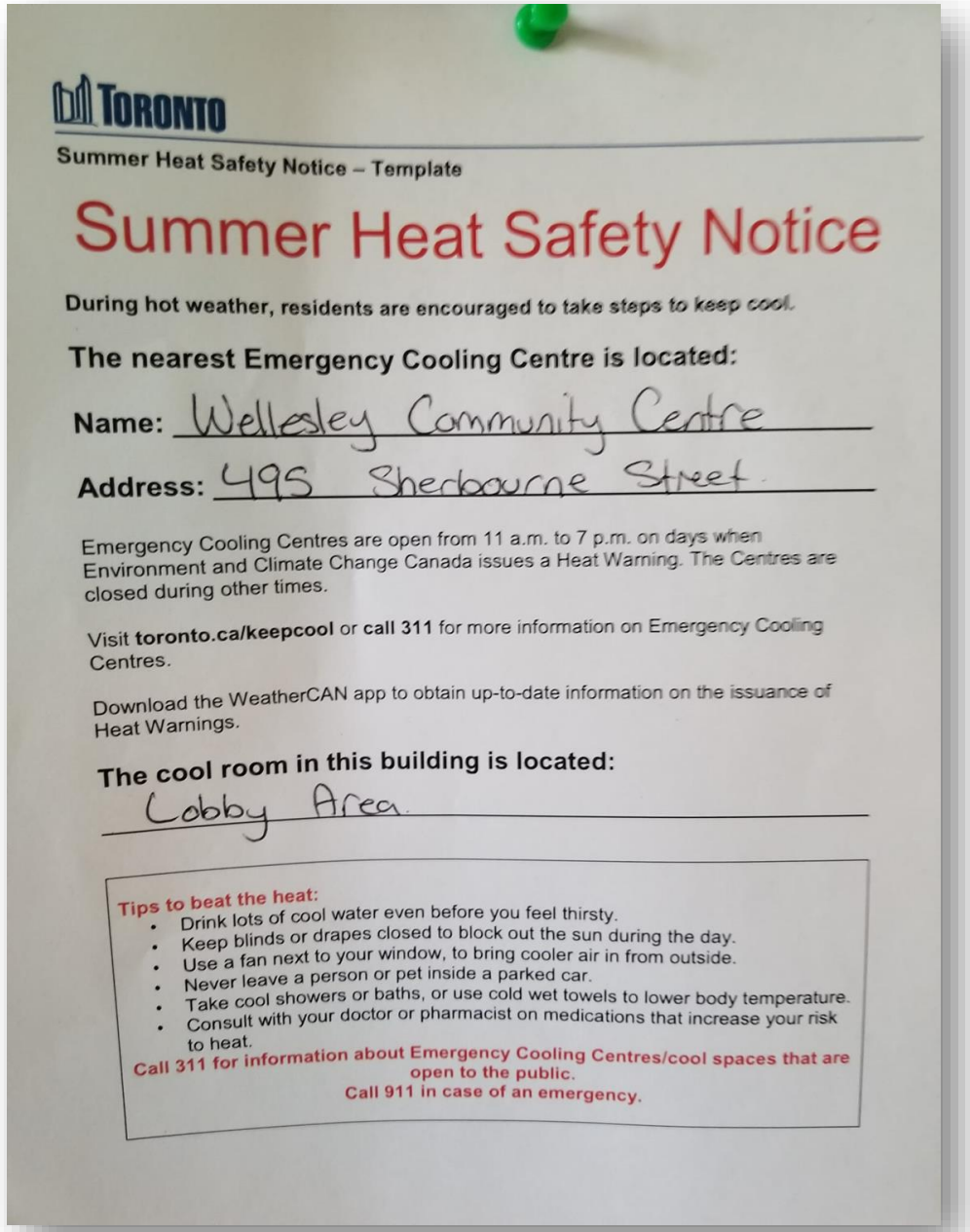
- ☐ Take off extra layers of clothing to expose as much skin as possible.
- ☐ Have access to cool drinking water and drink regularly, even when not feeling thirsty.
- ☐ Prepare damp towels in a plastic bag and put them in the fridge to apply on the body regularly.
- ☐ Take cool showers or baths or sit with feet in cool water.
- ☐ Fill a spray bottle with cool water for misting.
- ☐ Limit physical activity and exposure to the outdoors during the hottest hours.

Reducing indoor temperatures

- ☐ Turn on an air conditioner, if available.
- ☐ Turn on fans if the room temperature is below 35°C.
- ☐ Move to a cooler space within the home, if safe to do so.
- ☐ Draw curtains, shades, or shutters to help block direct sunlight.
- ☐ Cover windows with a blanket or cardboard if there are no curtains or shades.
- ☐ Close windows during the heat of the day to trap cooler air indoors.
- ☐ Open windows overnight or whenever there is a cool breeze, keeping safety in mind.
- ☐ Turn off heat-generating devices such as appliances, electronics, lights, etc.

Micro Interventions: Staying Cool

- common cool room
- cool public spaces including cooling centres, malls, libraries, places of worship, museums, shopping malls
- public pools & beaches
- avoid the sun: umbrella, tree cover, parks



TORONTO

Summer Heat Safety Notice – Template

Summer Heat Safety Notice

During hot weather, residents are encouraged to take steps to keep cool.

The nearest Emergency Cooling Centre is located:

Name: Wellesley Community Centre

Address: 495 Sherbourne Street

Emergency Cooling Centres are open from 11 a.m. to 7 p.m. on days when Environment and Climate Change Canada issues a Heat Warning. The Centres are closed during other times.

Visit **toronto.ca/keepcool** or **call 311** for more information on Emergency Cooling Centres.

Download the WeatherCAN app to obtain up-to-date information on the issuance of Heat Warnings.

The cool room in this building is located:

Lobby Area

Tips to beat the heat:

- Drink lots of cool water even before you feel thirsty.
- Keep blinds or drapes closed to block out the sun during the day.
- Use a fan next to your window, to bring cooler air in from outside.
- Never leave a person or pet inside a parked car.
- Take cool showers or baths, or use cold wet towels to lower body temperature.
- Consult with your doctor or pharmacist on medications that increase your risk to heat.

Call 311 for information about Emergency Cooling Centres/cool spaces that are open to the public.

Call 911 in case of an emergency.

Cooling centres: barriers & best practices

Widerynski et al. 2017
https://www.cdc.gov/climateandhealth/docs/UseOfCoolingCenters.pdf

For people with SPMI:

- Stigma
- Need to travel far from home
- Tendency not to view themselves as “vulnerable”

Therefore, need to work towards:

- Accessibility
- Inclusivity
- Desirability
  - Places people want to spend time
  - Activities & social programs → dual benefits for mental health / recovery

Education as a low-value improvement intervention: often necessary but rarely sufficient

Christine Soong ,[1] Kaveh G Shojania[2]

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Since the launch of Choosing Wisely in the United States,[1] efforts to raise awareness about avoiding low-value care have spread internationally,[2] prompting numerous commentaries,[3–7] descriptive studies and improvement interventions,[8–10] as well as inspiring new hospital job descriptions (eg, Chief Value Officer), journal sections[11] and conferences devoted to the 'Less is More' paradigm. Low-value clinical care refers to services or interventions that provide little to no benefit to patients in specific clinical scenarios, may cause harm and/or incur unnecessary cost.[6 12 13]

One example of a commonly encountered low-value practice is the continuation of proton pump inhibitors (PPIs) in patients without indication for ongoing use. Following completion of a defined period of therapy for appropriate indications (eg, peptic ulcer disease), continued use of PPIs provides little value, yet de-prescribing occurs infrequently. Moreover, this low-value use unnecessarily exposes patients to associated PPI-related adverse events such as pneumonia and

with other GPs nationwide. The remainder of the programme consisted of educational interventions, which th
a mixture of 'passive'
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mailed evidenced-prac
and other information
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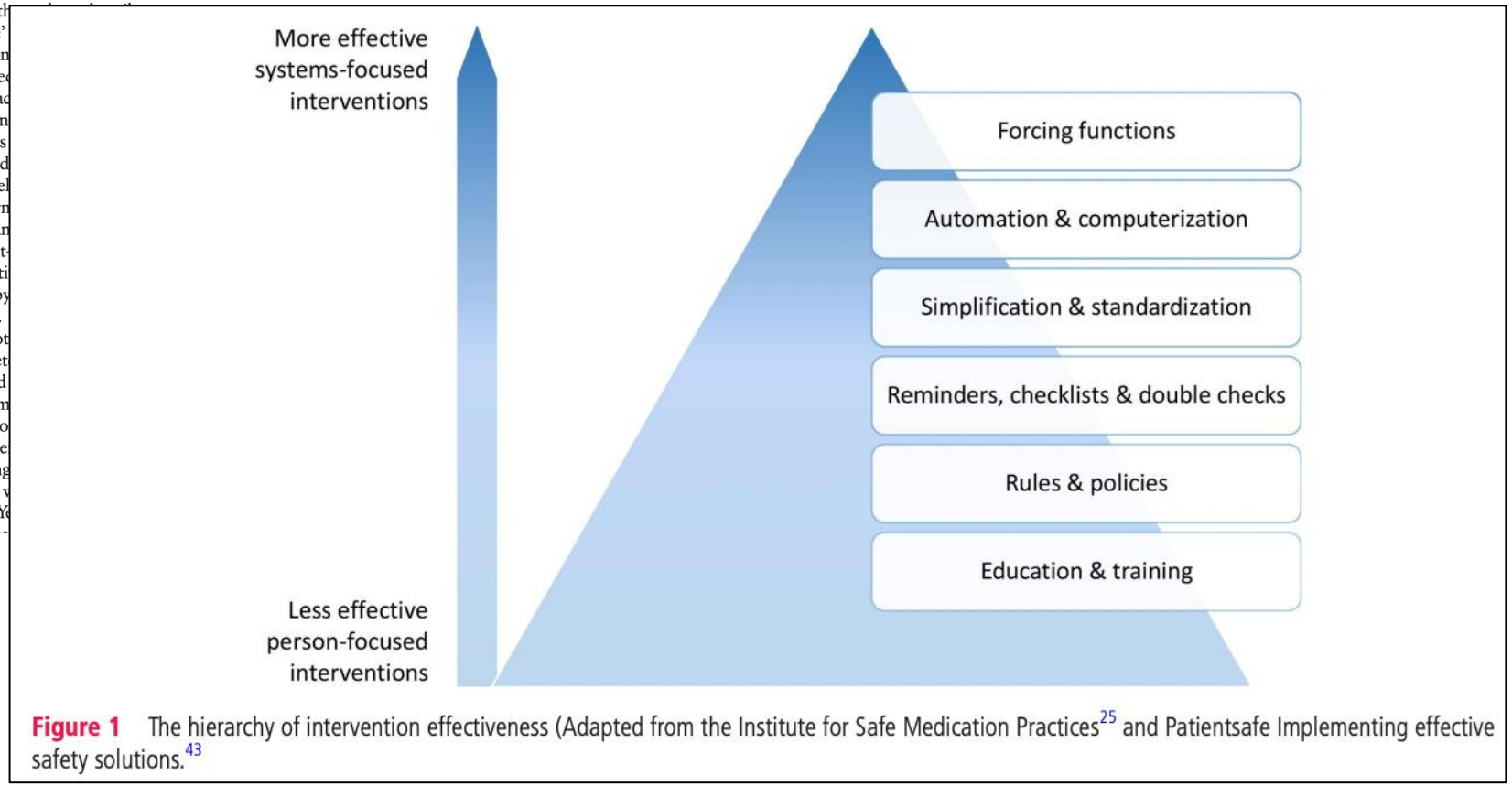

Figure 1 The hierarchy of intervention effectiveness (Adapted from the Institute for Safe Medication Practices[25] and Patientsafe Implementing effective safety solutions.[43]

Thank you & questions

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Impact of Climate Change on the Mental Health of Older Adults

Climate, Health & Sustainable Care Inaugural Symposium

October 22, 2024

camh

Eric Brown, MD, MSc, FRCPC

Interim Chief, Psychiatrist, and Associate Scientist, Geriatric Division, CAMH

Assistant Professor, Department of Psychiatry, University of Toronto

Mental Health in Older Adults

Age cutoff as definition doesn't capture "geriatric" mental health conditions

Early- and late-onset mental health disorders

- Anxiety and depression are common
- Schizophrenia persists into late life and in rare cases can emerge in late life
- Neurocognitive disorders

Spectrum of functional impairment and dependence on care partners, systems and facilities

Pandemic as Analogy

Impacts felt differently depending on illness, function, setting.

- Despite highest risk for death and disability, age was protective of some of the mental health impacts of the pandemic

Functional Independence □ Community Supports □ Supportive Housing/RH □ LTC

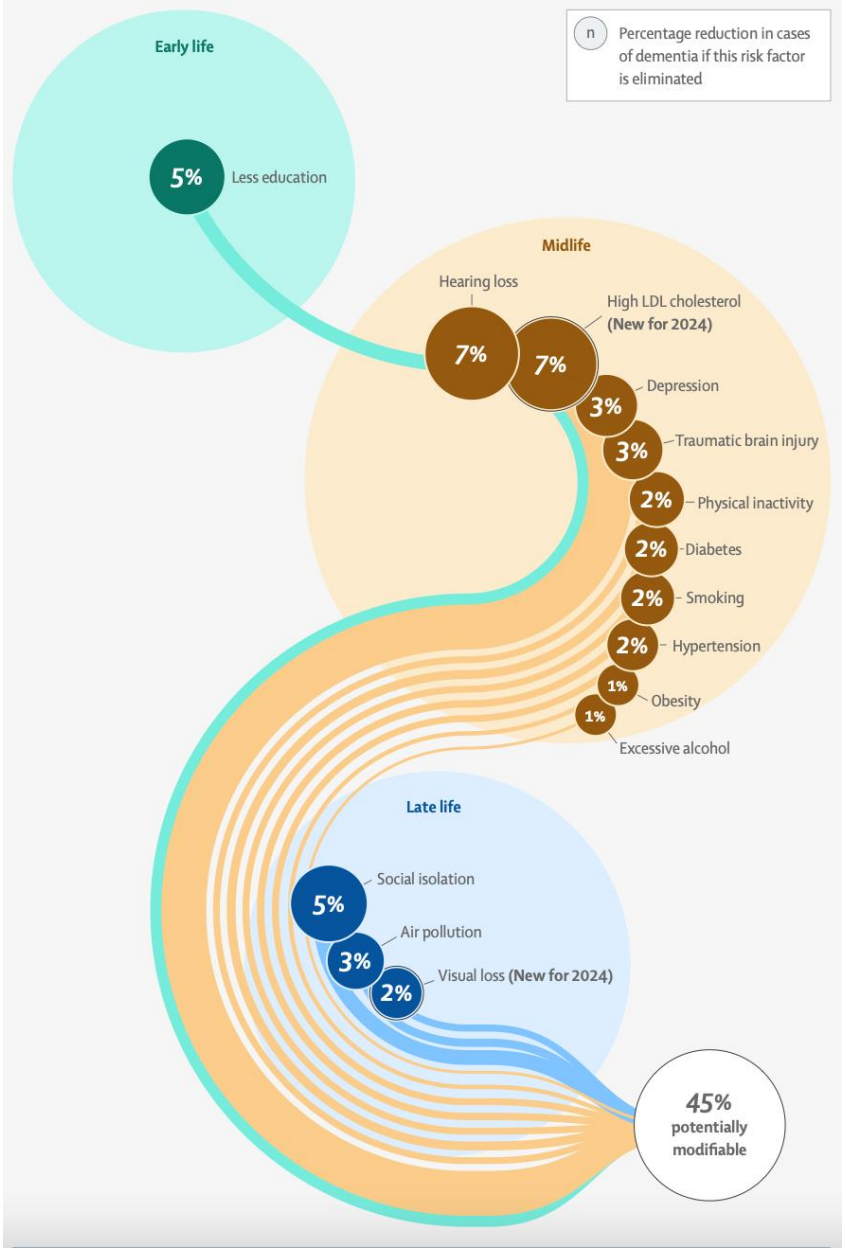
Early life experiences and exposures can impact late life mental health

Early life experiences and exposures can impact late life mental health

Consider upstream impacts to health and mental health

Dementia associated with early- and mid-life risk factors

2024 Lancet Commission: Air pollution reduction reduces dementia



Dementia (Major Neurocognitive Disorder)

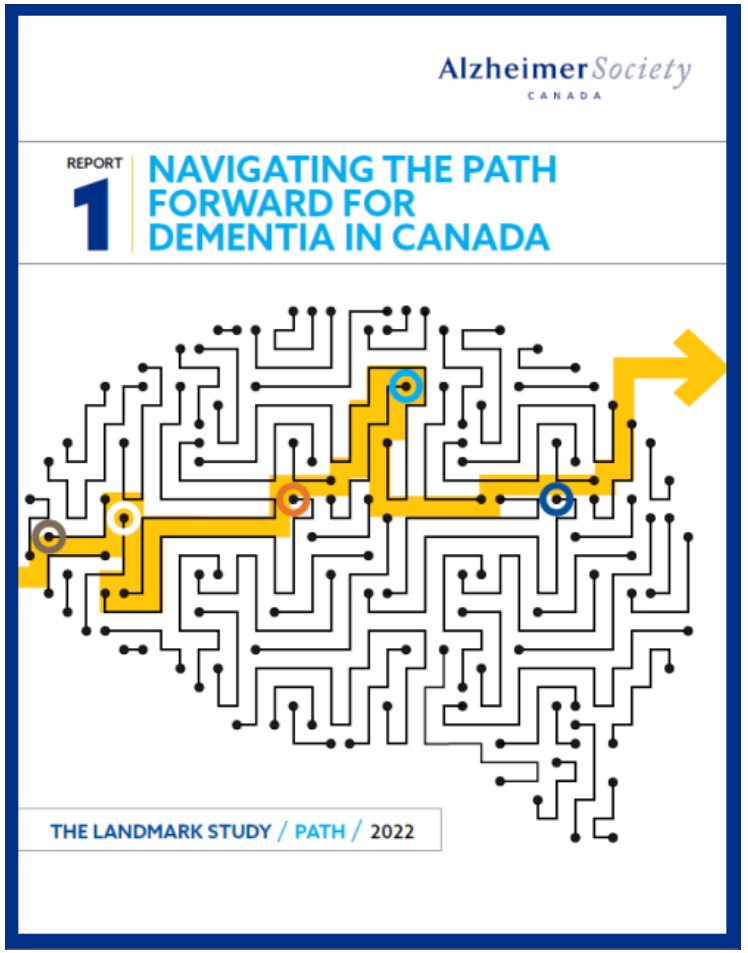
Chronic acquired reduction in cognitive function which impacts daily life

Caused by many different diseases, Alzheimer's is the most common

733,040 people in Canada living with dementia

6.3 million people in Canada will develop, have or die with dementia between 2020 and 2050

Delaying onset of dementia by 1 year avoids ~ 500,000 cases by 2050



2021 Western North America Heat Dome and Wildfires

Heat wave June 25-30, 2021

- 619 deaths in BC due to heat

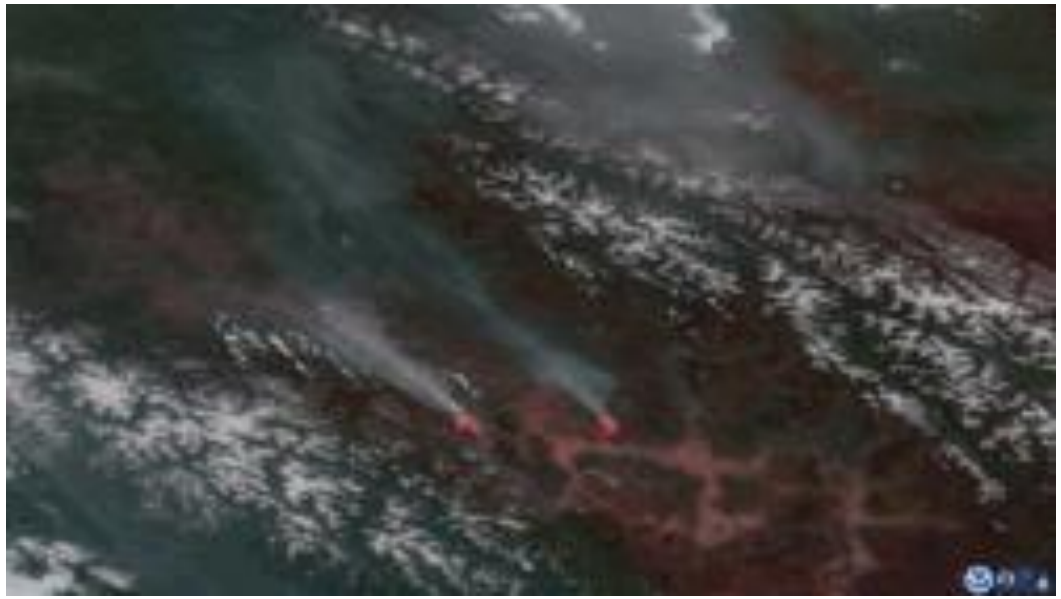
Intensity attributed to climate change

Record temp. in Canada – 49.6°C

Extensive wildfires

Town of Lytton destroyed

808 deaths in Western Canada



Wildfires and Air Pollution

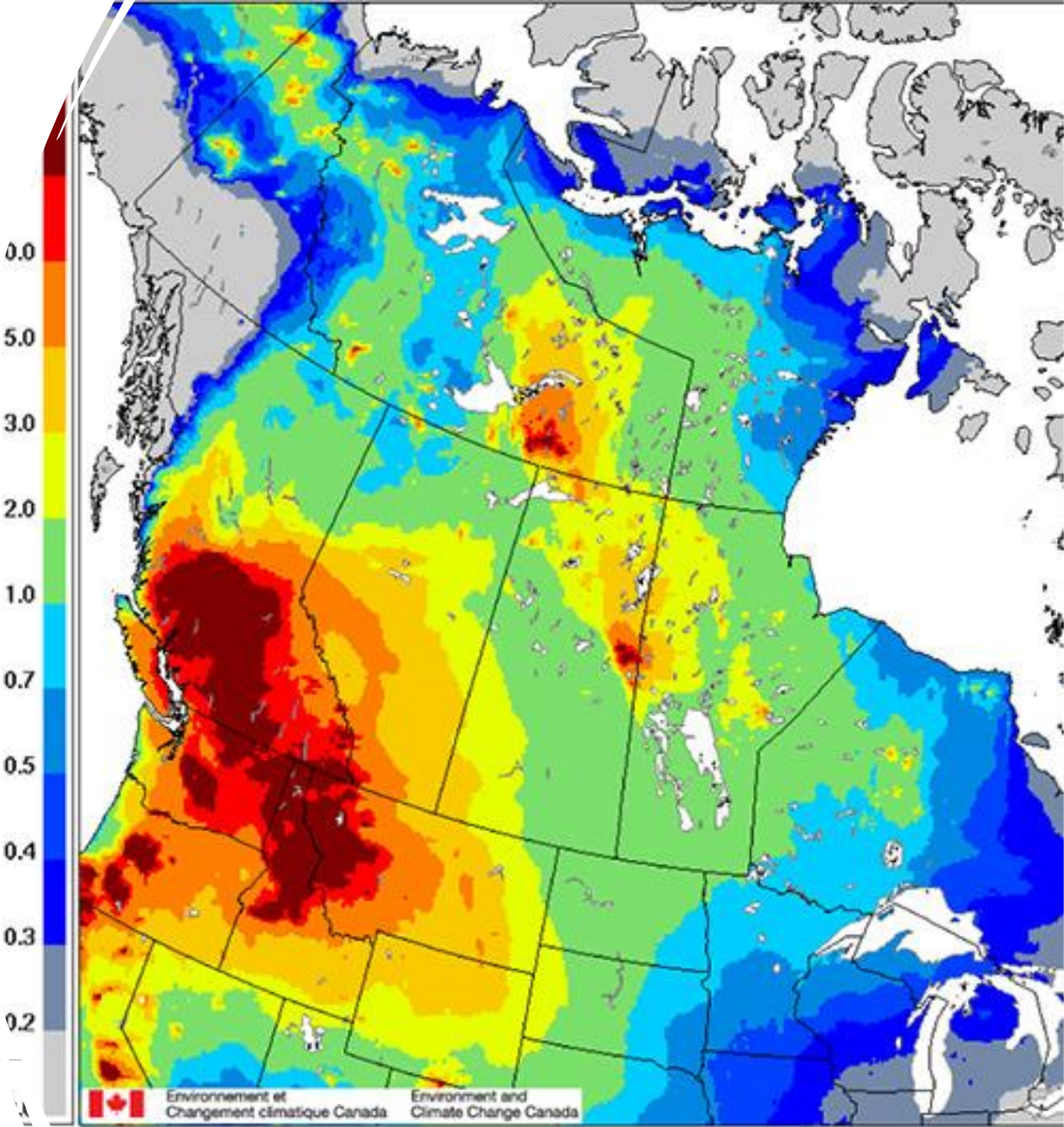
$PM_{2.5}$ (fine particulate matter) is strongly linked to wildfires

Linked to 100s-1000s deaths/yr in Canada (Matz)

Recently, $PM_{2.5}$ is thought to be a cause of cognitive decline and dementia, based on a longitudinal study of > 20,000 adults in US (Zhang and Adar)

May cause 188,000 cases of dementia per year

A meta-analysis of 12 studies showed the risk of dementia increased by 3% per 1 $\mu g/m^3$ increment in $PM_{2.5}$ (HR, 1.03; 95% CI [1.02–1.05]; I^2 = 100%). (Abolhasani et al)



Heat Waves

Older adults have the highest risk of death from heat events (Bratu et al.)

Older adults are the most vulnerable to heat related illness

Mental health disorders are exacerbated by heat waves

- Anxiety
- Mood
- Psychotic
- Neurocognitive

Heat Related Illness is associated with an increased risk of dementia (Kuo 2024)

Heat Related Illness and Dementia (Kuo et al 2024)

Cohort study of Taiwan National Health Insurance Research Database

Identified 70,721 patients with HRI without dementia from 2001-2015

Matched to 282,834 patients without HRI by age, sex, and index date

Followed cohorts to 2018 and compared risk using Cox proportional hazards regression models

HRI ~ higher risk of dementia–adjusted hazard ratio = 1.24 (1.19–1.29)

Heat stroke ~ adjusted hazard ratio = 1.26 (1.18–1.34)

Animal model of heat stroke: hippocampus damage including neuronal loss, amyloid plaques

Floods

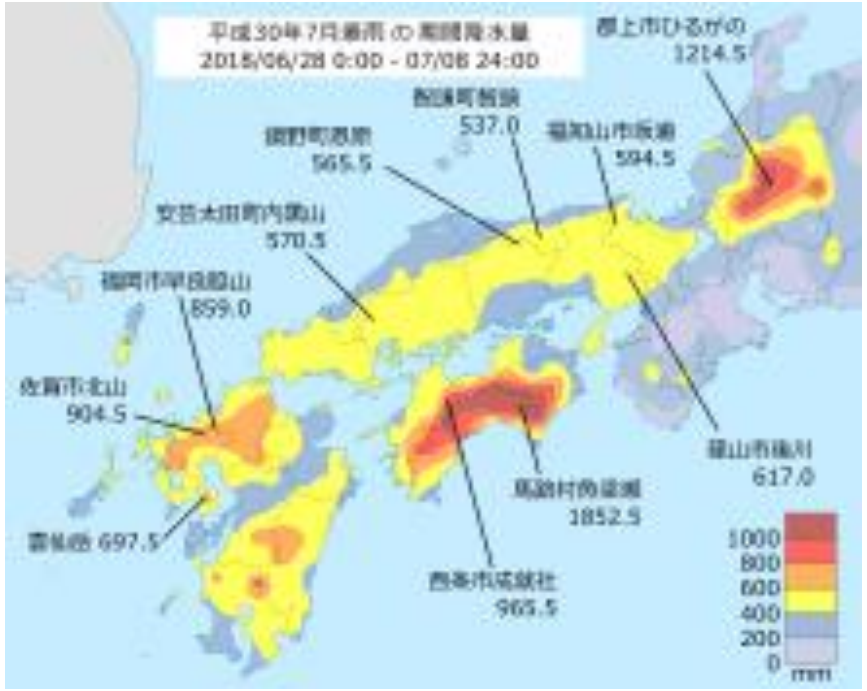
July 2018 in Japan, heavy rains followed typhoon. Some areas received > 1,000 mm of rainfall in 10 days.

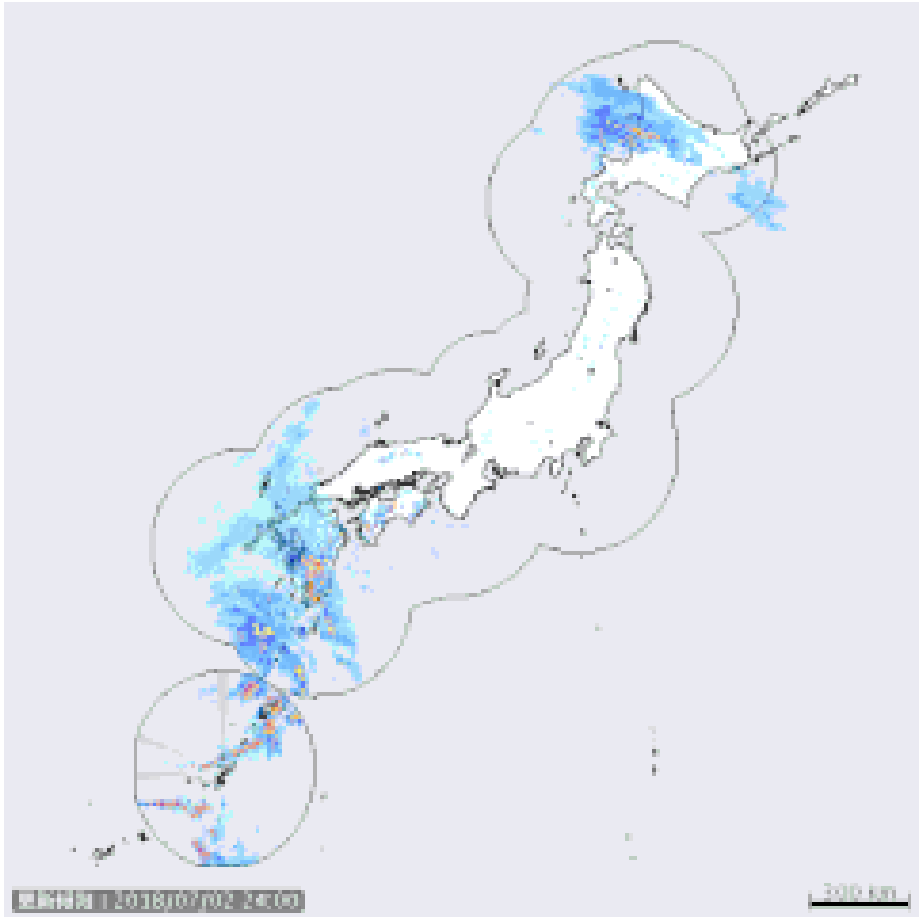
Flash flooding – in some locations water levels reached 5 m.

237 fatalities

6767 houses destroyed

90% of victims age > 65





Floods and Cognitive Impairment (Yoshida et al 2021)

Previous natural disasters associated with accelerated cognitive decline (Great East Japan Earthquake, Hurricane Katrina and Hurricane Maria)

Retrospective cohort study in Japan of 264,614 recipients of long term care insurance (home or in facility) to assess impact of July 2018 flood

- Hiroshima, Okayama and Ehime prefectures – the most damaged
- Participants identified from May – June and observed from July – December.
- 2,908 residents were victims of the flood (e.g. home damaged)

Prevalence of cognitive decline was 294 (10.11%) in victims and 23,389 (8.94%) in non-victims ($p < 0.031$)

Hazard ratio of home victims was 1.20 (1.06–1.36)

Hazard ratio of facility victims was 0.89 (0.67–1.17)

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Abolhasani E, Hachinski V, Ghazaleh N, Azarpazhooh MR, Mokhber N, Martin J. Air Pollution and Incidence of Dementia. Neurology 2023;100:e242–54.

Kosatsky T, Henderson SB, Pollock SL. Shifts in Mortality During a Hot Weather Event in Vancouver, British Columbia: Rapid Assessment With Case-Only Analysis. Am J Public Health 2012;102:2367–71.

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Livingston G, Huntley J, Liu KY, Costafreda SG, Selbæk G, Alladi S, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. The Lancet 2024;404:572–628.

Matz CJ, Egyed M, Xi G, Racine J, Pavlovic R, Rittmaster R, et al. Health impact analysis of PM2.5 from wildfire smoke in Canada (2013–2015, 2017–2018). Science of The Total Environment 2020;725:138506.

Yoshida S, Kashima S, Matsumoto M. The effect of the 2018 Japan Floods on cognitive decline among long-term care insurance users in Japan: a retrospective cohort study. Environ Health Prev Med 2021;26:113.

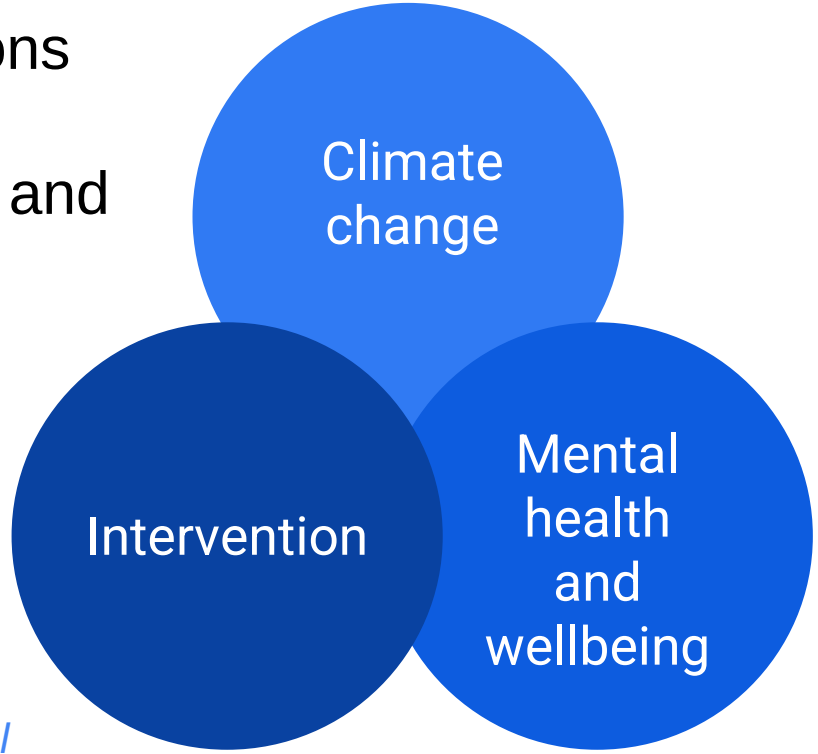
Psychosocial interventions in the context of climate change

Siqi Xue MD MSc FRCPC
Psychiatrist, Centre for Addiction and Mental Health (CAMH)
Assistant Professor, Department of Psychiatry, Temerty Faculty of Medicine, University of Toronto

Slide credit: Emma Lawrance PhD
Climate Cares Centre Lead and Mental Health Lead, Institute of Global Health Innovation, Imperial College London

In search of interventions…

- Scoping review on existing psychosocial interventions in response to climate change
- Academic database search (MEDLINE, PsycINFO, and Web of Science)
- Grey literature search
- Consultations (26 international experts)
- Results: identification of 37 unique interventions



Xue S, Massazza A, Akhter-Khan SC, Wray B, Husain MI, Lawrance EL. Mental health and psychosocial interventions in the context of climate change: a scoping review. Npj Mental Health Research. 2024 Mar 12;3(1):10.`

Examples of identified interventions:

Macrosystem

- Flood forecast based unconditional cash transfer **(Bangladesh)**
- Collective action groups and distribution of donor grants for livestock trading in pastoral communities **(Ethiopia)**

Exosystem

- Media campaign to raise post-disaster mental health awareness, destigmatize help-seeking, promote available resources **(California)**
- Drought Mental Health Assistance Package including community mental health forums, rural telephone support line, service network planning workshops **(Australia)**

Mesosystem

- Land-based activities for youth to connect with indigenous traditional knowledge and engage with participatory research **(Canada)**
- Hands-on nature restoration work **(United States)**
- Facilitated groups and workshops (e.g., Climate Cafes, Good Grief Network, The Work that Reconnects Network)

Microsystem

- Psychotherapy, resilience-building and disaster preparedness groups
- Environmental Health Clinic **(United States)**
- Self-guided activities (e.g., Hold This Space, Climate Cares guided journal, Eco-Anxious Stories)

Examples of interventions:

Rational Emotive Behavioural Therapy (REBT): delivered to flood victims with clinical depression in Nigeria (Kogi State) significantly reduced depressive symptoms relative to waitlist control group.

Example of microsystem intervention

Ede, M. O. et al. The effect of rational emotive behaviour therapy on posttraumatic depression in flood victims. J. Ration. Emot. Cogn. Behav. Ther. 40,124–143 (2021).

Borderlands Earth Care Youth Institute: hands-on nature restoration work, and essays and reflections on land ethics for Anglo and Hispanic youth from low-income households). Internal program evaluation demonstrated improved emotional strength among participants.

Example of mesosystem intervention

Nabhan, G. P., Orlando, L., Smith Monti, L. & Aronson, J. Hands-on ecological restoration as a nature-based health intervention: reciprocal restoration for people and ecosystems. Ecopsychology 12, 195–202 (2020).

Sonoma Wildfire Mental Health Collaborative: public awareness campaigns, free trauma-informed yoga and meditation classes, Skills for Psychological Recovery (SPR) training to counselors and paraprofessional, "Sonoma Rises" mental health app.

Example of exosystem intervention

Heinz, A. J. et al. Feasibility and preliminary efficacy of a public mobile app to reduce symptoms of post disaster distress in adolescent wildfire survivors: sonoma rises. Psychol. Serv. (2021).

Red Cross Red Crescent Project: distributed flood-forecast-based unconditional cash transfer (60 USD equivalent) to poor households in the Brahmaputra river basin in Bangladesh. Intervention group was less likely to experience psychological distress after the flood.

Example of macrosystem intervention

Gros, C. et al. Household-level effects of providing forecast-based cash in anticipation of extreme weather events: quasi-experimental evidence from humanitarian interventions in the 2017 floods in Bangladesh. Int. J. Disaster Risk Reduct. 41, 101275 (2019).

Imperial College London

Co-benefits of climate action for mental health

The transformation of society for a **safer climate future and good mental health aligns.**

Improving the energy efficiency of housing

- Homes more affordable to heat
- Reduction in fuel poverty
- Improvements in mental health

Increased provision of cycling and walking facilities

- More physical activity improves mental wellbeing
- Reductions in air and noise pollution improves mental health

Increased provision of green and blue spaces

- Trees and water help to reduce temperature extreme
- Connection to nature reduces stress and anxiety

Connected communities

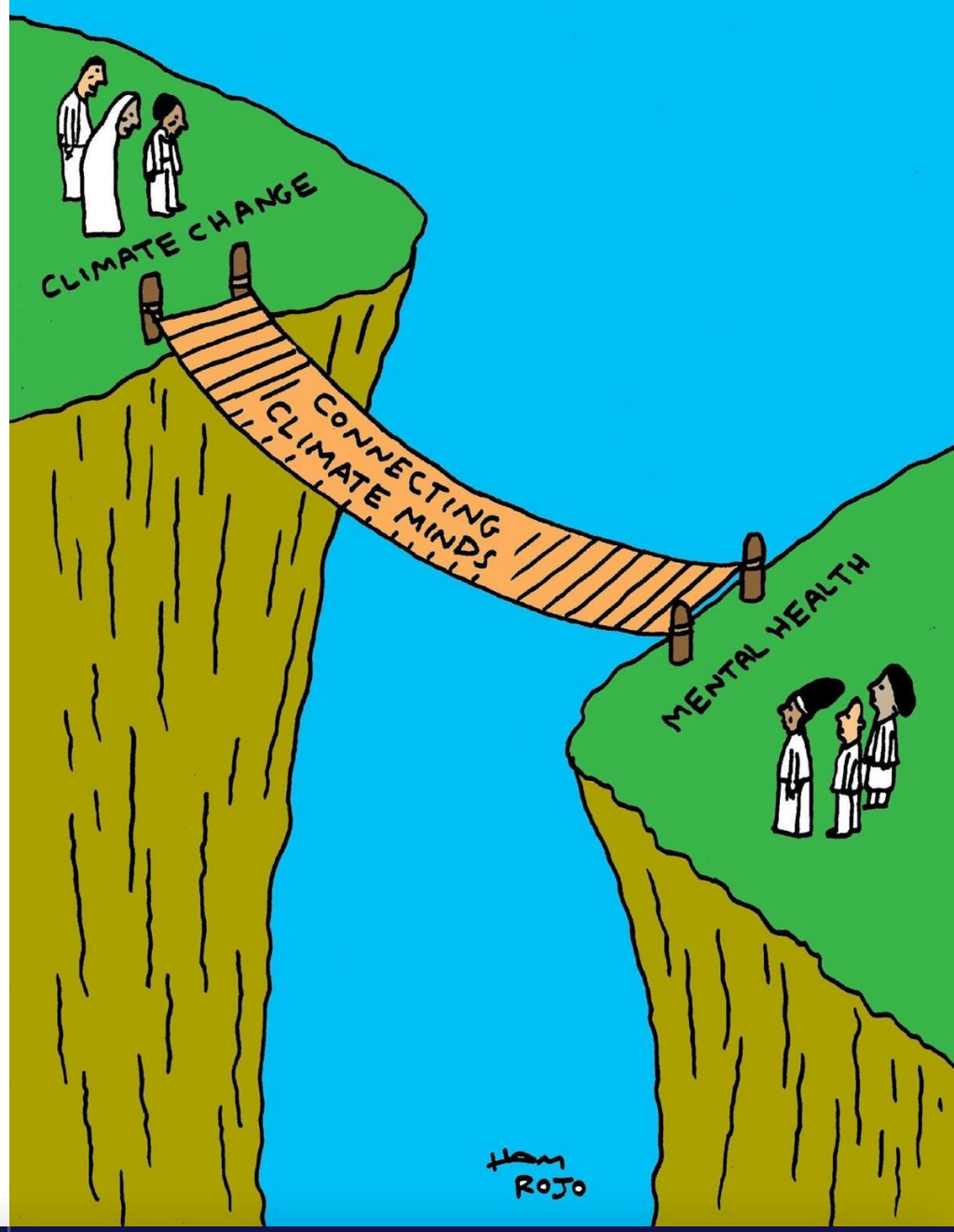
- Strong relationships provide the foundation for good mental health needed to withstand climate shocks
- Needed for climate action

Knowledge gaps and opportunities:

1. Opportunities to formally evaluate third-sector interventions using robust methodologies
2. Opportunities to adapt interventions for general adult populations to address the unique needs of at-risk populations
   - to be co-designed with the people for whom they are being created
3. Opportunities to adapt interventions from LMICs in other geographical regions
4. The need to have more proactive, adaptive and macro-system interventions
5. The need to have sustainable funding and to reduce barriers in accessing services

connecting climate minds

- **Agendas for research and action, identifying priorities to understand and address mental health burden of the climate crisis**

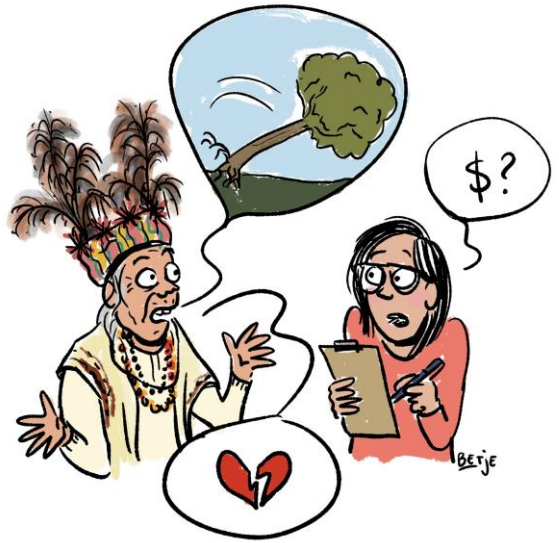


CCM outputs

14 virtual regional dialogues

- 1. **What:** Understanding needs and generating research themes
- 2. **How**: to best conduct this research, and how to translate evidence into policy and practice

3 virtual and 4 in person dialogues for young people, Indigenous communities, small farmers and fisher people in Nigeria, India, Cameroon and Peru



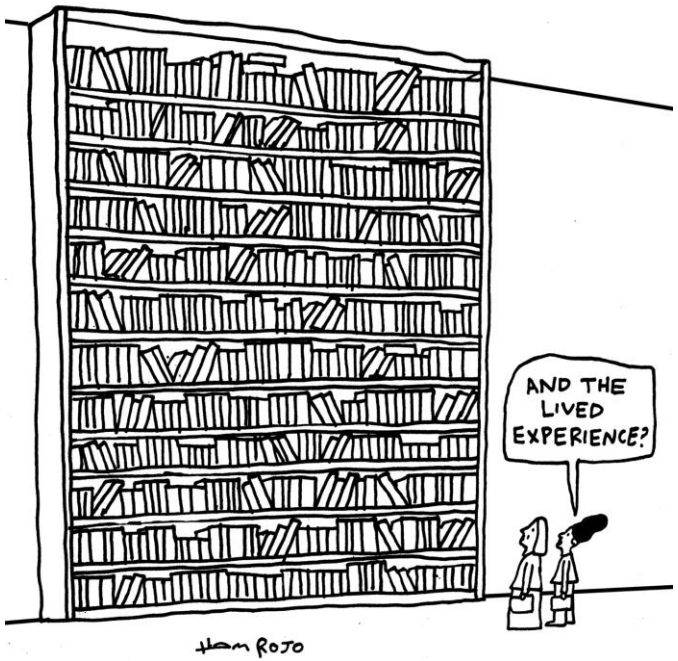
870 Participants

> 90 countries

10 Regional & Thematic Agendas

35 Lived Experience Stories

25 Case Studies



Global Research and Action Agenda for Climate Change and Mental Health

connecting climate minds

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hub.connectingclimateminds.org

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