

Mental Health and Our Changing Climate:

*Exploring the Mental Health Consequences of Climate Change for
Women, Youth, and Newcomers in the Greenbelt*



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Possibility grows here.

1.0 Introduction

The weather is becoming increasingly unpredictable around the globe and here in southern Ontario. These unpredictable weather events are becoming more frequent and intense because climate change ‘loads the dice’, increasing the frequency, intensity, and complexity of these events^{1,2}. Importantly too, these climate-related events are already affecting the health and wellbeing of Ontarians, including those living in and around the Greenbelt, and future climate projections continue to paint a dire picture for the health and wellbeing of people and the planet³. Throughout Ontario we have seen a rise in vector borne diseases, like West Nile Virus and Lyme disease^{3,4,5}; increased heat related and respiratory illnesses^{3,4,5}; increased risks of food and water-borne illnesses^{3,4,5}; and, mental ill-health effects, like depression, anxiety, and general trauma related to extreme events (e.g. flooding, wildfire exposures)^{4,5,6}. An example of the mental health effects of a climate hazard in southern Ontario include increased anxiety and worry following the 2014 Burlington flood for flood-exposed residents⁶.

There is growing concern about the mental health implications of climate change because of the rate of climatic change here in Ontario, and because of the pre-existing burden of mental ill-health that can be exacerbated by climate effects. In Canada, mental health is the leading cause of disability⁷. Mental health is defined herein as states of mental ill-health (e.g. Post-traumatic stress disorder, depression, exacerbated psychosis, etc.), mental problems (worry, fear, anxiety), and mental wellbeing (sense of resiliency, personal growth, compassion, wellness). Mental health is located in the broader definition of psychosocial health, which refers to psychological (thoughts, feelings, and behaviours) and social (context, culture, relationships with others) factors that influence health outcomes⁸.

In Ontario, mental illness accounts for approximately ten percent of the total burden of illness, and according to the Centre for Addiction and Mental Health (CAMH), “the disease burden of mental illness and addiction in Ontario is 1.5 times higher than all cancers put together and more than 7 times that of all infectious diseases”⁷. Importantly, climate change can amplify pre-existing mental health conditions and/or trigger mental health outcomes^{9,10, 11}.

Awareness of climate change can increase anxiety, worry, and feelings of impending doom¹². These are common reactions to our changing climate. People may experience emotional responses like anxiety, grief, or loss of a sense of place related to concerns over ecological degradation and species extinction. Terms like ‘climate trauma’, ‘ecoanxiety’, ‘ecogrief’, and ‘solastalgia’ (i.e. feeling homesick when one is in their home environment) are increasingly being used amongst mental health practitioners and climate change and health researchers to describe these experiences of trauma, anxiety, grief, and a loss related to environmental degradation from climate change^{13, 14, 15}. By restoring and protecting natural areas, including the many in the Greenbelt, we have an opportunity to alleviate these emotional responses of ecoanxiety, ecogrief, and solastalgia.

Specific climate hazards, like extreme heat events, flooding, wildfires, and droughts have been linked to mental-ill health effects like Post-traumatic stress disorder (PTSD), depression, anxiety, general trauma, suicidal ideation, and suicide^{9, 11,16,17,18,19,20,21}. In Toronto, for example, Wang et al. (2014) found increased emergency department visits for mood and behavioural disorders during heat waves in the city²²; and in a comparison study between Jackson, Mississippi and Toronto, Ontario, Dixon et al. (2014) found that anomalously warmer weekly temperatures in both cities were linked to higher weekly suicide totals²³. Highlighting these risks and impacts is important in the Greenbelt, when we consider that climate change-related hazards

are predicted to worsen over the next twenty to thirty years without significant mitigation efforts. Durham Region conducted a ‘Future Climate Study’ and found that by 2040-2049 the region’s climate will have: “much warmer air temperatures; higher humidity; less wind; more frequent and intense rain in the summer; less snow and more rain in the winter; more extreme weather events; and, high winds and heavy rain”²⁴. As noted earlier, these projected hazards can impact the burden of mental-ill health¹².

There are also overarching psychosocial* impacts related to climate change, which can include family and community strain (including violence and aggression) as resources become scarce; substance misuse related to loss of livelihoods and/or loss of employment opportunities from climate-related ecological degradation; and, financial stress and strain related to the economic impact of climate hazards to homes and businesses^{12, 14, 17, 25, 26}. There are also affirmative mental health outcomes, like a sense of altruism, compassion, sense of community, personal growth, and resiliency as people support their own wellbeing and one another throughout traumatic exposures to climate hazards^{11, 12, 27, 28}. The empirical research base on affirmative outcomes is currently limited, however, it is important to highlight them as this knowledge may support psychosocial adaptation efforts.

This article explores the mental health consequences of climate change amongst three target groups: women, youth, and newcomers. Before doing so, I provide a brief overview of populations most at risk to the mental health consequences of climate change.

* Psychosocial relates to psychological and social effects⁸. Mental health is encapsulated in the overarching definition of psychosocial⁷⁷.

2.0 Populations at Risk

The existing research indicates that populations most at risk to the mental health consequences of climate change include: women, youth, newcomers, people with pre-existing health conditions, seniors, people living in low-socioeconomic circumstances, and racialized people^{5,8,9,11}. Importantly, there are other populations who are marginalized in society, like LGBTQ2[†] populations, who may be disproportionately impacted by the mental health consequences of climate change; however, there is no known research investigating the mental health consequences to these groups, which highlights a key knowledge gap. It is important to note that these aforementioned groups are not mutually exclusive and social status can intersect amongst populations at risk, often compounding climate change risks and impact.

Importantly too, those most at risk to climate effects are not necessarily those who are less likely to adapt to climate change. In some cases, people may practice and exhibit adaptive and/or resilient behaviours because they are used to working with less resources (financial, social, services, networks, etc.) to support their wellbeing; thus when resources are impacted due to climate hazards, these groups may be able to bounce-back more quickly than those who rely and depend on resources to support their wellbeing²⁹. This is not to suggest that all at-risk groups will bounce-back more quickly, at-risk groups will most likely be pushed further into resource scarcity making it more difficult to cope with climate hazards^{30,31}. Further, at-risk individuals who may bounce-back more quickly from climate hazards will be bouncing back to pre-existing states of inequity and injustice related to the social and environmental determinants of health[‡]^{31,32,33,34}. Noting this, it appears important to learn from and with those who are most impacted to

[†] LGBTQ2 populations refer to anyone who identifies as: lesbian, gay, bisexual, transgender, queer, and two-spirited.

[‡] The social determinants of health include factors like income, housing, education, gender, and race; and, the environmental determinants of health include things like pollution, environmental degradation, and climate change.

better enhance and support adaptation practices and services that address underlying health inequities.

Below is an overview of the mental health consequences of climate change to the aforementioned three target groups: women, youth, and newcomers. As noted above, these statuses may intersect and overlap, thus the outcomes discussed are not mutually exclusive. In each section, an overview of the risks and impacts is highlighted as well as adaptation opportunities. The current research base on mental health and climate change risks, impacts, and adaptations in Canada is limited. Where possible, the risks and impacts as well as the adaptation opportunities that are most relevant to Southern Ontario will be highlighted.

3.0 Climate Change and Women's Wellbeing

In general, women tend to have higher rates of mood and anxiety disorders, while men tend to have higher rates of addiction⁷. As highlighted earlier, climate change hazards can amplify these pre-existing rates of mental problems and illness. Women are also more likely (than men) to report: anxiety, depression, worry, post-traumatic stress disorder (PTSD), sleeping problems, and domestic abuse from climate-related extreme weather events^{9, 31, 35}. Following the 2014 Southern Alberta floods, researchers found increases in new prescription medication for anxiety and sleeping disorders amongst women exposed to the floods³⁵. It is important to note here that while there is research to suggest that women are more likely to self-report mental ill-health and to discuss their mental health needs, this does not mean that men do not also experience mental problems or mental-ill health. There is research to suggest that men are socialized not to discuss their mental health needs³⁶ and that men may be less likely to seek support for their mental health needs³⁷. Importantly, the stigma of mental ill-health can affect

whether or not people report mental ill-health and also whether or not people seek mental health care.

Globally, women are more likely to die or be injured from extreme events, like climate-related weather events³¹. Corroborating this, Sorenson et al. (2018) highlight that women tend to “suffer disproportionate mortality, and survivors experience decreased life expectancy”³⁸ (pg. 2). Further, women tend to be at greater risk to climate hazards than men because of “distinct health needs” like, for example, during pregnancy women have “nutritional demands” that may be at risk due to food and water scarcity from extreme events or droughts³⁸. Similarly, women (globally), tend to have higher rates of anemia which are further compounded due to climate-related food scarcity³⁸.

A recent news report suggests that people who identify as women experience the mental health effects of climate change 60% more than people who identify as men³⁹. In particular, women living in low-socioeconomic situations tend to experience the mental ill-effects of climate-related extreme weather (specifically extreme heat and extreme weather events) more than their male counterparts^{9,35,40}. Corroborating these findings, researchers investigating the health effects of extreme heat events throughout nine neighbourhoods in Quebec found a nearly 18% prevalence of mental ill-health outcomes amongst a sample of 3,485 residents, the majority of self-reported ill-health outcomes occurred in people from low-socioeconomic backgrounds, those with pre-existing health conditions, and women⁴⁰.

From a physiological perspective, pregnant women and their children are also at increased risk from climate-related hazards³¹. For example, a longitudinal study following the 1998 Quebec ice storm found that exposure to pre-maternal stress from the ice storm resulted in lower language abilities and lower IQs for children who had been in utero during the ice storm⁴¹.

Women tend to be most at risk to the negative impacts of climate change because of social and cultural norms relating to gender roles and lack of control over financial resources and assets⁴². Emphasizing this, Williams et al. (2018) note that social and cultural positioning of women as “caregivers, helpers, and supporters produced a unique set of psychological stressors” while also reducing women’s agency over adaptation options⁴³. Those in caregiving roles (like nurses, hospice workers, support workers, family caregivers, etc.) tend to be at greater risk to mental health outcomes like compassion fatigue (often referred to more colloquially as ‘burn-out’) because of the compounding psychological stressors of taking care of people with high needs and overlooking one’s own wellbeing^{44,45}. Further, care-giving roles tend to be underpaid and undervalued which compounds the aforementioned psychological stressors and inhibits one’s ability to take control of their wellbeing⁹.

The intersections of race and culture are also important to highlight as these factors can compound the mental health effects of climate change. For example, following Hurricane Katrina, low-income, African American women had higher rates of mental-ill health outcomes than non-African American women³¹. In Canada, Indigenous women are on the front lines experiencing climatic change (e.g. melting permafrost, loss of a sense of place, displacement due to climate extremes) and Indigenous women have historically been on the front lines of environmental conservation enhancing connections to the land and food sources⁴⁶. Noting Indigenous women’s roles as agents of change, the following section highlights a number of examples of groups and resources focused on adaptation and resilience to a changing climate, many of which are women-led and address the mental health effects of climate change.

3.1 Agents of Change: Examples of Adaptation and Resilience to a Changing Climate Pertinent to Women's Wellbeing

Women are one of the leading forces driving action on climate change around the globe⁴⁶. Noting this, the Government of Canada “played an important role in adopting the Gender Action Plan at United Nations Climate Change Convention (UNFCCC) COP23” to support women’s empowerment to lead actions (e.g. climate negotiations) and awareness about the impact of climate change (including awareness of the disproportionate impacts on women)⁴⁶.

At the grassroots levels, women are taking leadership on the issue of climate change around North America. In the U.S. for example, [Mothers out Front](#) is a group of activist mothers, grandmothers, and caregivers “mobilizing for a livable climate” with the mission of ensuring a livable future for children. There are local groups throughout the U.S who work on local level and national level campaigns petitioning for climate action. In Canada, there are no known similar groups, however, this appears to be an opportunity for climate activism amongst this demographic.

From a mental health perspective there is a digital platform, called the [Good grief network](#) led by two women that provides a 10-step program to navigate the mental health consequences of climate change to address things like ecogrief and build resilience in a changing climate. There is also the [International Transformational Resilience Coalition](#) that provides webinars and resources to help people explore climate trauma and skills to enhance wellbeing within a changing climate. There are also a whole host of [Transition Towns](#) (community groups that address peak oil, climate change, and environmental degradation) throughout Canada that have heart and soul groups to explore social and emotional responses to a changing climate.

3.2 Opportunities for Adaptation and Resilience

While there are examples of adaptation and resilience pertinent to women exposed to the mental health effects of climate change, there remain opportunities to enhance adaptation and resilience. In particular, there are critical research needs focused on women's experiences, exposures, and adaptation efforts to a changing climate in order to enhance and support targeted climate change adaptation policy and practice in Canada. Further, there appears to be a need to enhance psychosocial support (including financial and physical access to mental health care) for women, particularly those in caregiving roles. Also, there appear to be opportunities for women-led activist groups in Canada, similar to the aforementioned 'Mothers out Front' group in the U.S.

4.0 Climate Change and Young People's Wellbeing

Children[§] and youth^{**} also tend to be disproportionately impacted by the health effects of climate change because they are more dependent upon others for their health and wellbeing. Bunyavanich et al., (2003) have highlighted some of the most significant health impacts of climate change on children, which include: respiratory diseases, heat-related morbidities, GI disease (from food and water borne pathogens), and "psychosocial maldevelopment" related to things like extreme weather exposure and climate displacement⁴⁷. There is research to suggest that youth are at increasing risk of long-term trauma, like PTSD from climate related extreme events³⁰. For example, a study investigating the mental health consequences of Hurricane Maria found increased, self-reported symptoms of PTSD amongst Puerto Rican youth⁴⁸.

In a 2018 publication, Burke and colleagues found that the mental health consequences from a changing climate on children and youth include: substance misuse, attachment and sleep

[§] Children are defined here using the United Nations definition as those aged 2-14.

^{**} Youth are defined here using the United Nations definition as those aged 15-24.

disorders, anxiety, phobias, depression and PTSD, as well as mental health problems, like: poor emotional regulation, impacts to cognition and learning, and behavioural issues⁴⁹. Corroborating some of these findings, a Canadian study of the mental health effects of the 2016 Fort McMurray wildfire found increased suicidal thinking, depression, and tobacco consumption amongst youth exposed to the wildfire (compared to controls in Red Deer who were unexposed)⁵⁰.

As noted earlier, social statuses can intersect often compounding the health effects of climate change; for children and youth, these intersecting threat multipliers would include socioeconomic status, race, culture, as well as pre-existing health conditions. In Canada's northern Inuit communities, for example, Inuit youth highlighted how climate and environmental changes impacted their concern over community member well-being, concerns over travel and access to hunting, and concerns and challenges over cultural continuity⁵¹.

With respect to specific climate hazards, there is evidence to suggest that youth are at greater risk to the physical and mental health effects of air pollution. For example, one study from the UK found increased risk of depression amongst children and youth exposed to air pollution⁵². While Canada is ranked amongst the top three (globally) for air quality⁵³, air pollution contributes to 14, 400 deaths annually in this country⁵⁴, thus there are continued morbidity (including mental health related morbidities) and mortality risks, which tend to disproportionately affect children and youth with developing immune and respiratory systems.

Among other climate hazards, Canada will experience more severe and pervasive droughts, particularly in the prairie provinces⁴. At present, there are few if any known studies documenting the mental health effects of drought on youth, however, there is existing research globally that appears relevant to a Canadian context. In Australia, researchers noting the impacts of drought on youth mental health, have found: increased distress, overwhelm, and worry over

family wellbeing, feelings of grief and loss, increased feelings of worry and isolation, and distress over long-term educational and work opportunities^{55, 56}. These studies also found that youth expressed a desire for mental health support to help them deal with their immediate worries, signalling a gap in mental health care resources^{55, 56}. These Australian studies are relevant to a Canadian context when we consider the current and projected risks of drought⁵⁷, particularly in the prairies, and the lack of mental health care infrastructure nationally⁵⁸.

The aforementioned research documenting the anxieties, distress, grief, and trauma gripping children and youth exposed to our climate in crisis appear to exemplify the terms ‘eco-anxiety’ and ‘eco-grief’ noted earlier in the introduction. The weight of the climate change burden, for many youth, has been a burden they have witnessed and/or been exposed to their whole lives. For many, the climate crisis is so gripping it is prompting many older youth not to procreate⁵⁹. In the U.S. last year, the birth-rate was the lowest it has been in thirty years prompting one journalist to suggest that “for some Millennials, the climate change clock ticks louder than the biological one”. At present, young Canadians have started a pledge titled: “No future, no children”, where young adults are pledging not to have children until their federal government acts on climate mitigation to ensure a safe future for all. These appear to be difficult decisions that our youth are making as they navigate feelings of being underwhelmed by government actions, and feeling a sense of hopelessness for their future and future generations. Importantly, youth and children have become powerful voices demanding climate action, something discussed below in the section that explores adaptation and resilience examples for and by youth.

4.1 Agents of Change: Examples of Adaptation and Resilience to a Changing Climate Pertinent to Young People’s Wellbeing

Youth are increasingly taking climate activism leadership roles to address the existential crisis posed by inaction on climate change⁶⁰. Some recent examples, of youth uprising come in the form of the global climate strike, which has active groups in Canada (see: climatestrikecanada.org), and, the [Indigenous climate action initiative](#). Further, in the Yukon, there is a training program for Indigenous youth on climate change leadership (see: [Yukon Indigenous Community Climate Change Champions Project](#)). There are also examples of youth demonstrating their creative leadership to adults; notably, Zayne Cowie, aged nine, wrote a children's book for adults on called, 'Goodbye-earth', which highlights the extent of the climate crisis and calls out inaction by adults who have failed to address the climate change problem⁶¹.

4.2 Opportunities for Adaptation and Resilience

Additional opportunities for adaptation and resilience include enhancing communication networks to talk about and address the mental health consequences of a changing climate, like ecoanxiety and ecogrief. For example, there is a program being piloted in northern Inuit communities called the eNuk program. It is an app where community members can take photos of their changing environment and discuss how these changes impact individual and community wellbeing^{62,63}.

There are also school-based interventions, like Heart Math, that teach children breathing techniques and coping skills to address stress and anxiety⁶⁴. These programs have been used for short periods of time in communities exposed to some of the most significant extreme events, like the 2013 southern Alberta Floods and the Fort McMurray wildfires⁶⁵. There appear to be opportunities to bring programs, such as Heart Math, into schools more widely to address the overarching anxieties youth and children face from a changing climate — not only those schools where students have been exposed to specific extreme events.

5.0 Climate Change and Newcomers' wellbeing

It is anticipated that climate change is set to displace 200 million people by 2050⁶⁶. Noting this, Canada may see a rise in internal displacement — particularly for Indigenous people living in Canada’s northern communities where melting permafrost is a particular concern — and displacement from other countries to Canada.

Research suggests that experiences of displacement can be linked to: substance misuse, homelessness, racialization and discrimination, and suicide^{21, 26, 66, 67}. Notably too, there are affirmative mental health outcomes related to displacement — in particular for those fleeing violence, war, and resource scarcity — these feelings may include increased safety and security in host locations⁶⁸.

Mental health concerns amongst newcomers^{††} include trauma and distress due to relocation. In particular, trauma and distress is heightened in those who have been displaced in the past (e.g. those displaced by colonization, war, resource scarcity, etc.) and exposures to climate hazards may compound pre-existing traumas⁹. Newcomers may experience a loss of a sense of place, a loss of social and community connection, alienation, and isolation^{9, 21, 26}. A recent Canadian study noted increased admission to emergency departments for mental health issues amongst immigrant and refugee youth, who have resettled in Canada⁶⁹. Importantly too, newcomers may also experience increased sense of resiliency because they have previously experienced traumatic events and have established coping mechanisms⁷⁰.

^{††} The term newcomers refers to any populations (internal and external to Canada) that have relocated to or within Canada. This definition includes populations who have migrated from climate disasters (in their home countries) and who may or may not have been exposed to climate disasters while in Canada. This definition also includes populations from Canada who have been exposed to a climate hazard and have had to relocate to other locations in Canada because of exposure to a climate hazard.

5.1 Agents of Change: Examples of Adaptation and Resilience to a Changing Climate Pertinent to Newcomers' Wellbeing

A recent Teen Vogue article highlights some of the work underway by young, female activists in North America who are championing migrant justice as a climate justice issue. In particular, Maya Menezes, an organizer for No One Is Illegal climate justice and podcast host for ‘*Change Everything*,’ explores the need to build community connections and allies with migrant groups to simultaneously address climate injustices and injustices to refugees and migrants ⁷¹. In the same article, Nayeli Jimenez, a youth organizer for Our Time 2019, highlights her experiences as a migrant from Mexico to Canada, where she continues to engage with environmental politics and advocate for environmental and human rights issues that are pertinent in both countries⁷¹.

Another example of adaptation and resilience pertinent to newcomers is the Access Alliance Scarborough cycles program that encourages newcomers to the Greater Toronto Area (GTA) to learn how to safely cycle in the GTA and build community⁷². Active transportation use has co-benefits in that it is considered a climate change mitigation effort that reduces fossil fuel consumption and it supports overall health and wellbeing⁸. In particular, active transportation has benefits to mental health, including reducing overall stress and depression from physical activity and encouraging time spent in nature, which reduces cortisol levels (stress hormones) ^{73, 74}. Further, the community-building component to the Access Alliance program is also protective to mental health as a sense of community has been suggested as a factor to enhance wellbeing in the face of a changing climate (see for example ^{28, 75}).

5.2 Opportunities for Adaptation and Resilience

Noting the risks and impacts to newcomers health from a changing climate mentioned above, there appear to be opportunities to enhance culturally relevant and responsive mental health care and to enhance opportunities for social inclusion amongst newcomers. For example, there are opportunities to build culturally relevant mental health care first aid training and psychosocial first and psychological recovery training for health professionals who will be called upon during climate hazards and to support the health and wellbeing of newcomers experiencing pre-existing and compounding trauma²⁸. Further, there appears to be a need to enhance peer-to-peer mental health care response and recovery interventions where newcomers can engage with other newcomers (who may be experiencing similar pre-existing traumas) in an effort to build connections and a sense of community. These interventions could take shape through connecting with the natural environment (gardening, tree planting, joining environmental or conservation groups etc.) and with food (e.g. producing and sharing food). Another timely intervention is to enhance social connections with newcomers through ‘social prescribing’ whereby community health centers prescribe community-based activities to reduce things like social isolation, build community, and improve overall wellness. At present, social prescribing is being piloted in Ontario.

3. Summary

The mental health consequences from a changing climate are increasingly a concern as climate change has become one of the most significant public health issues of our time⁷⁶. The information presented here, provides an overview of mental health in a changing climate with a particular focus on three target groups: women, youth people, and newcomers. While some of the information presented here drew from contexts outside of Canada, this information is pertinent to a Canadian context because the examples provided herein referred to climate hazards

experienced and projected in Canada, and the majority of examples drawn were from similar cultural contexts (like the United Kingdom and the United States).

This article also highlighted some of the current adaptation and/or resilience efforts and the many opportunities to enhance adaptation and resilience. As highlighted, there is a need for enhance mental health care training that is culturally relevant and specific to at-risk groups. In general, there is a need for sustained mental health care to address the pre-existing burden of mental ill-health and mental problems and the added burden of ill-health brought on by climate change. Further, there is a need for enhanced communication networks for people, particularly youth, to discuss experiences of eco-anxiety and ecogrief. Also, there appears to be a need for community-building practices like peer-to-peer support, social prescribing, and opportunities for collective activism to address the climate change problem. Creating connections with the environment is also particularly supportive for people navigating the difficult emotions of experiencing a changing climate and difficult emotions in general. Increasingly, people are turning towards nature-based solutions to enhance climate change adaptation⁵. These nature based solutions may come in the form of natural features such as wetlands, urban forests, and street trees that can protect against heat, mitigate the effects of flooding and drought, and enhance overall human health and wellbeing⁵. The Greenbelt is an exemplary ‘nature-based’ solution because of its significant natural infrastructure. Moreover, creating or enhancing connections with nature to improve ecological health and wellbeing can include: joining environmental and conservation efforts and groups, spending time in nature, growing local food, gardening and tree planting. Further, there is a need for additional research in a Canadian context that documents the extent of exposures, risk, impacts, and adaptation opportunities amongst the target groups highlighted in this article.

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