

# A Climate of Concern:

Climate Change and Health Strategy for Toronto  
2015

Re:PY2.1a  
Attachment 1

# Contents

Toronto's Health in a Changing Climate .....	2
A Time for Action .....	3
Why Now? .....	3
International Context .....	3
Federal Context .....	4
Provincial Context .....	4
Municipal Context .....	4
An Actionable Approach .....	5
Issue Areas .....	6
1. Protecting Health during Extreme Cold Weather .....	6
2. Protecting Health during Extreme Heat .....	7
3. Preventing the Health Impacts of Severe Weather .....	8
4. Air Quality and Climate Change .....	9
5. The Built Environment and Climate Change .....	10
6. Preventing Vector-borne Diseases .....	11
7. Water, Climate Change and Health .....	12
8. Food System Safety and Security .....	13
Cross Cutting Issues .....	14
Toward a Low Carbon Future .....	14
Emerging Issues .....	14
Conclusion   Strategic Action on Climate Change .....	15
References .....	16



## Toronto's Health in a Changing Climate

The evidence is clear, and it has been for some time. Climate change is a reality and it is already having an impact on our health. Whether our focus is on the creeping effects of gradual climate change or the unexpected and often violent effects of severe weather, serious health implications exist.

The Intergovernmental Panel on Climate Change (IPCC, 2013) has found that the warming of the climate is unequivocal, and that increasing concentrations of greenhouse gases in the atmosphere, driven largely by human activity, are having an influence on the Earth's climate. The world's leading scientists and policy makers are in agreement that actions need to be taken now to prevent climate change from worsening and limit the significant impacts it will have on the health of communities around the world. Health Canada reports that climate change poses significant risks to human health and well-being with impacts from extreme weather events and natural hazards, air quality, stratospheric ozone depletion and water, food, vector and rodent-borne diseases (Berry, 2014).

In Toronto, potential health impacts of climate change include:

- Increased incidence of heat/cold-related illness and premature death;
- Severe weather resulting in direct impacts such as injury and indirect impacts such as water-borne diseases;
- Increases in vector-borne diseases;
- Food system impacts including food insecurity and food-borne illness; and
- Degraded air quality increasing cardiovascular and respiratory illness.

*A Climate of Concern: 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. It recognizes the critical importance of both mitigation and adaptation in enhancing resilience to climate change now and into the future, while preventing maladaptation.

.....  
"The evidence is overwhelming: climate change endangers human health,"  
- Dr Margaret Chan, WHO Director-General  
.....



.....  
*"The benefits of addressing climate change include reduced pollution, improved public health, fewer disasters, cleaner, cheaper, more efficient energy, better managed forests, more livable cities, increased food security and less poverty" - Ban Ki-Moon, UN Secretary General*  
.....

## A Time for Action

### Why Now?

This strategy responds to a need to understand the broad impacts of climate change on the health of Torontonians. It recognizes that climate change represents a serious health issue of current and future concern that we need to address. It is a forward-looking strategy that recognizes the implications of international and regional efforts to address climate change as complementary to municipal action.

### International Context

At the global level the signal from the scientific community, civil society and nature itself, has never been clearer. According to data collected by the National Oceanographic and Atmospheric Administration (NOAA) global average temperatures in 2014 were the highest ever recorded (NOAA National Climatic Data Centre, 2015). In 2014, the IPCC's fifth assessment report (AR5) detailed in the strongest language to date, the degree to which climate change is recognized as a global challenge with a profound man-made or human induced cause (IPCC, 2013). Landmark studies conducted internationally and nationally have further established direct and indirect links between climate change and human health.

Climate change represents a significant threat to the environment, socioeconomic development and human health. The United Nations (UN), the World Bank (WB), the International Monetary Fund (IMF) and the World Health Organization (WHO), represent just a small number of the hundreds of international organizations that have continued to advocate for meaningful action to address climate change. A wide range of health-focused organizations have highlighted the specific health related concerns of climate change, including the World Medical Association (WMA) in its Declaration of Delhi on Health and Climate Change (2009). In 2012, the Doha Declaration on Climate, Health and Well-Being was supported by 83 international, national health organizations and NGOs including the European Public Health Association and Canadian Nurses Association, testament to a growing recognition of climate change health impacts.

---

*"The Canadian Medical Association believes that Canada must prepare now for the potential health threat that climate change poses to its population"*

**- The Canadian Medical Association**

---

Broadly it is hoped that international negotiations supported by regional and municipal efforts will result in a new global treaty on climate change which will come into force after 2020, which is intended to stabilize greenhouse gas emissions and prevent dangerous climate change.

### **Federal Context**

At the federal level work on climate change has been coordinated by Natural Resources Canada and Health Canada with a focus on understanding the impacts of climate change across the country. In 2007, the Canadian Government published, *From Impacts to Adaptation: Canada in a Changing Climate* and in 2014 it published the update, *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation*. In both instances, climate change is identified as a serious health concern and acknowledge that additional and ongoing collaboration at all levels of government will be required to best respond to the health challenges presented by a changing climate.

### **Provincial Context**

At the provincial level, numerous governments are increasingly motivated to address climate change. In Ontario, the signal of a renewed focus on the issue came with the renaming of the Ministry of the Environment as the Ministry of Environment and Climate Change (MOECC). The Climate Summit of the Americas, hosted in Toronto, aims to "work towards common approaches to reducing greenhouse gas emissions through broader adoption of carbon pricing mechanisms" (Government of Ontario, 2014). These efforts are part of a larger, short and long-term plan to address climate change through a variety of mechanisms, including a new cap and trade system.

### **Municipal Context**

At the municipal level, Toronto has a history of leadership on climate change. *Toronto's Climate Change, Clean Air and Sustainable Energy Action Plan* (City of Toronto, 2007) focuses on mitigation and adaptation activities to reduce greenhouse gas emissions and deal with its effects. Toronto's approach is increasingly focused on the concept of resilience. As defined by the Rockefeller Foundation, resilience refers to "the ability of a system, entity, community, or person to withstand shocks while still maintaining its essential functions and to recover quickly and effectively." *The Resilient City – Preparing for a Changing Climate* (2014) report to City Council advocates for resilience to be integrated into decision-making and co-ordination of City operations and services.

.....  
"It's not climate change. It's everything change"

- Margaret Atwood  
.....

In 2014, the Board of Health requested the Medical Officer of Health collaborate with appropriate City agencies, to identify and develop strategies to prevent potential health impacts associated with the range of inclement weather types that could adversely impact Toronto as a result of our changing and highly variable climate. This aligns with Toronto Public Health's (TPH) broader strategic plan – *A Healthy City for All* (2015-2019) which champions actions to increase resilience to climate change impacts on health.

The *Climate Change and Health Strategy for Toronto* recognizes that now is the time to act. It identifies several key areas as well as specific actions to better understand and respond to the health effects of climate change. It will help to ensure that effort and resources are appropriately directed to dealing with the issues of greatest health concern.

## An Actionable Approach

**The strategy addresses the following issue areas:**

- Cold Weather
- Hot Weather
- Severe Weather
- Air Quality
- Built Environment
- Vector-borne Disease
- Water
- Food

The strategy will also integrate analysis of the health benefits, and where possible the health-economic benefits of a low carbon transition. This strategy aims to identify and integrate emerging issues into the long-term response to climate change health impacts.

The following principles will be considered when implementing the strategy in order to ensure a consistent approach to better understanding and responding to the issue areas:

- The principles, priorities and actions outlined in TPH's current Strategic Plan: *A Healthy City for All*
- Utilize best practice, evidence, and science to understand and respond to the direct and indirect health effects of climate change
- Collaborate with internal and external partners in the public, private, academic, NGO and healthcare sectors;
- Address and mitigate the health equity impacts of climate change
- Seek to balance socioeconomic and environmental co-benefits in addressing the health effects of climate change
- Integrate and embed messaging on the health impacts of climate change into health communications across TPH programs, as appropriate

## Issue Areas

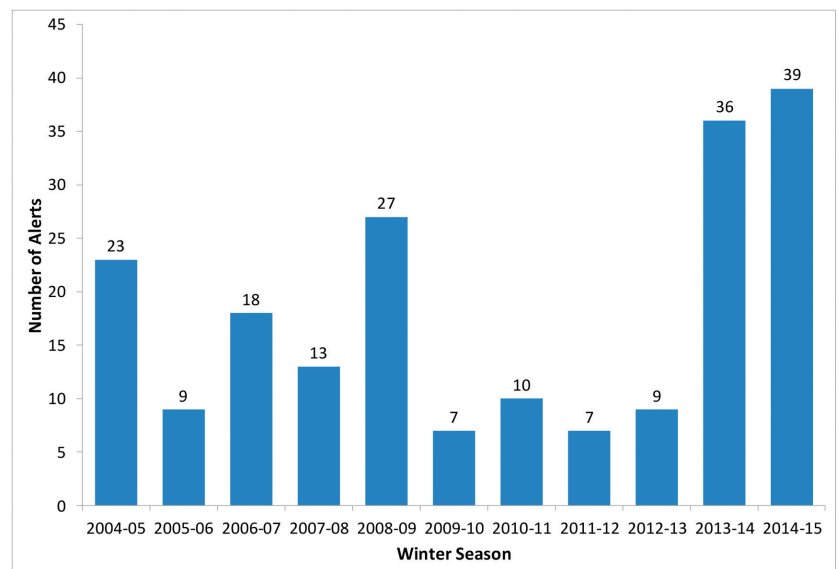
### 1. Protecting Health in Cold Weather

Climate change is associated with volatile swings in weather and while cold may become less common overall, unusual cold spells may occur more frequently. In a population that has become less acclimatized to cold, these unusual weather events could have a greater impact when they do occur (Ebi, 2013; Woodward, 2014). Toronto may experience more frequent episodes of extreme cold and the number of Extreme Cold Weather Alerts has been higher in recent years. For the 2014/2015 winter season there were 39 Extreme Cold Weather Alerts issued by the Medical Officer of Health. Toronto will experience periods of extreme cold and has seen an increase in the number of cold alerts issued.

Various health effects arise from periods of cold weather exposure, including frostnip, frostbite and hypothermia. As during periods of extreme heat, vulnerable populations are at particular risk. These include those with pre-existing illness (e.g., cardiovascular disease), infants and young children, the elderly, the marginally housed, homeless, and people who work outside.

#### Actions include:

- Conduct an analysis of the relationship between extreme cold weather and adverse health impacts with a focus on vulnerable populations, including the homeless
- Investigate the relationship between historic temperature and windchill trends in relation to extreme cold alert triggers
- Manage the Cold Weather Response Plan and the implementation of the Cold Weather Alert System



*Number of Extreme Cold Weather Alerts called in Toronto, Winter 2004/05 to Winter 2014/15. Source: Toronto Public Health*



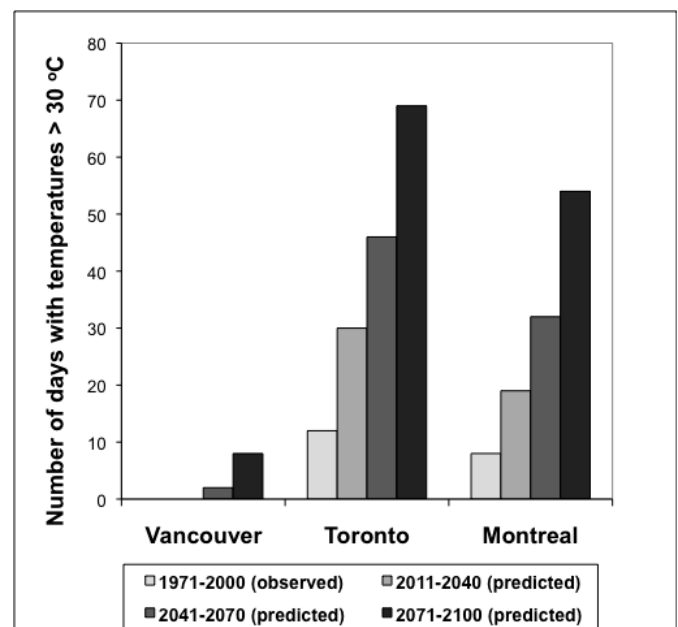
## 2. Protecting Health during Extreme Heat

Rising global temperatures were recognized early as the result of a changing climate, as were their direct and indirect health effects. The extended heat waves that affected Europe in 2003 and Russia in 2010 were linked to 70,000 and 55,000 deaths respectively and highlighted the significant effect extreme heat can have on morbidity and mortality, even in developed countries. These heat events and the significant numbers of deaths and illness associated with them, served to dramatically profile the risks associated with climate change, in particular to vulnerable groups including people with pre-existing conditions, infants and young children, seniors, socially isolated individuals and the homeless. Modelling suggests that by 2049, Toronto will experience 46 additional days per year where the temperature exceeds 30°C (currently 20 days per year), and as a consequence, increases in the health burden of heat related illness.

### Actions include:

- Explore policy and regulatory options to better protect vulnerable populations from extreme heat
- Investigate new and emerging research on health-based evidence for maximum temperature standards
- Improve the effectiveness of Toronto's Hot Weather Response Plan through ongoing monitoring and evaluation of the plan

This work builds on a longstanding commitment to address the health impacts associated with extreme heat, for example, through prior work on heat vulnerability mapping and strategies to prevent heat-related illness and deaths from extreme heat emergencies.



*Projected increase in the number of days above 30°C – Based on data from the Canadian Climate Change Scenarios Network, 2010. Source: Toronto Public Health*



### 3. Preventing the Health Impacts of Severe Weather

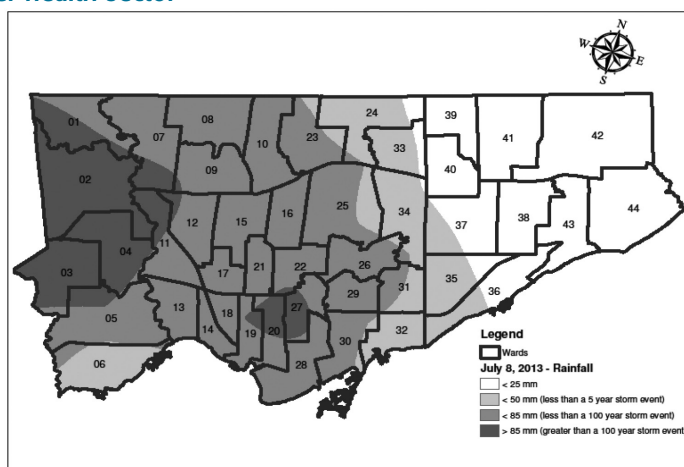


In 2013, Toronto was affected by severe weather events (flooding and an ice storm), following more than a decade in which numerous weather records were broken. In addition to the significant economic impact these events had on the City, they also had direct and indirect effects on the health of Toronto's population. The effects included illness related to carbon monoxide poisoning as some residents without power used gas powered equipment indoors to stay warm.

Recognizing Toronto's unique geography and climate, work on this issue will focus on understanding the specific impact extreme precipitation events (i.e., flooding), wind events (i.e., hurricanes, tornados) and ice storms may have on Toronto's population, while building on existing work to understand the discrete health impacts of extreme heat and cold events. By focusing on specific types of severe weather the analysis will help to understand short, medium and long-term health impacts as well as the combined effects of severe weather events that occur in combination or close succession. For example, an extreme precipitation event (flooding) may be followed by a prolonged period of extreme heat.

#### **Actions include:**

- Assess the acute and chronic health impacts, including mental health impacts of severe weather
- Investigate opportunities to enhance health sector preparedness to climate change and severe weather working with internal partners, other City divisions and the larger health-sector
- Develop protocols for enhancing public awareness of food safety and monitoring the epidemiology of food-borne illness following severe weather events
- Expand support for severe weather resilience through the development of community based severe weather protocols and improved risk communication
- Mitigate the impacts of electrical system disruptions (e.g. brownouts or blackouts) on the storage and handling of vaccines



*Map depicting rainfall intensity in Toronto from the July 8th storm in 2013. Source: City of Toronto*



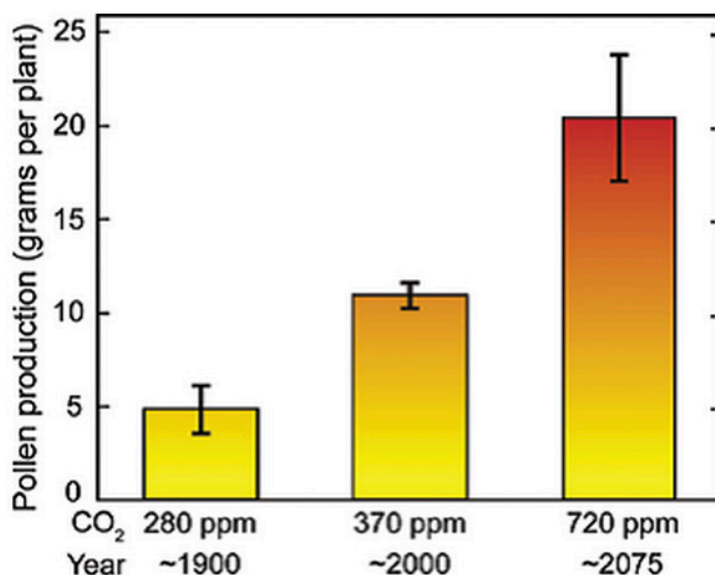
## 4. Air Quality and Climate Change

The strategy will inform a research effort to better understand and prepare for the effects of climate change on air pollution, asthma and seasonal allergies. It will also explore mechanisms to increase awareness of the health risks from air pollution, for example through the expanded promotion of the Air Quality Health Index (AQHI).

While air quality has improved in the last decade, air pollution still gives rise to around 1,300 premature deaths and 3,550 hospitalizations each year in Toronto. Climate change is also expected to affect pollination and consequently millions of individual who suffer from asthma and seasonal allergies. Changes in the concentration of atmospheric CO<sub>2</sub> may result in faster vegetation growth. In combination with warmer weather this may result in an earlier and prolonged pollen season (Smith et al., 2014). This can mean increased symptoms for individuals with breathing issues. While it is generally understood that climate change will affect pollination and asthma, the extent of the specific impact on health is poorly understood.

### Actions include:

- Examine the use of the Air Quality Health Index (AQHI) in communicating health risks during mass gatherings to enhance TPH's response to poor air quality events
- Support ongoing analysis to assess the health burden of air pollution
- Investigate the impact of climate change on the current and projected health burden of asthma and allergies associated with pollen



*Graph depicting increases in pollen counts from ragweed exposed to increased concentrations of carbon dioxide. Source: Global Climate Change Impacts in the US (2009)*

## 5. The Built Environment and Climate Change



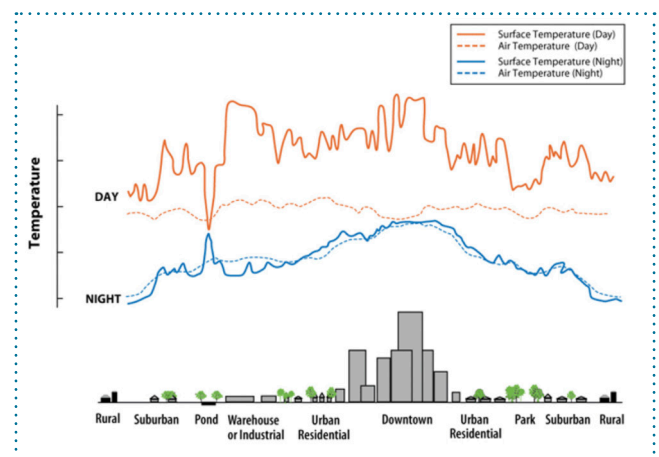
The built environment refers to the buildings, energy and transportation systems, essential infrastructure, open spaces, and agricultural lands that make up and support the City and its residents. Recognizing not only the long-term investment in our built environment and a reliance on built and natural infrastructure, we need to consider the health impacts associated with the way we design, plan and build our cities in light of climate change.

Various studies, including: *Healthy Toronto by Design* (Toronto Public Health, 2011); *The Walkable City: Neighbourhood Design and Preferences -Travel Choices and Health* (Toronto Public Health, 2012), *Road to Health: Improving Walking and Cycling in Toronto* (Toronto Public Health, 2012), as well as collaborative studies with other City Divisions (City Planning, Transportation Services) and other public health agencies have helped to better understand the relationship between the built environment and health.

The strategy builds on this experience and recognizes that both the natural and built environments modify interactions between climate and health. Future work will focus on examining acute and chronic health implications associated with our interactions with Toronto's built environment. The strategy acknowledges that significant economic, social, and environmental co-benefits may result from an enhanced focus on the low-carbon development of the built environment.

### Actions include:

- Assess the health implications of the urban heat island effect (UHI) around multi-unit residential buildings (MURBS)
- Explore the health benefits of expanding green space in Toronto
- Promote the implementation of the Active City Principles to improve health and increase resilience



Depicting the effect of the urban heat island on day-time and night time temperatures. Source: Environmental Protection Agency (EPA)

## 6. Preventing Vector-borne Diseases



Vector-borne diseases are a concern for Torontonians. In recent years, West Nile Virus (WNV) and Lyme disease have seen their geographic range expanded northward and pose increased risks to human health in Toronto. The strategy is focused on better understanding the impact climate change may have on the presence and risk of existing and emerging vector-borne disease in Toronto and ultimately, on actions to reduce risk and prevent health impacts.

### **Actions include:**

- Continue ongoing monitoring and reporting on Toronto-specific epidemiology of vector-borne diseases
- Assess projected changes in the burden of illness from vector-borne disease due to climate change
- Enhance education for the public and health care providers on preventing or seeking timely treatment for Lyme Disease, WNV, and other emerging vector-borne diseases
- Collaborate with other public health agencies (e.g. Public Health Agency of Canada) to ensure vector-borne disease prevention programs are aligned with provincial and national activities
- Update the WNV Adulticiding Plan and develop a Lyme Disease Action Plan

These efforts build on existing monitoring, awareness and control programs recognizing the important role climate change may play in shifting the distribution of disease-carrying vectors.





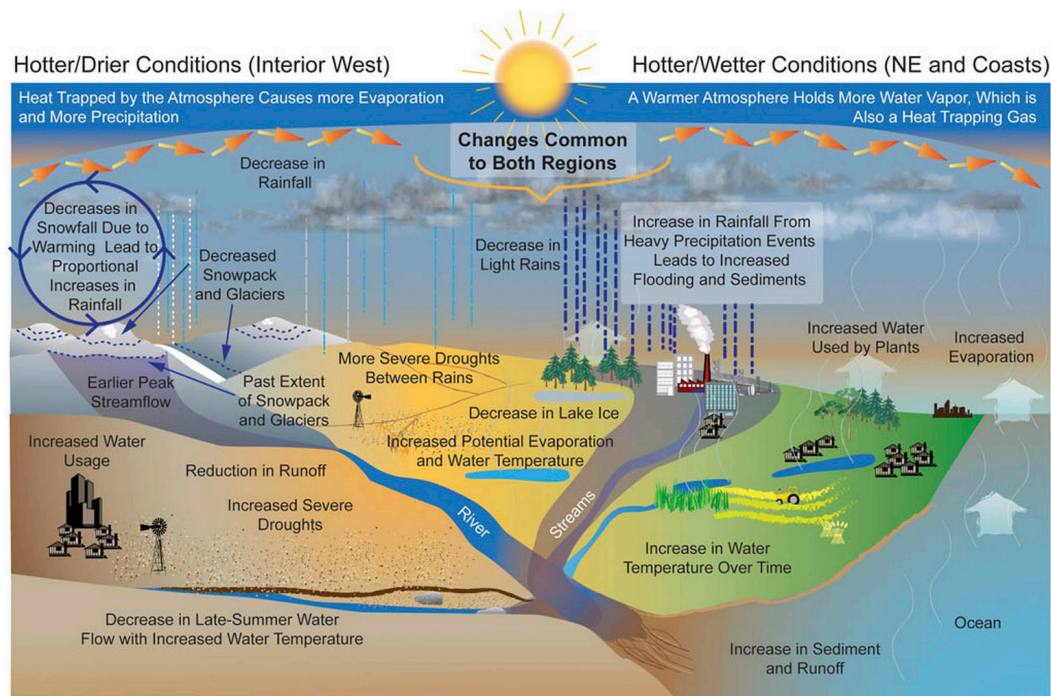


## 7. Water, Climate Change and Health

Climate change is expected to result in changes to the availability and quality of water. In some instances this may mean more water (flooding) or less (drought). The quality and quantity of available water can have impacts on health and sanitation, agricultural productivity, the economy, the natural environment, water-borne disease and important cultural and recreational activities. In light of the fundamental relationship between the availability of clean water and health, the strategy focuses on identifying specific health risks associated with the impacts of climate change on Toronto's water supply and other processes, services and activities.

### Actions include:

- Continue ongoing daily monitoring and public disclosure of beach water quality
- Assess climate change risk to water and waste-water treatment facilities and associated health impacts, including adverse drinking water quality reports
- Assess the potential impact of climate change on the burden of water-borne disease



*Projected changes in the water cycle linked to climate change.*

*Source: US Global Change Research Program*



## 8. Food System Safety and Security

Food is recognized as having a powerful role in human health, and in building strong and diverse communities, not to mention its critical connection to the health of the environment and the economy. Food, climate change and health are linked across the food system, from production to processing, distribution to storage, consumption to waste disposal. Climate change could affect the availability of some foods as weather events such as flooding, drought and heat can impact agriculture. This can increase food costs and reduce accessibility for people, especially those with low incomes. In addition, a large proportion of the food supply in the Toronto comes from outside of the area, resulting in transportation related greenhouse gas emissions. This work builds on projects such as the *Toronto Food Strategy*, aimed at improving the food system and the health of Torontonians.

### **Actions include:**

- Investigate opportunities for rebuilding infrastructure to support a sustainable food system that promotes access to healthy food and local food production
- Examine the promotion of sustainable diets that consider low carbon strategies in the context of Toronto's diverse population
- Assess the impact of climate change on food safety (e.g. changes in the burden of food-borne disease), food security and sustainability

## Cross Cutting Issues

### **Toward a Low Carbon Future**

It is necessary to decrease our reliance on fossil fuel use given its contribution to climate change and negative health impacts. Ongoing work to understand the health and health-economic benefits of a low carbon transition will be integrated into all aspects of the climate change and health strategy, alongside City-wide efforts to achieve an 80% reduction in greenhouse gas emissions by 2050.

This work will focus on understanding the potential health co-benefits that result from reducing greenhouse gas emissions in the following key areas:

- Energy use
- Transportation systems
- Food systems
- Built environment

This strategy will be informed by a growing body of evidence that finds significant health benefits and cost-savings for the health sector and the economy at large, can be realized by transitioning to a low-carbon future. As part of this initiative, TPH will explore mechanisms to decrease energy consumption and greenhouse gas emissions from our policies, facilities and operations, in collaboration with other City partners.

### **Emerging Issues**

Alongside efforts to understand the health and health-economic benefits of a low-carbon transition, the strategy recognizes that as the science advances, our understanding of climate change issues grows and new health impacts may be identified. Emerging issues will be integrated into ongoing work.

Some issues of potential concern that may need to be addressed include:

- Health concerns of displaced persons and 'climate refugees'
- The health sector's role in reducing greenhouse gas emissions.

## Conclusion | Strategic Action on Climate Change

This strategy identifies areas of concern to public health, and the actions to better understand and create workable solutions to pressing climate change and health challenges. In implementing the actions outlined in the strategy, TPH will focus on supporting advocacy, public engagement and communications to address climate change health impacts. Toronto Public Health will continue to advocate for public policies that contribute to a healthy environment, mitigate health risk and improve the resilience of Torontonians to climate change health impacts.

Toronto Public Health will engage a range of stakeholders to address climate change health impacts, including vulnerable groups most likely to be affected by climate change. Given the broad range of anticipated climate change health impacts, TPH is committed to working with internal and external partners, including community groups to coordinate efforts to address climate change and health.





## References

- Berry, P., Clarke, K., Fleury, M.D. and Parker, S. (2014): Human Health; in *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation*, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, ON, p. 191-232.
- City of Toronto. (2007). *Climate Change, Clean Air and Sustainable Energy Action Plan*. Retrieved from [http://www1.toronto.ca/City%20Of%20Toronto/Environment%20and%20Energy/Programs%20for%20Residents/Files/pdf/C/clean\\_air\\_action\\_plan.pdf](http://www1.toronto.ca/City%20Of%20Toronto/Environment%20and%20Energy/Programs%20for%20Residents/Files/pdf/C/clean_air_action_plan.pdf)
- Ebi and Mills. 2013. Winter mortality in a warming climate: a reassessment. *WIREs Climate Change*. 4:203-212.
- Government of Canada. (2007). *From Impacts to Adaptation: Canada in a Changing Climate*. Ottawa, ON, Canada.
- Government of Canada. (2014). *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation* (p. 286). Ottawa, ON, Canada.
- IPCC. (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. Retrieved from [www.climatechange2013.org](http://www.climatechange2013.org)
- NOAA National Climatic Data Centre. (2015, January). *State of the Climate: Global Analysis for December 2014*. Retrieved from <http://www.ncdc.noaa.gov/sotc/global/2014/12>.
- Government of Ontario. (2014, December 3). *Climate Summit of the Americas [information]*. Retrieved March 30, 2015, from <http://www.ontario.ca/environment-and-energy/climate-summit-americas>
- Smith, K. R., Woodward, A., Campbell-Lendrum, D., Chadee, D. D., Honda, Y., Liu, Q., ... Sauerborn, R. (2014). Human health: impacts, adaptation, and co-benefits. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, ... L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change* (pp. 709–754). Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Toronto Public Health. (2011). *Healthy Toronto by Design*. Toronto, Ontario.
- Toronto Public Health. (2012). *Road to Health: Improving Walking and Cycling in Toronto*. Toronto, Ontario.
- Toronto Public Health. (2012). *The Walkable City: Neighbourhood Design and Preferences, Travel Choices and Health*. Toronto, Ontario.
- Woodward A. 2014. Heat, cold and climate change. *Journal of Epidemiology and Community Health*. Published online first (1/04/2014) doi: 10.1136/jech-2014-204040