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**Review Article** 

# The clinical implications of climate change for mental health

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Climate change affects mental health through multiple pathways, including direct and indirect impacts, physical health and awareness of the climate crisis. Climate change increases the magnitude and frequency of extreme events with little or no time for recovery. This Review aims to provide an overview of the current evidence to inform the mental health field's response to climate change. While further innovation is needed, promising approaches for health professionals are identified at the levels of interventions for individuals, community and system-wide responses, and advocacy and education. Health worker training is important, so we offer guidance on mental health assessment and clinical risks from climate change. We also outline strategies to enhance individual and community psychological resilience and promising approaches to working with people experiencing emerging climate-related disorders. Beyond clinical care, mental health professionals can lead on climate action and sustainability in health care and can research and educate on the health effects of climate change.

In June 2022, the World Health Organization released a policy brief on mental health and climate change, urging countries to include mental health support in their response to the climate crisis<sup>1</sup>. It acknowledged that mental disorders already represent a substantial burden worldwide<sup>2</sup>, and while there are gaps in our understanding of the mental health impacts of climate change, current knowledge is sufficient to act.

It is well documented that extreme weather events negatively impact mental health<sup>3</sup>. However, what were once typically isolated events are now the norm. Climate change is increasing the magnitude and frequency of extreme events, and a new trend is emerging where populations are experiencing multiple, overlapping events with little or no time for recovery (for example, severe drought and bushfires), resulting in cumulative mental health impacts<sup>4</sup>. With this new trend comes the need for innovative solutions to protect and improve mental health. Evidence is emerging for mental health benefits of newer approaches, such as disaster preparedness, while enhancing traditional post-disaster mental health responses<sup>§</sup>. Mental health workers worldwide face an urgent need to respond to the mental health impacts of climate change, which demands a consciousness of rather than paralysis by the limitations of existing research. A challenge lies in providing an immediate yet appropriate response while the evidence is developing.

This Review aims to provide an overview of the current evidence to inform the field of psychiatry, and mental health more broadly, in its response to climate change. We begin by providing a brief overview of the links between climate change and a range of clinically diagnosable mental health outcomes<sup>6</sup> and emerging climate-change-specific

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# **Climate change affects mental health**

Climate change impacts mental health through complex pathways, interacting with a diverse set of bio-psycho-socio-cultural factors<sup>7</sup>. The impacts of heat and extreme weather events are linked to trauma, while indirect impacts are mediated through social and environmental determinants of health, such as loss and lack of access to safe and secure homes, food, livelihoods, schools, and recreational and cultural places<sup>4,8,9</sup>.

A bidirectional association exists between physical and mental illness, with climate change indirectly impacting mental health by exacerbating physical health conditions<sup>10,11</sup>. For example, asthma, associated with an increased risk of depression and anxiety, is increasingly prevalent due to air pollution and other impacts of climate change<sup>12–14</sup>.

The range of negative emotional responses felt in relation to climate change is of increasing clinical and research interest<sup>15,16</sup>, with particular attention given to 'eco-depression' (sadness or hopelessness about climate change), 'solastalgia' (feelings of loss and grief arising from perceived changes to one's home environment, which are not unique to climate-related effects) and 'climate anxiety' (the worry, dread and angst evoked by the awareness of climate change)<sup>17</sup>. While emotional responses to climate change are considered part of the normal human experience, they have been linked to more serious impacts on well-being and mental illness<sup>18</sup>. Impacts on behavioural engagement and adaptation to climate change (for example, pro-environmental engagement) and everyday functioning have also been identified<sup>19-22</sup>.

# **Priority populations**

One of the key messages of the latest report of the Lancet Countdown on health and climate change was "deepening inequities in a warming world"<sup>23</sup>. Climate change disproportionately impacts people who are the most vulnerable and marginalized, on the basis of socially and environmentally mediated factors<sup>24</sup>.

Children and youth are more susceptible to the impacts of climate change, as they are developmentally vulnerable, are dependent on adults and will experience greater cumulative mental health impacts over their lifetimes<sup>10,25,26</sup>.

Women and girls are at greater risk of mental health harms (and other harms) of climate change through multiple pathways, including the amplification of caregiving responsibilities and increased exposure to gender-based violence<sup>27</sup>. Pregnancy and the postpartum period are particularly high-risk periods in terms of increased vulnerability to the mental health impacts of disasters as well as indirect impacts such as food and water insecurity<sup>4</sup>. As clearly outlined by Stone et al., it is critical to note the importance of intersectionality, where gender intersects with factors such as race, age, socio-economic status and place to influence the severity of climate impacts<sup>27</sup>.

People with pre-existing mental illness are more vulnerable to the effects of climate change on both physical and mental health. Higher temperatures are associated with increased risks of hospital admissions (as described further in the next section), the causes of which can include medication side effects that impair the body's ability to regulate temperature, leading to increased risk of severe physical symptoms, especially among older individuals<sup>9</sup>.

For Indigenous peoples across the globe, climate change not only amplifies existing health inequities but also creates new challenges, particularly in terms of disrupting place attachment and cultural continuity, affecting food security, inducing human mobility, compounding emotions tied to historical and ongoing disempowerment, and causing intangible losses and damages  $^{\rm 28}.$ 

## Mental health presentations and climate change Emergency department presentations

Mental health presentations to emergency departments (EDs) increase for all ages on hotter days, even at quite modest temperature increases (observed at temperatures below 30 °C), with a dose–response pattern suggestive of a causal relationship<sup>29,30</sup>. As a result of heat, people present to hospitals with severe mental distress, suicidal ideation and suicide attempts, and agitation or distress from the exacerbation of psychosis or delirium superimposed on dementia<sup>9,30</sup>.

# Anxiety and somatoform disorders

Anxiety disorders can develop in response to climate-driven extreme weather events such as bushfires, floods and severe storms<sup>4,9</sup>. Some indirect impacts of climate change, such as food insecurity, forced migration, unemployment and disruptions to education, also increase the risk of anxiety disorders<sup>4,9,10</sup>.

Seeking help for anxiety may be delayed, particularly for children and adolescents, for months or even years following exposure to climate-driven extreme weather events or forced migration. Indirect climate change impacts may also lead to later presentation due to disruptions to schooling, impaired family functioning, parental unemployment and parental mental illness or substance abuse<sup>10</sup>. Increasing frequency and severity of presentations are being seen with cumulative exposure, where people are more severely affected when they experience a second or third climate-driven disaster<sup>4</sup>.

Somatic symptom disorders, or unexplained physical symptoms occurring in the context of the person's distress being expressed through their body, are being increasingly seen by specialist services, including for children and adolescents<sup>10</sup>.

#### **Mood disorders**

Depressive disorders are more frequent across the lifespan after exposure to climate-driven extreme weather events, with delay in help-seeking typical for children and adolescents<sup>9,10</sup>. Exposure to extreme weather events during pregnancy has been associated with postpartum depression<sup>31</sup>.

Strong evidence links drought with increased rates of depressive disorders in rural communities<sup>4</sup>. Climate change also increases vector-borne diseases, including West Nile virus, which is associated with notably increased rates of depression<sup>4</sup>. There is also some evidence that exposure to air pollution is associated with an increased risk of depressive disorders<sup>32</sup>.

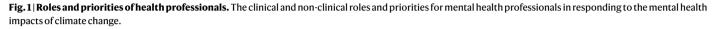
Climate change impacts may worsen social determinants of health such as unemployment, forced migration, food insecurity and homelessness, which are associated with depressive and anxiety disorders as well as suicidal ideation<sup>33,34</sup>. Clinical outcomes for people with depressive disorders are adversely affected by delays or lack of treatment, as occurs with disruption to and increased demand on mental health services from climate-change-related events<sup>35</sup>.

#### Post-traumatic stress disorder

Increasing numbers of people are being exposed to climate-related extreme events. A recent study in a high-income country found that over half of a community sample had been exposed, 25% of whom screened positive for post-traumatic stress disorder (PTSD)<sup>36</sup>. Exposure rates are expected to be higher sooner in low- and middle-income countries<sup>9</sup>.

Extreme weather events result in high rates of trauma exposure, including to life-threatening situations from the disaster and in the context of subsequent increases in interpersonal violence both within families and in the broader community<sup>4,37</sup>. Some indirect impacts of climate change, such as forced migration and armed conflict, have also been shown to be associated with PTSD<sup>4</sup>.

Individual	Role of health professionals • Clinical role assessing and treating clinical mental health impacts from the best available evidence, awareness and attending to one's own emotional response to climate change as a professional responsibility, and sustainable health care practice	Priorities for planning • Education for health professionals on mental health impacts of climate change, assessment, effective interventions and sustainable practice
Community/system	Role of health professionals • Helping communities and health care systems respond and prepare through training, increased workforce capacity, delivering community-based intervention and education, and improving social cohesion	Priorities for planning • Collaborating with other professionals, training and educating community members, and identifying opportunities to create 'virtuous cycles'
Advocacy and educa	<b>Note</b> of health professionals • Educating clients and the broader community, leading health care system preparation and sustainability, advocating climate action and researching health effects of climate change	Priorities for planning • Advocating climate-ready health services and climate action, advising policy leaders and collaborating with other professions, researchers and those with lived experience



PTSD is more likely to develop in people with previous trauma, and the risk increases with the severity and immediacy of threat to the individual and/or family or carer<sup>4,8,10</sup>. Another factor in the risk of developing PTSD is the extent to which the trauma is outside of people's control or to which the actions or lack of action of communities, business and governments are seen as contributing<sup>8</sup>. The repeated exposure to trauma, as is occurring with climate change, increases the risk for complex PTSD<sup>38</sup>.

#### Substance use disorders

Increases in the rates and severity of substance use disorders have been observed in communities impacted by extreme weather events<sup>4</sup>. Additionally, the risk of intoxication is higher during hot weather<sup>30</sup>. Some indirect impacts of climate change, such as disruption to education, unemployment and exposure to armed conflict, are also risk factors for substance use disorders<sup>10</sup>.

#### Confusional states and psychotropic medication side effects

Extreme heat increases the risk of delirium and the exacerbation of cognitive difficulties in people with dementia. The very young, the very old and those with comorbid conditions such as diabetes mellitus are particularly at risk of delirium<sup>39</sup>. Adverse effects of psychotropic medications (which are more likely in extreme heat) may also occur, particularly with medicines with anticholinergic side effects such as older antipsychotics and antidepressants<sup>40</sup>. Hyponatraemia, which can lead to delirium, has been identified as an adverse effect particularly increased for those taking antidepressants during hotter weather<sup>41</sup>.

#### Psychiatric-related mortality

During hotter weather, there is an increased risk of death for patients with psychosis, dementia and substance misuse (for example, attributable to several causes such as dehydration or suicide)<sup>42</sup>. There may also be increased risk of adverse effects for those taking substances and prescribed medications, which can make people more vulnerable to harm from heat<sup>4,30</sup>.

#### Climate-change-specific disorders

Emerging evidence suggests that some people may experience levels of functional impairment and distress in the clinical range due to climate change, although these have not yet been incorporated into diagnostic systems<sup>20,43</sup>. An individual's risk of developing a mental illness is influenced by their mental health support, level of isolation or connectedness with others and degree of exposure to indirect climate change impacts<sup>43</sup>. Currently, high levels of functional impairment and/ or distress are usually considered on the basis of established diagnoses,

such as anxiety or depressive disorders. It is important to ensure that healthy, adaptive climate distress in response to climate change is not pathologized<sup>43</sup>. Further research is ongoing as to whether additional diagnostic categories for those experiencing ongoing impairment and/ or distress due to climate change are needed.

Clinical diagnoses are further complicated in relation to solastalgia and mental health impacts of climate injustice in First Nations' peoples<sup>9</sup>. Functional impairment and distress have been reported in these populations; however, careful consideration of cultural influences is needed before categorizing mental health problems into specific clinical diagnoses.

A summary of mental health presentations that have been shown to be impacted by climate change can be found in Table 1.

# Climate change and mental health services

The mental-health-related harms of climate change will inevitably translate to increased demand for services. There is a need to address existing global under-resourcing of mental health services and to plan for projected increased need for mental health care. In addition, planning is needed for the predictable disruption to health services due to climate-change-related events<sup>44</sup>. The increases in ED presentations that occur with climate-related events<sup>29</sup> are a result of inadequate community mental health services. Extreme weather events also lead to increases in mental health crises<sup>24</sup>. These occur at times when health services providing support are disrupted by the same events<sup>4,8,9,45</sup>. It is essential that plans commence so that mental health services are prepared to meet the increased future demands associated with climate change. The framework in Fig. 1 provides an overview of the roles and priorities of health professionals in responding to the mental health impacts of climate change, at the individual and community levels, as well as beyond clinical care.

#### The role of mental health professionals Assessment

Initial contact may be with a health worker, a volunteer providing mental health first aid or a primary care medical practitioner<sup>46</sup>. When a person's level of distress or functional impairment is severe enough to potentially represent a clinical disorder, then clinician mental health assessment is indicated<sup>47</sup>. Figure 2 shows key elements of clinical mental health assessment in the context of climate change, with the acronym SAFE (setting, awareness, facts and engagement).

The assessing clinician should know about the increased risks of mental health deterioration across the broad range of clinical presentations during hotter weather and the risk of medication reducing heat tolerance or increasing adverse drug reactions. In addition to a higher

#### Table 1 | Summary of risk estimates of clinical mental health presentations due to climate-change-related exposure

Presentation	Exposure	Location	Reported estimate	Study design
Mental-health-related mortality	Heat	Global	RR=1.022 (95% CI, 1.015–1.029) for every 1°C increase in temperature (all ages)	Meta-analysis <sup>30</sup>
Mental-health-related morbidity	Heat	Global	RR=1.009 (95% Cl, 1.007–1.015) for every 1°C increase in temperature (all ages)	Meta-analysis <sup>30</sup>
Mental-health-related ED visits	Heat	California	4.8% (95% CI, 3.6–6.0) increased risk for every 5.6 °C increase in temperature (6–18 yr)	Time series <sup>80</sup>
	Heat	China	RR=1.435 (95% CI, 1.048–1.965) (adults)	Time series <sup>81</sup>
Suicide	Heat	Global	RR=1.09 (95% Cl, 1.06–1.13) for every 7.1°C increase in temperature (adults)	Meta-analysis <sup>82</sup>
Anxiety, stress-related and somatoform disorders	Heat	Global	RR=1.007 (95% CI, 1.001–1.013) for every 1°C increase in temperature (all ages)	Meta-analysis <sup>30</sup>
	Flood	Korea	Anxiety prevalence at 8.6% pre-flood versus 22.5% after floods (P<0.01) (14–95 yr)	Case-control study <sup>83</sup>
	Drought	Australia	Personal drought-related stress IRR, 1.50 (95% CI, 1.32–1.72) (adult farmers)	Longitudinal cohort study <sup>84</sup>
Mood disorders	Heat	Global	RR=1.011 (95% CI, 1.003–1.018) for every 1°C increase in temperature (all ages)	Meta-analysis <sup>30</sup>
Depressive disorders	Bushfire	Australia	Major depressive episode OR, 1.83 (95% CI, 1.17-2.85) (adults)	Longitudinal cohort study <sup>45</sup>
	Flood	UK	Depression OR, 8.48 (95% CI, 1.04–68.97) (adults)	Longitudinal cohort study <sup>85</sup>
PTSD	Bushfire	Australia	PTSD OR, 1.14 (95% Cl, 1.53–3.20) (adults)	Longitudinal cohort study <sup>45</sup>
	Flood	Korea	PTSD prevalence at 0.3% pre-flood versus 46.6% after floods (P<0.01) (14–95 yr)	Case-control study <sup>83</sup>
	Flood	UK	PTSD OR, 7.74 (95% CI, 2.24–26.79) (adults)	Longitudinal cohort study <sup>85</sup>
Psychotic disorders	Heat	USA	ED visits IRR, 1.05 (95% CI, 1.03–1.07) (all ages)	Case-crossover study <sup>29</sup>
Substance use disorders	Heat	Global	RR, 1.008 (95% CI, 0.996–1.021) (adults)	Meta-analysis <sup>30</sup>
	Heat	USA	ED visits IRR, 1.08 (95% CI, 1.07–1.10) (adults)	Case-crossover study <sup>29</sup>
	Bushfire	Australia	Self-report heavy drinking OR, 1.39 (95% CI, 1.01–1.89) (adults)	Longitudinal cohort study <sup>45</sup>
Organic mental disorders	Heat	Global	RR=1.008 (95% CI, 1.001–1.015) (adults)	Meta-analysis <sup>30</sup>
Adverse drug reactions	Heat	Sweden	Hyponatraemia with heat and medications including serotonergic antidepressants	Case-crossover design <sup>41</sup>
	Heat	France	ED visits for heat-related pathology with anticholinergics, antipsychotics and anxiolytics	Case-control study <sup>40</sup>
Climate anxiety	Awareness	Global	59% very or extremely worried about climate change (16–25 yr)	Cross-sectional survey <sup>20</sup>
Developmental disorders	Storm	USA	Attention-deficit hyperactivity disorder HR, 5.5 (P=0.01) (2–5 yr)	Case-control study <sup>86</sup>

RR, relative risk; CI, confidence interval; IRR, incidence rate ratio; OR, odds ratio; HR, hazard ratio.

index of suspicion for these issues during hotter weather, supporting and advocating access to cool shelter is a sensible response while specific research about the most effective ways to do this to protect mental health is awaited<sup>48</sup>.

#### Individual interventions for emerging disorders

There is an increasing demand for climate-related mental health support, but policymakers and practitioners face several challenges. While addressing access to mental health services and protective factors is key for established disorders, being able to intervene either with at-risk individuals (targeted intervention) or universally (community-wide) to improve outcomes for people experiencing climate-related conditions such as climate anxiety and solastalgia is an important area of research. There is recent evidence that climate anxiety can elicit adaptive and function-enhancing responses and that clinicians and/ or community leadership may influence these positive outcomes, and yet many practitioners do not have the training or tools to provide appropriate support  $^{\rm 49,50}$  .

**Enhancing resilience.** Considering these challenges, it is important for practitioners to have a clearly defined role and a framework that may guide how best to reduce the severity of the potential mental health impacts<sup>51,52</sup>. This could be achieved through enhancing individual and community psychological resilience<sup>51,53–55</sup>. This is relevant to prevention and early intervention approaches at a universal/community-wide level, as well as targeted intervention to those at the highest risk of clinical levels of distress and/or functional impairment.

Psychological resilience is described as the ability to overcome and recover from difficult stressors. It encompasses the capacity to positively adapt or grow (for example, learning new skills and developing stronger relationships) in the face of adversity<sup>56,57</sup>. Applying this to climate change adversity, the aim of enhancing resilience

Waiting area/entrance cues of safety to share climate concerns	Setting
Clinician is aware of and has sufficient support for their response to climate change	<ul> <li>Awareness</li> </ul>
Clinician knowledge of mental health impacts of climate change and identifying the need for climate intervention	• Facts
Engaging client/patient through validation, connection to others and values-based action	• Engagement

Fig. 2 | SAFE mental health assessment. Key elements of clinical mental health assessment in the context of climate change.

would be to strengthen adaptive coping—that is, the helpful cognitions and behaviours that one uses to maintain well-being despite adversity<sup>58</sup>. A disaster risk management model can be applied to frame how climate-related psychological resilience may be enhanced<sup>59</sup>. Specifically, practitioners may aim to help individuals and communities in (1) responding to mental health impacts arising from climate-related stressors, (2) preventing and mitigating climate change or its potential impacts on mental health, and (3) preparing for future adversity<sup>51,52</sup>.

**Mechanisms for enhancing resilience.** In responding to the mental health impacts of climate change, practitioners have an important role in helping individuals to develop adaptive cognitions and behaviours that can maintain well-being. Mindfulness-based or cognitive-based interventions could be used to evaluate and reframe thoughts in helpful ways, particularly if thought content or processes are maladaptive (for example, reducing catastrophizing, emotional reasoning, uncontrollable worry or rumination). Existential therapies may take cognitive exploration further, allowing individuals to access existential thoughts and concerns arising from climate change (for example, meaning in life or thoughts about death)<sup>50</sup>.

Practitioners may also focus on supporting individuals to develop or build on useful behaviours (for example, coping behaviours and engagement) that enhance well-being, security or safety during stressful climate-related events. For example, behavioural activation strategies, exposure-based techniques or nature-based therapies might help individuals to set concrete goals (for example, going back to work or school after a disaster) or re-engage in values-based activities such as pro-environmental behaviour, climate mitigation or other community projects. Additionally, practitioners may use psychoeducation and trauma-informed self-regulation to promote awareness of mental health issues related to climate change, psychological adaptation and preparation<sup>S1</sup>. These types of psychological interventions may help to enhance resilience through self-efficacy, agency, hope and connection to nature.

Despite the fact that evidence for best practice has not yet been demonstrated, it is broadly accepted that practitioners should hold a space where feelings can be explored, processed and regulated safely<sup>50,53</sup>. Similarly, peer-based emotional support groups or group therapy (guided by a trained practitioner) may also provide an opportunity where individuals can collectively share, process and respond to emotions.

To date, there has been little exploration of the effectiveness of existing interventions in strengthening climate-related psychological resilience and adaptive coping<sup>58</sup>. However, it is worth acknowledging evidence demonstrating the effectiveness of psychological interventions (for example, cognitive behaviour therapy and mindfulness-based interventions) for individuals who are clinically affected (for example, presenting with a diagnosable mental illness) after exposure to natural disasters or traumatic or stressful events<sup>60,61</sup>. More recently, there has been emerging consideration of potential interventions that could be used for individuals experiencing climate anxiety<sup>50</sup>. Despite this, there is a clear need to investigate how best to address the training needs of practitioners, as well as the empirical effectiveness of interventions delivered at the individual, community or public health level. Research may also explore whether particular or new forms of therapy may specifically benefit those experiencing climate anxiety or solastalgia. This is especially critical for populations considered vulnerable to the negative health impacts of climate change, including young people, First Nations and culturally diverse groups, and those who are geographically vulnerable, live in low socio-economic areas or are vocationally exposed to climate change (including farmers, first responders, scientists and health-care professionals).

#### Services, planning and decision-making

To reduce climate-change-associated mental illness, community initiatives that fortify the mental health of the population are needed. These include improving community preparedness, government planning and coordinated responses to heat waves, droughts, floods and bushfires. To address the gaps in knowledge on effective interventions, future evaluation of responses to climate-change-related events must include mental health as an outcome measure<sup>7</sup>.

Education for health professionals and the wider community about emerging conditions, such as climate anxiety, is important to avoid pathologizing the normal range of responses and to encourage adaptive, health-enhancing activities<sup>36,62</sup>. Although climate anxiety and solastalgia may be accompanied by functional impairment and/ or distress in the clinical range, the evidence of efficacy for available interventions is limited<sup>50</sup>, and further research is needed.

**Workforce capacity.** Planning for the predictable increased need for mental health care must also consider the current global under-resourcing of mental health services<sup>9,63,64</sup>. An overall increase in the mental health workforce (including primary health-care providers) is needed. In addition, with predictably increased needs for emergency mental health care during extreme heat and the warmer seasons<sup>29</sup>, surge capacity is also required. The needs of communities during climate-related disasters include pro-actively maintaining or restoring access to mental health care and evidence-based responses to reduce the risk of people with psychological distress developing mental disorders<sup>34,65</sup>.

**Training.** An increase in the mental health workforce is needed to meet the increased demand for services due to climate-change-related mental health harm. Furthermore, clinicians must be skilled and knowledgeable about the emerging impacts of climate change on mental health<sup>10</sup>. These additional skills include distinguishing clinical from non-clinical presentations of climate distress, an awareness of resources that support healthy coping and the need to attend to their own response to climate change so that appropriate, professional mental health care to others experiencing mental health impacts of climate change can be provided<sup>65</sup>.

#### Community- and system-wide responses

While the interactions between climate change and mental health are extremely complex and create challenges for research, this complexity also provides a myriad of opportunities for targeted interventions across the mental health–climate change system. Opportunities to improve mental health include improved physical health through increased activity and time in nature, improved access to mental health care, connection with community and the possibility to improve mental well-being through how people respond to their awareness of climate change. Helping communities to prepare and respond. How climate change impacts the mental health of communities may be influenced by the resources, preparedness and social cohesion of those communities<sup>66</sup>. There are several ways in which mental health professionals can help to strengthen these aspects and thus enhance community resilience and well-being. One important recommendation is the training of non-mental health specialists or even social support networks to be able to provide services or social support in the aftermath of extreme weather events<sup>67,68</sup>. For example, there is evidence to support the efficacy of training seminars (such as mental health first aid) in improving mental health literacy in preparing for disasters, including for rural and urban communities<sup>69</sup>. Mental health professionals can also strengthen a community's resources through helping community members to facilitate peer discussions, relaxation and engagement in group activities such as sports, games, meditation and relaxation<sup>70</sup>. Through training others to assist in mental-health-targeted community-based interventions, mental health professionals may then have more capacity to focus on identifying and treating those in need of more specialized mental health support.

Given that disaster-related depression, anxiety and PTSD can influence preparedness, there is also a need for mental health professionals to help to address the mental health disorders that may arise following climate events. Existing interventions have shown effectiveness in improving disaster preparedness and reducing the mental health impacts of exposure to disaster. For example, James et al. developed and tested a community-based intervention in three earthquake- and flood-prone communities in Haiti, which was found to increase disaster preparedness, help-seeking and help-giving and to reduce symptoms of depression, PTSD, anxiety and functional impairment<sup>5</sup>.

Clearly, the multiple interconnections between different climate change risks and mental health outcomes mean that effective responses will require a shift from the traditionally siloed or isolated approaches to responses that require connecting and communicating to work more effectively<sup>71</sup>. Rather than temporary mental health services without substantive local engagement, it is vital to work alongside local communities and provide support that restores and enhances long-term local mental-health-care capacity, with awareness of maintaining or restoring determinants of health impacted by climate change<sup>72</sup>. The importance of local responses is also highlighted in disaster mental health guidelines<sup>73</sup>. Sustained responses are also crucial; there are now multiple examples of leadership from impacted communities, including First Nations peoples and young people, and the importance of mental health professionals listening and working alongside impacted communities is difficult to overstate<sup>74</sup>.

Advocacy and education. Beyond providing clinical care, mental health professionals can also lead sustainable changes in their health services, advocate for climate action, research the health effects of climate change and educate clients, health professionals and the broader community. The mental health harm arising from climate change provides an opportunity for mental health clinicians, researchers, people with lived experience and organizations to work together<sup>9,65,75</sup>. International networks and organizations have formed to advocate on behalf of health-care professionals in response to scientific evidence that shows an urgent need for government action to mitigate against and respond to climate change health impacts<sup>76</sup>. There are opportunities for mental health professionals to collaborate with other professions. For example, working with town planners can ensure that green space is incorporated into future residential developments<sup>77</sup>. Mental health professionals can also inform developmentally appropriate educational content for children and youth in schools and more broadly so that young people are supported in climate action<sup>78</sup>, which may, in turn, support their mental health. The fundamental principle is that the health harms of climate change are a concern and responsibility of all health professionals. Every practitioner has an opportunity and an obligation to influence others around them to mitigate the associated physical and mental health problems.

Concurrently, mental health professionals must also attend to their own response to the threat of climate change<sup>75</sup>. This may be more obvious for mental health practitioners who experience the direct impacts of climate-related events; however, it also applies across broader climate change impacts on mental health<sup>75</sup>. Distress experienced by affected mental health professionals without sufficient awareness or support can impair their ability to care for others. Self-care and support are needed for health professionals living through a climate-related disaster<sup>79</sup>. After all, mental health professionals are humans who experience environmental threats at the same time as everyone else in their community.

#### Conclusion

The implications of climate change for the mental health field are substantial and far-reaching. While the interactions between climate change and mental health are extremely complex, this complexity also provides a myriad of opportunities for targeted interventions across the mental health-climate change system. However, this urgently requires a shift from a siloed approach to a collaboration across disciplines and sectors. Mental health professionals have an opportunity and an obligation beyond the role of providing clinical care to address the mental health impacts of climate change through a range of non-clinical actions.

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# **Competing interests**

The authors declare no competing interests.

# **Additional information**

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