

# **Climate Change and Mental Health Policy Framework**

Centre for Addiction and Mental Health

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## **About CAMH**

The Centre for Addiction and Mental Health (CAMH) is Canada's largest mental health teaching hospital and one of the world's leading research centres in its field. CAMH is fully affiliated with the University of Toronto and is a Pan American Health Organization / World Health Organization Collaborating Centre. With a dedicated staff of more than 4,500 physicians, clinicians, researchers, educators, and support staff, CAMH offers outstanding clinical care to more than 38,000 patients each year. The organization conducts groundbreaking research, provides expert training to health care professionals and scientists, develops innovative health promotion and prevention strategies, and advocates on public policy issues at all levels of government.

## **About this document**

This policy framework is part of a series of documents that review evidence, summarize current policy environments, and propose evidence-informed recommendations to guide public policy in Ontario and Canada.\* The purpose of this framework is to provide a template for climate and mental health policy that effectively addresses climate change-related harms to brain and mental health, and informs government initiatives in this area.

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\* The other CAMH policy frameworks focus on alcohol, cannabis, criminal justice, gambling, housing, prescription opioids, and primary care. They can be found at be <https://www.camh.ca/en/driving-change/influencing-public-policy>

## **Executive Summary**

Climate change poses a significant threat to the brain and mental health of Canadians. Exposure to climate change and its related hazards can both directly and indirectly lead to a range of brain and mental health disorders. Even people without firsthand exposure to climate change hazards can experience climate-related anxiety because of the immense threat that climate change poses to the planet and our lives.

The brain and mental health impacts of climate change are not equitably distributed. Some groups of people are more vulnerable due to social and structural inequities. People with pre-existing mental illness or brain health disorders, children and young people, Indigenous peoples, and certain marginalized groups are more at risk of experiencing the brain and mental health impacts of climate change.

As more people experience the brain and mental health impacts of climate change, the pressure on Canada's already overwhelmed mental health systems and services will continue to grow. These systems and services will face further pressure if/when they experience reduced capacity to provide care as a result of climate change hazards. People will struggle to get the mental health care they need when and where they need it most.

In this Climate Change and Mental Health Policy Framework, CAMH reviews the latest evidence and expertise on climate change and mental health, brain health and well-being. We outline ways that we can work together to build resiliency through collective efforts to mitigate and respond to the harmful effects of climate change on our brain and mental health. The Framework includes 22 recommendations for governments and decision-makers to support these efforts through a complementary package of actions that include priority investments in research and evaluation.

## **Why climate and mental health policy is important**

Climate change is a public health emergency.<sup>1</sup> Human-influenced global warming is causing extreme changes to our climate and weather patterns, disrupting ecosystems and adversely affecting the lives and livelihoods of millions of people across the globe.<sup>2</sup> Climate change hazards, and particularly extreme heat events, are known to have a negative impact on human health, including mental health and well-being.<sup>3</sup> In fact, the impact on mental health is at least equal to and, at times, greater than the impact on physical health. Evidence shows that in the aftermath of extreme weather events, the number of psychological trauma cases can outnumber physical injury cases by 40 to one.<sup>4</sup>

Canadians are all too familiar with the negative impacts of climate change. Canada is warming at twice the global rate,<sup>5</sup> increasing our vulnerability to a range of climate change hazards. These hazards - such as the wildfires of Western Canada, storms of Eastern Canada, and damaging floods across the nation - can strike quickly,<sup>6</sup> or they can build slowly and last over longer periods of time, like record breaking heatwaves and rising sea levels.<sup>7</sup> As more and more Canadians experience climate change hazards, we are likely to see increasing levels of stress, mental illness and significant impact on brain health and development,<sup>18</sup> especially amongst people who are more vulnerable to the impacts of climate change because of social and structural inequities.<sup>9</sup>

The potential for an increase in climate change-associated mental illness and impacts on brain health should be of concern to us all. Canada's mental health systems are already overwhelmed and would struggle to meet a rising demand for service, particularly in the wake of an immediate climate change hazard where mental health infrastructure is damaged and/or services interrupted.<sup>10</sup> The economy would also be impacted. Mental illness currently costs Canadians \$50 billion each year in health care expenditures, lost productivity and reductions in health-related quality of life.<sup>11</sup> As climate change continues to take its toll across the country and on our health, we can expect these costs to rise.<sup>12</sup> It is clear that urgent action is needed.

At CAMH, we have committed to investing in climate research, education, clinical care and action in our 2024–2030 strategic plan.<sup>13</sup> In collaboration with experts and partners across the country we are working on various initiatives to better understand and address the brain and mental health impacts of climate change, and to advance climate resilience solutions. We join a collective of dedicated individuals, communities and institutions that are committed to similar endeavors. Climate change and mental health is a complex and urgent problem that requires all of us to work together on solutions.

This Climate and Mental Health Policy Framework is intended to provide guidance to governments and decision-makers at all levels on how they can support collective efforts to address the brain and mental health impacts of climate change. The Framework provides an overview of the latest evidence – research, clinical expertise and lived experience – on the many ways that climate change negatively impacts brain and mental health, and highlights populations that are most at risk. It also looks at how mental health systems are impacted by, and contribute to, climate change. In the last section, the Framework

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<sup>†</sup> Brain health refers to our brain's functioning - how we think, feel, and move - across our lifetimes. (Chen et al, 2022 <https://pubmed.ncbi.nlm.nih.gov/34131954/>)

outlines ways we can work together to build resiliency through collective efforts to mitigate and respond to the harmful effects of climate change on our brain and mental health. We include 22 policy recommendations for governments and decision-makers to support these efforts, and to help protect and bolster the brain and mental health of Canadians in the face of a changing climate.

## **What we know**

### **Climate change is harming our mental health**

Researchers have established a clear link between climate change and mental health problems and illnesses.<sup>14</sup> While further study is needed to better understand this link and the true costs of climate change on our collective well-being, experts are in agreement that climate change and its associated hazards can impact our mental health in a variety of ways.<sup>15</sup> There are three main ways that climate change hazards can impact mental health:

1. When exposure to a climate change hazard **directly** impacts mental health;
2. When exposure to a climate change hazard **indirectly** impacts mental health as a result of related events (e.g. from losing one's home, income, autonomy, etc.); and
3. When **emotional well-being** suffers as a result of strong feelings about climate change and climate change hazards (e.g. climate anxiety).

#### **Direct effects**

First hand exposure to climate change hazards can lead to the development of a variety of mental health problems and illnesses, including:

- post-traumatic stress disorder (PTSD);<sup>16</sup>
- anxiety and mood disorders;<sup>17</sup>
- complicated grief;<sup>18</sup>
- substance use disorders;<sup>19</sup> and
- suicide and suicidal ideation.<sup>20</sup>

Climate change hazards are also associated with psychological trauma,<sup>21</sup> survivor's guilt,<sup>22</sup> recovery fatigue<sup>23</sup> and poor sleep.<sup>24</sup>

The mental health impacts of climate change are also closely connected to physical health impacts. For example, exposure to climate change hazards can lead to depression, which can trigger hormonal imbalances that lead to a weakened immune system and changes in digestion.<sup>25</sup> (The reverse is also true: exposure to climate change hazards can lead to physical injuries and chronic conditions like cardiovascular disease, which are, in turn, linked to feelings of hopelessness and anxiety.)<sup>26</sup>

The mental health impacts of climate change may not appear immediately; some people may only experience their first symptoms months or years after exposure, and then continue to experience the effects long thereafter.<sup>27</sup>

In addition to the impacts of climate change on mental health, brain health can also be affected. Climate change hazards, particularly heat-related hazards, are associated with increased incidence, prevalence and severity of brain-related events and diseases such as epilepsy, strokes, encephalitis and meningitis, multiple sclerosis (MS), Alzheimer's disease and dementia, and Parkinson's disease.<sup>28</sup> Emerging evidence has also linked wildfire smoke to a range of brain health disorders.<sup>29</sup> Many of these brain-related

events and diseases are associated with, and further complicated by, mental health problems and illnesses, like depression in stroke,<sup>30</sup> suicidal ideation in MS,<sup>31</sup> and psychosis in Parkinson's disease.<sup>32</sup>

### ***Effects of specific climate change hazards***

Various climate change hazards can directly affect brain and mental health in similar ways, but each also presents its own unique risks.

#### Heat events and rising temperatures

There is a well-recognized link between high temperatures and poor mental health. Even a 1°C rise in temperature over the course of five years can increase the number of mental health problems in the population by 2%.<sup>33</sup> Suicide is another major risk of high temperatures, with one review finding that the suicide rate rises by 14–37% with every 1°C increase in temperature.<sup>34</sup>

High temperatures can also impact brain health across the lifespan. For example:

- During extreme heat events, a pregnant person's exposure to high temperatures of 30°C and above may be associated with a 49–56% increase in neurological birth defects;<sup>35</sup>
- One research study found that one-in-five patients below the age of 12 who had heatstroke also experienced lasting neurological problems;<sup>36</sup>
- Globally, across all age groups, the risk of meningitis increases by 4.8% with each unit increase in temperature;<sup>37</sup> and
- Rising temperatures and extreme weather patterns are associated with greater numbers of people experiencing migraines, or more frequent migraines in people who already experience them.<sup>38</sup>

#### Air pollution

Climate change can significantly alter air quality and elevate levels of air pollutants through increased sunlight, changing weather patterns, and rising temperatures.<sup>39</sup> Exposure to air pollution increases the odds of developing autism spectrum disorder (ASD) by 7%<sup>40</sup> and the risk for attention deficit hyperactivity disorder (ADHD) by 3–18%.<sup>41</sup> Air pollution is also linked to neurodegenerative diseases like Alzheimer's disease and dementia.<sup>42</sup>

#### Flooding

Floods can be a major cause of worry and emotional distress, particularly for individuals who do not have property and casualty insurance.<sup>43</sup> In one national study of people living in flooded neighbourhoods in the U.K, those directly affected by the flooding were more likely to have mental health problems, such as depression (20%), anxiety (28%), and PTSD (36%), than those not directly impacted.<sup>44</sup> Concerns about flooding also persist over time. People who have experienced flooding are 15 times more likely to be worried when it rains compared to people who have never experienced flooding.<sup>45</sup>

#### Hurricanes

In the aftermath of Hurricane Katrina in the U.S., one in two people who had experienced the most severe impacts of the storm developed an anxiety or mood disorder in the 30 days following the event, while one in six developed PTSD.<sup>46</sup> In contrast to other research showing that the mental health impacts of climate change hazards tend to decrease over time,<sup>47</sup> the prevalence of mental health problems in the aftermath of Hurricane Katrina actually increased over time. Between six months and one year after the hurricane, the number of cases of PTSD rose from 15% to 20%, suicidal ideation from 3% to 6.5%, and serious mental illness from 11% to 14%.<sup>48</sup>

### Wildfires

The mental health impacts of wildfires are most acute in the immediate aftermath of the event, but the effects appear to linger over time. For example, the rates of PTSD post-wildfire are between 24–50% three months after and between 13–26% six months later.<sup>49</sup> In the longer term, PTSD cases still remain, though rates decrease from 16% after three years to under 8% after ten years.<sup>50</sup> Similarly, major depression affects up to 33% of people three months after a wildfire, with about 10% of individuals continuing to experience symptoms a decade later.<sup>51</sup>

Wildfires can also harm brain health through exposure to the particulate matter originating in wildfire smoke. A small number of studies have linked wildfire smoke to increased rates of dementia, blood vessel problems that can lead to stroke, and headaches.<sup>52</sup> Acute exposure may lead to reduction in cognitive function in the short-term.<sup>53</sup>

### **Indirect effects**

Climate change can indirectly impact brain and mental health by causing hardships that then lead to the development of mental health problems/brain health disorders, exacerbate physical health conditions, and affect community well-being.

Perhaps the most obvious indirect impact of climate change on mental health occurs when there is a **loss of loved one** as a result of a climate change hazard. The significance of this loss can profoundly affect a person's mental health and emotional well-being.<sup>54</sup> Climate change hazards can also indirectly impact mental health through **financial/economic losses** that come from having to replace damaged or missing property and possessions, and/or from job insecurity and employment losses.<sup>55</sup>

Individual financial/economic losses can disrupt community well-being in the wake of a climate change hazard.<sup>56</sup> Many people in the same area can **lose homes** when a climate change hazard strikes,<sup>57</sup> forcing them to move locations.<sup>58</sup> This **loss of place** or displacement may lead to the **loss of social supports and social networks**,<sup>59</sup> which can negatively impact mental health.<sup>60</sup> Displacement can also be driven by alterations in food systems, such as those caused by drought.

Drought, in particular, is also associated with economic hardship and migration - both of which are recognized as the key reasons for increased rates of anxiety, depression, and suicide in those exposed to this climate change hazard.<sup>61</sup> A study from Australia found that about one in ten mental health problems among people living in rural areas could be attributed to the effects of drought.<sup>62</sup> Prolonged and severe drought, and the resulting **loss of crops and food**, can lead to more cases of malnutrition and broader food insecurity, and is linked to mental distress as well as changes in brain development.<sup>63</sup> Without sufficient essential nutrients, children are at risk of severe impairments in brain development, increasing the chances for poor neurodevelopmental outcomes, including challenges with motor and language skills and poor mental health.<sup>64</sup>

Mental health and well-being can also be negatively impacted by climate change due to a **loss of sense of self and identity**,<sup>65</sup> a **loss of autonomy and control** as independent ways of living are threatened (particularly for older adults and people with disabilities),<sup>66</sup> and **loss of culture** from destroyed heritage sites and the disappearance of oral traditions and language.<sup>67</sup>

All of the various types of losses associated with climate change hazards are stressful and can result in substantial mental health problems and illnesses.<sup>68</sup> For example, forced relocation due to climate change is associated with a greater likelihood of developing depression, anxiety and PTSD,<sup>69</sup> not to mention the feelings of sadness and anger that come with this experience.<sup>70</sup> The stress from these losses are further associated with behaviours that can negatively impact overall wellness, such as smoking and changes in eating patterns.<sup>71</sup> Climate change and associated losses/stresses can also affect the mental health of future generations through genetics, shared familial experiences, and intergenerational trauma.<sup>72</sup>

Further, as we already know, mental health is closely tied to physical health. Climate change hazards can worsen physical health problems, such as respiratory illnesses, infectious diseases, and injuries, which can then lead to, or exacerbate mental health problems.<sup>73</sup>

Finally, climate change can make people more aggressive and violent, particularly during high temperatures. This can then fuel civil conflict over dwindling and limited resources.<sup>74</sup> Injuries from assault, for example, are 13% higher during heatwaves.<sup>75</sup> Aggression and violence are symptoms of worsened community cohesion and wider social instability which can result from climate change hazards.<sup>76</sup>

#### ***Box 1 - Vector-borne diseases and brain health***

*As climate change drives warmer temperatures and increases rainfall, disease-carrying organisms will begin to spread beyond their usual geographic boundaries.<sup>77</sup> Many of these vector-borne diseases are known to cause brain and nerve problems.*

*As a primary carrier of disease, mosquitos can infect individuals with malaria or dengue.<sup>78</sup> Severe cases of malaria can cause cognitive and behavioural difficulties, such as epilepsy, language problems, and cerebral palsy, particularly in children. Effects can last up to nine years after infection.<sup>65</sup> Additionally, dengue, considered the fastest-spreading tropical disease, can cause encephalitis.<sup>79</sup> Mosquitoes may also carry the Zika virus which can cause microencephaly and other birth defects, as well encephalitis and other severe neurological conditions.<sup>80</sup>*

*Ticks are another problematic disease-carrying organism whose range is projected to expand by about 11% by 2050 due to climate change.<sup>81</sup> Similar to mosquitos, ticks can cause encephalitis,<sup>82</sup> but they also cause Lyme disease, which is linked to panic attacks, cognitive impairments, and even hallucinations in rare instances.<sup>83</sup> It is not uncommon for a person with Lyme disease to experience depressive episodes during their infection, which then disappear once the bacteria causing the disease is treated.<sup>84</sup>*

#### **Emotional well-being**

Climate change can generate strong feelings, or climate emotions, in some people. These emotions are not necessarily associated with firsthand exposure to climate change hazards, but are a general response to the serious threat that climate change poses to the planet and people's lives, health and well-being. The most well-known of these emotions is climate anxiety or eco-anxiety.<sup>85</sup>

Climate anxiety is the feeling of worry and unease about the ongoing dangers of climate change.<sup>86</sup> It is a condition that is distinct from typical stress, anxiety, or depression.<sup>87</sup> Climate anxiety involves unique concerns about one's own personal impact on the planet, and repeated thinking about climate change

that can perpetuate further anxiety. In some instances, however, climate anxiety can be a motivational force that spurs people to take pro-environmental action.<sup>88</sup>

In addition to climate anxiety, other climate emotions include climate grief,<sup>89</sup> climate paralysis,<sup>90</sup> and solastalgia (distress from the changes in a person's home environment because of climate change).<sup>91</sup> Climate change can also invoke feelings of anger, guilt, shame, and even indifference.<sup>92</sup>

Many people who have been asked how they feel about climate change express concerns. In a 2020 U.S. survey, over 90% of people said they were either somewhat or very worried about climate change.<sup>93</sup> Similarly, a 2019 poll from the U.K. identified climate change as one of the top five issues for the general public and the most important issue for young people.<sup>94</sup> This latter finding reflects research showing that youth may experience heightened climate emotions.<sup>95</sup> One global study of young people from across ten countries found that nearly 60% were very or extremely worried about climate change, with an additional 25% indicating moderate worry.<sup>96</sup> (See following section for more.)

While climate emotions are usually considered a normal adaptive survival response to climate change and the hazards associated with it,<sup>97</sup> they can be potentially problematic if these emotions become debilitating, paralyzing, or otherwise interfere with a person's daily functioning and quality of life.<sup>98</sup> For some, climate emotions can result in insomnia or panic attacks for which they may require professional help.

Higher levels of climate anxiety have also been linked to lower levels of grey matter in areas of the brain that are involved in decision-making, attention, and fear;<sup>99</sup> as well as mental illnesses like depression, anxiety, and PTSD.<sup>100</sup> Generally, however, climate emotions do not inherently contribute to or indicate that a person has poor mental health.<sup>101</sup>

It is also important to note that climate emotions are not always negative. In fact, concerns about climate change have the potential to foster post-traumatic growth, which is when a person develops strength and a sense of meaning as a result of having struggled and lived through a traumatic experience.<sup>102</sup> Post-traumatic growth can involve feelings of altruism,<sup>103</sup> compassion,<sup>104</sup> generosity,<sup>105</sup> and optimism.<sup>106</sup> That said, there is an overall lack of research into the 'positive' effects of climate change on self-growth.

### **The mental health burdens of climate change are not equitably distributed**

While climate change and its associated hazards can affect many peoples' brain and mental health, some groups are more vulnerable than others due to social and structural inequities.<sup>107</sup> Communities who have been historically and currently excluded or underserved may have less power and resources to respond to climate change hazards placing them at higher risk for more severe mental health impacts and making it more difficult for them to recover.<sup>108</sup> In this section, we use a health equity lens<sup>109</sup> to look at populations who are most at risk of experiencing the brain and mental health impacts of climate change (note that this is not an exhaustive overview).

#### **People with pre-existing mental illness or brain health disorders**

People with pre-existing mental illness or brain health disorders are more likely than the general population to experience the mental health impacts of climate change. For these individuals, climate change hazards can lead to more frequent and intense symptoms.<sup>110</sup> Heatwaves, for example, can

worsen both the mental and physical health outcomes for people with schizophrenia, dementia, and substance use disorders,<sup>111</sup> and also increase their risk for hospitalization,<sup>112</sup> sometimes by as much as 84%.<sup>113</sup> The risk of death associated with mental health problems also rises up to 5% with each 1°C temperature increase.<sup>114</sup> People with schizophrenia, for example, are up to three times more likely to die during heatwaves compared to the general population.<sup>115</sup>

The deterioration in mental and physical health experienced by people with pre-existing mental illness and brain health disorders is likely due to changes in their ability to regulate body temperature – whether because of side effects from medications to treat their conditions, fatigue or poor sleep – or changes within the body, like altered blood flow due to the high temperature.<sup>116</sup> The stress associated with climate change hazards can also raise the likelihood of seizures in people with PTSD and mood disorders; and in patients with pre-existing brain health disorders such as MS, symptoms can worsen with even a 0.5°C increase in temperature.<sup>117</sup>

Actions and responses related to climate change hazards may also be more complex in people with existing mental illness. For example, an individual with obsessive compulsive disorder may check publications on climate science compulsively.<sup>118</sup>

### **Children and young people**

Compared to adults, children and young people may be more susceptible to the brain and mental health effects of climate change.<sup>119</sup> These effects can begin before birth.<sup>120</sup> Pregnant people who experience stress as a result of exposure to a climate change hazard are more likely to have children who are at risk for developing ASD, ADHD, mood disorders, and schizophrenia.<sup>121</sup> Children who are exposed to a climate change hazard before the age of five have a 16% greater risk of developing depression and a 33% greater risk of developing anxiety in adulthood.<sup>122</sup> Stress due to disaster and displacement in childhood can also affect neural development, which can then impair memory, executive function, and decision-making in later life,<sup>123</sup> and also increase the overall risk for mental health problems.<sup>124</sup>

Children are also more dependent on others and the loss of social supports in the wake of a climate change hazard can be particularly distressing for a child's mental health and well-being.<sup>125</sup> Without sufficient social support, children are more likely to develop chronic PTSD after experiencing a climate change hazard.<sup>126</sup>

Young people are also more likely than adults to report having climate emotions.<sup>127</sup> According to the 2023 Ontario Student Drug Use and Health Survey (OSDUHS), the longest running survey of Canadian students in grades 7 to 12, nearly 20% of youth reported substantial worries about climate change, and nearly 50% felt depressed because of climate change.<sup>128</sup> Similarly, a national survey reported that half of Canadians between the ages of 16 and 25 have experienced fear, sadness, anxiety, and powerlessness because of climate change.<sup>129</sup> Further, 80% said that climate change negatively affected their mental health, and 40% said that their feelings about climate change impacted their day-to-day functioning.<sup>130</sup> Even though these feelings are seen as a normal response to climate change, ongoing stress related to these climate emotions could develop into anxiety and depression.<sup>131</sup>

### **Indigenous peoples**

Indigenous peoples are disproportionately and significantly affected by climate change and climate change hazards. Climate change – ignited and exacerbated by settler colonialism – as well as

environmental racism has disrupted Indigenous peoples' connections to their land.<sup>132</sup> The impacts of climate change on water, forests, and wildlife have changed how Indigenous people live and has left communities vulnerable to climate change hazards.<sup>133</sup> It has also negatively impacted their mental health and well-being.<sup>134</sup> There is already a gap in mental health outcomes between Indigenous and non-Indigenous peoples in Canada, with the former reporting 6% higher psychological distress and 83% higher suicidal ideation.<sup>135</sup> Climate change will only widen this gap.

### **Box 2 - Environmental racism and Indigenous peoples**

*Environmental racism disadvantages racialized groups and Indigenous peoples through systemic policies and practices that increase the exposure of these communities to environmental hazards, like air pollution.<sup>136</sup> This exposure in turn amplifies health risks.<sup>137</sup> A key case is Sarnia's Chemical Valley where industrial refineries are located right next to the homes of a nearby First Nation.<sup>138</sup> Aside from the distress and fear caused by the ever-present sound of sirens and smell of fumes,<sup>139</sup> air pollutants in general are linked to poor brain and mental health outcomes – such as greater odds of dementia or higher risk of schizophrenia relapse<sup>140</sup> – which can be due to harmful processes like oxidative stress and inflammation in the brain.<sup>141</sup>*

### **Disrupting Indigenous connections to water and land**

Climate change hazards, such as melting permafrost and floods, can damage water supplies in Indigenous communities.<sup>142</sup> Damaged water supplies not only threaten Indigenous peoples' fundamental right to clean and safe drinking water, but also their cultural identity and way of life. Indigenous peoples have a sacred relationship with water, and water plays an essential role in everyday life, spiritual practices and traditional knowledge.<sup>143</sup> The destruction and contamination of water disrupts this sacred relationship, which can have a harmful effect on mental health and well-being in Indigenous communities.<sup>144</sup> For example, the current drinking water advisories in First Nations communities across Canada are linked to 2.3 times higher rates of suicide.<sup>145</sup> Fortunately, Indigenous peoples are using their traditional ecological knowledge to preserve and protect water for future generations.<sup>146</sup>

Wildfires are another major climate change hazard that significantly affects Indigenous communities. Over the past 10 years, Canada has experienced several significant wildfire seasons.<sup>147</sup> In 2023 alone – the worst wildfire season on record – almost 16 million hectares burned across the country.<sup>148</sup> Wildfires are expected to increase by 75% in Canada within the next century and will lead to even more people being displaced from their homes and communities.<sup>149</sup> This is particularly concerning for First Nations and Métis people who already make up almost half of wildfire evacuations.<sup>150</sup> As land plays a significant role in Indigenous peoples' identities, the resulting stress from being removed from familial and historic lands is significant<sup>151</sup> and could lead to depression, anxiety, and PTSD.<sup>152</sup>

Climate change hazards also create food insecurity that threatens Indigenous peoples' ability to access traditional foods.<sup>153</sup> Effects on hunting, fishing, trapping, and gathering have been observed:

- First Nations community members have noticed changes in wildlife populations;<sup>154</sup>
- Métis people have expressed worry over declining food sources due to changing ecosystems;<sup>155</sup> and
- Inuit living in Canada's arctic have recorded smaller, fewer fish and other aquatic life due to altered weather patterns and melting ice affecting marine environments.<sup>156</sup>

These changes to traditional food supply disrupt Indigenous peoples' ways of living and their connection to place, which research has linked to anxiety, depression, substance use, and suicidal ideation.<sup>157</sup>

The risk of losing of traditional knowledge, culture, and language due to climate change<sup>158</sup> will have significant impact on Indigenous peoples and communities. It has been noted, for example, that the preservation of Inuit culture and language is vital for individuals' mental well-being and social cohesion.<sup>159</sup> That is why Indigenous-led efforts to address the impacts of climate change must be at the core of all climate action initiatives in Canada.

### **Marginalized groups**

Some groups of people face elevated risks from climate change and reduced access to resources to respond to climate change hazards because of social, economic, and environmental factors beyond their control. These social and structural determinants of health,<sup>160</sup> either individually or in combination, contribute to the marginalization of certain groups and magnify the effects of climate change on their mental health.<sup>161</sup> Some key social and structural determinants of health that put people at greater risk of climate change hazards are socioeconomic status (SES), race and ethnicity, and housing status.

SES covers multiple factors such as income, occupation and education level.<sup>162</sup> Compared to people of higher SES, people of lower SES may be pushed to neighbourhoods that are more prone to climate change hazards and that have less access to safe and adequate housing (e.g. structurally sound, heating/cooling systems, etc.), social support networks, and mental health services. These circumstances can negatively impact peoples' resiliency against and ability to recover from climate change hazards.<sup>163</sup>

Race and ethnicity are closely connected with SES. A larger proportion of people from racialized groups experience economic disadvantages and disparities that limit their ability to respond to climate change hazards and cope with the resulting impacts on their mental health.<sup>164</sup> In other words, it is the social and structural inequities experienced by racialized people that create the conditions which make them more vulnerable to the impacts of climate change.<sup>165</sup> In addition, as we saw in the previous section, environmental racism increases the likelihood that racialized people will be exposed to climate change hazards in the first place.<sup>166</sup> The combination of land use planning and development patterns, along with inequities in infrastructure investment, can leave some racialized and low-income communities particularly vulnerable to climate change hazards.<sup>167</sup> A spatial analysis of climate-induced flooding in Toronto, for example, found that four lower-income, largely racialized neighbourhoods were at disproportionate risk of flooding - driven by discriminatory policies, lack of maintenance and infill development.<sup>168</sup> The consequences of historical discrimination and inequities in land-use planning and infrastructure investment were particularly evident in the aftermath of Hurricane Katrina in the US. Lower-income, Black communities were disproportionately affected, partly because they were more likely to be located in flood-prone areas of New Orleans. These areas were particularly vulnerable to failures in the city's levee system that, despite repeated warnings, governments failed to adequately invest in and fortify. The city's evacuation plans also assumed that these residents had access to private vehicles, despite people living in the most flood-prone areas being less likely to have access to a car.<sup>169</sup>

Given that social and structural inequities create conditions that increase many racialized communities' exposure and vulnerability to climate change hazards, it is unsurprising that there are mental health

disparities between racialized and non-racialized groups in the aftermath of such hazards. For example, research conducted in the U.S. among Hurricane Sandy survivors found that Hispanic and Black Americans were significantly more likely – 3.03 and 2.11 times, respectively – to experience a mental health disorder compared to White Americans.<sup>170</sup> Beyond the Indigenous context, similar evidence on the mental health impacts of climate change on racialized communities in Canada is limited, and has been identified as an important area for future research and intervention.<sup>171</sup>

Finally, housing is crucial for resilience and recovery from climate change hazards. People experiencing homelessness do not have access to adequate shelter to protect them from climate change hazards making them physically vulnerable during these events.<sup>172</sup> Mental health can also be impacted. Not being able to readily secure shelter during climate change hazards can be a significant source of worry for people experiencing homelessness, in addition to any secondary stresses they face from climate change, like food insecurity.<sup>173</sup>

### **Other groups**

Other groups that are more vulnerable to the mental health impacts of climate change are women,<sup>174</sup> older adults,<sup>175</sup> and workers in specific occupations.<sup>176</sup>

- **Women and girls** often hold, and are perceived to hold, more caregiving responsibilities. Because of this, they may experience heightened stress and mental health problems in the wake of climate change hazards as they look after their own health and well-being as well as that of others (e.g. children, family members).<sup>177</sup> Further, climate change hazards can cause displacement and financial/economic losses that can exacerbate domestic violence against women and girls - which is linked to a variety of mental health-related problems, such as depression, eating or sleep disorders, and substance use, among others.<sup>178</sup>
- **Older adults** are particularly vulnerable to heat events due to diminished physiological mechanisms for regulating their body temperature. Many older adults also have physical health issues like heart disease and diabetes which further affect their body's ability to cool down. Other common health problems, like cognitive impairments and mobility issues, can impair older adults' ability to recognize signs of heat stress and/or respond appropriately.<sup>179</sup> Such conditions make older adults more susceptible to the mental health impacts of heat events - from irritability and sleep disturbances, to episodes of psychosis and suicide.<sup>180</sup> One review of studies on older adults found that for every 1°C increase in temperature, the risk of hospital visits/admissions due to mental health problems increased by 1.5%.<sup>181</sup> Deaths related to mental illness in this population also increased during heat-events<sup>182</sup>
- People in **specific occupations** like first responders (particularly firefighters)<sup>183</sup> and outdoor workers<sup>184</sup> have greater direct exposure to climate change hazards, such as rising temperatures and air pollution, which are linked to symptoms of PTSD, depression, anxiety, suicide and substance use.<sup>185</sup> Farmers – whose livelihoods are deeply connected to the land – are susceptible drought, which is increasing globally due to climate change. Drought is strongly associated with stress, anxiety and depression amongst farmers, and prolonged drought is linked to suicide in this population.<sup>186</sup>

### **Climate change will impact mental health systems and services**

Climate change and its related hazards not only affect brain and mental health, but also has the potential to impact the mental health systems and services that people rely on for care. For example, one recent

review found that even short-term exposure to increased temperatures was associated with more emergency department and hospital visits due to mental illness and/or suicidal behaviours.<sup>187</sup> That means that as more and more people experience the mental health impacts of climate change, we can expect an increase in demand for mental health care across the country and further strain to Canada's overwhelmed mental health system.<sup>188</sup>

Depression is already the leading cause of poor health and disability worldwide.<sup>189</sup> In Canada, the prevalence of mood and anxiety disorders increased substantially over a 10-year period; the prevalence of major depression rose from 4.7% in 2012 to 7.6% in 2022, and the prevalence of generalized anxiety disorder increased from 2.6% to 5.2% during that same period.<sup>190</sup> Despite the growing number of people with mental illness, mental health care remains underfunded across the globe,<sup>191</sup> including in Canada,<sup>192</sup> resulting in gaps in access to care and quality of care.<sup>193</sup> Canadians currently wait about 30 days for community mental health counselling, with 1 in 10 waiting four months or more,<sup>194</sup> and 1 in 3 report that their needs for mental health care are unmet or only partially met.<sup>195</sup> As more people seek out mental health care due to climate change and its associated hazards, we can expect wait times and access to care challenges to grow. This means that many individuals, particularly those in rural and underserved areas, could be left without access to much needed mental health care.<sup>196</sup> Young people may end up bearing most of the long-term burden of strained mental health systems given that they are at a critical developmental stage (i.e. most mental illnesses begin during childhood and adolescence), and they are especially vulnerable to the mental health impacts of climate change.<sup>197</sup>

Climate change hazards can also impact the delivery of mental health care services. Climate change hazards can damage health care infrastructure, cause power outages, disrupt supply chains, interfere with communications systems, and lead to hospital overcrowding and evacuations.<sup>198</sup> Disrupted transportation systems can impact patients, staff and vendors.<sup>199</sup> Climate change hazards can also impact healthcare workers' physical and mental health and cause moral distress when healthcare systems are not adequately prepared to respond to climate change and its related hazards.<sup>200</sup>

Most critically, climate change has the potential to both reduce the mental health system's capacity to provide care while at the same time increasing the need for such care.<sup>201</sup>

### ***Box 3 - The mental health system's contribution to climate change***

*Mental health systems are not only impacted by climate change –they also contribute to climate change. Mental health systems produce waste in a variety of ways, including: pharmaceutical waste; commuting by patients and staff; and the use of energy, waste disposal and food options.<sup>202</sup> The U.K.'s mental health system, for example, released 1.5 megatonnes of greenhouse gases in 2019.<sup>203</sup> Recognizing the costs of climate change, England's National Health Service became the first national health system to make climate mitigation a legal requirement and set a goal to reach net-zero carbon emissions by 2040.<sup>204</sup> Mental health leaders in the U.K. have also embraced this goal and released their own guidance and recommendations to support the delivery of more sustainable and net-zero mental health care.<sup>205</sup> CAMH and other mental health leaders in Canada have the opportunity to make a similar commitment in their organizations and health systems.*

## **What we can do about it**

Addressing the brain and mental health impacts of climate change will require individual, community and system level action, along with guidance, support and resources from governments and decision-makers. Since the area of climate change and mental health is relatively new, it is imperative that we prioritize research and evaluation efforts to better understand the scope of impact, and learn how to best intervene in the wake of climate change hazards. As with other public health emergencies, we need to put evidence into practice quickly, and continuously improve our approach as climate pressures increase and new evidence emerges. Further, as the frequency and severity of climate change hazards continue to increase, there are actions we can take now to bolster mental health and build resiliency and agency.

In this section CAMH offers governments and decision-makers 22 recommendations to prevent and address the harmful impacts of climate change on brain and mental health (see Appendix A for a summary). These policy-level recommendations – informed by evidence and developed in consultation with experts – have the potential to make the most widespread impact when it comes to climate change and mental health. While recommendations are presented in broad order of priority, they are intended to function as a complementary package of actions – implementing any one recommendation will help strengthen the effectiveness and impact of others. These recommendations also align with established national and international guidelines – for example, Canada’s National Adaptation Strategy.<sup>206</sup>

In addition to the recommendations below, CAMH also supports evidence-informed policies and efforts that reduce greenhouse gas emissions by addressing the root causes of climate change, and which have the co-benefit of mitigating the impacts of climate change on mental health.<sup>207</sup> For example, government subsidies to support active transportation will reduce fossil fuel use, lessen the impact of warming temperatures and poor air quality on mental health, and promote overall health and well-being.<sup>208</sup> Further, broader policies that improve access to mental health care and promote the social determinants of health will help build resilience in the face of climate change, and ultimately benefit the brain and mental health of all Canadians.

### **Invest in research and evaluation**

While researchers have established a clear link between climate change and mental health problems and illnesses,<sup>209</sup> there are still major gaps in our understanding, including: the complex ways brain and mental health impacts are experienced across diverse populations; the long-term brain and mental health impacts of climate change; and the role of protective factors in building resiliency in the context of climate change. There is also a need to better understand the potential scope of impact on brain and mental health in the wake of climate change hazards. Working together with climate scientists, mental health researchers could create models to predict the number and types of brain and mental health problems expected if/when a specific climate change hazard strikes in a specific area. Such knowledge would equip mental health system decision-makers with more accurate information for climate risk assessment and response planning. Therefore, CAMH recommends that:

1. *The federal and provincial/territorial governments increase and prioritize funding for research that strives to better understand the impacts of climate change on brain and mental health, and the associated costs.*

In addition to research on the scope and impact of climate change-related mental health problems and illnesses, we also need to understand how to best intervene to support individuals and communities impacted by climate change hazards. Researchers and other experts across the globe have identified an array of promising strategies for supporting people in the immediate aftermath of climate change hazards, and for building resiliency and agency in the face of climate change. For example, there is evidence to suggest that Rapid Emotive Behaviour Therapy (REBT), a short-term therapy similar to Cognitive Behaviour Therapy (CBT), can reduce depression in flood victims.<sup>210</sup> Other interventions that promote mental health literacy and resiliency-building have shown that they can reduce mental health symptoms amongst those who have experienced flooding and hurricanes/typhoons.<sup>211</sup> Self-directed resiliency-building interventions (e.g. interactive websites, journaling) have also been implemented as an approach for exploring and addressing climate emotions.<sup>212</sup>

Another set of promising interventions focus on harnessing emotional responses to climate change into climate action. Emerging evidence suggests that people's emotional reactions to climate change can motivate them to take action to address climate change, and that collective action can help reduce climate anxiety and promote good mental health, especially among young people.<sup>213</sup> (Though, in some cases, climate action itself can lead to anxiety and burnout).<sup>214</sup> The idea is that engaging in 'meaning focused' activities induces positive emotions and helps people cope more constructively with climate distress.<sup>215</sup> These types of interventions typically focus on creating safe-spaces for people to talk about their climate emotions with others – such as Climate Café's or Carbon Conversations – while also spurring individual and collective action to reduce environmental impact and address climate change more broadly.<sup>216</sup> Evaluation of the Carbon Conversations model found that involvement in these groups helped participants to address their worries about climate change and feel empowered and more in control.<sup>217</sup>

An additional model of action-oriented intervention focuses on capacity-building to help participants, often youth, redirect their climate anxiety into becoming climate change leaders, mentors and advocates.<sup>218</sup> CAMH, for example, is currently implementing the 'Youth Taking Action on Climate Change and Active Hope' initiative which provides young people experiencing climate distress with the opportunity to co-develop, implement, and scale an Active Hope program that helps other young people build coping skills for managing their climate distress. The intervention also seeks to reduce isolation and promote collective agency and climate action.<sup>219</sup> Other promising collective action interventions include land restoration efforts, community gardens, and tree-planting activities – all of which are associated with improved mental health amongst participants.<sup>220</sup>

There is also evidence to suggest that climate change adaptation and mitigation interventions in low and middle-income countries have the potential to benefit mental health and well-being.<sup>221</sup> In particular, evaluations of poverty reduction interventions, such as those that provide unconditional cash transfers or grants to promote microenterprises in the wake of climate change hazards, found that those who received government assistance demonstrated better mental health and well-being outcomes than those who do not receive assistance.<sup>222</sup>

While there are many promising interventions that address the mental health impacts of climate change, evidence on their effectiveness remains limited and more information is needed to determine which interventions work best for which populations in which circumstances.<sup>223</sup> For that reason, CAMH recommends that:

2. *Governments and decision-makers provide resources for researchers and other experts to design, implement, scale and evaluate a range of promising interventions that address climate change and brain and mental health. Priority should be given to interventions that support and empower populations that are most vulnerable to the brain and mental health impacts of climate change and emphasize upstream, preventative approaches rather than focusing solely on crisis response.*

Further, because climate change and mental health research is still in its infancy, it is important that we support further inquiry in the field and continue to add to the body of knowledge on effective interventions and best practices. Therefore, CAMH recommends that

3. *Governments and decision-makers provide funding for the development and evaluation of novel interventions that address the impacts of climate change on brain and mental health.*

Finally, given the urgent and growing need to better understand and address the impacts of climate change on brain and mental health, we recommend that:

4. *Governments and other funding bodies create fellowships to support and accelerate the next generation of scientists working at the intersection of climate change and brain and mental health.*

## **Strengthen mental health system capacity**

As more people experience mental health problems and brain health disorders as a result of climate change, the mental health system must be able to provide care when and where people need it most. We know that in the aftermath of climate change hazards, more people will be in need of mental health care.<sup>224</sup> We also know that if this care is provided in a timely manner, it can help reduce the negative impact of these events.<sup>225</sup> This means that mental health systems must have a plan in place, and be sufficiently resourced, to mobilize quickly when climate change hazards occur.<sup>226</sup> Proper resourcing would also allow mental health systems to rapidly address any damaged infrastructure and supply chains.<sup>227</sup>

In addition to providing care in the wake of climate change hazards, mental health systems can also play a role in building climate change resiliency. For example, when people are provided with the care and supports that they need to manage their climate emotions, it can lessen the overall impact of climate change on mental health.<sup>228</sup> And for people with mental problems and illnesses, simply having access to mental health care that is affordable/accessible, and that addresses the social determinants of health (e.g. housing, social isolation and employment), can help build resiliency in the face of climate change and its associated hazards.<sup>229</sup>

To strengthen mental health systems to enable them to respond quickly in the wake of climate change hazards, and to ensure they are able to play a role in building climate change resiliency, CAMH recommends that:

5. *Federal and provincial/territorial governments provide funding to expand mental health system capacity to meet rising demand due to climate change, particularly in response to climate change hazards.*
6. *Mental health system decision-makers include climate change in risk assessment and planning, and ensure essential mental health services can be delivered in the wake of climate change hazards.*

Strengthening the mental health system's capacity to address climate change and mental health will also require enhancing front-line providers' awareness and understanding of the issues. This could include providing widespread brain and mental health and climate change literacy training to mental health and other healthcare providers who support people impacted by climate change hazards,<sup>230</sup> as well as for those who work with young people and others who are at risk of experiencing climate distress.<sup>231</sup> For example, CAMH included a session on addressing climate distress and supporting youth-driven climate action in our education series on crisis and emergency preparedness for Integrated Youth Service providers across the country.<sup>232</sup>

In addition to broader mental health and climate literacy training, more specific resources and training can be offered to those who work closely with people with mental illness and others who can be particularly vulnerable during certain climate change hazards. CAMH has done some work in this area via our [Global Learning Academy](#). Through this evidence-based education hub we offer a series of resources for health and social service providers, as well as the general public, to help them support higher-risk people and communities in preparing for and responding to extreme heat events. CAMH is taking a similar focus in our collaboration with the University of Toronto's Collaborative Centre for Climate, Health & Sustainable Care and CASCADES (a pan-Canadian network addressing the healthcare system's response to climate change) on a virtual training program for healthcare providers to help them mitigate heat risk with vulnerable patients.<sup>233</sup>

Finally, mental health professionals, and particularly those who work with youth, would benefit from clinical guidance and best practices to better understand how to assess and treat people experiencing more extreme forms of climate-related distress.<sup>234</sup>

Therefore, to better prepare front-line mental health providers and others who work at the intersection of climate change and mental health, CAMH recommends that:

7. *Governments at all levels provide resources for experts to develop education and training, standards of practice and clinical guidelines for health care professionals and others who work with people whose brain and mental health is impacted by climate change.*
8. *Professional healthcare organizations integrate climate and mental health into professional education, training, and competency standards.*

## **Address colonialism and prioritize Indigenous-led action**

We know that Indigenous peoples have experienced significant disruptions in their connections to their land, culture and traditions due to climate change, with resulting impact on their mental health and well-being. Action is needed to address these climate change-related disruptions – and crucially, action that is Indigenous-led and relies on traditional knowledge and worldviews.<sup>235</sup> This means that any strategy or intervention that seeks to address climate change and mental health in Indigenous communities must be culturally relevant and rely on the knowledge and leadership of people in that community.<sup>236</sup> For example, a community-led climate action program in the Yukon sought to improve mental, emotional and spiritual well-being amongst First Nations youth by connecting them with traditional fish camp activities.<sup>237</sup> Indigenous knowledge and traditions can also assist when implementing broader climate change and mental health efforts. Indigenous peoples are leaders and active champions in the climate change field, and prioritizing their efforts will benefit us all.<sup>238</sup> That is why CAMH recommends that:

9. *Governments provide sustained funding for Indigenous-led institutions and initiatives to enable communities to design and lead their own climate mitigation and adaptation strategies for mental health – strategies that are self-determined and grounded in traditional knowledge systems.*<sup>239</sup>

Centering Indigenous-led climate action is also one of the ways that Canada can live up to its commitments to Indigenous peoples. As a signatory of the United Nations Declaration on the Rights of Indigenous peoples, Canada has a responsibility to ensure that Indigenous peoples “have an equal right to the enjoyment of the highest attainable standard of physical and mental health.”<sup>240(p18)</sup> This means that Canada must ensure that the mental health outcomes of Indigenous peoples do not deteriorate due to systemic inequities, including the impacts of climate change. Therefore, CAMH recommends that:

10. *Governments ensure that efforts to address the historical and ongoing impacts of colonialism and environmental racism on climate change and the mental health of Indigenous peoples are central to advancing climate action.*<sup>241</sup>

## **Support assessment and planning**

Many communities across Canada have developed, or are developing, vulnerability and adaptation assessments, resiliency plans, and disaster preparedness plans to address climate change. While some communities, such as Ottawa, have included brain and mental health considerations in their assessments and plans,<sup>242</sup> this is not consistent across jurisdictions. Given the significant impact that climate change and its related hazards can have on brain and mental health, it’s important that those responsible for developing these assessments and plans include evidence-informed strategies to support community mental health and well-being, particularly in the wake of climate change hazards.<sup>243</sup> It is also important that mental health considerations be included in, and aligned across, local and broader jurisdictional climate change assessments and plans, and include strategies for supporting those most at risk of experiencing the brain and mental health impacts of climate change.<sup>244</sup> Therefore, CAMH recommends that:

11. *The federal government, in consultation with experts, set standards and best-practices for including brain and mental health and psychosocial wellbeing in climate change vulnerability and adaptation assessments, resiliency plans and disaster preparedness plans.*
12. *Governments at all levels provide resources for provinces/territories and municipalities to include brain and mental health and psychosocial wellbeing in climate change vulnerability and adaptation assessments, resiliency plans and disaster preparedness plans, and to harmonize these plans across regions.*

Canada's National Adaptation Strategy provides an excellent example of how mental health can be included in the climate change planning. The Adaptation Strategy, developed in consultation with a range of stakeholders including Indigenous groups, adaptation experts and youth, outlines a comprehensive plan for building a more climate-resilient country and includes goals, objectives and targets for protecting health, including mental health and social well-being, in the face of climate change hazards.<sup>245</sup> While the National Adaptation Strategy is crucial for addressing the mental health impacts of climate change, it is not sufficiently resourced to be truly effective. That is why CAMH recommends that:

13. *The federal government increase their investment in the National Adaptation Strategy, and particularly in the health and well-being stream to ensure that objectives and targets can be met.*

## **Invest in infrastructure and housing**

We know that people experiencing adverse social determinants of health are more susceptible to the mental health impacts of climate change.<sup>246</sup> Given that under-resourced neighbourhoods, sub-standard infrastructure, lack of safe and adequate housing, and weak social support networks impact peoples' resiliency against and ability to recover from climate change hazards, it important that investments are made in these areas.<sup>247</sup> Therefore, CAMH recommends that:

14. *Governments invest in social and climate-smart infrastructure that builds climate resiliency — e.g. shelter, social capital, and community belonging— and delivers co-benefits such as community spaces (e.g. cooling and warming centres) and energy-efficient housing.*
15. *Governments work across Ministries and sectors to develop a climate change- focused housing strategy (or embed climate change considerations into existing housing strategies) and implement associated policies (e.g. requiring climate resilient building materials, mandating indoor maximum temperatures, etc.).*

## **Collaborate and co-design**

Preventing and addressing the harmful impacts of climate change on brain and mental health is a complex and long-term challenge. It will require cooperation, collaboration and commitment from across governments and sectors. Therefore, CAMH recommends that:

16. *Governments work together across levels and Ministries to develop a coordinated, intersectoral (e.g. health, social services, education, etc.) action plan for addressing the impacts of climate change hazards on brain and mental health, and for building resiliency in the face of climate change.*

Further, Canadian governments, decision-makers and other experts must connect with counterparts across the globe. Sharing research and best practices will help us all to tackle the brain and mental health impacts of climate change more effectively and efficiently. For that reason, we recommend that:

17. *Governments, decision-makers and experts strengthen international collaborations by sharing knowledge and partaking in coordinated global strategies to address the impacts of climate change on brain and mental health.*

Collaboration is also needed with people whose brain and mental health is most impacted by climate change. When governments, decision-makers and experts are developing strategies and interventions to address climate change and mental health, they should draw on the knowledge and expertise of those most affected.<sup>248</sup> Collaboration and co-design is especially impactful with young people. By creating opportunities and spaces for young people to discuss their climate distress, validating those concerns and centering their experiences, leaders can empower young people to take action to address climate change and mental health.<sup>249</sup> Therefore, CAMH recommends that:

18. *Governments, decision-makers and experts respect, promote and prioritize voices from groups disproportionately affected by the impacts of climate change on brain and mental health in the co-design of, and decision-making around climate change research and action.*

## **Increase public awareness**

While Canadians are becoming more aware of climate change and its threats to their physical health, the brain and mental health impacts of climate change are less well known. Given that these impacts can be significant and widespread, it is important that the general public know about these threats to their brain and mental health, understand who is most at risk, and learn how they can best respond and build resilience. We know that there are a range of meaningful activities that individuals and communities can engage in to mitigate the mental health impacts of climate change, including: developing personal preparedness plans; starting/joining community resiliency projects and advocacy initiatives; experiencing and preserving nature; actively reducing ones environmental impact; enhancing social connections and networks; and prioritizing mental well-being.<sup>250</sup> Efforts must be made to share this important information with the public and, particularly with young people, to do so in a way that is reassuring, positive and hopeful.<sup>251</sup> Therefore, CAMH recommends that:

19. *Governments invest in a variety of methods (e.g. public health media campaigns, patient education initiatives, student curricula) to raise awareness about the impacts of climate change on brain and mental health, as well as strategies for preventing and addressing such impacts.*

## **Develop a data monitoring strategy**

Determining when and where to best target actions to prevent and address the brain and mental health impacts of climate change and its related hazards requires up- to-date, accurate information about the populations who are most at risk/affected. That is why CAMH recommends that:

20. *Governments invest in a data monitoring strategy to accurately monitor and surveil the impacts of climate change on brain and mental health. Data should be shared across health and other sectors to inform service delivery and design.*

## **Centre health equity and climate justice**

We know that the brain and mental health impacts of climate change are not equitably distributed, and some groups of people are more vulnerable due to social and structural marginalization.<sup>252</sup> That is why efforts to address the brain and mental health impacts of climate change should also include upstream interventions that address social and structural inequities, and build climate resilience. This can include investments in housing and infrastructure, as already mentioned, as well as interventions that foster financial/economic stability in vulnerable populations. For example, poverty reduction interventions that provide financial assistance to people whose livelihoods have been impacted by climate change have led to improvements in mental health and well-being amongst recipients.<sup>253</sup> Other projects, like the National Youth Climate Corps, offer apprenticeships to marginalized youth – helping them to establish career pathways while building community and environmental resilience.<sup>254</sup> Therefore, CAMH recommends that:

21. *Governments and decision-makers use a health equity lens and direct climate change interventions upstream to address the underlying social and structural determinants that affect brain and mental health and build climate change resilience.*

It is also imperative that people who are most vulnerable to the brain and mental health impacts of climate change have ready access to culturally appropriate and/or population-specific mental health care and supports that are designed to meet them when and where they need it most – particularly in the aftermath of climate change hazards.<sup>255</sup> For that reason, CAMH recommends that:

22. *Governments and decision-makers ensure equitable distribution of brain and mental health resources to ameliorate climate-related brain and mental health disorders, and related burdens faced by populations most at risk.*

## **Conclusion**

Climate change is impacting our brain and mental health. Exposure to climate change hazards—such as wildfires, floods, and extreme heat—can directly and indirectly lead to mental illness and brain health disorders. Even without direct exposure, people can experience climate anxiety, grief and other forms of distress that impact their emotional wellbeing.

While research in the field is ongoing, the emerging evidence is clear: as climate change hazards become more frequent and severe, we can expect rising levels of stress, mental illness, and brain health disorders. These impacts will not be felt equally. Communities already facing social and structural inequities are at greater risk.

At the same time, demand for mental health services is growing, placing further strain on systems that are already overburdened—and themselves vulnerable to disruption due to climate change hazards. That is why governments at all levels must act. By implementing the 22 recommendations outlined in this paper, federal, provincial, and municipal leaders, and other decision-makers, can help to protect brain and mental health, strengthen community and system resilience, and ensure that climate strategies integrate and prioritize mental health.

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## **Appendix A**

### **Summary of CAMH recommendations**

#### **Invest in research and evaluation**

1. The federal and provincial/territorial governments should increase and prioritize funding for research that strives to better understand the impacts of climate change on brain and mental health, and the associated costs.
2. Governments and decision-makers should provide resources for researchers and other experts to design, implement, scale and evaluate a range of promising interventions that address climate change and brain and mental health. Priority should be given to interventions that support and empower populations that are most vulnerable to the mental health impacts of climate change and emphasize upstream, preventative approaches rather than focusing solely on crisis response.
3. Governments and decision-makers should provide funding for the development and evaluation of novel interventions that address the impacts of climate change on brain and mental health.
4. Governments and other funding bodies should create fellowships to support and accelerate the next generation of scientists working at the intersection of climate change and brain and mental health.

#### **Strengthen mental health system capacity**

5. Federal and provincial/territorial governments should provide funding to expand mental health system capacity to meet rising demand due to climate change, particularly in response to climate change hazards.
6. Mental health system decision-makers should include climate change in risk assessment and planning, and ensure essential mental health services can be delivered in the wake of climate change hazards.
7. Governments at all levels should provide resources for experts to develop education and training, standards of practice and clinical guidelines for health care professionals and others who work with people whose brain and mental health are impacted by climate change.
8. Professional healthcare organizations integrate climate and mental health into professional education, training, and competency standards.

#### **Address colonialism and prioritize Indigenous-led action**

9. Governments should provide sustained funding for Indigenous-led institutions and initiatives to enable communities to design and lead their own climate mitigation and adaptation strategies for mental health – strategies that are self-determined and grounded in traditional knowledge systems

10. Governments must ensure that efforts to address the historical and ongoing impacts of colonialism and environmental racism on climate change and the mental health of Indigenous peoples are central to advancing climate action

### **Support assessment and planning**

11. The federal government, in consultation with experts, should set standards and best-practices for including brain and mental health and psychosocial wellbeing in climate change vulnerability and adaptation assessments, resiliency plans and disaster preparedness plans
12. Governments at all levels should provide resources for provinces/territories and municipalities to include brain and mental health and psychosocial wellbeing in climate change vulnerability and adaptation assessments, resiliency plans and disaster preparedness plans, and to harmonize these plans across regions.
13. The federal government should increase their investment in the National Adaptation Strategy, and particularly the health and well-being stream to ensure that objectives and targets can be met.

### **Invest in infrastructure and housing**

14. Governments should invest in social and climate-smart infrastructure that builds climate resiliency — e.g. shelter, social capital, and community belonging— and delivers co-benefits such as community spaces (e.g. cooling and warming centres) and energy-efficient housing.
15. Governments should work across Ministries and sectors to develop a climate change- focused housing strategy (or embed climate change considerations into existing housing strategies) and implement associated policies (e.g. requiring climate resilient building materials, mandating indoor maximum temperatures, etc.).

### **Collaborate and co-design**

16. Governments should work together across levels and Ministries to develop a coordinated, intersectoral (e.g. health, social services, education, etc.) action plan for addressing the impacts of climate change hazards on brain and mental health, and for building resiliency in the face of climate change.
17. Governments, decision-makers and experts should strengthen international collaborations by sharing knowledge and partaking in coordinated global strategies to address the impacts of climate change on brain and mental health.
18. Governments, decision-makers and experts should respect, promote and prioritize voices from groups disproportionately affected by the impacts of climate change on brain and mental health in the co-design of, and decision-making around climate change research and action.

### **Increase public awareness**

19. Governments should invest in a variety of methods (e.g. public health media campaigns, patient education initiatives, student curricula) to raise awareness about the impacts of climate change on brain and mental health, as well as strategies for preventing and addressing such impacts.

### **Develop a data monitoring strategy**

20. Governments should invest in a data monitoring strategy to accurately monitor and surveil the impacts of climate change on brain and mental health. Data should be shared across health and other sectors to inform service delivery and design.

### **Centre health equity and climate justice**

21. Governments and decision-makers should use a health equity lens and direct climate change interventions upstream to address the underlying social and structural determinants that affect brain and mental health and build climate change resilience.
22. Governments and decision-makers should ensure equitable distribution of brain and mental health resources to ameliorate climate-related brain and mental health disorders, and related burdens faced by populations most at risk.