



CANADIAN  
PUBLIC HEALTH  
ASSOCIATION

The Voice of Public Health

# CLIMATE CHANGE AND HUMAN HEALTH

POSITION STATEMENT | OCTOBER 2019



# THE VOICE OF PUBLIC HEALTH

**The Canadian Public Health Association** is the independent national voice and trusted advocate for public health, speaking up for people and populations to all levels of government.

We champion health equity, social justice and evidence-informed decision-making. We leverage knowledge, identify and address emerging public health issues, and connect diverse communities of practice. We promote the public health perspective and evidence to government leaders and policy-makers. We are a catalyst for change that improves health and well-being for all.

We support the passion, knowledge and perspectives of our diverse membership through collaboration, wide-ranging discussions and information sharing.

We inspire organizations and governments to implement a range of public health policies and programs that improve health outcomes for populations in need.

## OUR VISION

A healthy and just world

## OUR MISSION

To enhance the health of people in Canada and to contribute to a healthier and more equitable world.

### How to cite this document:

Canadian Public Health Association (CPHA). Position Statement: Climate Change and Human Health. October 2019. Available at <https://www.cpha.ca/climate-change-and-human-health>.

For more information, contact:

### Canadian Public Health Association

404-1525 Carling Avenue, Ottawa, ON K1Z 8R9

T: 613-725-3769 | [info@cpha.ca](mailto:info@cpha.ca)

**[www.cpha.ca](http://www.cpha.ca)**

# Climate Change and Human Health

## ACKNOWLEDGEMENTS

This statement is adapted from a document prepared by Kim Perrotta, former Executive Director; current Senior Director, Climate, Health and Policy, Canadian Association of Physicians for the Environment (CAPE), with input from Dr. Courtney Howard, President, CAPE, and representatives of the Canadian Medical Association, the Canadian Public Health Association (CPHA), the Canadian Nurses Association, and the Canadian Association of Nurses for the Environment (formerly Canadian Nurses for Health and the Environment).

The purpose of this paper is to clarify CPHA's position on climate change. Its focus is to identify issues that could be addressed within the ambit of Canadian public health systems. The Association also recognizes the need for professional education concerning climate change and is supporting a separate group that has the purpose of advancing climate change education for public health students and professionals.

Climate change is “the greatest health threat of the 21<sup>st</sup> century”<sup>1</sup> and it is recognized that “the effects of climate change are being felt today and future projections represent an unacceptably high and potentially catastrophic risk to human health.”<sup>2</sup> The enormity of the challenge has been catalogued in a recent Government of Canada report.<sup>3</sup> The effects of climate change include: overall changes in temperature, increases in extreme weather events, changes in conventional patterns of disease vectors, polar ice decline, sea level rise, and changes in plant food production patterns with their subsequent effect on human health. Our response to climate change can also be “the greatest health opportunity of this century”,<sup>4</sup> as many of the policies needed to fight climate change could also produce health benefits, reduce health care costs, and improve social cohesion and equity in our communities.

Canada is a signatory, with 193 other countries, to the Paris Accord<sup>5</sup> that provides a global response to the threat of climate change by requiring each signatory to establish carbon reduction goals and to take actions aimed at keeping a global temperature rise this century to well below 2°C above pre-industrial levels, and to pursue efforts to further limit the temperature increase to 1.5°C. The world is currently at approximately 1°C warmer since 1880 with approximately two-thirds of that rise occurring since the mid-1950s.<sup>6</sup>

In Canada, the average annual temperature over land has increased 1.7°C, while the temperatures in Northern Canada have increased by 2.3°C between 1948 and 2016.<sup>7</sup> Federal, provincial, and territorial governments have committed to making change,<sup>8,9</sup> but the work is far from complete. The Auditor General of Canada found that climate emissions in 2020 are

projected to be 111 MT (megatonnes) greater than Canada's 2020 target of 620 MT.<sup>10</sup>

Climate change will affect all areas of Canada; however, it will be most apparent in Canada's Far North. The Arctic is warming at triple the global rate and is considered one of the more vulnerable regions to climate change in the world.<sup>11</sup> In the Far North, permafrost underlies most infrastructure, including roads, buildings, bridges, landfills, sewage lagoons and tailings ponds. Ice road networks, built on frozen seas, lakes and rivers, facilitate delivery of food and medical supplies and enable Indigenous hunting, fishing, and gathering traditions. With few permanent roads, frozen oceans and land provide transportation links to hunting grounds. The rapid thawing of permafrost and ice roads has profound implications for the health and safety of northern people. By altering traditional ways of life, these changes will also result in further physical, social and economic disruption. Furthermore, the animals that make up the base of the Inuit diet (seal, caribou, arctic char, beluga whale, and narwhal) are vulnerable to climate change-related conditions, presence or absence of snow or ice, and a precipitation regime that determines migration timing, abundance and health.<sup>12</sup>

CPHA recognizes the scientific consensus that, without rapid mitigation of greenhouse gas (GHG) emissions, the public health effects will only intensify.<sup>13</sup>

## RECOMMENDATIONS

CPHA calls on the federal government to work with provinces, territories, municipalities, communities, Indigenous Peoples, and industries to take action in the following areas:

### Legislation

- Develop and implement a Pan-Canadian Climate Change Act to strengthen, support, integrate and enforce existing national and federal frameworks and commitments, and better coordinate provincial/territorial, municipal, and industry plans.
- Strengthen the existing carbon-pricing regime to further reduce carbon consumption;
- Direct revenues obtained through *Greenhouse Gas Pollution Pricing Act* to the development and use of renewable energy sources.

### Regulatory and Program Initiatives

- Renew, develop new, and implement effective, evidence-based climate action plans that describe how Canada will achieve the emission reductions needed to do its fair share\* to keep global warming below 1.5°C based on our commitments in the Paris Accord and the Pan-Canadian Framework by:
  - Reviewing, establishing and enforcing scientifically sound emission reduction targets needed to meet Canada's 2030, 2050 and 2080 commitments;
  - Developing and implementing emissions monitoring approaches and transparent

\* Fair share refers to the concept that the world's wealthier countries should take stronger steps to address climate change than developing countries. Overall, developed countries are the greatest consumers of resources and as such should pay the greatest amount to clean up.

- emissions reporting mechanisms to measure progress on meeting target reductions;
- Integrating a health-in-all-policies approach to climate policy, identifying health co-benefits associated with climate change policy, and integrating health equity impact assessments into ongoing policy decisions; and
  - Developing and implementing programs to support an equitable transition for farmers, oil and gas sector workers, and their families and communities affected by climate change mitigation and adaptation efforts.

## **Greenhouse Gas Emissions**

- Reduce emissions from the oil and gas sector, by phasing out fossil fuel subsidies, regulating methane emissions, phasing out carbon extraction and undertaking other actions as necessary;
- Phase out coal-fired power plants in Canada by 2030, with this electricity supply being replaced by improved energy-use efficiency, and increased use of electricity that comes from non-carbon-based forms of production;
- Reduce greenhouse gas emissions and foster environmentally-sound innovation in the agricultural sector; and
- Implement a National Food Policy, based on the 2019 Food Guide, which incorporates steps to reduce the consumption of animal-based proteins and promotes consumption of a diet rich in plant-based proteins (while respecting the traditional diets of Indigenous Peoples).

## **Health of Canadians**

- Undertake local and regional climate change impact assessments, develop adaptation plans, undertake emergency response planning and training, prepare health equity impact assessments, develop and implement sustainable practices, and support best practice information-sharing among provinces, territories, municipalities, and Indigenous Peoples;
- Standardize and enhance Pan-Canadian surveillance and reporting of climate-related health effects, using a health equity lens;
- Develop and implement communications plans and educational tools that support the need for change to maintain Canadians' quality of life; and
- Support research on the physical and mental health effects of climate change, and physical and psychosocial adaptation opportunities.

## **CPHA further calls upon public health professionals and organizations to:**

- Identify and report on the health implications and effects of climate change, including a focus on Indigenous Peoples;
- Undertake research into the physical and mental health, and health equity implications of climate change and the health co-benefits of adaptation activities;
- Support the development of and transition to a sustainable, just and healthy future; and
- Communicate effectively with key stakeholders concerning the importance of this issue, the health implications of our current path and the health co-benefits of the transition we require.

## CONTEXT

Climate change is defined as a long-term shift in weather conditions that are identified by changes in temperature, precipitation, winds, and other indicators. It can involve both changes in average conditions and changes in variability, including extreme events.<sup>14</sup> Climate change can occur naturally; however, since the beginning of the First Industrial Revolution (approximately 1760 to sometime between 1820 and 1840), human activity has had the single greatest influence. Its two greatest causes are the burning of fossil fuels and deforestation. Both activities result in the release of carbon dioxide into the environment that causes a greenhouse effect that increases temperature.

### An International Perspective

The health effects of climate change on a global scale are devastating. The 2018 *Lancet Countdown on Health and Climate Change*<sup>15</sup> report found that 712 extreme weather events occurred around the world in 2017, resulting in \$326 billion (USD) in economic losses; nearly a three-fold increase in economic losses over 2015. It reported that 157 million more people were exposed to heat waves in 2017 than were exposed in 2000, and that 3.4 billion weeks of work were lost due to extreme heat worldwide. It noted an increase in insect- and water-borne diseases in some regions of the world and a decrease in agricultural yield potential in the 30 countries for which data were available.<sup>15</sup> This report identified undernutrition as the largest health effect of climate change in the 21<sup>st</sup> century.<sup>16</sup>

The Intergovernmental Panel on Climate Change (IPCC)<sup>17</sup> has identified the effects on health resulting from climate change as:

- Increases in atmospheric temperature are projected to increase morbidity and mortality due to heat-related illnesses such as heat stroke, heat edema, heat rash, heat stress, acute cardiovascular disease and renal disease;
- Reduced air quality from GHGs will likely increase morbidity and mortality due to asthma, ischemic heart disease, stroke, acute lower respiratory infections, lung cancer and chronic obstructive pulmonary disease;
- Vector-borne diseases are increasing in prevalence and are likely to continue their advance as warming temperatures expand the geographic range of insects and other species; and
- Extreme weather events, including flooding, droughts, cyclones, hurricanes and wildfires, are expected to increase in frequency and intensity. Changes to weather and extreme weather events threaten food security, housing and infrastructure and result in lost income for those affected by the event. Climatic instability is expected to undermine crop yields, Indigenous hunting and gathering practices, and fishery production.

This report also paints a bleak picture of the world's future with 2°C of warming. While it concluded that 1.5°C of warming will amplify many of the climate-related health effects that we are already experiencing at 1°C of warming, the effects of 2°C of warming were found to be far greater. For example, a 1.5°C target would protect several hundred million more people from climate-related poverty by 2050 than would a 2°C target. The World Health Organization agrees; it found that health outcomes from undernutrition, climate-related migration and climate-related infectious disease will be significantly less at 1.5°C of warming than at 2°C of warming.<sup>18</sup> These reports are corroborated by Environment Canada's Report to the United Nations<sup>11</sup> and *The Lancet Countdown Report*.<sup>15</sup>

## The Canadian Situation

The average temperatures in Canada have increased at a rate greater than that for the world,<sup>7</sup> and have resulted in twelve areas of risk from climate change. The six major risk areas and their description are summarized in Table 1, while the remaining six risks include: agriculture and food; forestry; geopolitical dynamics; governance and capacity; Indigenous ways of life; and water.<sup>19</sup>

Over the last two decades, Canada has seen a dramatic increase in the costs of extreme weather events, such as extremes in temperature, flooding, and wildfires. The Insurance Bureau of Canada reports that claims for natural disasters such as floods and wildfires have grown from \$400 million per year in previous decades to approximately \$1 billion per year today, while government funding for flood damage and other disasters has increased steadily from about \$100

million per year two decades ago to \$2 billion per year in 2013-14.<sup>20</sup> The average annual losses resulting from climate change over the period 2007 to 2017 have averaged \$1.7 billion per year.<sup>18</sup>

Climate change is harming the physical and mental health of Canadians. Cardiorespiratory effects from worsening air pollution due to wildfires left many Canadians ill in recent summers.<sup>21,22</sup> Emergency evacuations and population displacement from wildfires and floods have been associated with trauma and post-traumatic stress disorder.<sup>23,24</sup> In the Canadian Arctic, where temperatures have increased by 2.3°C since 1948,<sup>25</sup> health risks associated with food insecurity are increasing due to decreased access to traditional food sources.<sup>26</sup> Meanwhile, Lyme disease has spread into new regions in Canada,<sup>27</sup> and more intense and prolonged pollen seasons have the potential to exacerbate hay fever and asthma.<sup>28</sup>

**Table 1: Top six areas of climate risk facing Canada, from the Council of Canadian Academies, *Canada's Top Climate Change Risks*<sup>19</sup>**

Area of Risk	Description
Physical Infrastructure	Damage to homes, buildings and critical infrastructure from heavy precipitation events, high winds, and flooding; increased probability of power outages and grid failures; and increased risk of cascading infrastructure damage.
Coastal Communities	Damage to coastal infrastructure, property, and people from inundation, saltwater intrusion and coastal erosion due to sea-level rise and storm surges.
Northern Communities	Damage to buildings, roads, pipelines, power lines, and airstrips due to thawing permafrost; reduced and disrupted access to communities and facilities due to warmer summer temperatures; and increased risks from marine accidents due to increased marine traffic and reduced summer sea-ice extent.
Health and Human Wellness	Adverse effects on physical and mental health due to hazards that accompany extreme weather events, heatwaves, lower ambient air quality, and increasing range of vector-borne pathogens.
Ecosystems	Threats to biodiversity, ecosystem resilience, and the ability of ecosystems to produce a range of benefits to people, such as: environmental regulation, provision of natural resources, habitat, and access to culturally important activities and resources.
Fisheries	Declining fish stocks and less productive/resilient fisheries due to changing marine and freshwater conditions, ocean acidification, invasive species and pests.

Climate change became a reality for many Canadians in the summer of 2018. In Ontario, temperatures exceeded 30°C for 21 days,<sup>29</sup> a significant increase over the 30-year average of 13.5 days per year that held until 2005,<sup>30</sup> while in Quebec, the only province that monitors heat-related deaths in real-time, extreme heat claimed the lives of more than 90 people.<sup>31</sup> British Columbia declared a provincial state of emergency as it fought to contain nearly 600 wildfires,<sup>32</sup> while Ontario saw the number of wildfires nearly double from a 10-year average of 716 to 1,312.<sup>33</sup> In addition, millions of people in Canada were exposed to levels of air pollution rated as “high risk” and “very high risk” for days or weeks because of smoke from wildfires.<sup>34</sup> Articles on the emergence of eco-anxiety, ecological grief and solastalgia in Canada are appearing with regularity in mainstream media.<sup>24,35</sup>

## Anticipated Effects of Climate Change

While the changes in temperature and precipitation resulting from climate change are well documented,<sup>7</sup> as are the risks in Canada,<sup>18</sup> there is less information available concerning the anticipated effects of climate change at a regional level. However, the anticipated effects of climate change in the United States have been assessed at a regional level<sup>36</sup> and can be extrapolated to the corresponding Canadian regions, whereby:

- *Quebec and the Maritime provinces* (corresponding to the northeastern region of the U.S.) are projected to see increased heat waves, precipitation, coastal erosion, flooding, and storm surge;
- *Ontario* (corresponding to the Midwest) can expect increased number of heat waves, changes to its forest composition, and changes in the aquatic ecosystems of the Great Lakes, as well as alterations to crop yields due to rising temperature and CO<sub>2</sub> levels;
- *The Prairie provinces* (corresponding to the Plains states) are projected to see an increased demand

for water and energy, and altered agricultural practices and needs;

- *British Columbia* (corresponding to the Northwestern region) will see changes in fresh water supply due to earlier snowmelt, resulting in summer droughts. Coastal erosion and sea level rise could cause infrastructural problems and displacement of populations. The increased frequency of wildfires, insect outbreaks, and disease will increase the rate of forest decline, thereby reducing carbon absorption; and
- *Northern Canada* (corresponding to Alaska) will see rapidly receding summer sea ice and thawing permafrost, which may damage infrastructure. Shrinking glaciers will cause changes to hydropower production, fisheries, sea levels, and ocean circulation patterns, with resulting effects on Indigenous Peoples and rural communities.

These effects, however, do not affect all people and communities equally. The more marginalized members of our communities will be inequitably affected, with Indigenous Peoples, young people and socially and economically disadvantaged populations being particularly affected.<sup>37,38</sup> The pathways for these unequal effects include unequal geographic distribution of health risks, exclusion from health and environmental decision-making, and unequal access to health and health care. There will be direct and indirect effects on the general population due to climate change's influence on existing social support structures, economic security, food security, and housing, yet the actions taken to address climate change could result in co-benefits to population health.<sup>39</sup>

For example, in Canada, chronic exposure to fine particulate air pollution resulting from the burning of fossil fuels is responsible for 7,100 premature deaths and \$53.5 billion in health-related costs per year;<sup>40</sup> thus climate solutions directed at motorized vehicles, coal plants, heating homes and other buildings, and oil and gas extraction, would save lives, reduce rates of

heart disease, asthma and lung cancer, and cut health care costs, while reducing climate emissions.

Similarly, chronic diseases cost Canada about \$200 billion per year in treatment and lost time.<sup>41</sup> By increasing levels of physical activity through investments in public transit, cycling and walking,<sup>42</sup> as well as developing food systems that support diets rich in plant-based proteins,<sup>43</sup> it could be possible to save lives, reduce rates of heart disease, diabetes and cancer, and cut health care costs, while reducing climate emissions.

## **Looking Forward**

The effect of climate change on Canada is increasingly well documented and will continue to evolve as people and communities continue to release carbon emissions in excess of target levels. Current emission trajectories have the world on course for 2.6 to 4.8°C of warming by 2100.<sup>44</sup> *The Lancet Countdown 2018 Report* concluded that: “Trends in climate change impacts, exposures, and vulnerabilities demonstrate an unacceptably high level of risk for the current and future health of populations across the world,” and that both human lives, and the health systems upon which people are dependent, will be at risk unless steps are taken to significantly reduce climate emissions and increase our resilience to the climate change that is now inevitable.<sup>16</sup> It is essential that all people work to reduce their personal carbon footprint.

To prevent global warming from reaching 2°C, the IPCC has concluded that collectively we have to reduce climate change-causing emissions by 45% by 2030 and to zero by 2050.<sup>18</sup> To do its fair share, Canada will have to double its existing pledge and cut climate emissions by at least 60% below 2005 levels by 2030.<sup>45</sup> Current and future Parliamentarians will be responsible for setting this target and establishing the policies and programs needed to realize it.

Adaptation policies, however, can help reduce the health effects associated with some elements of climate change. Those interventions that show signs of effectiveness have been reviewed elsewhere.<sup>18</sup> From a human health and wellness perspective, generic interventions could result in reduction of socio-economic disparities and enhancement of protection and support for vulnerable populations. Similarly, heat-related effects could be mitigated by issuing timely advisories, providing access to air conditioning and green space and developing and maintaining resilient power grids. Adverse effects on physical and mental health could be reduced through comprehensive disaster preparedness that includes recovery operations combined with long-term and sustainable physical and mental health programs. Emerging zoonotic infectious threats can be partially mitigated through public advisories, training, and outreach initiatives. Incumbent with these activities is the need for adequate monitoring, surveillance and epidemiological capacity, and research to support these adaptive approaches.

The United Kingdom reduced its climate emissions by 41% between 1990 and 2016 as a result of the *Climate Change Act*, which led to long-term, legislated targets with policies subject to continuous evaluation by an independent scientific body.<sup>46-48</sup> In Canada during the same period, emissions increased from 603 MT to 704 MT.<sup>49</sup> A target-based, policy-driven plan with broad support should provide a similar response in Canada.

We are running out of time. By the time today’s toddlers are in high school, our window for the most effective action will have closed. We are the last generation that has the opportunity to make the changes needed to avoid catastrophic climate change. Climate change must be treated like the public health emergency that it is.

## REFERENCES

1. Costello, A., Abbas, M., Allen, A., et al. 2009. [Managing the health effects of climate change](#). *The Lancet* 373: 1693-1733.
2. Whitmee, S., Haines, A., Beyer, C., et al. 2015. [Safeguarding human health in the Anthropocene Epoch: Report of the Rockefeller Foundation - Lancet Commission on planetary health](#). *The Lancet* 386 (1007) 1973-2028.
3. Government of Canada, 2019. [Canada's changing climate report: advancing our knowledge for action](#). A collaborative effort of Environment and Climate Change Canada, Fisheries and Oceans Canada, Natural Resources Canada and University experts. April 2019.
4. Watts, N., Adger, N.W., Agnolucci, P., et al. 2015. [Health and climate change: policy responses to protect public health](#). *The Lancet* 386(10006)1861-1914.
5. [United Nations Framework Convention on Climate Change 2015](#). The Paris Agreement.
6. Union of Concerned Scientists, n.d. [The Planet's Temperature is Rising](#).
7. Bush, E., and Lemmen, D.S. (eds.) 2019. [Canada's Changing Climate Report](#). Ottawa ON. Government of Canada.
8. Governments of Canada 2016. [Pan-Canadian Framework on Clean Growth and Climate Change. Canada's Action Plan to Address Climate Change and the Economy](#).
9. Government of Canada, 2011. [Federal Adaptation Policy Framework](#). Environment and Climate Change Canada.
10. Office of the Auditor General, 2018. [Perspective of Climate Change Action in Canada - A Collaborative Report from Auditor Generals - March 2018](#).
11. Government of Canada, 2014. [Canada's Sixth National Report on Climate Change. Actions to meet commitments under the United Nations Framework Convention on Climate Change](#). Ottawa.
12. Ford, D.J., Smitt, B., Wandel, J., et al. 2007. [Climate change in the Arctic: current and future vulnerability in two Inuit communities in Canada](#). *The Geographical Journal* 174(1): 45-62.
13. Intergovernmental Panel on Climate Change, 2014. [AR5 Synthesis Report: Climate Change 2014](#). IPCC.
14. Environment Canada, 2015. [Causes of Climate Change](#).
15. Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Berry, H., et al. 2018. [The 2018 report of The Lancet countdown on health and climate change: shaping the health of nations for centuries to come](#). *The Lancet* 392 (10163) 2479-2514.
16. Watts, Nick et al. 2017. [The 2017 report of the Lancet Countdown on health and climate change: from 25 years of inaction to a global transformation for public health](#). *The Lancet* 391(10120): 581-630.
17. Intergovernmental Panel on Climate Change, 2018. [Global Warming of 1.5 degrees Celsius. Special Report. Summary for Policy Makers](#). IPCC.
18. World Health Organization (WHO). 2016. [WHO Director-General Keynote address at the Human Rights Council panel discussion on climate change and the right to health](#).
19. Council of Canadian Academies, 2019. [Canada's Top Climate Change Risks: The Expert Panel on Climate Change Risks and Adaption Potential](#). Ottawa, ON.
20. Hodgson, G. 2018. [The costs of climate change are rising](#). Special to *The Globe and Mail*. May 15, 2018.
21. Henderson, S.B., and Johnston, F.H. 2012. [Measures of forest fire smoke exposure and their associations with respiratory health outcomes](#). *Curr Opin Allergy Clin Immunol* 12(3):221-7.
22. Howard, C., Rose, C., and Hancock, T. 2017. [Lancet Countdown 2017 Report: Briefing for Canadian Policymakers](#). Lancet Countdown and Canadian Public Health Association; October 31, 2017.
23. Dodd, W., Scott P. Howard, C., Rose, C., Scott, C., Cunsolo, A., et al. 2018. [Lived experience of a record wildfire season in the Northwest Territories, Canada](#). *Can J Public Health* 109:327-337.
24. McCue, D. (2018) [Growing 'ecological grief' is the mental health cost of climate change](#). 2018 [October 26, 2018].
25. Government of the Northwest Territories. N.d. [Climate Observations in the Northwest Territories \(1957-2012\)](#).
26. Rosol, R., Powell-Hellyer, S., and Chan, H.M. 2016. [Impacts of decline harvest of country food on nutrient intake among Inuit in Arctic Canada: impact of climate change and possible adaptation plan](#). *Int J Circumpolar Health* 75(1):3127
27. Ogden, N.H., St-Onge, L., Barker, I.K., Brazeau, S., Bigras-Poulin, M., Charron, D.F., et al. 2008. [Risk maps for range expansion of the Lyme disease vector, \*Ixodes scapularis\*, in Canada now and with climate change](#). *Int J Health Geogr* 7:24.
28. Berry, P., Clarke, K., Fleury, M.D., and Parker, S. 2014. [Human Health](#). In: [From Impacts to Adaptation: Canada in a Changing Climate](#). Natural Resources Canada.
29. Government of Canada. 2017. Environment Canada Weather. [Top Weather Stories in 2017](#).
30. Government of Canada, 2018. [Climate Atlas of Canada](#).
31. Woods, A. 2018. [More than 90 deaths now linked to heat wave in Quebec](#). July 18, 2018.
32. Government of BC Government News (BC). 2018. [Provincial state of emergency declared](#). August 15, 2018.
33. Government of Ontario. 2018. [Emergency Preparedness. Forest Fires](#).
34. Government of Canada. 2018. Environment Canada. [Weather Air Quality Health Index \(AQHI\)](#).
35. Calabrese, D. 2018. [At the edge of Canada, climate change brings 'ecological grief' to Labrador Inuit](#). Special to *The Globe and Mail*. October 22, 2018.
36. Melillo, J.M., Richmond, T.C., and Yohe, G.W. (eds.) 2014. [Highlights of Climate Change Impacts in the United States](#). The Third National Climate Change Assessment. U.S. Global Change Research Program.
37. Clean Air Partnership. 2011. [Climate Change Adaptation and Health Equity. Background report](#). Prepared for: Healthy Public Policy Team, Toronto Public Health.
38. Kumar, N. 2018. [Cities, Climate Change and Health Equity](#). Wellesley Institute, Toronto.
39. Public Health Institute/Center for Climate Change and Health. 2016. [Climate Change and Health Equity](#).
40. Howard, C., Rose, C., and Rivers, N. 2018. [Lancet Countdown 2018 Report: Briefing for Canadian Policymakers](#). *The Lancet*.
41. Celis-Morales, C., Lyall, D., Welsh, P., Anderson, J., Steell, L., Guo, Y., et al. 2017. [Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study](#). *Br Med J* 357:j1456).
42. Public Health Agency of Canada. n.d. [Against the Growing Burden of Disease](#). Presentation by Kimberly Elmslie, Director General, Centre for Chronic Disease Prevention, PHAC.
43. Willet, W., Rockstrom, J., Loken, B., et al. 2019. [Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems](#). *The Lancet* 393(10170) 386-387.

44. Intergovernmental Panel on Climate Change. 2013. [Summary for Policymakers: Climate Change 2013: The Physical Science Basis](#). Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [(eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
45. Environmental Defence and Stand.earth. 2018. [Canada's Oil & Gas Challenge: A Summary Analysis of Rising Oil and Gas Industry Emissions in Canada and Progress Towards Meeting Climate Targets](#). Katowice, Poland.
46. Government of the United Kingdom. 2018 [cited 2018]. [UK Regulations: The Climate Change Act](#).
47. Government of the United Kingdom. 2017. [2016 UK Greenhouse Gas Emissions](#).
48. Fankhauser, S., and Averchenkova, A. J. F., 2018. [Policy brief. 10 years of the UK Climate Change Act](#).
49. Government of Canada, 2018. [Greenhouse Gas Emissions](#). 2018 [June 13, 2018.].



CANADIAN  
PUBLIC HEALTH  
ASSOCIATION

The Voice of Public Health

**The Canadian Public Health Association** is the independent national voice and trusted advocate for public health, speaking up for people and populations to all levels of government.

For more information, contact:

**Canadian Public Health Association**

404-1525 Carling Avenue, Ottawa, ON K1Z 8R9

T: 613-725-3769 | [info@cpha.ca](mailto:info@cpha.ca)

[www.cpha.ca](http://www.cpha.ca)