Climate and Mental Health Regional Research & Action Agenda

Europe & Northern America

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REGIONAL AGENDA LEADS:

Executive summary

Connecting Climate Minds (CCM) is a Wellcome-funded initiative which aims to cultivate a collaborative, transdisciplinary climate change and mental health field with a clear and aligned vision. Over the last year, we have convened experts across disciplines, sectors and countries to develop regional and global research and action agendas. These agendas set out 1) research priorities to understand and address the needs of people experiencing the mental health burden of the climate crisis, and 2) priorities to enable this research and translate evidence into action in policy and practice. This report summarises the research and action agenda for climate change and mental health in Europe and North America (EU-NA); the full agenda[1] has been published separately and is available **here**.

A total of 47 priority research themes (the top 27 of which are highlighted in this summary document; the complete list can be found in the appendix and full agenda) emerged covering a myriad of areas within the following high-level themes:

- **The impact on mental health vulnerabilities** amidst compounding climate disasters;

- **Links between climate-mental health and Indigenous Peoples and cultural practices;**

- **Global policy and governance** for climate-related mental health;

- **Community resilience and the role of social and cultural connectedness** in mental health outcomes; and

- **Technology and innovation** for climate-mental health.

Key actions to turn evidence into policy and practice involve:

- **Advocating for dedicated funding and blending** of mental health and climate initiatives;

- **Developing climate-mental health training programmes** for healthcare providers and educators;

- **Decolonising** climate and mental health with community-based interventions and resilience-building;

- **Acknowledging the limitations of traditional mental health approaches** in diverse communities, especially in historically oppressed groups; and

- **Highlighting co-benefits** of climate-mental health actions for policymakers.

The CCM community aspires to establish a global support and resilience ecosystem in the climate-mental health field. Our goal is to empower individuals with information and psychological tools to navigate the changing climate. We need accessible community-driven and proactive research and action that addresses the psychological impact of environmental crises while inspiring sustainable solutions. This agenda serves as a reference for stakeholders, inspiring innovative research and concrete action across EU-NA.

Introduction

Climate hazards in Europe and North America

Europe and North America (EU-NA) is facing an increase in the frequency and severity of a range of climate hazards, including the following, modelled to approximately 2030 as compared to historical baseline (generally 1986-2005): [2,3,i]

- **Extreme temperatures**, with 30 additional days above 35°C per year in the central region of North America (covering Mexico and the southern half of the United States) and 20 additional days above 35°C in southern Europe (high confidence);[ii]

- **Droughts** in the Mediterranean region (high confidence) and southern US (low to medium confidence) though there is a projected decrease in droughts in northern Europe (medium confidence);

- **Wildfires**, particularly in the Mediterranean (high confidence), western Russian Federation (medium confidence) and central Canada (medium confidence);

- **Heavy precipitation events and flooding** across many areas of North America (medium to high confidence), Europe (high confidence) and the Russian Federation (high confidence);

- **Sea level rise** in all European areas except countries on the Baltic Sea (high confidence) and along most coasts of Central and North America (high confidence), leading to increased coastal flooding and erosion, though regions with strong coastal land uplift along the south coast of Alaska and Hudson Bay are exceptions (high confidence); and

- **Tropical cyclones**, with category 4-5 tropical hurricanes with higher precipitation expected to become more extreme in the United States Gulf Coast and the East Coasts of Northern and Southern Central America (medium confidence).

Climate change and mental health in Europe and North America

Existing research

While extensive research investigates the climate change-mental health link in EU-NA (see appendix), evidence gaps persist. These gaps involve quantifying mental health effects, particularly for disadvantaged populations, understanding climate-related factors increasing risks of mental health challenges and elucidating the nature of novel mental health experiences due to climate change.

Findings from the Connecting Climate Minds project

The following sections present findings from the Connecting Climate Minds (CCM) project – including pre-dialogue scoping, two dialogues, two surveys and expert consultations – to explore the gaps identified above. Please note that the summaries in the following sections are reports or perceptions from diverse experts, including those with lived experience, rather than drawing from published evidence.

[i] *Future projections are based on the middle of the road emissions scenario (SSP2-4.5 Shared Socio-economic Pathway) from the CMIP6 multi-model ensemble provided in the IPCC, 2021.*

[ii] *Within the IPCC and other major sources of climate projections, confidence levels are given on a scale of low, medium, high. The ranking refers to the robustness of the evidence available and the agreement between climate models.*

What mental health outcomes appear to be impacted?

Participants identified the following mental health and wellbeing impacts from climate change:

Mental health challenges, such as depression, anxiety, suicide and substance abuse.	Mental health-related experiences and symptoms, such as stress or sleep disruptions.

Mental wellbeing impacts specifically related to climate change, such as ecological grief, eco-anxiety, social isolation, pre-traumatic stress disorder and climate distress.

Who appears to be particularly affected by the mental health impacts of climate change?

Children and youth	Older adults	Rural and agricultural communities

Indigenous, coastal and small island communities	People with pre-existing mental and physical health conditions

Marginalised communities	Migrant and displaced communities

What appear to be the pathways and mechanisms linking these climate hazards to mental health outcomes?

Dialogue participants highlighted how climate change impacts lead to the disruption of social and economic determinants of mental health as well as the loss of social connection and increased isolation, particularly where extreme heat prevents people from being able to leave their homes, resulting in poor mental health outcomes. Participants also noted the compounding nature of climate impacts and interactions between multiple pathways and mechanisms affecting mental health and mental wellbeing. Lack of meaningful climate action, particularly from governments, may also result in harmful impacts on mental health and mental wellbeing.

Research agenda

Priority research themes

This research agenda provides a cohesive vision for guiding the climate and mental health field in EU-NA. Research priorities have been generated through extensive consultation with experts across disciplines, sectors and geographies in the region and iterated with experts regionally and globally; they are presented within four overarching research categories that were identified as areas of critical need for further work globally, based on an initial review of the literature (see appendix for further details). The priority research themes represent areas where targeted research investment could create a full picture of climate-related impacts on mental health challenges, their mechanisms and solutions across both mental health and climate actions.

Impacts, risks and vulnerable groups

Priority research themes:[iii]

1a. Understanding how individuals with pre-existing mental health challenges are affected by the compounding effects of multiple climate disasters and related stressors, and how these symptoms manifest across different cultures.

2. Measuring the mental health impact of climate change-related disruptions on culturally based ceremonial practices in Indigenous populations.

4. Identifying, measuring and tracking the short-term and long-term mental health challenges for populations that have suffered Universal Declaration of Human Rights (UDHR) violations in the context of climate change (e.g., right to an adequate standard of living, right to health, right to water, etc.).

6a. Understanding and measuring how the loss of blue and green spaces (rivers, oceans, seas and lakes; forests, parks, grasslands and recreational areas) due to climate change impacts the mental health of individuals and communities who previously had access to these spaces.

1b. Identifying which strategies are effective in preventing a cascading effect on mental health challenges in the face of multiple climate disasters and related stressors.

3. Establishing effective approaches to monitor short-, mid- and long-term mental health responses to compounding climate disaster events.

5. Understanding how and why the perception of climate-related institutional betrayal (such as government inaction relating to climate) from governments, workplaces, social institutions and/ or political stakeholders and lobbyists impacts the mental health of certain individuals.

6b. Evaluating the efficacy of prescribing lifestyle changes which integrate blue and green spaces (e.g., forest bathing, gardening, tree planting initiatives, conservation work, etc.) on mental health outcomes at the individual and community level and the synergies with climate action.

7. Quantifying the additional economic impact of mental health challenges caused or exacerbated by climate change in EU-NA.

Pathways and mechanisms

Priority research themes:

1. Understanding political, social, economic and environmental pathways stemming from climate fragility that impact mental health. Climate fragility occurs when there is a lack of coping or adaptation mechanisms for countries, communities and individuals to respond to climate shocks (i.e., climate events, biodiversity loss and environmental degradation) and can lead to political instability, food insecurity, economic weakness and large-scale migration.

4. Understanding the pathways through which experiencing compounding climate events impacts mental health (e.g., recovering from one climate event while experiencing anticipatory stress or fear for future impacts).

6. Assessing how climate misinformation impacts the mental health challenges of vulnerable populations.

2. Identifying the pathways to standardise climate-mental-health terminology that is culturally informed and holistic.

3. Understanding how climate-related disruptions to accessing health care, education, livelihoods, cultural practices and/or traditional ways of being impact mental health.

5. Exploring and understanding how loss of social connection and increased isolation caused by extreme weather events (e.g., heatwaves) influences mental health outcomes.

7. Understanding how the loss of blue and green spaces due to climate change impacts the mental health outcomes of communities most at risk for biodiversity loss (e.g., coastal and Indigenous communities).

[iii] *See appendix for complete list of priority research themes*

Mental health benefits of climate action (adaptation and mitigation)

Priority research themes:

1. Evaluating how various levels of government can most effectively enact policies and allocate funding to support climate adaptation and mitigation strategies that address mental health challenges in low socioeconomic communities in EU-NA.

2a. Understanding the impacts of these strategies on mental health at both the community and the population level.

2b. Evaluating how climate mitigation and adaptation strategies (such as green infrastructure) impact those with mental health challenges, in both positive and negative ways.

3a. Evaluating how the integration of child rights principles within climate mitigation and adaptation policies in EU-NA might influence mental health outcomes in children and youth (given the unique strengths and vulnerabilities of these groups).

2c. Identifying methods for data collection to model and capture the co-benefits of climate mitigation and adaptation strategies, including development of appropriate metrics/indicators.

3b. Identifying the critical factors that shape how climate mitigation and adaptation policies could either mitigate or exacerbate mental health challenges among young populations, especially considering varying socioeconomic, cultural and environmental contexts.

4. Assessing which types of financing and implementation models optimise and facilitate policies and interventions at the intersection of climate change and mental health.

5. Understanding how mental health and mental wellbeing policies and programmes that directly or indirectly respond to climate change are evaluated and prioritised across different levels of government in EU-NA.

6. Assessing whether and how climate mitigation and adaptation projects contribute to the cultivation of social capital (defined as the community's ability to collaborate and achieve common objectives) and assessing the resulting effects on mental health risks within a specific region.

Mental health interventions/solutions in the context of climate change

Priority research themes:

1. Exploring ways to harness and enhance the protective effects of social and cultural connectedness on the mental health of communities before, during and after acute climate disaster events.

2a. Identifying methods to evaluate the efficacy of climate education programmes that include mental health considerations in educational institutions.

3. Exploring methods to research, evaluate, adapt, cost and scale Indigenous climate knowledge systems and wellness practices as preventative and healing mental health interventions for the broader population in EU-NA.

2b. Assessing how to best integrate climate awareness into education programmes in ways that promote mental health and wellbeing while mitigating the potential mental health impacts on children and youth.

4. Assessing methods to equip the mental health workforce serving communities affected by climate change with culturally and regionally specific decolonial practices, and the effects on mental health outcomes for the populations they serve.

5. Evaluating short-term, mid-term and long-term mental health interventions to address the mental health challenges from systemic neglect of unhoused populations and other disadvantaged groups during climate-related disasters.

6a. Measuring the extent to which healthcare practitioners, educators, social welfare workers and policymakers are aware of the connection between mental health challenges and climate change.

6b. Identifying where these groups acquire information about climate-mental health.

6c. Determining the most effective methods to disseminate the most relevant climate-mental health information to these groups.

7. Developing standardised assessment tools to collect region-specific climate and mental health data and track mental health trends to improve understanding of mental health impacts of climate change and evaluate interventions.

Action agenda

This action agenda sets out a shared vision as a rallying focus of the climate-mental health field in EU-NA. It sets out the challenges which must be addressed, opportunities that can be harnessed and priority actions to work towards a thriving climate and mental health field.

Regional vision for mental health in a changing climate

The EU-NA Regional Community of Practice (RCoP) aspires to foster a society resilient to climate-induced mental health challenges. We aim for individuals and communities to receive ample support, prioritise mental health without stigma and effectively address mental health impacts amid climate change. Envisioning a future with education, resources and compassionate care, our goal is to empower everyone to navigate climate-related stress, fostering resilient minds and interconnected communities. Through a culture of understanding and support, we strive to build sustainable, inclusive and mentally resilient communities, where collective action and empathy prevail in adapting to climate-mental health challenges.

Creating an enabling environment for research and translating a growing evidence base into action

Creating an enabling environment for research at the intersection of climate change and mental health

Challenges:

- **Funding**
- **Lack of reliable quantitative and qualitative data**
- **Silos** preventing collaboration
- **Climate change denialism**
- **Distrust of researchers** among groups with negative past encounters

Opportunities and enablers:

- **Lessons from public & global health**
- **Growing interest** in this field
- **New data and collection methods**

Relevant potential partners:

- Academic & healthcare institutions
- Climate action groups & advocates
- Environmental law experts
- Foundations, funders and charities
- Government organisations
- Impacted populations
- Media companies, journalists and communication specialists
- The private sector and startups

Translating a **growing evidence base** into action that can respond to the mental health impacts of climate change

Challenges:

- **Topic complexity**
- **Stigma** around mental health
- **Systemic climate-mental health injustice and cultural appropriation**
- **Regional differences and nuances**
- **Institutional inertia**

Opportunities and enablers:

- **Higher political will & public support**
- **Using emerging technology**
- **Varying paths to knowledge sharing**

Relevant potential partners:

- **Academic & healthcare institutions**
- **Climate action groups & advocates**
- **Environmental law experts**
- **Foundations, funders and charities**
- **Government organisations**

- **Impacted populations**
- **Media companies, journalists and communication specialists**
- **The private sector and startups**

Priority **next steps/recommendations** to investors and actors

Creating an enabling environment for research at the intersection of climate change and mental health

The principles guiding EU-NA climate-mental health research prioritise accessibility, inclusion and collaboration.

Academic community and researchers should:
- Ensure research is understandable to diverse audiences, considering variances in education, socioeconomic status and physical or mental abilities.
- Co-create research with impacted groups, prioritising inclusivity across cultures and languages.
- Uphold equity and respect for diverse knowledge systems such as Indigenous knowledge, avoiding the imposition of Western customs.
- Collaborate across disciplines to foster a transdisciplinary field and support the development of robust, applicable solutions.

Investors should:
- Increase access and inclusion by funding groups outside of major universities.
- Fund transdisciplinary work encouraging collaborations across disciplines and sectors.
- Support an array of Indigenous and traditional knowledge-centred research.

Academic community and researchers should:

- Link outcomes to specific policy mechanisms and present them in a concise manner for policymakers' understanding.
- Translate evidence into briefs with key quantitative data for policymakers, covering incidence rates, economic costs, co-benefits and associated mortalities.
- Ensure that research establishes a connection between lived experiences and measurable costs to authentically depict the impact on affected communities.
- Partner with networks and organisations to boost funding for policy-oriented research and integrate climate-mental health knowledge into education programs.

The **healthcare sector** should:

- Educate all healthcare professionals on climate-related mental health issues.
- Establish guidelines for healthcare professionals defining 'normal reactions to abnormal situations' in the context of climate-mental health, particularly for cases reaching clinically-diagnosable levels or requiring clinical services.

Conclusion

This agenda highlights the urgency of generating evidence to support the integration of mental health into climate action and vice versa. Policymakers need to prioritise the inclusion of mental health services and interventions as components of broader climate action plans, and researchers will need to provide the data to support this process. Similarly, mental health professionals should identify and understand the implications of climate change on mental healthcare. Collaborative efforts between stakeholders are essential. Join us in fostering a collective commitment to climate-mental health research in EU-NA, advocating for awareness, resilience and compassionate support to build a sustainable future for all of our communities.

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The authors have no conflicts of interest to declare.

Appendix

Connecting Climate Minds (CCM) overview

Connecting Climate Minds (CCM) is a Wellcome-funded project launched in 2023 to develop an inclusive agenda for research and action in climate change and mental health. The project has two key, intertwined aims. The first is to develop an aligned and inclusive agenda for research and action that is grounded in the needs of those with lived experience of mental health challenges in the context of climate change, to guide the field over the coming years. The second is to kickstart the development of connected communities of practice for climate change and mental health in seven global regions (designated by the Sustainable Development Goals), equipped to enact this agenda. We aim to combine the strengths of a global perspective and regional focus, and bring together diverse disciplinary perspectives into a shared vision that can ensure research is effective at addressing priority evidence gaps and informing changes in policy and practice at the intersection of climate change and mental health.

Regional Community Team

In EU-NA, CCM is led by a Regional Community Team (RCT), responsible for convening diverse expertise across the region and building regional capacity to create and enact the research and action agenda. The structure of the RCT is outlined below.

RCT Structure	Role	Members
Regional Community Convenor (RCC)	Responsible for developing and delivering project activities in the region, including convening and supporting a regional community of diverse expertise.	Planetary Health Alliance, USA • Tulsi Modi, MPH • Samuel Myers, MD • Marie Studer, PhD
Co-Convenors	Bringing additional breadth of expertise across disciplines and countries, providing technical advice and review, and supporting project delivery.	• Britt Wray, PhD - Stanford University, USA • Sean Kidd, PhD, C.Psych - Centre for Addiction and Mental Health, Canada • Donald K. Warne, MD, MPH - Center for Indigenous Health at JHU, USA • Lise Van Susteren, MD - Climate Protection and Restoration Initiative, USA
Lived Experience Advisory Group (LEAG)	Advisory board of experts with lived experience of mental health challenges in the context of climate change and/or belonging to vulnerable population groups and living with climate hazards. Drawing on their unique expertise and wisdom, LEAGs provide vital community-centred perspectives and guidance that inform the overarching approach and outputs of the project.	• Allison Kelliher, MD - Johns Hopkins University, USA • Kyle Hill, PhD, MPH - University of North Dakota, USA • Michele Lapini - Michele Lapini Photography, Italy

RCT Structure	Role	Members
Youth Ambassador(s) (YAs)	Youth advisors (aged 18-29) with lived experience of mental health challenges in the context of climate change and/or belonging to vulnerable population groups and living with climate hazards. YAs bring unique youth-centred perspectives to the development and implementation of project activities.	• Amiteshwar Singh - University of East Anglia, UK • Bonolo Madibe, MSc in Gender, Development & Globalization - Youth and Environment Europe, UK • Iris Blom, PhD candidate - London School of Hygiene and Tropical Medicine, UK • Leeya Pressburger - Johns Hopkins University, USA • Philippa Clery, MD - Camden and Islington NHS Foundation Trust, UK

Methods

We produced this research and action agenda through a robust and inclusive methodology to capture, combine and refine a rich diversity of perspectives while fostering connection across a growing community of practice. Experts across disciplines, sectors and countries were convened in two virtual dialogues and consulted through two online surveys.

The CCM core team developed this methodology at a global level in consultation with the RCT, a Global Advisory Board and Wellcome. Methods and materials were adapted regionally by the RCT to ensure a balance of global standardisation with regional appropriateness and flexibility. Continuous sharing between regions of processes, learnings and challenges facilitated iterative development of the methodology. The process for developing the regional research and action agendas is shown below.

Participants were recruited firstly through the networks of the RCT, CCM core team and Wellcome, with further recruitment through snowball sampling to reach a broad range of experts across disciplines, sectors and geographies.

Full methods can be found here.

Global scoping and framing

Mapping of relevant stakeholders, disciplines and sectors

Review of current academic evidence base and policy landscape

Development of a global framework of research categories

Formation of Global Advisory Board to advise on development of global and regional research and action agendas

Jan – March 2023

Scoping and context setting

Lived experience perspective gathering

Scoping review of existing literature at regional level

Climate hazard mapping

Key informant interviews

Pre-dialogue survey with regional experts invited to the dialogue

March–September 2023

Identifying priority areas for research

Dialogue 1 with diverse regional experts to surface relevant needs and discuss research priorities

Analysis and synthesis of data from dialogue 1 to generate draft research priorities

August–October 2023

Refining research priorities

Dialogue 2 with regional experts to obtain feedback on research priorities and identify pathways for implementing and translating research

Analysis and synthesis of data from dialogue 2 to refine research priorities

Survey with regional experts to share refined research priorities, obtain further feedback and wider regional input

Review and consultation with regional and global experts

Identifying pathways to enact research and translate evidence to action

Analysis and synthesis of data from dialogue 2 to identify pathways for implementing and translating research

Building regional community of practice

October–December 2023

Global research and action agenda

Formation of a global analysis expert working group

Synthesis of seven regional agendas, Indigenous Nations and Peoples agenda, youth agenda, and small farmers and fisher peoples agenda into draft global agenda.

Global Event to convene experts to finalise and endorse global research and action agenda

January–April 2024

Generation of research and action priorities

Priorities for research were generated, refined and finalised through the following process:

- **Developing research categories**: Through a global landscaping exercise of relevant existing climate change and mental health reviews[4–13] four broad research categories were identified as areas of critical need for further work globally. This framework was used as the basis for structuring discussions within dialogues to generate research priorities and formed the global coding framework for analysis. These were:
  - **Impacts, risks and vulnerable groups**: improving our understanding of the ways in which mental health is affected by climate change. For example: what mental health outcomes are impacted or at risk; the prevalence, severity, economic and societal costs of these impacts; and who is most vulnerable to these impacts.
  - **Pathways and mechanisms**: improving our understanding of how mental health is affected by climate change and, in particular, whether there are factors specific to climate change that increase mental health risks. This includes considering biological, psychological, societal or environmental pathways and mechanisms.
  - **Mental health benefits of climate action (adaptation and mitigation)**: understanding and quantifying when and how climate adaptation and mitigation actions, across sectors, can also have win-win benefits for mental health.
  - **Mental health interventions/solutions in the context of climate change**: identifying the most effective mental health interventions/solutions/actions to support mental health in the context of climate change, across diverse sectors. This encompasses providing support to people already experiencing negative mental health impacts and reducing risk or severity of future negative mental health impacts.
- **Generating priority research themes**: Participants in dialogue 1 were led through a structured discussion to surface their views on 1) emerging and likely mental health consequences of current and future regionally-relevant climate hazards and opportunities for mental health benefits of action in both mental health and climate, and 2) where more research is needed to understand and respond to identified consequences and opportunities.
- **Analysis**: Dialogue data (transcripts of breakout rooms and notes) was analysed using the Framework Method[14] – a matrix-based approach that allows qualitative researchers to undertake deep interrogation of transcripts and written notes.
- **Draft priority research themes**: This matrix was used in combination with data from pre-dialogue scoping (interviews/literature review/pre-dialogue survey) conducted in the region to draft a list of priority research themes. These were refined through consultation with the RCT and triangulation across breakout notes, transcripts, pre-dialogue scoping and expert consultation.
- **Refinement of priority research themes**: Research themes were shared with participants in Dialogue 2 for their feedback. Research themes were refined in response to this feedback and shared with dialogue participants and a wider sample of experts in the post-dialogue survey.
- **Finalisation of priority research themes**: A final list of priority research themes was generated based on incorporation of post-dialogue survey feedback, consultation with the RCT and regional experts, CCM core team, Global Advisory Board and Wellcome.

Priorities for action were generated, refined and finalised through the following process:

- **Developing action categories**: Through consultation with experts across the global CCM team, two high-level categories for priority actions were identified. These were: 1) creating an enabling environment for research at the intersection of climate change and mental health and 2) translating a growing evidence base into action that can respond to the mental health impacts of climate change. Within each, sub-categories were: 1) a desired future state, 2) opportunities and enablers, 3) challenges, and 4) partners and stakeholders.
- **Generating priority actions**: Participants in Dialogue 2 were led through a structured discussion to surface their views on 1) how the research agenda for climate change and mental health research could best be implemented in the region and 2) how a growing evidence base could be translated into action in policy and practice.
- **Analysis**: Dialogue data (transcripts of breakout rooms and notes) was analysed using the Framework Method (as described above).
- **Finalisation of priority actions**: An action agenda summarising insights from Dialogue 2 and outlining identified priority actions was generated based on consultation with the RCT and regional experts, CCM core team, Global Advisory Board and Wellcome.

Participants

Dialogue participants were a diverse group across geographical spread, gender, sector, and discipline. All participants were invited to both dialogues, however in some cases participants were unable to attend both dialogues and only attended the first or the second dialogue.

In total 46 participants attended Dialogue 1 and 43 participants attended Dialogue 2. The tables below provide a breakdown of participant characteristics.

Geographical spread:

	Dialogue 1		Dialogue 2	
Country	Number	Percentage	Number	Percentage
Belgium	0	0%	3	8%
Canada	5	11%	3	8%
Finland	1	2%	1	3%
France	1	2%	1	3%
Germany	2	5%	1	3%
Italy	3	7%	6	15%
Netherlands	3	7%	1	3%
Serbia	0	0%	1	3%
Spain	1	2%	1	3%
Switzerland	2	5%	2	5%
United Arab Emirates	1	2%	1	3%
United Kingdom of Great Britain and Ireland	11	25%	8	21%
United States of America	13	30%	9	23%

Expertise:

	Dialogue 1		Dialogue 2	
Expertise	Number	Percentage	Number	Percentage
Climate change	25	28%	20	28%
Mental health	27	30%	21	30%
Healthcare	25	28%	22	31%
Other	13	14%	8	11%
I do not know/ Prefer not to say	0	0%	0	0%

Discipline:

Discipline	Dialogue 1		Dialogue 2	
	Number	Percentage	Number	Percentage
Activism	12	10%	9	8%
Community	11	9%	13	12%
Education	18	15%	14	13%
Expert through my own lived experience	11	9%	6	5%
Funding	1	1%	1	1%
Healthcare	9	7%	11	10%
Non-governmental organisation	11	9%	13	12%
Policy	12	10%	11	10%
Research	31	25%	27	24%
Other	7	6%	6	5%

Gender:

Gender	Dialogue 1		Dialogue 2	
	Number	Percentage	Number	Percentage
Men	12	27%	10	26%
Women	32	73%	29	74%
Non-binary	0	0%	0	0%

Survey participants [iv]:

Pre-dialogue survey: 66

Post-dialogue survey: 45

[iv] *Please note numbers are approximate and do not account for duplicate or incomplete responses.*

Ethics, data collection and storage

Ethics

This study has been reviewed and given an ethically favourable opinion by the Imperial College Research Ethics Committee (study title: "Global Dialogues to set an actionable research agenda and build a community of practice in climate change and mental health"; study ID number: 6522690).

Data storage and sharing

Dialogues were conducted virtually on Zoom following informed consent from all participants. Dialogues and breakout groups were recorded and transcribed by third party providers (Way with Words and Absolute Translations). Survey distribution and data collection was carried out using the online platform Qualtrics. Data was stored and managed by Imperial College London using a secure server. The Planetary Health Alliance was a Joint Data Controller for the data provided to this project for EU-NA and responsible for securely storing and sharing data with Imperial College London and with regional analyst teams. Data will be stored by Imperial College London for 10 years after study completion.

Summary of existing research on climate change and mental health in EU–NA

Europe and North America face several major climate threats, including but not limited to extreme weather events (including extreme temperatures), floods, wildfires, heat and drought. These events can lead to mental health challenges such as acute stress, anxiety, depression, PTSD and increased risk of suicide.[15,16,17] Wildfires in the Canadian Northwest Territories are increasing human isolation and time spent indoors, worsening mental health outcomes overall.[18] Residents of Florida who have experienced multiple successive hurricanes are facing cumulative mental health impacts, like post-traumatic stress syndrome (PTSS), from recurring disasters.[19] Additionally, populations exposed to flooding in the UK face a heightened prevalence of PTSD and anxiety compared to the general public.[20] Climate change also impairs mental health in the region by forcing migration and displacement after extreme events, leading to increased stress, trauma, isolation and feelings of loss and grief,[21,22] and can cause economic hardships for rural or agriculture-based communities, worsening depression and anxiety.[23] There is also emerging research on the relationship between climate awareness and climate distress; eco-anxiety may disproportionately affect youth populations or those working in the climate change field.[24]

It is important to highlight that marginalised and disadvantaged groups face risk amplifiers to these climate impacts, such as socioeconomic status, age, race and pre-existing health conditions. Indigenous peoples and those experiencing housing insecurity also experience heightened vulnerability. Often, these vulnerability factors intersect or overlap, further worsening mental health and wellbeing outcomes. It is important to note that some of these factors are linked to social and environmental inequities and 'vulnerability' is not naturally occurring. As an example, Alaska Native communities report increased stress, depression, suicide rates and social disruption as well as rising rates of drug and alcohol use due to imposed rapid socioeconomic and cultural change (such as assimilationist educational policies) in the last 75 years. Suicide rates spiked after periods of 'active colonialism' when government-sponsored economic programs altered traditional ways of living. These socioeconomic factors laid the groundwork for mental health outcomes that will likely be exacerbated by climate impacts, further threatening lives, livelihoods and culture.[25]

Climate change and biodiversity loss present a particular challenge for farmers and agricultural workers, as extreme ecological stress and constraints to agriculture threaten their livelihoods. Studies have shown that farmers have high rates of chronic stress that can lead to anxiety and depression.[26,27]

Finally, during the 2021 Canadian heat dome event in British Columbia, 8% of the people who died had schizophrenia, but people with schizophrenia make up approximately 1% of British Columbia's population.[28] Considering these cases, climate-mental health is presenting as a clear and urgent problem across the entire region.

Priority research themes (complete list)

Impacts, risks and vulnerable groups

Priority research themes:

Understanding how individuals with pre-existing mental health challenges are affected by the compounding effects of multiple climate disasters and related stressors, and how these symptoms manifest across different cultures.

Identifying the protective and risk factors affecting an individual's susceptibility to climate-related mental health challenges.

Measuring the mental health impact of climate change-related disruptions on culturally based ceremonial practices in Indigenous populations.

Understanding whether and how awareness of climate change hazards can be related to suicidality and severe mental health challenges in Europe and North America (bearing in mind the complex and multifactorial nature of suicide).

Identifying, measuring and tracking the short-term and long-term mental health challenges for populations that have suffered Universal Declaration of Human Rights (UDHR) violations in the context of climate change (e.g., right to an adequate standard of living, right to health, right to water, etc.).

Measuring the impact of different features of climate change communication (for example, the validity and quality of information, tone, strategy, style of messaging, formatting [image, audio, written, etc.], dominant narratives, misinformation, and mode of communication) on mental health challenges in Europe and North America. *(Reference theme 9 in the pathways and mechanisms section for more context)*

Evaluating the efficacy of prescribing lifestyle changes which integrate blue and green spaces (e.g., forest bathing, gardening, tree planting initiatives, conservation work, etc.) on mental health outcomes at the individual and community level and the synergies with climate action. *(Reference theme 10 in Pathways and mechanisms for additional context.)*

Establishing which metrics and methods could be used to identify these communities across the region and their specific protective factors.

Identifying which strategies are effective in preventing a cascading effect on mental health challenges in the face of multiple climate disasters and related stressors.

Understanding how both individual and community mental health outcomes are related to climate action (including individual, community, and system level action), especially for groups experiencing overlapping disadvantages (e.g., low socioeconomic status, youth, Indigenous populations, and racialized populations).

Establishing effective approaches to monitor short-, mid- and long-term mental health responses to compounding climate disaster events.

Evaluating and understanding the increased risk, if any, of suicide/suicidal ideation and its drivers for climate change professionals (i.e., scientists, researchers, programme leads, communication specialists, teachers, students, activists, etc.).

Understanding how and why the perception of climate-related institutional betrayal (such as government inaction relating to climate) from governments, workplaces, social institutions and/or political stakeholders and lobbyists impacts the mental health of certain individuals.

Understanding and measuring how the loss of blue and green spaces (rivers, oceans, seas and lakes; forests, parks, grasslands and recreational areas) due to climate change impacts the mental health of individuals and communities who previously had access to these spaces.

Quantifying the additional economic impact of mental health challenges caused or exacerbated by climate change in EU-NA.

Identifying examples of climate-resilient communities with high levels of mental wellbeing and/or low levels of mental health challenges in the context of climate change.

Identifying the specific protective factors within these communities that foster resilience to mental health and/or mental wellbeing challenges in the face of climate hazards and exploring how to adapt to other populations and contexts.

xploring ways to leverage new or existing health technology (such as data from health apps or wearable devices) safely and ethically to better understand or attribute the mental health challenges resulting from climate impacts.

Pathways and mechanisms

Priority research themes:

Understanding how different communication channels that share climate-mental health information influence the mental health of individuals with pre-existing mental health challenges and the mental wellbeing of a broader population (acknowledging that select communication channels, such as scholarly publications, have more credibility than others, such as social media platforms).

Understanding political, social, economic and environmental pathways stemming from climate fragility that impact mental health. Climate fragility occurs when there is a lack of coping or adaptation mechanisms for countries, communities and individuals to respond to climate shocks (i.e., climate events, biodiversity loss, and environmental degradation) and can lead to political instability, food insecurity, economic weakness and large-scale migration.

Evaluating methods to measure how climate change exacerbates mental health inequities (such as access to care, pre-existing disparities, etc.) in EU-NA, and explore if and how this acts as a mechanism by which climate change is worsening mental health outcomes for vulnerable groups.

Understanding the climate-related mental health outcomes and experiences of individuals who are living with multiple intersecting or compounding risk factors for poor mental health and/or climate change-related impacts (for example, an Indigenous person living with physical disabilities).

Identifying the pathways to standardise climate-mental-health terminology that is culturally informed and holistic.

Understanding the pathways through which experiencing compounding climate events impacts mental health (e.g., recovering from one climate event while experiencing anticipatory stress or fear for future impacts).

Understanding how climate-related disruptions to accessing health care, education, livelihoods, cultural practices and/or traditional ways of being impact mental health.

Assessing how climate misinformation impacts the mental health challenges of vulnerable populations. *(Reference theme 9 in the impacts, risks, and vulnerable groups section for more context.)*

Exploring and understanding how loss of social connection and increased isolation caused by extreme weather events (e.g., heatwaves) influences mental health outcomes. *(Reference theme 2 in the mental health interventions/solutions in the context of climate change section for more context.)*

Understanding how the loss of blue and green spaces due to climate change impacts the mental health outcomes of communities most at risk for biodiversity loss (e.g., coastal and Indigenous communities). *(Reference theme 10a and 10b in in the impacts, risks, and vulnerable groups section for more context.)*

Mental health benefits of climate action (adaptation and mitigation)

Priority research themes:

Assessing how applying alternative economic theories (such as the degrowth economic model or the doughnut economics model) to climate mitigation actions would impact the mental health sector (e.g., behavioural health providers and organisations, pharmaceutical companies and other private enterprises) in EU-NA.

Evaluating how various levels of government can most effectively enact policies and allocate funding to support climate adaptation and mitigation strategies that address mental health challenges in low socioeconomic communities in EU-NA.

Understanding the impacts of these strategies on mental health at both the community and the population level.

Evaluating how the integration of child rights principles within climate mitigation and adaptation policies in EU-NA might influence mental health outcomes in children and youth (given the unique strengths and vulnerabilities of these groups).

Assessing which types of financing and implementation models optimise and facilitate policies and interventions at the intersection of climate change and mental health.

Understanding whether and how individual- or community-level climate action has co-benefits or negative effects on mental health and/or determinants of mental health (e.g., sociopolitical forces and inequality).

Exploring ways to safely integrate mental health programmes into grassroots organisations, research institutions and governments working on climate action to protect the mental health of the people working on these programmes and benefit the mental health of the communities with whom they work.

Identifying the climate policies that prioritise youth mental health and wellbeing and addressing political barriers in EU-NA.

Evaluating how climate mitigation and adaptation strategies (such as green infrastructure) impact those with mental health challenges, in both positive and negative ways.

Identifying methods for data collection to model and capture the co-benefits of climate mitigation and adaptation strategies, including development of appropriate metrics/indicators.

Identifying the critical factors that shape how climate mitigation and adaptation policies could either mitigate or exacerbate mental health challenges among young populations, especially considering varying socioeconomic, cultural and environmental contexts.

Understanding how mental health and mental wellbeing policies and programmes that directly or indirectly respond to climate change are evaluated and prioritised across different levels of government in EU-NA.

Assessing whether and how climate mitigation and adaptation projects contribute to the cultivation of social capital(defined as the community's ability to collaborate and achieve common objectives) and assessing the resulting effects on mental health risks within a specific region.

Mental health interventions/solutions in the context of climate change

Priority research themes:

Identifying the cross- and multisectoral interventions (e.g., social and cultural health) needed to alleviate climate-induced mental health challenges across different settings and how to implement them.

Identifying methods to evaluate the efficacy of climate education programmes that include mental health considerations in educational institutions.

Exploring methods to research, evaluate, adapt, cost and scale Indigenous climate knowledge systems and wellness practices as preventative and healing mental health interventions for the broader population in EU-NA.

Assessing methods to equip the mental health workforce serving communities affected by climate change with culturally and regionally specific decolonial practices, and the effects on mental health outcomes for the populations they serve.

Evaluating short-term, mid-term and long-term mental health interventions to address the mental health challenges from systemic neglect of unhoused populations and other disadvantaged groups during climate-related disasters.

Identifying where these groups acquire information about climate-mental health.

Determining the most effective methods to disseminate the most relevant climate-mental health information to these groups.

Exploring ways for European and North American multi-level governments to adapt these solutions.

Identifying cross-sector interventions, beyond focused mental health and psychosocial support strategies, that support positive mental health and psychosocial outcomes in vulnerable populations in the context of climate disasters.

Evaluating the economic cost-benefit of interventions designed to support mental health in the context of climate change.

Exploring ways to harness and enhance the protective effects of social and cultural connectedness on the mental health of communities before, during and after acute climate disaster events.

Assessing how to best integrate climate awareness into education programmes in ways that promote mental health and wellbeing while mitigating the potential mental health impacts on children and youth.

Evaluating the effects of prescribing ecotherapy (a type of therapeutic treatment, also known as nature therapy, that involves participating in outdoor activities in nature) for climate-related mental health challenges within the formal mental health sector.

Identifying, developing, implementing and evaluating existing mental health and mental wellbeing education programmes that include relevant information on climate change for healthcare practitioners (including medical students and other professionals in the health sector) globally, especially for those engaging with vulnerable groups impacted by climate change.

Measuring the extent to which healthcare practitioners, educators, social welfare workers and policymakers are aware of the connection between mental health challenges and climate change.

Identifying and evaluating effective government policy and programmatic solutions to address climate-mental health challenges and improve mental wellbeing in the context of climate change.

Assessing methods to evaluate, recognise and integrate these interventions (which could include nutritional programmes, prenatal healthcare, educational supports, traditional/Indigenous practices, etc.) within broader public and private sector mitigation and adaptation policies.

Exploring ways to deliver low-cost, highly accessible and effective services for people experiencing mental health challenges because of climate change.

Developing standardised assessment tools to collect region-specific climate and mental health data and track mental health trends to improve understanding of mental health impacts of climate change and evaluate interventions.

Glossary

For a glossary describing relevant concepts and key words for the Connecting Climate Minds research and action agendas, please download from **here.**

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