



REPORT FOR ACTION

Climate Change and Health Strategy: 2016 Update

Date: November 15, 2016
To: Board of Health
From: Acting Medical Officer of Health
Wards: All

SUMMARY

Climate change is having an impact on health and will continue to be of concern in the City of Toronto. Potential health impacts of climate change include increased incidence of heat/cold-related illness, including premature death; severe weather resulting in injury and water-borne diseases, increases in vector-borne diseases, food system impacts (including food insecurity and food-borne illness), and degraded air quality (with increasing cardiovascular and respiratory illness).

Toronto Public Health's (TPH) Climate Change and Health Strategy for Toronto identifies specific actions and sets out a direction to better understand and respond to the health effects of climate change. This five year strategy (2015-2019) includes actions to support climate mitigation, adaptation and resilience activities at the City. The strategy recognizes that while the approach to addressing climate change health risks is broad, different assessment, analysis and engagement techniques need to be applied to specific health risks to address each one effectively.

This report provides an update on progress TPH has made in implementing the Climate Change and Health Strategy since June 2015 when it was adopted by the Board of Health.

RECOMMENDATIONS

The Acting Medical Officer of Health recommends that:

The Board of Health forward this report to:

- a) the Parks and Environment Committee;
- b) the Ontario Minister of Environment and Climate Change and the Minister of Health and Long-Term Care and;

c) the Association of Local Public Health Agencies; Ontario Public Health Association; Ontario Registered Nurses Association; Ontario Medical Association; Toronto Atmospheric Fund; Toronto Environmental Alliance and the Toronto Central Local Health Integration Network.

FINANCIAL IMPACT

There are no financial impacts arising from this report.

DECISION HISTORY

On February 20, 2013, City Council considered the report, Toronto's Future Climate: Study Outcomes by the Environment and Energy Division, that detailed projected changes in climatic conditions. City Council recommended that City Divisions and agencies, including Toronto Public Health, develop a Climate Change Risk Management Policy.

<http://www.toronto.ca/legdocs/mmis/2013/pe/bgrd/backgroundfile-55150.pdf>

On October 21, 2013, the Board of Health considered the report Exploring Health and Social Impacts of Climate Change in Toronto, which highlighted the results of ongoing research to understand the wide ranging health impacts of climate change.

<http://www.toronto.ca/legdocs/mmis/2013/hl/bgrd/backgroundfile-62786.pdf>

On July 8, 2014, City Council adopted the Resilient City - Preparing for a Changing Climate report including the Climate Change Risk Management Policy. TPH adopted this policy and developed a complimentary Climate Change and Health Strategy.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.PE28.6>

In November 2014, the Board of Health adopted TPH's Strategic Plan 2015-2019, A Healthy City for All, which includes actions that increase resilience to the climate change impacts on health.

<http://www.toronto.ca/legdocs/mmis/2014/hl/bgrd/backgroundfile-73622.pdf>

On June 12, 2015, the Board of Health adopted the Climate Change and Health Strategy. The strategy identifies specific actions and sets out a direction to better understand and respond to the health effects of climate change and will be implemented between 2015 and 2019. The Board recommended that the Medical Officer of Health report by December 2016 on progress in implementing the Climate Change and Health Strategy. <http://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-81508.pdf>

On September 26, 2016, the Board of Health considered the report Hot Weather Response for Vulnerable People in Toronto, which focuses on access to cooling for vulnerable populations.

<http://www.toronto.ca/legdocs/mmis/2016/hl/bgrd/backgroundfile-96422.pdf>

On September 26, 2016, the Board of Health considered the report Reducing Health Impacts of Cold Weather, which focuses on the timing of injuries, vulnerable populations, and a multi-component cold weather response.
<http://www.toronto.ca/legdocs/mmis/2016/hl/bgrd/backgroundfile-96420.pdf>

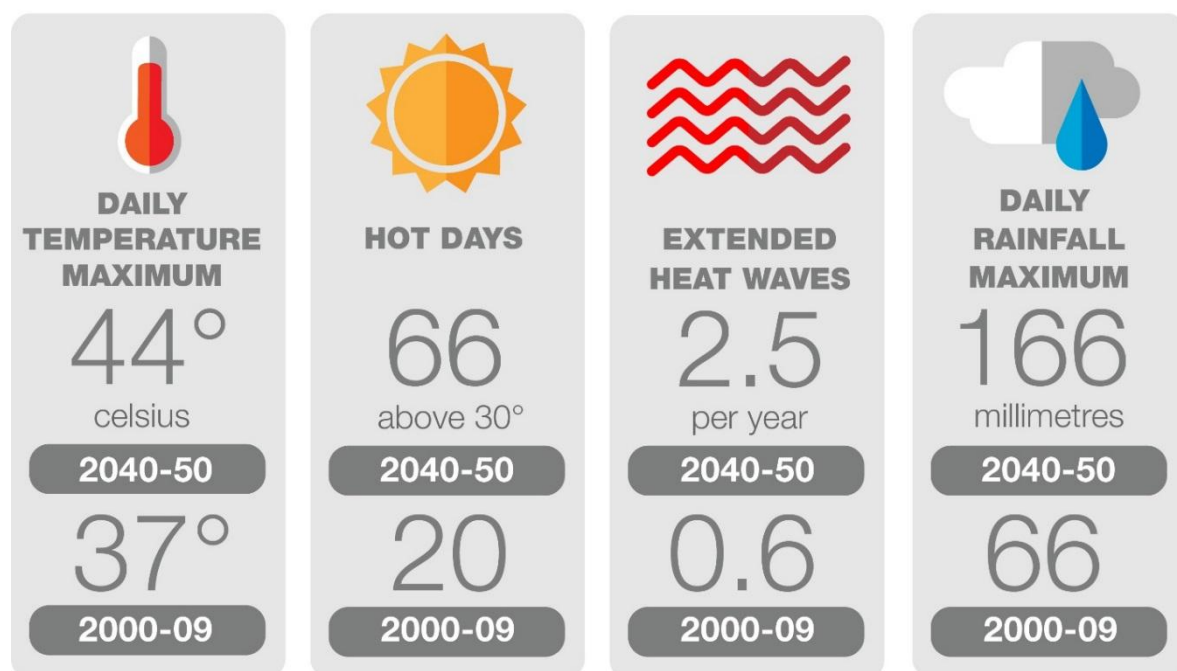
On October 31, 2016, the Board of Health considered the report Preventing Injuries from Wintertime Slips and Falls in Toronto, which included information about the numbers, trends and locations of injuries resulting from wintertime slips and falls.
<http://www.toronto.ca/legdocs/mmis/2016/hl/bgrd/backgroundfile-97431.pdf>

ISSUE BACKGROUND

Climate change is a global challenge with regional and local implications. Due to the changing climate, by 2050 Toronto can expect a fivefold increase in three-day heat waves and an increased likelihood of a heat emergency with high mortality such as has occurred in large cities in other developed countries¹. Climate models suggest that by 2040-2050, there will be more than triple the number of hot days (approximately 66) with temperatures that exceed 30°C, as compared with historical conditions (2000 to 2009) (Figure 1). TPH estimates that heat contributes to an average of 120 premature deaths in the city each year, and that mortality related to heat could double by 2050 and triple by 2080^{1,2}.

Figure 1: Toronto's Current and Future Weather by 2040 - 2050.

Toronto's **Future Weather***



*Source: Toronto's Future Weather and Climate Driver Study, 2011

Extreme weather events including rain, snow, drought, wind and ice storms are likely to increase. The health impacts related to severe weather on health are associated with both acute and chronic health effects. For example, heavy rainfall events can result in direct injury, but also have potentially negative health effects due to contaminated water, food and growth of harmful moulds. In addition, ice storms have the potential to cause injury from falling tree branches, slips on the ice, and increased likelihood of exposure to extreme cold weather resulting from power failures.

While climate change may increase the average wintertime temperature in Toronto, the number and intensity of extreme cold weather events may increase. Extreme cold weather increases the risk of mortality and hospitalizations lasting for up to several weeks after exposure, especially for people with heart conditions³. In recent years, the number of Extreme Cold Weather Alerts has been higher than the historical average. For example, the 2013/2014 and 2014/2015 winter seasons had a combined total of 75 Extreme Cold Weather Alerts while the 2011/2012 and 2012/2013 winter seasons had 16. Research also shows that a large proportion of health impacts occur at moderately cold temperatures, which will remain a feature of Toronto's winter weather even as warming increases.

Air pollution gives rise to approximately 1,300 premature deaths and 3,550 hospitalizations each year in Toronto⁴. In recent years, air quality in Toronto has improved largely due to the phase-out of coal-powered electricity generation and improved vehicle emission standards on new vehicles. However, progress may now be slowing, especially for several of the pollutants including sulphur dioxide, fine particulate matter, and carbon monoxide. As well, weather patterns can facilitate the formation of secondary pollutants such as ozone. By 2050, Toronto will experience significantly more hot days than it currently does¹. As a consequence, higher temperatures may create the ideal conditions for increasing amounts of secondary pollutants such as ozone to be produced.

Warmer weather and longer summers are anticipated to expand the geographic range of some animals and insects that carry diseases, and increase the chance that they will survive the winter. In recent years, the range of ticks that can carry Lyme disease has spread westward to some wooded and bushy areas of Toronto, including Rouge Valley⁵. In contrast, the number of new cases of West Nile Virus disease varies from year to year, depending on the temperature and precipitation levels that influence population levels of the mosquitoes that can transmit the virus.

TPH's Climate Change and Health Strategy identifies specific actions and sets out a direction to better understand and respond to the health effects of climate change to be implemented between 2015 and 2019⁶.

COMMENTS

This report is an update on the progress made in the first year of implementation of the five year Climate Change and Health Strategy for Toronto. The strategy addresses the following areas:

- Extreme cold weather
- Extreme heat
- Severe weather
- Air quality
- Built environment
- Vector-borne disease
- Water
- Food
- Greenhouse Gas Reduction

The strategy outlines a cross-cutting focus to address the promotion of low-carbon interventions in the following areas: energy use, transportation systems, food systems and the built environment.

While everyone is at risk from the impacts of climate change, some populations may be disproportionately affected. The Climate Change and Health Strategy applies a health equity lens to balance the socioeconomic and environmental co-benefits in addressing the health effects of climate change.

Extreme Cold Weather

Vulnerable Populations Research

Toronto Public Health is undertaking research to describe the burden of illness in vulnerable populations resulting from exposure to cold weather. TPH is collaborating with St. Michael's Hospital and Shelter, Support and Housing Administration to conduct interviews and focus groups with homeless populations about their experiences during extreme cold and heat. TPH is also collaborating with St. Michael's Hospital to analyze emergency department visits among homeless individuals for hypothermia and other cold-related health outcomes in order to identify those most vulnerable to cold weather. Evidence gathered to date supported expansion of service at two Toronto drop-ins that provide service to people who are homeless, marginally housed or socially isolated, to provide continuous, 24-hour access during winter months. Lastly, TPH continues to coordinate the City's Cold Weather Response Plan, including calling Extreme Cold Weather Alerts.

Ice and Snow: Slips and Falls

Exposure to cold weather is not the only hazard during the wintertime. TPH recently reviewed city policies regarding sidewalk snow clearing with consideration of slips and falls due to ice and snow. This included an analysis of emergency department visits and hospitalizations from falls on snow or ice, the economic burden of injury from falls on snow or ice, and a spatial analysis of the locations of falls based on liability insurance claims against the City of Toronto. As a result, the Board of Health made recommendations for preventing wintertime slip and fall injuries and increasing walking

that include TPH and Transportation Services staff working together to explore clearing all sidewalks in all parts of the City.

Extreme Heat

Toronto Public Health is working towards improving awareness of the health risks associated with heat exposure and to protect vulnerable populations. In 2015 and 2016, activities focused on extreme heat in multi-residential buildings.

Extreme Heat in Multi-Unit Residential Buildings

Toronto Public Health is exploring options to increase access to cool spaces for vulnerable people living in rental apartments without air conditioning. TPH is consulting with tenants, building owners, technical experts and other stakeholders on the feasibility of establishing indoor and outdoor cooling spaces at rental apartment buildings. In addition, TPH and Ryerson University are collaborating in a design charrette focused on the built environment and heat. Architecture students will design outdoor cooling spaces for apartment building locations, and residents will be given the opportunity to provide feedback on the designs. In addition, TPH is in discussion with Municipal Licensing and Standards (MLS) about including questions in the proposed Multi-residential Rental Property Licence framework about the availability of indoor and outdoor cooling spaces in the apartment buildings.

In 2015, the Board of Health recommended that TPH examine the feasibility of requiring multi-unit residential property owners to maintain a list of vulnerable residents who may need assistance during a heat event. To date, TPH has begun consultations with landlords and tenant groups to assess community needs and stakeholder concerns. Further, TPH has started a jurisdictional review of vulnerability registries to better understand best practices, challenges and opportunities.

Also in 2015, TPH reported on new research from Public Health Ontario on the relationship between temperature and all-cause mortality in Toronto. The research evidence and Toronto-specific findings of the association between heat and health are supportive of exploring a maximum indoor temperature standard of 26°C. TPH is consulting tenants and landlord groups about implementing a maximum indoor temperature standard. An online survey was conducted with Toronto residents about support for a regulatory approach for such a standard and their experiences with extreme heat.

It is expected that findings from these consultation activities will be reported to the Board of Health in 2017.

Hot Weather Response

Toronto Public Health co-ordinates Toronto's Hot Weather Response Plan, which aims to prevent harmful health impacts of high heat on residents of Toronto. In 2015, TPH participated in a pilot provincial Harmonized Heat Alert and Response System (HARS) and in 2016, HARS was fully implemented across Ontario. The criteria for issuing warnings were selected after a review of epidemiological evidence led by Public Health Ontario and Health Canada about the links between temperature, humidity, and health outcomes including mortality and illness. Planned future activities include a review of

the HARS and Toronto's Hot Weather Response Plan with a view to ensuring people who are vulnerable to the impacts of hot weather have adequate access to cooling in the City. This work will support decisions about how best to meet the needs of the City's vulnerable populations during hot weather.

Awareness of Heat and Heat-related Illness

TPH staff engage tenants and community organizations on a regular basis in apartment neighbourhoods across the city with the aim of increasing community capacity and addressing health inequities. In 2016, tip sheets on protecting one's health during extreme heat were distributed to tenants living in multi-storey buildings who could be vulnerable to the health effects of heat. Also in 2016, TPH sent information to landlords of multi-residential buildings about how they can help protect tenants from extreme heat.

During the Pan Am & Parapan Am Games, TPH's Weather Active app displayed temperature information and health messages, and pushed notifications about heat advisories to users. TPH is exploring redeveloping the app in 2017 to increase awareness of health protective actions during episodes of extreme heat.

Severe Weather

TPH collaborates with other City divisions to enhance the City's capacity to respond to emergencies that have a public health impact. TPH is an active participant in the Resilient City Working Group (a climate change adaptation staff group).

In 2015, TPH conducted a review that focused on the connection between severe weather (e.g. severe thunderstorms, heavy rainfall, ice storms and snowstorms) and health. The review identified certain populations as being more at risk from extreme weather events. These include those with low income, older adults, children, people who are socially isolated, pregnant or physically disabled and the homeless and under housed. Research indicated that stress experienced as a result of severe weather can have mental health effects. These findings will inform future policy work related to the acute and chronic impacts of severe weather.

The review has been shared with the Resilient City Working Group for their consideration in severe weather response planning. In addition, TPH contributed information to the new Extreme Weather Portal to inform residents and staff about the risks of extreme weather and actions they can take to reduce those risks, weather-proof their homes and improve their resilience.

The 2015 Pan Am & Parapan Am Games offered an opportunity to develop emergency response communication tools and enhance information sharing with other public health units, hospitals, Toronto Paramedic Services and other City divisions. For example, the EMCT (Emergency Management Communication Tool), a situational awareness tool, was developed to connect healthcare partners within the Games footprint. After the Games, these systems were maintained and expanded to include additional partners including other health units in the province.

TPH maintains and tests 89 Business Continuity Plans (BCP) that enable the health unit to effectively respond to and recover from unplanned interruptions that disrupt time-critical services and operational functions. Additional activities include participating in City-wide, TPH-specific, and health sector emergency exercises. TPH has also implemented and maintains an emergency staff notification system to notify staff during an emergency, including a severe weather event.

Air Quality

Toronto Public Health continues to undertake research studies, health assessments, advocacy work and public education in the area of air quality.

Given the potential for weather patterns to affect air pollution, it is important to continue to characterize the health burdens and risks associated with air pollution in the City. TPH is actively engaged in the Local Air Quality Studies (LAQS) led by the Environment & Energy Division. This work enables spatial mapping at the neighbourhood scale of the cumulative health risks associated with exposure to 33 common air pollutants and air toxics. As well, the project enables the City to identify which types of sources (e.g., vehicle, industrial, commercial and residential) contribute most to air pollution-related health risk. The next report on the LAQS is expected in 2017.

Changes in Toronto's climate are also being investigated as they relate to the production of pollen. Work is currently underway examining the link between asthma and allergies and the burden of illness resulting from pollen exposure. The findings of this work are expected to be reported to the Board of Health in 2017.

Toronto Public Health monitors emerging issues and actively participates in policy development and advocacy work to improve air quality, including efforts to reduce vehicle and industrial air emissions both provincially and federally. As well, TPH is an active member of working groups focused on gathering evidence about the Air Quality Health Index (AQHI) and on developing and implementing a cumulative exposure assessment for new industrial permits. TPH is also engaging other City divisions to update smog response plans.

Built Environment

In 2015, TPH released a report entitled *Green City: Why Nature Matters to Health* that identified the benefits to increasing greenspace in the City. The benefits include providing relief from extreme heat and reducing the urban heat island effect. This work will help support work to reduce the urban heat island effect around multi-unit residential buildings. TPH is also an active member of the C40 Cool Cities Network.

Toronto Public Health is promoting the implementation of the Active City Principles as outlined in the 2014 report entitled *Active City: Designing for Health*. The report outlines design principles to guide changes to neighbourhoods, streets and buildings that allow people of all ages and abilities to incorporate physical activity into their daily routines without extra costs for physical exercise. Implementing the Active City Principles is expected to increase active transportation which helps lower greenhouse gas emissions and improves resilience to climate change related impacts. In September 2016, the

Public Health Agency of Canada approved a grant for the Healthy by Design: Active Apartment Neighbourhoods Project which will implement these principles at two demonstration sites in Toronto.

Vector-borne Diseases

Toronto Public Health has comprehensive response plans for West Nile Virus (WNV) and Lyme disease that include monitoring and reporting on Toronto-specific epidemiology of vector-borne disease; mosquito control programs; education for public and health care providers; and ongoing collaboration with other public health agencies to ensure the City's disease prevention programs are aligned with provincial and national activities.

Most recently, TPH has undertaken a review of the protective messaging regarding WNV and Lyme disease. This review focuses on the scientific evidence surrounding the different messages given to the public about mosquito and tick avoidance. This review will create a resource for TPH to provide evidence-informed advice to the public on preventing bites from mosquitoes and ticks. In addition, TPH will undertake a vulnerability assessment to better understand the changes in vector populations in Toronto, and how this could impact TPH's response to WNV and Lyme disease. This will include a review of current City, provincial and federal procedures.

Water

Toronto Public Health conducted a review of the literature to better understand potential interactions between water, climate change and health. The review identified health impacts that could be associated with flooding, increased water temperature, and decreasing lake levels. Direct impacts of flooding include hypothermia, cardiovascular stress, mental health effects, injuries from debris, and injuries from contact with downed electrical wires or disturbed chemicals including fuels. Indirect health risks of flooding arise from exposure to toxic materials that enter waterways; contamination of food, drinking water, and recreational water; exposure to mould that develops after a flooding event; and increase in habitat for vectors such as mosquitoes that carry diseases such as West Nile Virus. In addition, warmer water in the Great Lakes could alter availability of fish as a food source; mobilize mercury or other pollutants from contaminated sediment; impact drinking water quality as a result of cyanobacteria produced by algal bloom growth and increased presence of bacteria, parasites, and enteric viruses. Decreasing lake levels could concentrate pollutants, resulting in increases in exposure to toxins.

However, it is still not clear which of these health impacts could be relevant for Toronto. TPH will conduct a vulnerability assessment to identify which of these risks may be a concern for the City, where actions are already underway by City or community partners to reduce or eliminate existing risks, and whether there are outstanding health risks that warrant further mitigation.

Food

Climate change and food systems are interconnected and complex. Building community level resilience can help to mitigate the risks resulting from climate change⁷. TPH continues to work on increasing healthy food access, improving the food environment, and engaging in community building and partnership development through a variety of initiatives. TPH seeks to improve the amount, quality and affordability of safe, healthy and culturally appropriate food made available to Torontonians. The Healthy Corner Stores initiative is helping small independent food retailers in low-income neighbourhoods sell healthier foods in a profitable way. The Mobile Good Food Market Project sells fresh, affordable vegetables and fruit in lower income areas that are underserved by traditional food retailers. The Grab Some Good initiative was recently expanded to the TTC to provide access to fresh fruit and vegetables while commuting. Food Reach is a one stop healthy food ordering service for community agencies and schools through an e-commerce platform providing wholesale pricing through aggregate purchasing. Lastly, the Toronto Agriculture Program is supporting the expansion of urban food growing in or close to the City.

Toronto Public Health recently hosted a Food Innovation Lab session that brought together City stakeholders to explore the connections and opportunities related to food systems and climate change. This workshop informed the agenda for future action and research over the next few years as part of the Climate Change and Health Strategy. The agenda includes the vulnerability of food systems, food procurement, food waste and sustainable diets. TPH and Solid Waste Management are exploring possible strategies for minimizing food waste. In 2017, TPH plans to undertake a vulnerability assessment to better understand the potential health effects of climate change on Toronto's food system.

Toronto Public Health is actively exploring the role that municipal governments can play in sustainable food systems both locally and globally. TPH is an active member of the C40 Food Network and the City of Toronto is a signatory to the Milan Urban Food Policy Pact. Lastly, many of the United Nations Sustainable Development Goals are directly related to food security. TPH will continue to look for opportunities to provide leadership related to food, climate change and health.

Greenhouse Gas Reduction

In July 2016, the Board of Health adopted a report entitled Health Benefits of a Low-Carbon Future. The results of this review suggest that actions to reduce greenhouse gas (GHG) emissions in Toronto will also benefit health. GHG-reduction actions that may be particularly beneficial to health are those that increase physical activity, reduce fossil fuel consumption and air pollutant emissions, reduce the risk of injury or encourage a healthier diet. Based on the published research reviewed, some GHG-reduction actions have the potential to reduce GHG emissions and also benefit health. The findings of this review will help inform climate change related activities that are ongoing across the City including TransformTO and Resilient City.

Next Steps

In the coming years, TPH will continue to implement the actions from the Climate Change and Health Strategy. This work will include efforts to develop or enhance partnerships with community agencies to better understand the impacts of climate change and extreme weather on the health of specific groups and populations.

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