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Developing a Municipal Heat Response Plan: A Guide for Medium- sized Municipalities

2017

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August 17, 2017

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Introduction

Climate change is a key factor driving increases in summer temperatures. In British Columbia (BC), increases in summer temperatures are expected to rise faster than the global average. In 2009 an extreme heat event resulted in an estimated 110 premature deaths in the lower mainland¹. However, largely due to the temperate climate of this region, the risk posed by heat in BC has generally been overlooked. To address the public health risks posed by increasing BC temperatures and the capacity of municipal authorities to respond to them, the BC Centre for Disease Control assessed current perceptions of the health risks of heat and levels of preparedness of health authorities (HAs) and municipalities around extreme heat. In the course of our interviews, respondents stressed the need for guidance in developing heat-response plans for small and medium-size municipalities which lack the infrastructure and expertise of larger centres.

Some populations, such as the elderly, those living in social isolation, taking certain drugs, or living in impoverished circumstances, are more at risk of negative health impacts from heat events². Few studies in Canada or abroad have been conducted to evaluate the effectiveness of declared heat action plans. Nonetheless, in Montreal, strategies such as water distribution, hot day visits to socially isolated people, moving care facility patients to air conditioned rooms, and monitoring workers in warm environments, have been effective in lowering the number of heat related deaths on extremely hot days³. This guide is based on information gained through consultations with HAs and municipalities and a review of pertinent literature. It is intended as a tool to help BC municipalities develop extreme heat plans, ideally in a way that these plans are integrated with existing emergency preparedness strategies.

Asset Mapping

Some large municipalities e.g., Vancouver⁴, have resources for comprehensive heat response plans. Other smaller municipalities tend to have less comprehensive or no plans due to a limited perception of risk, lack of information, and/or lack of capital/human resources. While developing an effective municipal heat response plan requires coordination, the assets needed to develop such plans are already available in many communities. Municipalities should begin the process by taking stock of physical resources, non-profit volunteer supports, and what communications strategies are in place or are needed to respond to extreme heat.

Smaller municipalities may not have data on heat-mortality relationships specific to their populations. However, they may be able to obtain and infer these relationships using records from nearby, larger municipalities or regional health authorities. Similarly, while smaller municipalities often do not have the resources for extensive mapping of vulnerable populations – census data or local partners (detailed below) can help to identify areas to focus their efforts e.g., places comprised largely of heat-retaining concrete structures, buildings that lack air conditioning or cooling, or areas where people have reduced mobility or social supports.

Before the heat season, municipalities should assemble potential partner groups, including community planners, environmental/sustainability officers, emergency management officials, and public health officials to discuss a common vision for protecting vulnerable populations.

INFRASTRUCTURE/ RESOURCES

Municipalities can create an index of resources available for protection against extreme heat conditions.

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5226699/>

² <http://www.nccch.ca/content/vulnerable-populations>

³ <https://www.ncbi.nlm.nih.gov/pubmed/27203433>

⁴ <http://vancouver.ca/files/cov/Vancouver-Climate-Change-Adaptation-Strategy-2012-11-07.pdf>

- Municipalities should keep a list of public air-conditioned buildings, including community centres, libraries, and swimming pools to use as cooling centres, as well as alerting staff/volunteers that these may be opened beyond regular hours during extreme heat events. For populations without transportation to shelters, some cities partner with community groups (detailed below) to transport vulnerable people to cooling shelters; for example the city of Ottawa works with the Salvation Army.
- Cooling facilities can also be used as places for residents to access water. Some municipalities have portable water stations. For municipalities in Metro Vancouver which do not have access to portable water stations, Metro Vancouver has several water wagons that can be used. Publicly accessible water fountains in Metro Vancouver can be found at [TapMap](#)⁵. In jurisdictions where these resources are unavailable, non-profit groups may be able to provide bottled water for at-risk and homeless populations.
- Municipalities may be able to provide temporary air conditioning to some buildings or mandate that apartment buildings have at least one communal air conditioned room.

PARTNERS

If resources for mapping vulnerable populations are not available, information from community partner organizations can be used to identify where vulnerable populations reside including seniors, new Canadians with language barriers, low income families with young children, people living in low-income housing, socially isolated, homeless, and mentally ill citizens. Volunteers can provide outreach services to the vulnerable, distribute water, and/or be trained to help in cooling shelters.

- Some of the most common community partners in extreme heat planning are public health officials, fire officials, the Canadian Red Cross, Meals on Wheels, home support staff, staff at seniors' residences, and staff working with the homeless⁶. Some cities may have general emergency preparedness volunteers.

COMMUNICATIONS

- Communication material should be prepared with the aid of public health authorities and distributed before and during extreme heat events. Municipal websites may be updated with heat health messaging⁷, including "look out for each other," and which medications might put people at greater risk of heat related complications⁸. Paper materials could also be distributed to senior and community centres, schools, low-income housing areas, pharmacies and medical centres, as well as outdoor events. Where possible, it is helpful to have pictorial, multilingual materials.
- These materials should inform citizens of the location of cooling centres and public water fountains, and information about transport to get there.
- During a heat emergency, notifications, including compounding factors such as power outages, water shortages or boil water advisories, or air quality alerts, should also be sent out to media outlets and internal staff.
- Outdoor municipal workers should be alerted that they may be at higher risk for heat illness and be trained to monitor outdoor spaces for people experiencing heat-related illnesses.

How DOES this Fit with Other Emergency Response Plans?

⁵ <https://apps.metrovancouver.org/tapmap>

⁶ <http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/adapt/index-eng.php>

⁷ <https://www.healthlinkbc.ca/healthlinkbc-files/heat-related-illness>

⁸ <http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/HealthyEnvironments/Medicationsandtheheat%20.pdf>

Most municipalities already have all-hazard or emergency response plans in place, which can be adapted for extreme heat.

PRESEASON

- From weather to earthquakes, impacts can be minimized when neighbours are looking after each other and vulnerable members of their family/community. Throughout the year, neighbourhoods should be encouraged to work together to improve social capital and resiliency, as outlined in the *In it Together: Neighbourhood Preparedness Guide*⁹ by Prepared BC.
- Assemble the emergency planning committee and community groups linked to vulnerable populations. Necessary positions for effective planning include a Risk Management Officer, Liaison Officer, and Information/Communications Officer¹⁰. Clarify roles and ensure lists of vulnerable citizens are up to date.
- A link can be set up on the municipality website where people can sign up to be contacted in the event of an emergency.
- Most municipalities have a list of facilities that can be used as shelters, for extreme cold or air pollution events, which can also be adapted as cooling centres.
- Information about extreme heat preparedness and heat-illness symptoms can be hosted on the municipality website under emergency responses^{11,12}.

IMPLEMENTATION

Once a HA advises a municipality to call a heat emergency, reconfirm that the Chief Administrative Officer or Emergency Officer is leading the response. An emergency contact tree can then be used to communicate with stakeholders and mobilize response.

- Organize press conferences to get messages out to the public.
- Alert partner organizations and volunteers to check on vulnerable populations.
- Closely monitor heat-related morbidity and mortality, in concert with the regional HA.
- Activate heat plans for identified cooling facilities (e.g., public libraries, community centres, facilities already catering to heat-vulnerable people, such as seniors' centres).
- Extend hours of air-conditioned facilities where people are likely to seek heat relief (e.g., swimming pools).
- Open cooling shelters with overnight capability.
- Provide portable water stations and/or distribute drinking water to homeless shelters.
- Provide maps with locations and hours of operation of cooling facilities and drinking water stations.
- Reduce the cost of swimming at community pools or make it free.
- Provide transportation support to and from cooling facilities (where possible, work with community groups).
- Provide financial assistance for utility bills or ask your utility to halt service cancellations/charges during extreme heat events, so that citizens are not cautious in using their air conditioning.
- Check on citizens who have pre-registered to be alerted during emergencies.
- Provide advice to the public through healthlink.ca or directing them to call 811.
- Modify or cancel scheduled sports and outdoor events at daycares, summer camps, etc.

Establish a heat alert activation/deactivation protocol

⁹https://www.newwestcity.ca/database/files/library/in_it_together_neighbourhood_preparedness_guide_web_final_2015.pdf

¹⁰<http://www.portmoody.ca/modules/showdocument.aspx?documentid=6601> (pages 69-75)

¹¹<http://vancouver.ca/people-programs/hot-weather.aspx>

¹²<http://nsem.info/know-risks/extreme-weather>

Environment Canada data is used in BC to determine humidex and/or temperature triggers with sufficient response time for action. Vancouver Coastal Health and Fraser Health Authorities use specific trigger algorithms to set municipal emergency plans in motion when the average of the current day's 14:00h temperature and tomorrow's forecasted high is $\geq 34^{\circ}\text{C}$ at Abbotsford Airport or $\geq 29^{\circ}\text{C}$ at Vancouver Airport, an extreme heat warning is issued and municipalities are advised to call a heat emergency. A deactivation protocol should also be determined, informed by Environment Canada, when cooler weather is predicted for an extended time. For jurisdictions outside of the lower mainland, BC CDC is currently establishing heat response triggers.

Debrief

After an extreme heat event it is recommended to convene with partners to evaluate how well the response was carried out and to gather suggestions for future improvements. It may be useful for municipalities to practice their heat plans through table top exercises, both before and after events.

Long-term Heat Mitigation Strategies

In preparation for extreme heat due to climate change, best practices identified for the heat island effect and for assuring that residents have the means to best protect their health in the heat include:

- Preserving and expanding tree canopies and improving connectivity of greenspaces.
- Building shade structures in heat vulnerable areas where trees are not feasible¹³.
- Providing incentive programs to help fund green roof projects and cool roofs (high albedo and high emissivity materials) on residential, industrial, commercial, and institutional buildings across the municipality, especially in areas with large expanses of concrete¹⁴.
- Improving building codes to decrease the need for air-conditioning; however, in the case of vulnerable populations in substandard housing, provide air conditioning where possible. Vancouver is considering mandating cooling rooms in nonmarket housing for vulnerable populations¹⁵.
- Increasing water access with public drinking fountains.
- For rural jurisdictions, having a strategy in place to assure that residents who are not on municipal systems have access to water.

Additional Resources

- [Heat Alert and Response Systems to Protect Health: Best Practices Guidebook](#) (Health Canada, 2012)
- [Excessive Heat Events Guidebook](#) (US Environmental Protection Agency, 2016)
- [Climate and Health Intervention Assessment](#) (US Centre for Disease Control, 2017)
- [Guide for the Evaluation of a Warning System for People Vulnerable to Heat and Smog](#) (Institute national de Sante Publique du Quebec, 2013)
- [Cities Adapt to Extreme Heat: Celebrating Local Leadership](#) (Institute for Catastrophic Loss Reduction, 2016)
- [Developing Heat Alert and Response Systems in Urban and Rural Communities](#) (Health Canada, 2014)
- [Heat Alert and Response Systems in Urban and Rural Communities in Canada](#) (Berry et al. 2014)

¹³ [http://www.citywindsor.ca/residents/environment/environmental-master-plan/documents/urban%20heat%20island%20report%20\(2012\).pdf](http://www.citywindsor.ca/residents/environment/environmental-master-plan/documents/urban%20heat%20island%20report%20(2012).pdf)

¹⁴ [https://www1.toronto.ca/City%20Of%20Toronto/Environment%20and%20Energy/Climate%20and%20Energy%20Goals/Transform%20TO/PDFs/23-09-2015%20TransformTO%20Workbook%20Results%20Summary%20\(AODA%20Compliant\).pdf](https://www1.toronto.ca/City%20Of%20Toronto/Environment%20and%20Energy/Climate%20and%20Energy%20Goals/Transform%20TO/PDFs/23-09-2015%20TransformTO%20Workbook%20Results%20Summary%20(AODA%20Compliant).pdf)

¹⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4306883/>