A Policy Guide of Best Practices: Addressing Extreme Heat Through a Health Equity Lens

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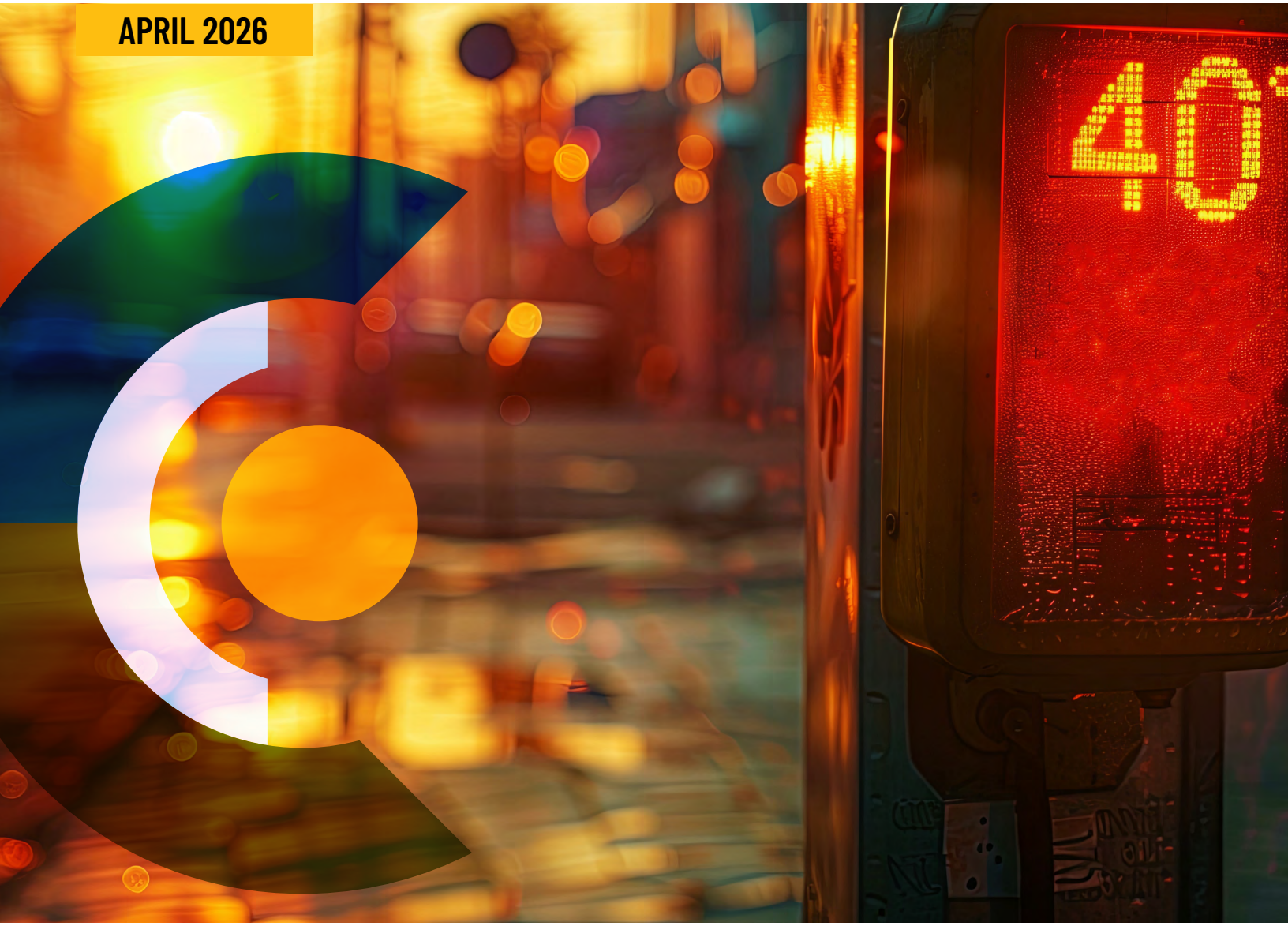

UNIVERSITY OF WATERLOO | WATERLOO Climate Institute

SOUTHWESTERN Public Health
Oxford · Elgin · St.Thomas

About this Report

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Abbreviations

AC – Air Conditioning

CCHVA – Climate Change and Health Vulnerability Assessment

CoPs – Communities of Practice

ECCC – Environment and Climate Change Canada

ED – Emergency Department

GIS – Geographic Information Systems

HAP – Heat Action Plan

H/W – height-to-width

IPCC – Intergovernmental Panel on Climate Change

LEED – Leadership in Energy and Environmental Design

2SLGBTQIA+ – Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, and Asexual

MOHLTC – Ministry of Health and Long-Term Care

NbS – Nature-based Solutions

NCCDH – National Collaborating Centre for Determinants of Health

SSP – Shared Socioeconomic Pathways

SWPH – Southwestern Public Health

UHI – Urban Heat Island

Glossary

Health Equity: Health equity means that all people can reach their full health potential and are not disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status or other socially determined circumstances (MOHLTC, 2018).

Health Inequity: Health inequities refer to the health differences that are the result of an unfair distribution of the underlying conditions required for good health, such as: social, economic and environmental conditions (NCCDH, 2023).

Social Determinants of Health: The social determinants of health are the interrelated social, political and economic circumstances in which people are born, grow up, live, work and age (NCCDH, 2022).

Structural Determinants of Health: Structural determinants take the form of values, beliefs, worldviews, culture and norms; governance; laws, policies, regulations and budgets; and institutional practices. Structural determinants also include the basic building blocks of how our society operates and can include policies, practices, and mental models that inform how we make decisions. Structural determinants can also include legacies of oppression and discrimination (NCCDH, 2022).

Commercial Determinants of Health: Although commercial entities can contribute positively to health and society there is growing evidence that the products and practices of some commercial actors—notably the largest transnational corporations—are responsible for escalating rates of avoidable ill health, planetary damage, and social and health inequity; these problems are increasingly referred to as the commercial determinants of health (Gilmore et al., 2023).

Policies: Government, institutional and organizational rules, regulations, and priorities that guide the entity's own and others' actions (Kania et al., 2018).

Practices: Activities of institutions, coalitions, networks, and other entities targeted to improving social and environmental progress. Also, within the entity, the procedures, guidelines, or informal shared habits that comprise their work (Kania et al., 2018).

Resource Flows: How money, people, knowledge, information, and other assets such as infrastructure are allocated and distributed (Kania et al., 2018).

Relationships & Connections: Quality of connections and communication occurring among actors in the system, especially among those with differing histories and viewpoints (Kania et al., 2018).

Power Dynamics: The distribution of decision-making power, authority, and both formal and informal influence among individuals and organizations (Kania et al., 2018).

Mental Models: Habits of thought—deeply held beliefs and assumptions and taken-for-granted ways of operating that influence how we think, what we do, and how we talk.

Assess and Report: Assess and report on the existence and impact of health inequities and effective strategies to reduce these inequities (NCCDH, 2023).

Partner with Other Sectors: Partner with other government and community organizations to identify ways to improve health outcomes for populations who experience marginalization due to social and economic disadvantage (NCCDH, 2023).

Participate in Policy Development: Lead, support and participate with other organizations in policy analysis and development, and in advocacy for improvement in health determinants and inequities (NCCDH, 2023).

Modify and Orient Interventions: Modify & orient interventions to reduce inequities, with an understanding of the unique needs of populations who experience marginalization due to social and economic disadvantage (NCCDH, 2023).

1.0 Introduction

Climate projections indicate that the magnitude and frequency of extreme heat events will increase worldwide (IPCC, 2022). These trends are already being observed; the highest global temperatures in over 100,000 years were recorded in 2023 and heat records were broken on every continent in 2022, underscoring unprecedented impacts on human health and wellbeing (Romanello et al., 2023).

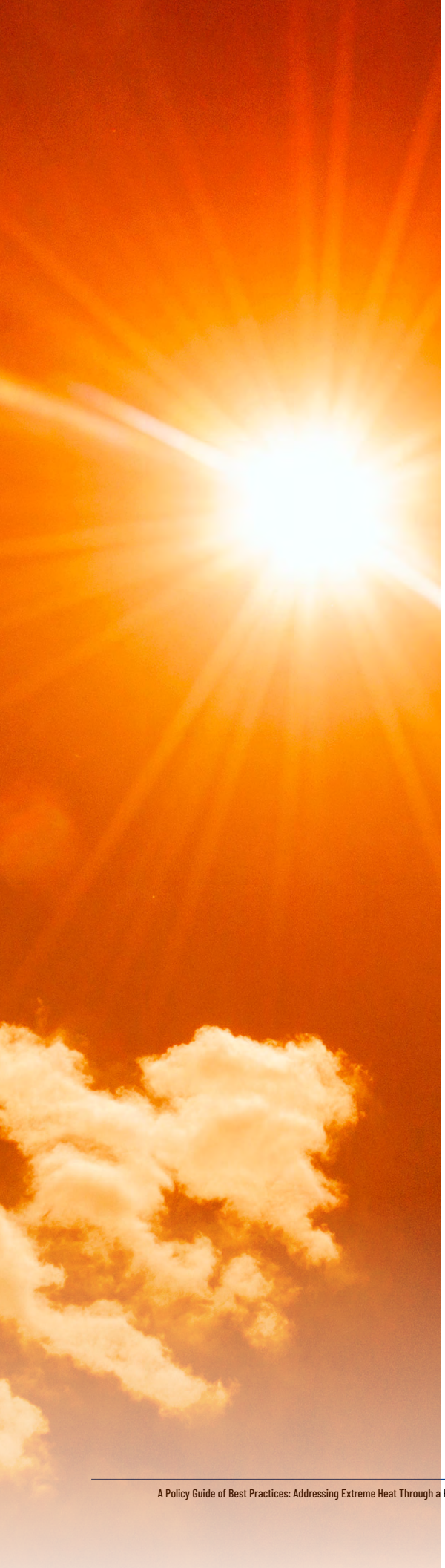
Extreme heat impacts health and wellbeing directly and indirectly. The IPCC (2022) projects an increase in mortality and morbidity in heat-related cardiovascular and respiratory illnesses, alongside growing concerns about adverse health impacts on mental health, psychosocial health, well-being, life satisfaction, happiness, cognitive performance, and aggression (Hayes et al., 2019). Data from 65 million deaths in nine countries suggests that extreme temperatures are associated with cardiorespiratory and metabolic diseases, as well as suicide and other injuries (Burkart et al., 2021). Furthermore, climate change will lead to increases in droughts and heat waves that will jeopardize water security, sanitation, and food production (Romanello et al., 2023). Climate projections also indicate a loss of economic activity, as hours of labour lost due to heat have increased in the past two decades, as some regions are at or are approaching heat stress conditions that limit labour productivity (IPCC, 2022).

In Canada, Dr. Theresa Tam, the Chief Public Health Officer, calls for decision-makers to respond to the now inevitable impacts of climate change on the well-being of Canadians (Public Health Agency of Canada, 2022). With increasing frequency, severity, and duration of heatwaves, possible health effects include (Berry & Schnitter, 2022):

- Increase in direct heat-related mortality and morbidity (e.g., heat edema, heat rash, heat exhaustion, heat stroke)
- Increase in respiratory disorders and cardiovascular disorders
- Perinatal care complications (e.g., miscarriage, premature birth, congenital complications)
- Increase in mental health problems and psychosocial impacts
- Changing patterns of mortality and morbidity due to gradually warming temperatures (e.g., due to increased outdoor activity levels)
- Impacts on health infrastructure and health and social services
- Increased risk of zoonotic infectious diseases

SWPH has already taken steps to address climate-related health impacts and reduce risks through strategic collaboration with a broad range of partners across the public, private, and non-profit sectors. As part of Canada's National Adaptation Strategy and Adaptation Action Plan, SWPH is now conducting a HeatADAPT project as funded by Health Canada's Climate Change and Health Capacity Building Program. This project will run from April 1, 2025, to March 31, 2028, with three main objectives: to increase our understanding of how extreme heat affects human health, improve community preparedness in reducing health harms associated with extreme heat, and enhance resilience for vulnerable populations and the natural environment in our region.

This Policy Guide is one deliverable within HeatADAPT, alongside broader efforts focused on climate change adaptation and integrating SWPH's health equity framework. Its purpose is to provide guidance to SWPH to inform how we can best support the development and facilitation of policies that protect health during extreme heat events while advancing equity. By centering populations made vulnerable from social, commercial and structural determinants of health, emphasizing place-based action, and highlighting evidence-informed practices, this guide aims to support decision-makers in implementing effective, equitable responses to extreme heat now and into the future.



2.0 Extreme Heat and Human Populations

The SWPH Climate Science Report (2023) and the CCHVA (2024) highlight some of the work that SWPH has already done to inform equitable and effective climate adaptation. Together, these reports provide an overview of extreme heat risks in the Southwestern Region, key population subgroups made vulnerable, and key recommended actions to address extreme heat.

2.1 Climate Change in the Southwestern Region

The SWPH Climate Science Report indicated that by the 2080s Oxford and Elgin County and the City of St. Thomas will experience a significant rise in the number of days surpassing 30°C and 32°C in every projection scenario (from SSP-2.6 to SSP5-8.5) when compared to the baseline of 1986-2014 (See table 1 and 2). These findings underscore the need for enhanced readiness and preparedness in the SWPH region, which must adapt to a future in which prolonged periods of extreme heat become an increasingly common feature of summer conditions. Recently, a study in Southwestern Ontario found an overall 22% increase in emergency department visits between 2002 and 2019 when temperatures reached 33°C (Wilk et al., 2021).

Table 1: Baseline and Projected Annual Days above 30°C for Oxford County and Elgin County and the City of St. Thomas – SSP1-2.6, SSP2-4.5, and SSP5-8.5 (Data sourced from Climate Data Canada).

Annual Days Above 30°C	Baseline 1986-2014	2050s SSP1-2.6	2050s SSP2-4.5	2050s SSP5-8.5	2080s SSP1-2.6	2080s SSP2-4.5	2080s SSP5-8.5
Oxford County	11	30	37	45	32	48	80
Elgin County and the City of St. Thomas	8	25	33	41	27	45	78

Table 2: Baseline and Projected Annual Days above 32°C for Oxford County and Elgin County and the City of St. Thomas – SSP1-2.6, SSP2-4.5, and SSP5-8.5 (Data sourced from Climate Data Canada).

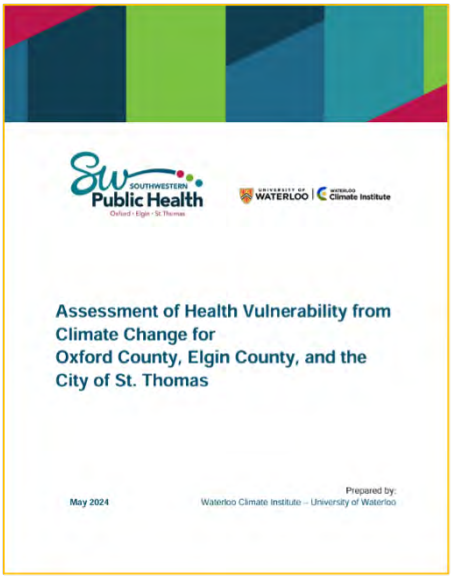
Annual Days Above 32°C	Baseline 1986-2014	2050s SSP1-2.6	2050s SSP2-4.5	2050s SSP5-8.5	2080s SSP1-2.6	2080s SSP2-4.5	2080s SSP5-8.5
Oxford County	3	12	16	22	13	24	55
Elgin County and the City of St. Thomas	2	9	12	17	9	30	51

2.2 Vulnerability and Recommended Actions in the Southwestern Region

To facilitate equitable adaptation to address climate-related impacts, SWPH conducted a CCHVA to identify key risks and population subgroups made vulnerable as identified by several criteria, including levels of exposure to hazards associated with climate change, socio-economic circumstances, and age, gender or race. The vulnerability assessment highlighted the urgent need to address the health impacts of climate change, particularly for populations facing heightened vulnerability, and stressed the importance of proactive actions to strengthen resilience and advance equity.

The most vulnerable populations in the SWPH region identified by the assessment include:

- Amish communities
- Low-German speaking Mennonite communities
- Immigrants
- Indigenous communities
- 2SLGBTQIA+ community
- International agricultural workers
- Older adults
- Outdoor workers/outdoor farm workers
- People experiencing homelessness
- People living below the poverty line
- Women, especially single-parent households
- Young children



The CCHVA further identified seven key recommendations (See **Appendix A** for specific activities that explicitly mention extreme heat):

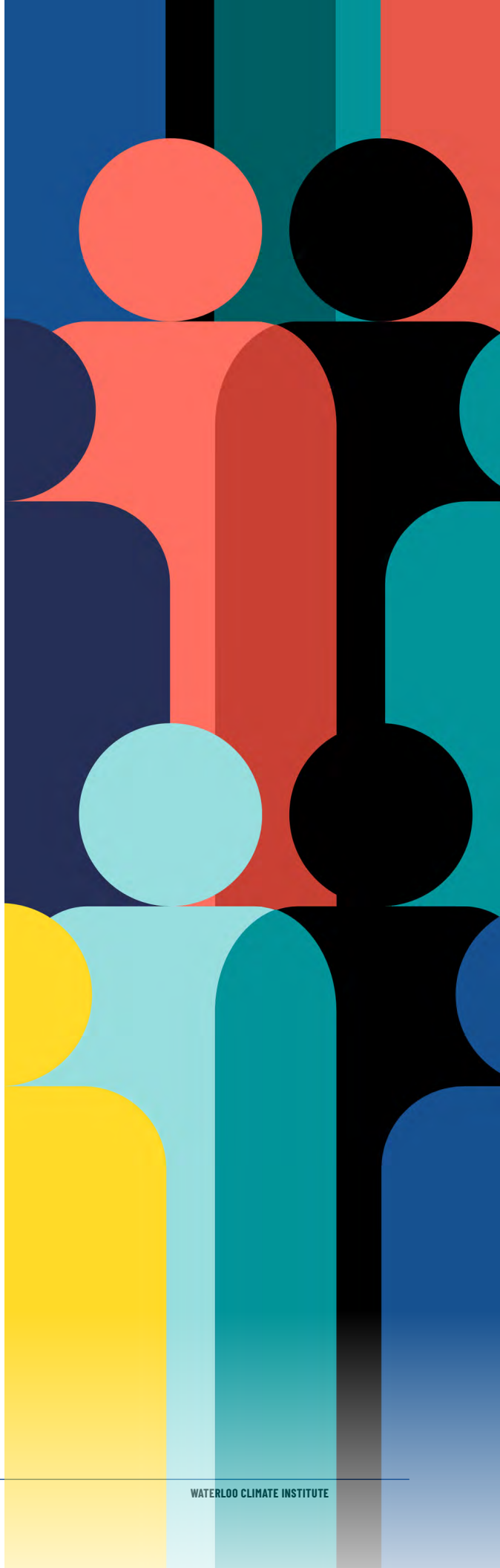
1. Develop a comprehensive and co-produced risk reduction and prevention strategy for extreme weather conditions.
2. Review and enhance coordination mechanisms with area municipalities on land use planning.
3. Build and strengthen partnerships with agencies, organizations, and individuals beyond jurisdictional boundaries.
4. Create a communications plan to share up-to-date data on health risk information with recommendations.
5. Establish a monitoring and evaluation framework to assess the impact of climate actions and interventions.
6. Promote and advocate for social capital building activities.
7. Develop a climate-compatible sustainable food system strategy.

Additionally, SWPH facilitates local initiatives, such as the tracking of heat- and cold-related emergency visits and hospitalizations, and establishing RAVE Alerts, which are proactive measures to address extreme heat. However, much remains to be done, as the climate change and health vulnerability assessment report remains a first step in equitably addressing climate risk.

3.0 Guiding Principles of SWPH

SWPH is dedicated to improving population health through a focused, equity-driven approach. As highlighted in SWPH's 2025-2029 strategic plan, efforts will centre on health equity as a core value. Health equity refers to the availability of resources and opportunities that enable all people to achieve optimal health and well-being, regardless of their circumstances, identity, abilities, or income, in ways that are meaningful and relevant to their lives.

SWPH acknowledges that barriers to optimal health extend beyond personal and lifestyle choices, as the underlying factors that contribute to health and well-being are often outside of a person's control. For example, a person's ability to cope with extreme heat is bigger than personal choice, and depends on income levels, place of accommodation, access to air conditioning or cooling space, and connections to community. SWPH will identify and address systemic barriers that lead to unequal health outcomes across population groups. This includes improving access to services for children and youth, seniors, and individuals with low income.



3.1 Determinants of Health

Determinants of health refer to the wide range of factors that influence a person's health and well-being. These include biological and genetic characteristics, as well as the environments in which people live, their lived experiences, and their access to services, supports, and opportunities. Health inequities arise when these factors are distributed in ways that are unfair or unjust, resulting in avoidable differences in health outcomes between individuals and communities. Factors outside of individual control or genetics are commonly described as the social, structural, and commercial determinants of health.

Social determinants of health

These determinants encompass the social and economic conditions that shape people's everyday lives and directly influence health. These include the conditions in which people live, work, learn, play, and age. Health is influenced by far more than access to health care alone; it is shaped by opportunities such as stable income, secure and safe housing, decent working conditions, access to nutritious food, clean air and land, and strong social connections. Inequities in income, wealth, and living conditions can significantly limit people's ability to achieve and maintain good health and wellbeing.

Structural determinants of health

These determinants are rooted in the broader social, political, and economic systems that organize society and distribute power and resources. These determinants include both formal and informal rules, such as laws, policies, governance systems, institutional practices, and societal values, that create and sustain patterns of advantage and disadvantage among socially constructed groups. Structural determinants influence who has power, whose needs are prioritized, and how inequities related to factors such as colonialism, racism, and discrimination are perpetuated over time.

Commercial determinants of health

These determinants refer to the ways in which business practices and economic actors influence health outcomes. This includes activities such as marketing, labour practices, product design, and efforts to shape public policy. Commercial determinants can have both positive and negative effects on health, depending on how they influence access to resources, working conditions, and exposure to

health risks. These forces often contribute to health inequities by shaping how power, benefits, and harms are distributed across populations.

SWPH is committed to advancing health equity as a core organizational value, recognizing that health outcomes are shaped by interconnected social, structural, and commercial determinants of health. Through a systems-change lens, SWPH seeks to address these intersecting determinants to reduce inequities and support more just, inclusive, and effective climate and health action.

3.2 Public Health in Action: SWPH Action and Health Equity Framework

SWPH has an existing Health Equity and Priority Populations Advisory Committee, which is a cross-team group of staff who come together to review equity concerns they are seeing in program work for coordinated action and who support staff capacity building. SWPH has also developed a Health Equity Framework to inform action across public health programming (see Figure 1). This framework was created by adapting and combining two key existing frameworks (with permission) - The Water of Systems Change by FSG, a network for social innovation (Kania et al., 2018), and the NCCDH's (2023) Public Health Roles for improving health equity. Together, these two frameworks highlight the conditions that hold systems in place and actions public health practitioners can take to shift systems towards more equitable health outcomes.

The Health Equity Framework guides understanding of how to dismantle health inequities and the systems or conditions that hold them in place. Health inequity refers to differences in health outcomes that are not attributable to a person's genetics or personal choices but rather determinants of health outside of their direct control that are a product of the structures that are avoidable, unfair, systematic, and unjust.

The framework identifies six conditions that hold systems in place: policies, practices, resource flows, power dynamics, relationships and connections, and mental models. The conditions that hold systems in place are difficult to see as we are all participants. Applying a systems lens can help illuminate the factors at play and identify areas for action toward equitable health outcomes.

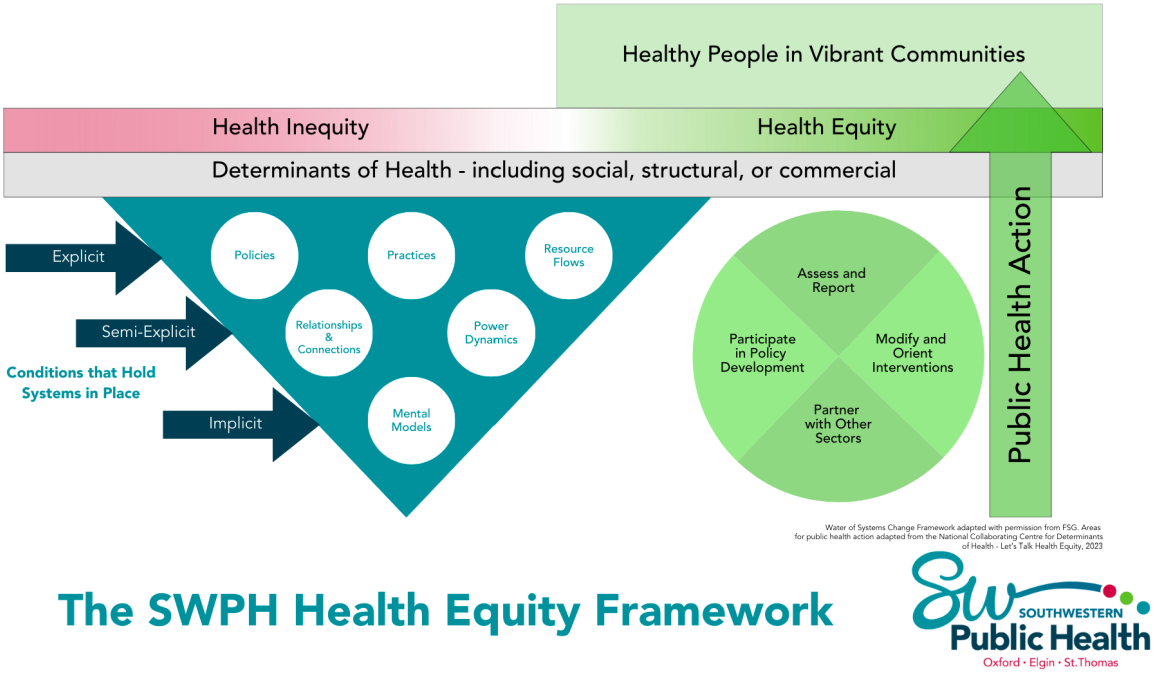


Figure 1. The SWPH Health Equity Framework.

To promote health equity and build healthy, vibrant communities, public health action includes four core practices: assess and report, partner with other sectors, participate in policy development, and modify and orient interventions:

By assessing and reporting on heat-related health inequities through disaggregated data, vulnerability mapping, and transparent communication, SWPH can make disparities visible and inform evidence-based priorities. For example, through the sharing of best practices, which is the aim of this policy guide.

By partnering with other sectors, including municipalities, housing providers, and community organizations, SWPH can help address the broader social and structural determinants that shape heat vulnerability.

Through participation in policy development, SWPH can influence upstream drivers such as housing standards, land-use planning, and worker protections to advance long-term, equitable adaptation.

Finally, by modifying and orienting existing and new interventions to reflect the lived realities of populations experiencing marginalization, SWPH can ensure that extreme heat strategies are accessible, culturally responsive, and effective in reducing inequities rather than reinforcing them.

4.0 Policies and Practices Around the Globe

Solutions to adapt to extreme heat range from places that have historically high temperatures to locations that are now beginning to experience increases in temperature in regions that have not prepared or customarily needed to adapt to heat. People and organizations across Canada and globally have already implemented a range of climate change adaptation strategies to reduce heat-related health risks. By learning from these experiences, effective practices and policy innovations, such as heat action plans, cooling access strategies, housing standards, and community-based supports, can be adapted to the Southwestern region local context to protect health in an equitable way. Recognizing this, a review and a survey with follow-up interviews were conducted as part of this report to synthesize existing information and create a catalogue of implemented adaptation practices (see **Appendix B** for description of methods).

4.1 Review of Policies and Practices

Six categories of actions to reduce heat risk in communities were identified in the literature:

1. Built environment and infrastructure
2. Preparedness and response
3. Technology and tools
4. Workplace and occupational safety
5. Community-based actions and social interventions
6. Education, communication, and public awareness

See **Appendix C** for a table of approximately 100 adaptation actions identified in the literature. Actions were grouped into six categories; when an action could fit multiple categories, it was assigned to the category that best reflected its primary objective. The following sections summarize each category, highlights selected examples of activities, and presents outcomes as reported in the literature.

The Built Environment and Infrastructure

Built environment strategies modify urban form, infrastructure, and buildings to reduce heat exposure, mitigate urban heat island effects, and enhance cooling at neighbourhood and city scales.

Examples of activities:

- Green infrastructure: Expansion of tree canopy, urban parks, green roofs/ walls, to increase shading, evapotranspiration, and surface permeability.
- Building retrofits: Upgrades to insulation, glazing, shading devices, ventilation systems, and infiltration control to improve thermal performance and reduce indoor heat exposure.
- High-albedo and reflective pavements: Installation of light-colored, reflective, or radiative cooling materials on roofs, roads, and pavements to increase solar reflectance and decrease heat absorption. Hybrid approaches combining reflective and permeable technologies further enhance cooling performance and reduce heat retention in dense urban areas.
- Thermal comfort-based urban morphology: Optimization of street orientation, height-to-width (H/W) ratios, sky view factors, and building massing to improve airflow and radiative cooling. Integrating ventilation corridors and vegetated buffers into urban design reduces heat trapping, particularly in high-density neighbourhoods.
- Engineering strategies: Integration of renewable energy systems, thermal energy storage, carbon-neutral building materials, and climate-adaptive architectural design to improve energy efficiency and reduce long-term heat vulnerability.

Outcomes:

- Surface and ambient temperature reductions of 1 – 4°C from green infrastructure; up to 30% reduction in urban heat exposure from NbS but performance depends on context (Ouria et al., 2025).
- Implementation of reflective materials (e.g., high-albedo surfaces) can reduce surface temperatures by 10 – 25°C and cooling energy demand by 15 – 30% (Ouria et al., 2025).
- Urban morphology optimization associated with 1 – 3°C temperature reductions, particularly when combined with vegetation (Ouria et al., 2025).

- Singapore's greening policies linked to 18% reduction in heat-related hospital admissions (Ouria et al., 2025).
- Zoning bylaw revisions, including regulatory measures to address UHI, led to increased uptake of compliant roofing permits, and served as regulatory instruments to strengthen resilience (Canada in a Changing Climate, 2021).
- Green building certifications (e.g., LEED) linked to reduced heat stress and lower risk to heat-related mortality and morbidity (Houghton & Castillo-Salgado, 2019).

Preparedness & Response

Preparedness and response strategies anticipate and mitigate heat-related health risks through alerts, emergency measures, and coordinated planning.

Examples of activities:

- Heat action plans and early-warning systems: Systems that are temperature-triggered, with alert levels linked to predefined public health actions, such as activating cooling centres, extending pool hours, conducting wellness checks, and issuing targeted communications.
- Cooling centres and hydration stations: Establish fixed or portable cooling centres, misting tents, and hydration stations in high-risk areas, often accompanied by transportation support for vulnerable populations.
- Vulnerability and risk assessments: Epidemiological analyses, heat-mortality threshold modelling, GIS-based mapping, and community-level surveys to identify at-risk populations and high-exposure neighbourhoods.
- Consolidated emergency response systems: Centralized emergency response platforms, health surveillance systems, and coordinated multi-agency alert protocols to enhance situational awareness during extreme events.

Outcomes:

- Heat warning systems in Europe reduced mortality risk associated with heat (Donato et al., 2015; Hasan et al., 2021).
- In Italy, attributable fraction of heat-related deaths declined from 6.3% to 4.1% following heat action plan implementation (Hasan et al., 2021; Scortichini et al., 2018).

- In Canada, 2.52 deaths were reduced per day after heat action plan implementation (Benmarhnia et al., 2016; Hasan et al., 2021).
- Heat-wave intervention program in China, where community staff managed a 24/7 hotline and WeChat platform to communicate heat-risk information, and physicians shared heat-mitigation advice during routine visits, led to higher knowledge, attitude and practice scores in intervention groups (Hasan et al., 2021; Xu et al., 2018).
- Cross-municipality 511 system enhanced emergency services' efficiency and responsiveness by enabling faster and more coordinated action (Canada in a Changing Climate, 2021).

Technology and Tools

Technology and tools enhance heat adaptation through mapping, surveillance, data analysis, and evidence-based decision support.

Examples of activities:

- GIS-based heat vulnerability mapping: GIS platforms to overlay temperature exposure, land use, infrastructure, and sociodemographic indicators to identify neighbourhoods at elevated risk of heat-related illness.
- Interactive data visualization platforms: Dashboards that display environmental exposures, population sensitivity, and adaptive capacity metrics.
- AI-driven urban heat risk assessment tools: Integrate satellite imagery, infrastructure data, and demographic information to model urban heat island intensity and identify heat-vulnerable populations.
- ArcGIS StoryMaps: StoryMaps to communicate heat-health risks, health equity indicators, and climate vulnerability narratives in visually engaging, publicly accessible formats.
- Real-time surveillance systems for extreme heat and health indicators: Surveillance platforms to monitor emergency visits, mortality, and heat-related illnesses in near real time.

Outcomes:

- AI tools that integrate satellite imagery, local heat, infrastructure, and demographic data, enable municipalities to identify heat-vulnerable areas, understand how land use and building patterns influence UHI, and assess sociodemographic disparities in heat exposure, supporting targeted investments, equitable adaptation strategies, and long-term urban planning decisions (Canada in a Changing Climate, 2021).
- GIS technology allows for real-time surveillance to monitor public health indicators, including extreme heat impacts and smoke-related respiratory issues, enabling hazards tracking and managing public health risks locally (Canada in a Changing Climate, 2021).

Workplace and Occupational Safety

Workplace adaptation strategies aim to reduce occupational heat stress through procedural interventions, behavioural interventions, and physiological adaptation measures. These strategies are particularly relevant for outdoor workers and high-exertion occupations.

Examples of activities:

- Work-rest scheduling and modified shifts: Employers implement adjusted work–rest ratios based on temperature thresholds or physiological indicators. Additional measures include shifting work hours to cooler parts of the day, rotating tasks, limiting exertion during peak heat, and allowing flexible work hours during extreme heat events.
- Hydration programs and cooling access: Workplaces provide structured hydration access (e.g., water or electrolyte beverages), shaded rest areas, air-conditioned spaces, and cooling technologies.
- Heat acclimatization training: Seasonal acclimatization protocols gradually expose workers to elevated temperatures to promote physiological adaptation and improve tolerance to heat stress.
- Protective clothing: Employers introduce heat-appropriate protective clothing, reduce heavy protective gear where feasible, and increase mechanization to minimize physical workload and metabolic heat production.
- Employer-led awareness campaigns and policies: Organizations implement heat stress training, awareness campaigns, and formal occupational heat policies.

Outcomes:

- A Texas study found reduced occupational heat illness incidence and compensation costs following heat awareness and work-rest modifications (Borg et al., 2021; McCarthy et al., 2019).
- Hydration intervention reduced sweat rate and improved thermal comfort (Lundgren-Kownacki et al., 2018).
- Heat acclimatization improved tolerance among medical responders and athletes, mitigated up to 40% of heat's adverse effects individually; 70% when combined strategies applied (Brearley, 2016; Qiu & Zhao, 2022).

Community-Based Actions and Social Interventions

Community-based measures strengthen local adaptive capacity by targeting vulnerable populations, reducing social isolation, and improving access to cooling and heat-prevention resources. These interventions often rely on social networks, volunteerism, and localized service delivery.

Examples of activities:

- Door-to-door delivery of water bottles and heat-prevention information: Community-based trials delivered water bottles alongside brief, face-to-face heat-prevention messaging, and in some cases distributed tangible resources such as thermometers, fridge magnets, and hotline information.
- Programs addressing social isolation among older adults: Maintained regular contact with older adults engaged neighbours and volunteers, and integrated health promotion campaigns during heat events.
- Participatory neighbourhood resilience projects: Co-design localized adaptation measures (e.g., rain gardens, shaded seating areas, tree planting, and water-filling stations) based on neighbourhood-specific vulnerability assessments.
- Engagement with local organizations for at-risk populations: Public health units leveraged community partners (e.g., landlords, social service providers, and community organizations) to disseminate heat alerts and protective guidance to vulnerable populations such as seniors, people experiencing homelessness, and individuals with chronic illness or mental health challenges.

- Community tree-planting and urban canopy programs: Targeted tree-planting initiatives in high-risk neighbourhoods to increase shade, reduce surface temperatures, and improve environmental quality.

Outcomes:

- Targeted program for elderly populations associated with 13% reduction in heat-related mortality in Italian cities (Liotta et al., 2018; Hasan et al., 2021).
- Culturally and age-specific outreach led to increased knowledge (67% to 94%) on who to contact for assistance during hot weather within interventions groups (Hasan et al., 2021; Mattern et al., 2000).
- Door-to-door delivery of water bottles with brief heat-prevention messages led to improvements in the frequency of water intake, cooling the body, and taking breaks; reduced activities in the heat, and increase in hat or parasol use (Hasan et al., 2021; Takahashi et al., 2015).

Education, Communication, and Public Awareness

Education and communication strategies improve risk awareness, promote protective behaviours, and enhance knowledge translation between health systems and communities. These measures are often integrated into broader heat action frameworks.

Examples of activities:

- Dissemination of heat safety information: Targeted materials (e.g., tip sheets for athletes and older adults, fridge magnets, and flyers) providing guidance on hydration, cooling practices, and symptom recognition.
- Public heat alert services: Opt-in email or text alert systems to notify residents of extreme heat events, sometimes with tailored streams for schools, farm workers, or older adults.
- Educational modules for students, professionals, and community partners: Curriculum modules for middle school students, training videos for public health practitioners, community volunteers, and webinars for physicians.
- Media campaigns: Public campaigns, such as slogan-based summer heat messaging, aimed to increase awareness of heat-health risks and encourage protective behaviours.

Outcomes:

- In Australia, 54% of adults reported behavioural change following media campaign; moderate slogan recall (Oakman et al., 2010; Hasan et al., 2021).
- Distribution of tangible resources led to increases in air conditioner use during hot weather (74.4% versus 63.4%), use of a wet cloth on face, neck or body to cool down during heat waves (16% vs. 8%), and the belief that participants had enough information to 'beat the heat' (94% vs. 88%) in intervention groups in Australia (Hasan et al., 2021; Nitschke et al., 2017).

4.2 Insights from Canada

Many organizations across Canada and Ontario work to address extreme heat impacts on health and well-being. Current public health policy priorities for climate adaptation and extreme heat focus on protecting vulnerable populations, improving coordination, and integrating climate considerations across municipal and regional systems. These priorities are informed by public health standards, alongside locally conducted CCHVAs. Policies are further shaped by external guidance from federal and provincial agencies, intergovernmental partners, and technical resources such as heat warning systems, hazard identification and risk assessments, and environmental data.

Equity is integrated into climate adaptation policies and practices through the use of vulnerability assessments and statistical mapping tools to target interventions to communities most in need. For example, tree planting priorities are determined using data on population density, urban heat islands, and other social and environmental indicators. Networks and partnerships with community organizations further ensure that services and resources reach vulnerable populations, embedding equity considerations into planning, implementation, and evaluation of adaptation actions.

The catalogue of actions in Appendix C already includes many examples from Canada. However, key experts highlight additional adaptation initiatives within their organizations (See Appendix D for details). The following section groups these initiatives into five categories, and provides examples of actions, key partners, barriers, and facilitators.

4.2.1 Adaptation Initiatives in Ontario

Heat-Health Messaging

These actions focus on alerting at-risk populations, partners, and the public about extreme heat and other climate hazards to reduce exposure and support adaptive behaviours. Examples of activities include:

- Extreme Heat Notification System (heat warnings to partners and the public via email or social media)
- Heat-health messages during events
- Webpages and resource dissemination
- Equity-based climate adaptation communication and engagement
- Partner and community engagement webinars

Table 3: Examples of Partners, Barriers, and Facilitators for Heat-Health Messaging

Partners	Barriers	Facilitators
• Internal staff (e.g., health promotion, communications, epidemiology, emergency/hazards management teams) • Local municipalities • Federal agencies • Community service partners (e.g., childcare centres)	• Over-communication and uncertain reach • Capacity limitations (e.g., staff and time) • Coordinating across multiple partners • Language and accessibility challenges	• Strong relationships and communication plans • Dedicated staff and flexible engagement strategies • Participate in knowledge-sharing networks and communities of practice (CoPs) • Accessible, translated resources

Planning and Policy Support

These actions inform municipal, school, and regional planning to integrate climate and health considerations into policy and planning processes. Examples of activities include:

- Collaborating on Official Plans or climate adaptation strategies
- Informing school policies with evidence-based guidance
- Drafting climate change urgent response plans
- Providing municipal climate teams with heat-related data
- Developing guidance for partners on health/equity integration
- Establishing an indoor heat bylaw

Table 4: Examples of Partners, Barriers, and Facilitators for Planning and Policy Support

Partners	Barriers	Facilitators
• Internal staff (e.g., disease prevention, surveillance, planning teams) • Municipal planners • School boards • Conservation authorities • Local climate action networks	• Competing priorities within agencies • Difficulty cooperating across levels of government • Limited accountability among external organizations and partners • Limited capacity/time for review • Difficulty identifying opportunities to influence policy • Uncertainty in scientific evidence	• Relationship building with planners and schools • Participation in CoPs and engagement networks • Internal technical expertise (e.g., GIS, data analysis) • Structured engagement plans

Assessment and Reporting

These actions include collecting, analyzing, and reporting data on heat, climate hazards, and health outcomes to support planning, monitoring, and evaluation. Examples of activities include:

- Weekly heat-season reporting and hospital data analysis
- CCHVAs
- Climate public health surveillance reports
- Climate surveillance and public health dashboards
- Urban heat island and vulnerability mapping
- Technical synthesis of the best available evidence

Table 5: Examples of Partners, Barriers, and Facilitators for Assessment and Reporting

Partners	Barriers	Facilitators
• Internal staff (e.g., epidemiology and health promotion teams, data analysts) • Municipal government data teams • Research institutions and universities	• Data quality or access issues • Limited indicators for indirect health impacts • Capacity constraints (e.g., staff and time)	• Dedicated analytic teams • Participation in climate CoPs and research networks • Internal expertise • Strategic prioritization of climate change

Targeted Adaptation Interventions

These actions implement practical measures to reduce exposure or improve adaptive capacity for vulnerable populations. Examples of activities include:

- Cooling options analysis for social housing
- Installation of fire hydrant water fountain misters
- Identifying high-risk housing buildings and implementing interventions
- Engaging social housing tenants about heat risks

Table 6: Examples of Partners, Barriers, and Facilitators for Targeted Adaptation Interventions

Partners	Barriers	Facilitators
• Internal staff (e.g., project leads, surveillance staff) • Housing corporations • Municipal climate offices • Community housing providers • City infrastructure teams	• Funding limitations • Technical complexity • Language/accessibility challenges • Time constraints	• Start small and scale up • Partner and tenant engagement • External funding support • Collaboration with local service providers

Capacity Building

These actions strengthen internal and external partnerships, skills, and networks to enable climate adaptation and health protection. Examples of activities include:

- Participation in multi-stakeholder networks
- Partner mapping and one-on-one consultations
- Webinars and formal presentations to stakeholders
- Engagement with partners (e.g., internal programs and external partners such as community climate action CoP)
- Developing flexible engagement plans

Table 7: Examples of Partners, Barriers, and Facilitators for Capacity Building

Partners	Barriers	Facilitators
• Internal staff (e.g., epidemiology, health promotion, and communications teams) • Community partners • Municipalities • Local climate action networks • Conservation authorities	• Limited capacity (e.g., staff and time) • Lack of honoraria for partners • Competing priorities and low partner capacity and interest • Overwhelming engagement opportunities	• Strong relationships and trust-building • Knowledge-sharing networks and CoPs • Flexible, adaptable engagement plans • Clear workplans and internal support

4.2.2 Key Considerations in Implementation

Success in climate adaptation has been facilitated by strong partnerships, active collaboration, and consistent engagement with community and internal stakeholders. Leadership support helped prioritize initiatives, while networks enabled sharing of resources, knowledge, and best practices. Tailoring interventions to local needs and raising awareness of climate-related health risks strengthened community preparedness and resilience to extreme heat, cold, and poor air quality.

Tools and resources that would strengthen climate adaptation include standardized climate-hazard indicators to support consistent measurement and comparison across regions, accessible communication resources, and dedicated funding and staffing (including GIS expertise). Guidance from provincial and federal governments on emergency heat response triggers, climate adaptation plan templates, evidence-based examples of heat adaptation initiatives, and standardized evaluation and reporting tools would further support public health units in planning, implementing, and assessing adaptation actions effectively.

Key considerations when initiating climate adaptation include prioritizing early and ongoing engagement and building and maintaining strong relationships with both internal teams and external partners. Establishing a community partner network or working group focused on extreme heat can help coordinate efforts and ensure timely action during an extreme heat event. Internal capacity, such as dedicated staff and resources, should be developed to support sustained adaptation work. Additionally, integrating available tools and guidance from the onset, and considering a broad climate lens rather than focusing narrowly on specific hazards, can strengthen planning. Overall, embedding climate change within the organization's strategic direction ensures alignment and prioritization.

5.0 Next Steps

5.1 Operationalizing the Health Equity Framework

This policy guide aims to provide insights and a roadmap for SWPH to operationalize the Health Equity Framework in addressing heat risk. The design is intended to be an iterative approach that begins by identifying evidence-based policies or practices to inform selection of appropriate actions within a particular place. By starting from the desired outcome, the framework proceeds counterclockwise, facilitating backwards-mapping to examine the system conditions that influence whether the policy can be implemented equitably. This includes assessing how existing policies, organizational practices, resource allocation patterns, power dynamics, relationships across sectors, and dominant mental models may support or hinder successful implementation. Evaluating these conditions helps uncover structural barriers that often remain unseen but have significant implications for equitable outcomes.

With these conditions identified, public health practitioners can apply the core public health practices of assessing and reporting, partnering with other sectors, participating in policy development, and modifying or orienting interventions to address the gaps. These practices provide concrete pathways to influence system conditions and build the enabling environment required for equitable implementation. Through this ongoing process, the framework supports continuous system improvement and strengthens the capacity of policies and programs to reduce rather than reproduce health inequities. Accordingly, the following section outlines evidence-based policies to consider for implementation, and the public health actions required to facilitate implementation.

5.2 Policy Recommendations for Heat Resilient Communities

Infrastructure and Housing Policy

Embeds health equity considerations into land-use planning, housing standards, and climate-resilient infrastructure investment to support interventions that reduce structural exposure to heat.

Table 8: Policy recommendations for building heat resilience through Infrastructure and Housing

Recommendations	Description
Expand Urban Green Infrastructure and NbS	Encourage tree canopy expansion, urban parks, green roofs, and vertical greenery, tailored to urban density and climate conditions. Encourage minimum canopy targets and integrate green/ blue infrastructure into planning.
Adopt Cool Materials Standards in Municipal Codes	Encourage high-albedo pavements and cool roofing materials in new developments and major retrofits.
Embed Thermal Comfort Criteria into Urban Planning and Zoning	Incorporate ventilation corridors, height–width ratios, and shading requirements into secondary plans and development approvals.
Retrofit Existing Buildings for Passive Cooling	Establish incentive programs and minimum retrofit standards for insulation, glazing, and ventilation upgrades in heat-vulnerable housing.
Embed Health Equity into Official Plans	Incorporate consideration of heat vulnerability and canopy inequities in planning decisions.
Establish Indoor Heat Bylaw	Encourage minimum requirements to maintain comfortable indoor temperatures (e.g., in rental units).

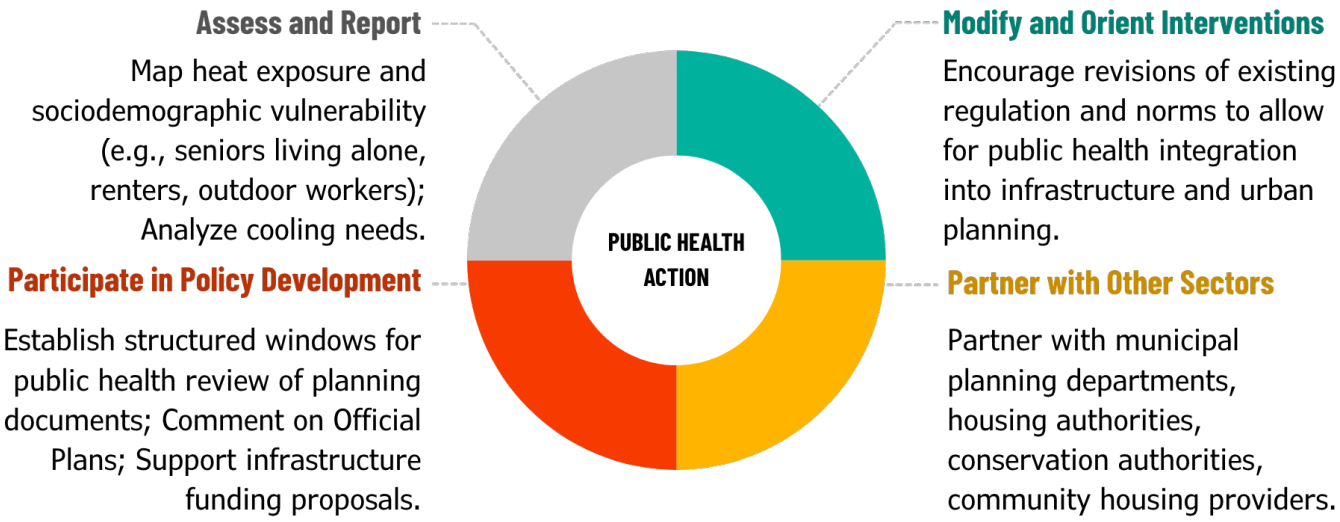


Figure 2: Examples of public health actions for supporting adaptation through Infrastructure and Housing

Preparedness and Response Policy

Formalize coordinated, equity-informed heat preparedness and emergency response by ensuring activation thresholds, communication protocols, and institutional roles are standardized, evidence-informed, and responsive to populations disproportionately affected by extreme heat.

Table 9: Policy recommendations for building heat resilience through Preparedness and Response

Recommendations	Description
Mandate Municipal Heat Action Plans (HAPs)	Encourage all municipalities to develop, update, and publicly report on standardized Heat Alert and Response Plans.
Regional Heat Alert Triggers	Align alert thresholds with meteorological data and local health surveillance indicators to ensure timely activation.
Establish Cooling Centre Activation Protocol	Develop clear criteria, geographic targeting, hours of operation, and transportation considerations for cooling centre deployment.
Sustain Community Cooling and Adaptation Spaces	Maintain pre-identified accessible facilities (libraries, community centres, adaptation hubs) for rapid activation.
Embed Equity-Based Cooling Access Planning	Use vulnerability mapping to prioritize locations in neighbourhoods with high UHI intensity and social vulnerability.
Conduct Social Housing Tenant Engagement	Identify high-risk buildings and co-design interventions.
Establish workplace guidelines	Implement work-rest cycles, hydration programs, heat acclimatization protocols, and heat-stress training for outdoor and high-exposure workers.
Deliver Equity-Based Climate Communication	Tailor messaging to cultural, linguistic, and accessibility needs.
Implement Post-Event Evaluation Framework	Assess reach, utilization rates, communication clarity, and equity impacts after each heat event.

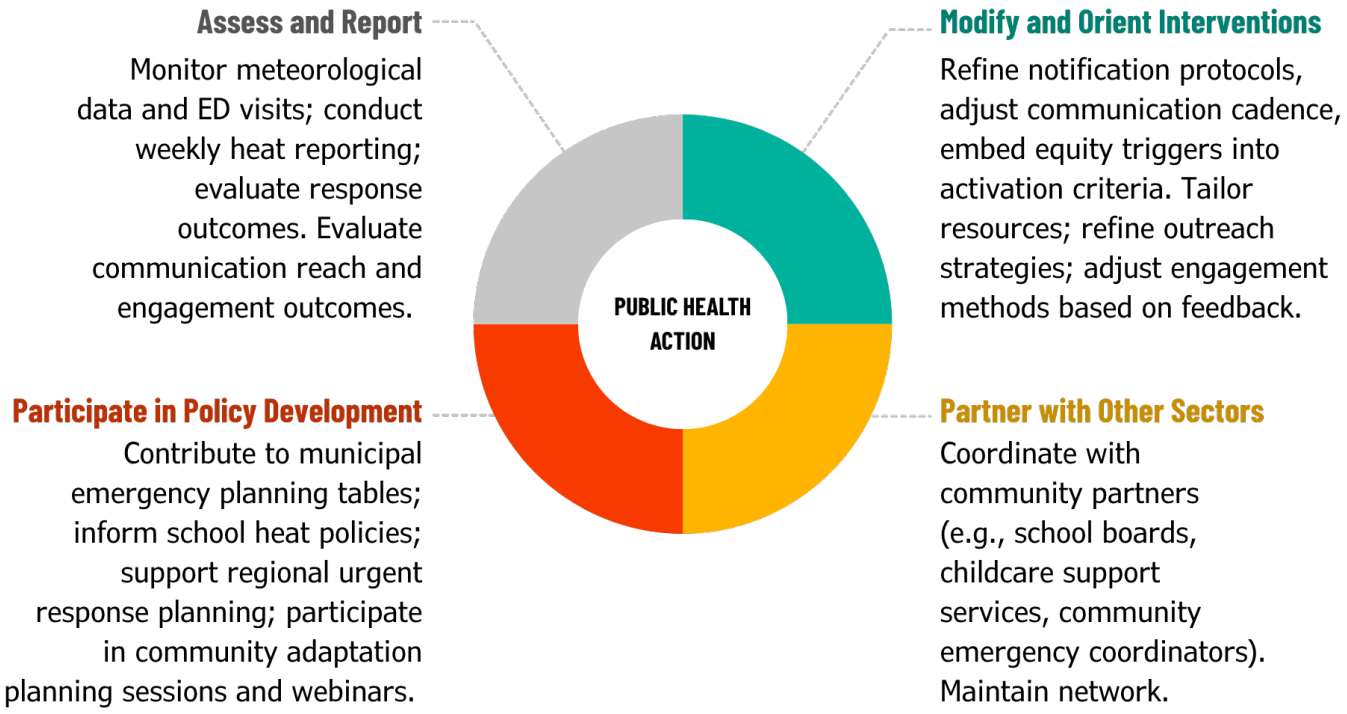


Figure 3: Examples of public health actions for supporting adaptation through Preparedness and Response

Data and Information Policy

Establish a climate and health surveillance infrastructure to make inequities visible and actionable by formalizing data governance, reporting, and analytic capacity to inform upstream adaptation and resource allocation decisions.

Table 10: Policy Recommendations for Building Heat Resilience Through Data and Information

Recommendations	Description
Establish Climate Surveillance Dashboard	Integrate heat exposure mapping, health data, and vulnerability indicators.
Establish Internal Data Analysis Priorities	Address data gaps and enhance spatial vulnerability mapping.
Formalize Data-Sharing Agreements	Enable secure municipal-level reporting using multi-year averages where needed.
Publish Regular Climate and Health Reports	Translate surveillance findings into policy-relevant evidence.

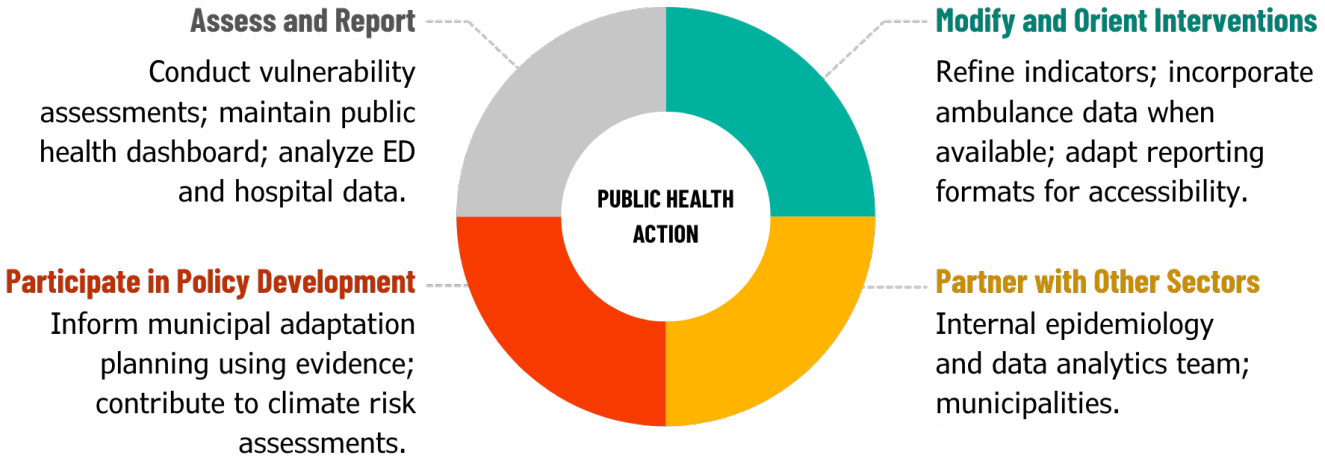


Figure 4: Examples of public health actions for supporting adaptation through Data and Information

Capacity-Building Policy

Institutionalize climate change as a core public health priority through sustained staffing, and analytic capacity.

Table 11: Policy Recommendations for Building Heat Resilience Through Capacity Building

Recommendations	Description
Establish Dedicated Climate and Health Capacity	Maintain support for dashboard and planning work
Institutionalize Theory of Change Planning	Clarify intended systems-level outcomes of climate interventions.
Embed Climate in Strategic Priorities	Align surveillance and reporting with corporate strategy.
Sustain Climate CoP and Network Engagement	Strengthen coordination and knowledge exchange.
Develop Technical Evidence Response Protocol	Provide rapid synthesis for emerging policy and planning requests.

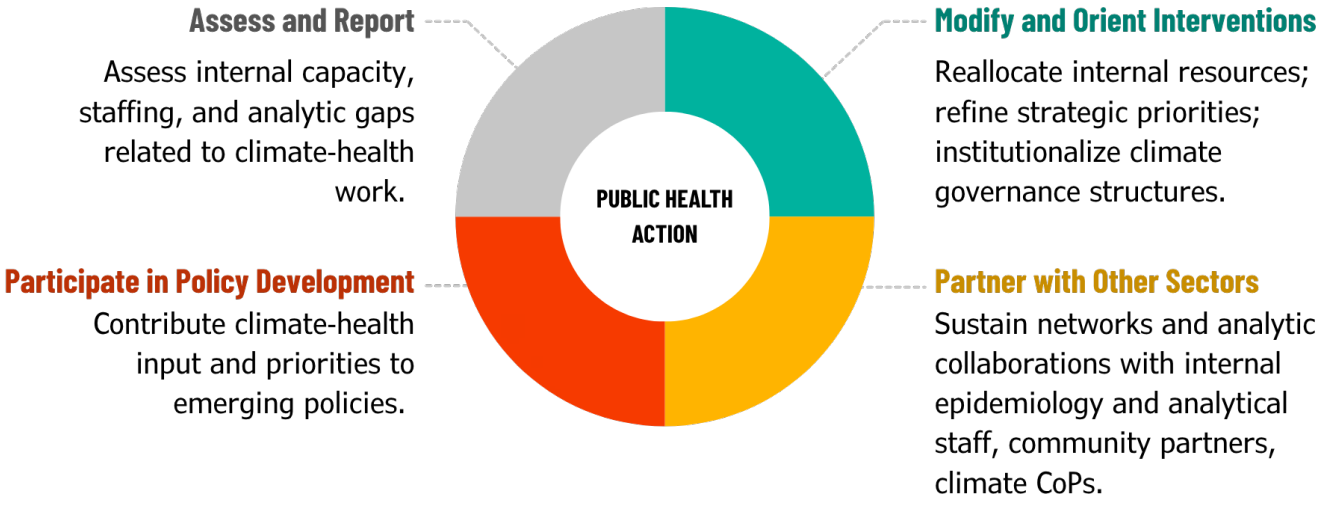


Figure 5: Examples of public health actions for supporting adaptation through Capacity Building

6.0 CONCLUSION

This policy guide provides an evidence informed roadmap for building heat resilient communities by outlining the range of actions that public health can take to reduce heat related health impacts. Informed by the SWPH Health Equity Framework, it recognizes that health inequities are sustained through interconnected system conditions, including policies, practices, resource flows, power dynamics, relationships, and mental models. Public health roles of assessing and reporting, partnering with other sectors, participating in policy development, and modifying or orienting interventions serve as important levers for shifting these conditions and supporting equitable implementation.

The policy recommendations in this guide are organized into four domains: Infrastructure and housing; preparedness and response; data and information; and capacity building. Infrastructure and housing include expanding green infrastructure, adopting cool materials, retrofitting buildings, embedding thermal comfort criteria, and establishing indoor heat bylaws. Preparedness and response include requiring HAPs, developing cooling centre protocols, integrating equity-based cooling access planning, implementing workplace heat protections, and delivering culturally responsive communication. Data and information include climate and health surveillance dashboards, internal data analysis priorities, formal data sharing agreements, and ongoing climate and health reporting. Capacity building includes maintaining dedicated climate and health capacity, embedding climate considerations into strategic planning, strengthening knowledge networks, and developing rapid evidence response protocols. Collectively, these domains address upstream planning, emergency preparedness, evidence generation, and institutional capacity to reduce heat related risks.

Equity considerations are embedded into the operationalization of these policies. Structural policies, including zoning, housing standards, and workplace protections, must reflect patterns of unequal exposure and prioritize populations at greater risk, such as renters, older adults, outdoor workers, and communities experiencing marginalization. Institutional practices, including surveillance, emergency activation, and the allocation of resources, should be designed to not perpetuate existing inequities. Resource flows must direct adaptation investments toward neighbourhoods of need, for example, areas with limited canopy cover, areas that have experienced historic underinvestment, and populations facing social and economic barriers. Shifting power dynamics ensures that public health evidence informs planning and that community partners participate fully in decision-making. Strengthening relationships among municipalities, housing authorities, community organizations, and employers supports coordinated action and embeds collaboration within capacity building structures. Finally, shifting mental models, such as recognizing cooling infrastructure as essential, valuing lived experience as evidence, and integrating equity into routine decision-making, enables equitable heat adaptation. By incorporating these equity considerations across the four policy domains, implemented heat adaptation can reduce immediate health risks while also addressing the systemic inequities that shape vulnerability to extreme heat.

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APPENDIX A

Recommended activities from the Climate Change and Health Vulnerability Assessment

Activities were separated into two groups, activities for SWPH and external partners to consider, and activities for SWPH were split into three categories with input from the advisory groups:

- Quick Wins - activities that typically require little investment/few additional resources and often capitalize on existing processes that require only minor tweaks to achieve results.
- Best Buys - activities that typically require modest investment/some additional resources and produce the greatest returns on investment toward the outcome of interest.
- Gamechangers - activities that typically require greater investments/ additional resources, including time as well as changes in processes and/ or governance procedures to undertake activities that are transformative in nature.

Recommended activities with extreme heat considerations for SWPH and external partners from the Climate Change and Health Vulnerability Assessment report.

Recommendation 1: Develop a comprehensive and co-produced risk reduction and prevention strategy for extreme weather conditions.

SWPH

Quick wins:

- Co-create inventory of heat stress management practices with farmers, workers, and vulnerable communities working with community partners such as businesses. Existing knowledge and practices on those communities most affected by heat can provide important insights into heat mitigation for outdoor work.

Best buys:

- Develop an online Heat Vulnerability Assessment tool for community partners to identify risks and actions to guide core practices to address heat risk.
- Best buy: Develop protocols for small and medium sized businesses to protect employees' working outdoors, including increasing rest times during heatwaves and extreme heat days.

Game changers:

- Develop a Heat Action Plan for and with local stakeholders, which would identify clear opportunities for partnerships across the public and private sector, seek to leverage existing resources and infrastructure for reducing risk, and highlight concrete practices for addressing long term high heat stress in the southwestern region.
- Share non-confidential data and reports on climate risk and impacts on vulnerable populations with community partners to help them develop organizational adaptation, health and wellbeing strategies, protocols, and investments, including with local schools, businesses, and community centers.
- Create a repository of health equity data tools that could be used in the development of policies and the implementation and evaluation of programs and services.

External

Retrofitting infrastructure:

- Test mist cooling infrastructure for farm fields during heat waves to reduce the risk of heat stroke or cardiac arrest. This portable or movable infrastructure can be co-located in places of high traffic or target vulnerable hot spots in the community to create cooling corridors.
- Assess and report on school and public building standards to ensure these are equipped with heating and cooling infrastructure that comply with the climate risk projected for the region.
- Place policy directions towards Nature based Solutions (NbS) such as environmentally friendly infrastructure (i.e., green roof/white roof/solar) which reduce heat islands in urban contexts.
- Promote a review of access ramps and backup generators for social housing, multistory buildings, and elder care facilities to ensure rapid access or exit for communities most at risk of heat stress.

Recommendation 2: Review and enhance coordination mechanisms with area municipalities on land use planning.

SWPH

Quick wins:

- Ensure strong communication mechanisms exist between the health unit and municipal planning staff to strengthen climate-related considerations in local planning decisions.
- Create a directory of community liaisons to share information and create a local network for community partner collaborators communications on risk and best practices. Developing a compendium of best practices and preferences (including technologies used to communicate or spaces to gather) drawn from local community partner collaborators can better inform local community strategies.
- Liaise private sector and public sector environmental, sustainability and health and safety officers to coordinate and enhance climate-resilience adaptation practices and learning across community networks.

Best buys:

- Ensure schools and daycare centers for young children have updated protocols for climate-related health risks, including extreme heat events, poor air quality, and extreme weather events.
- Strengthen the data collection processes of the use of heating centers (through partnership).
- Use climate impacts-associated patient intake data to inform strategies to support the community in the long term, including where possible disaggregated data by gender, age, and vulnerable population variables that might exacerbate certain risks.

Game changers:

- Develop decision-making tools to support climate adaptation interventions for vulnerable populations (i.e., tree canopy site selection and planting).

External

Retrofitting infrastructure:

- Develop public transport protocols for local transport authorities to ensure efficient functioning of schedules on days of extreme cold and days of extreme heat, including emergency hydration packages.
- Identify co-located infrastructure through discussions with site staff for a shared extreme weather climate control space with low barrier access for different communities to reduce risk from extreme heat and summer to increase public familiarity with the sites.

Recommendation 3: Build and strengthen partnerships with agencies, organizations, and individuals beyond jurisdictional boundaries.

SWPH

Quick wins:

- Strengthen partnerships with local universities, civil society organizations, the private sector and other key community partner collaborator groups to support climate adaptation initiatives.
- Convene a local advisory group on psychosocial impacts and provide training resources on climate change impacts and the vulnerable population of the southwestern region.
- Educate school-aged children through partnership with school boards (embedding into curriculum).

Best buys:

- Engage and empower youth to develop the skills they need to participate in climate change and health action in partnership with local universities.
- Plan for learning events series for different communities, especially those in the most vulnerable classification in partnerships with colleges/universities to discuss risks and the links to different health associated impacts.
- Strengthen institutional collaboration among health providers on climate change actions, for example working with local hospitals to support a climate vulnerability assessment.

Game changers:

- Engage social housing owners and construction companies to promote nature-based solutions as central to reducing heat island effects in urban settings. This can be part of a long-term strategy to new green buildings and provide learning opportunities for investment practices informed by health considerations for projected climate impacts.

- Target emergency response interventions for populations most likely to be severely impacted (i.e., older adults) by increasing collaboration between SWPH and agencies responsible for developing community regional emergency plans.

External

Community partnerships:

- Partner with local organizations representing vulnerable populations to identify possible interventions and support needed to address mental health and climate vulnerability.
- Celebrate wins and highlight real local actions on specific improvements to our local environment: i.e., the improvement of Lake Erie water quality and related ecosystem health resulting from more environmentally sustainable farming practices that reduce runoff into waterways.

Industry partnerships:

- Develop private-public partnerships for increased heating and cooling centers in areas of increased vulnerability, including resources to diffuse information among communities pinpointing the locations, and heat protection materials.

Financial investments:

- Climate risk informed budgeting to allocate resources for training and practice to reduce health risk on individuals and key community partner collaborators or clients.

Recommendation 4: Create a communications plan to share up-to-date data on health risk information with recommendations.

SWPH

Quick wins:

- Deploy Early Warning Alerts for extreme weather using the local community channels of communication (Facebook, WhatsApp groups, etc.). and online applications.
- Create a digital infographic archive with materials that outline the risks and measures to reduce climate impacts on individuals and vulnerable populations. This can be shared with local stakeholders, chambers of commerce and businesses to print and place in visible locations in advance of heat waves.

- Enhance targeted communication of tangible actions that can be taken at the community level to enhance resilience and adaptive capacity.
- Launch an awareness raising campaign with targeted components for the most vulnerable community groups and include key actions for protecting residents of heat waves and peak hot days.

Best buys:

- Design, in collaboration with mental health professionals and climate experts, an education and awareness campaign for the general public, target vulnerable populations and healthcare providers across the region to address climate anxiety, promote mental health strategies in response to climate impacts and support science informed mental health literacy in the community.
- Provide translated key materials for at-risk immigrant and seasonal workers of the types of services and support for health associated risks.
- Develop a targeted campaign for low-cost actions for protecting against heat for older adults (i.e., fridge magnets, critical temperature-marked thermometers with a hotline for high-risk thresholds).

Game changers:

- Provide education and information to invest in communities' understanding of the health risks of climate change and the projected impacts for the region to ensure individuals make it personal, urgent and relevant for themselves and ultimately the region.

External

Community partnerships:

- Increase wellness checks on the elderly during heatwaves and promote practices that support access to food and social recreation activities in times of extreme weather.

Recommendation 5: Establish a monitoring and evaluation framework to assess the impact of climate actions and interventions.

SWPH

Quick wins:

- Incorporate the use of citizen science to highlight local climate action successes (e.g., use of a hashtag to see what is being implemented in the community).

Game changers:

- Evaluate the delivery and impacts of the program activities over time to support extreme temperature policies. Continue to tailor policies and practices (based on evaluation data) to the needs of the population.
- Establish routine evaluations on the delivery and impacts of the activities using consistent indicators to measure success and draw lessons learned from the interventions.

External

Use technology and customized tools:

- Draw on research expertise and resources to make custom assessments, studies, and develop capacities to better understand risk and plan for context relevant actions.

Recommendation 6: Promote and advocate for social capital building activities.

SWPH

Quick wins:

- Expand community support programs for example, "Be a Buddy/Hey Neighbour program" to support check-ins during extreme weather events such as extreme hot days (such as the existing age friendly Program) and to educate the public about the risk of heat on physical and mental health.
- Communication of local successes and progress towards climate action to reduce climate anxiety and support community actors undertaking initiatives to mitigate or adapt to climate change. These can include the municipality, local businesses, schools, community organizations and universities.
- Support social capital formation by enabling social connection and nourishing a sense of belonging as a health priority for the SWPH region, related to the social determinants of health (e.g., social exclusion).
- Promote inclusion of psychosocial dimensions in SWPH education and training programs for staff.

Best buys:

- Use existing information to make evidence-based interventions to increase social connections (e.g., heyneighbourcollective.ca).

- Co-create community strategies around social prescribing and novel approaches to reduce stress, anxiety and depression among local residents.
- Develop and offer training opportunities for local community groups and organizations to increase their capacity to design and implement health-related climate adaptation strategies to support their clients, employees and community members directly.

Game changers:

- Coordinate with community partner collaborators to support social capital building activities such as partnerships with existing community-based organizations that have a vision and a mission around social connection and include social capital building efforts (e.g., GenWell Project) in the implementation of programs and strategies such as part of the Community Safety and Well-Being Plan.

External

Building capacities:

- Develop a community-based strategy to expand social capital to support the development of urban heat island interventions.
- Invest in capacity building: Provide heat risk training and response to all employees (e.g., City parks employees, daycares, nursery schools etc.)
- Support targeted investments to fund psychosocial wellbeing programs (e.g., Deployment of Mental Health Practitioners in the aftermath of climate-related emergencies).
- Invest in community and individual mental health support programs for vulnerable people or provide training to those supporting vulnerable populations during and after climate associated impacts, such as the elderly limited in mobility during heatwaves, foreign temporary workers and field workers, or daycare or social workers overseeing family wellbeing, and young people at risk. Similarly, coordinate with local emergency response services to create an inventory of support services for affected populations after extreme events such as floods and hurricanes in the region.

Revising operating procedures, policies, and protocols:

- Using social research to identify and create multi-dimensional community spaces that are available 24/7. These spaces can be used as heating/cooling centres, and they promote community gathering and social connections.

- Promote good labour practices to protect the health of seasonal working and outdoor employees during fire events raising risk, including recommendations on the use of safety equipment, and requiring employers to ensure wellness breaks for people working long periods of time outdoors.

Recommendation 7: Develop a climate-compatible sustainable food system strategy

SWPH

Quick wins:

- Develop safe-food handling communication campaign as extended heat waves and weather patterns change towards longer heat days, food safety is central to reducing the risk of disease from food poisoning.

External

Revising operating procedures, policies, and protocols:

- Develop emergency response plans with local businesses and farmers in the event of food supply chain interruptions under a short or extended time frame accounting for disruptions during an emergency and crisis abroad.

APPENDIX B

Methods for literature review and stakeholder engagement

Given the growing number of systematic reviews on climate change adaptation, these reviews synthesize information of different scopes (e.g., implemented adaptation, effective adaptation, adaptation for particular population subgroups, etc.) which offers valuable insights for heat adaptation in Canada. As such, a review of existing systematic reviews was conducted to identify key adaptation practices in the peer-reviewed literature.

Searches were conducted in the following databases to capture published systematic reviews across multiple disciplines: Scopus, Pubmed, and Web of Science. Only articles published within (2015-2025) were included to ensure that results yield interventions that are based on recent data and are relevant to current climate change impacts. As this research aims to catalogue climate change adaptation interventions relevant for extreme heat impacts on human health in Canada, keywords corresponding with climate change, health, select locations (Canada, the United States, Australia, and New Zealand, or the United Kingdom), and systematic reviews. This list of countries was chosen based on their similarities in geography, climate, or economic status to Canada. Articles were uploaded to COVIDENCE, a systematic review managing software, and screened to only include systematic review articles with relevant information on implemented or evaluated extreme heat adaptation practices to impacts on health and wellbeing.

To further strengthen this review, a targeted search within the peer-reviewed literature was conducted for select urban areas that are highly exposed to extreme heat outside of the geographic scope described above: India, Indonesia, Philippines, Singapore, Hong Kong, Tokyo, Seoul, China, Jakarta, Italy, France, and Athens. Alongside this, information from organizational reports and websites were collected with to provide adaptation practices in the grey literature. Reports and websites were collected through keyword searches and through recommendations from knowledge experts.

Furthermore, to identify best practices for effective and equitable adaptation,

surveys were conducted with climate and public health experts to complement the literature review and address gaps regarding facilitators, barriers, and implementation context. Purposeful snowball sampling targeted participants such as staff from public health units, Public Health Ontario, and other organizations with experience implementing heat risk reduction measures. If interested, participants were then invited to participate in a semi-structured follow-up interview to provide further details about adaptation actions.

APPENDIX C

Catalogue of policies and practices as reported in the scientific and grey literature

This catalogue is available for download as a separate document.

APPENDIX D

Examples of adaptation policies and practices in Ontario

Climate change surveillance dashboard and urban heat island mapping

- Partners: Internal project only
- Role of Partners: Dashboard development; UHI mapping
- Barriers: Access to data; lack of local data; time lag; identification of appropriate indicators
- Facilitators: N/A

Regional Official Plan

- Partners: Regional planning departments; other public health teams
- Role of Partners: Supported creation of official plan statements to reduce climate and built environment health impacts
- Barriers: N/A
- Facilitators: N/A

Provide ED visit data to municipalities

- Partners: Local municipal climate teams
- Role of Partners: Provide data on heat-related ED visits to support adaptation planning
- Barriers: Low case counts at municipal scale; limited statistical significance
- Facilitators: N/A

Heat Notification Plan

- Partners: Internal: Emergency Management / Health Hazards, Communications, School Health, Childcare Support. External: Weather agency, community emergency coordinators, municipalities, local service partners

- Role of Partners: Monitor weather; issue notifications; initiate communications during heat events
- Barriers: Over-communication; unclear reach; capacity; competing priorities
- Facilitators: Relationship building; engagement plan; communication plan; evaluation

Informing Official Plan and Climate Adaptation Plans

- Partners: Internal: Health prevention team. External: Municipal planners; conservation authorities; climate CoPs; adaptation resource centres
- Role of Partners: Comment on official plans; inform adaptation strategies; develop health/equity guidance
- Barriers: Capacity; competing priorities; identifying opportunities for comment
- Facilitators: Relationship building; climate CoP participation

Assessment, Surveillance and Reporting

- Partners: Internal: Epidemiology, Data Analyst, Health Promotion Specialist
- Role of Partners: Weekly heat reporting; hospital data; public health reporting; vulnerability assessments
- Barriers: Data quality; lack of ambulance data; indicator gaps; capacity
- Facilitators: Strong epidemiology/data team; participation in climate CoPs

Communication / Dissemination of Resources

- Partners: Internal: Health Promotion, Graphic Design, Communications. External: Other public health agencies; translation services
- Role of Partners: Heat season communications; webpage; develop public and partner resources
- Barriers: Capacity; over-communication; partner engagement needs
- Facilitators: Relationship building; engagement plan; communication plan

Engagement with Partners

- Partners: Internal programs; external partners including community coordinators and climate CoPs
- Role of Partners: Engagement plan; partner mapping; webinars; presentations; resource collaboration
- Barriers: Staff capacity; lack of honorarium; partner interest; competing priorities

- Facilitators: Flexible engagement plan; knowledge sharing networks; honorarium policy; workplans

Social housing tenant engagement

- Partners: Housing authority; internal climate/energy office
- Role of Partners: Identify high-risk buildings; implement interventions
- Barriers: Funding; language barriers
- Facilitators: Start small; tenant advisor engagement

Theory of change exercise

- Partners: Internal staff
- Role of Partners: Exercise lead
- Barriers: Fully understanding possible outcomes
- Facilitators: Discussions

Informing school policies

- Partners: Local school boards
- Role of Partners: Provide evidence-based guidance
- Barriers: Expectations; lack of scientific consensus
- Facilitators: Clear communication

Mapping vulnerabilities

- Partners: Surveillance staff
- Role of Partners: Guidance; review
- Barriers: Access to data; GIS mapping skills
- Facilitators: N/A

Climate Change urgent response plan

- Partners: Internal staff
- Role of Partners: Drafted plan using Incident Management Principles
- Barriers: Time; complexity
- Facilitators: Hired contract staff

Climate Change and Health Vulnerability Assessment

- Partners: City government and partners

- Role of Partners: Fed into climate risk assessment; influenced climate resiliency strategy
- Barriers: Funding
- Facilitators: Council approval; external adaptation funding

Equity-based climate adaptation communication

- Partners: City strategic department
- Role of Partners: Support project
- Barriers: Funding
- Facilitators: Adaptation funding

Fire Hydrant water fountain Misters

- Partners: City infrastructure services
- Role of Partners: Funding secured; design; deployment; cleaning
- Barriers: Funding
- Facilitators: Adaptation funding

Cooling Options Analysis for Social Housing

- Partners: City; community housing
- Role of Partners: Selected building archetypes for assessment
- Barriers: Funding
- Facilitators: Adaptation funding

Climate Change and Public Health Surveillance Report

- Partners: Internal epidemiology staff
- Role of Partners: Data analysis
- Barriers: Time
- Facilitators: Climate change became strategic priority

Technical evidence synthesis

- Partners: Internal analytic staff
- Role of Partners: Respond to technical requests; synthesize best available evidence
- Barriers: Time; capacity
- Facilitators: Internal analytic expertise

Heat and Climate Network

- Partners: Community partners
- Role of Partners: Participate in network; share information
- Barriers: N/A
- Facilitators: Network participation

Community Climate Adaptation Spaces

- Partners: Community partners
- Role of Partners: Maintain spaces; provide information
- Barriers: N/A
- Facilitators: Community partnerships

Public Health Dashboard

- Partners: Epidemiology team
- Role of Partners: Collect, build, maintain dashboard
- Barriers: Technical capacity
- Facilitators: Dedicated analytic team