

EDITORIAL

Protecting human health in a time of climate change: how Cochrane should respond

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There is an urgent need to respond to climate change's multiple intersecting impacts on human health. Health journals around the world recently published a joint call for immediate action by governments and health professionals.[1] Researchers and methodologists also have an important contribution to make, by producing and synthesizing evidence relevant to climate-health impacts. In particular, we argue that Cochrane needs to mobilize its expertise in high-quality evidence syntheses to prioritize the production of reviews needed by global decision makers. This will involve working closely with stakeholders to ensure that both topics and methods are aligned to the task of strengthening health resilience to oncoming climate shocks.

Health-system decision makers need to be ready to monitor, anticipate, manage and adapt to a wide range of climate-related health risks.[2] The increasing frequency, intensity and duration of extreme weather events, such as heatwaves, floods, droughts and wildfires, have extensive effects on both physical and mental health.[3][4][5] Other impacts include alterations to patterns of food-, water- and vector-borne diseases; changes to food production that increase risks of malnutrition; emergence of multi-drug-resistant infectious diseases and acceleration of drug resistance in existing infectious diseases; breakdown of ecosystem services; and the mental health impacts of climate-related disasters and disruptions to traditional ways of life.[6][7][8][9][10][11][12]

Climate-health issues are multi-system problems, with complex outcomes stemming from the interaction of hazards, exposures, pre-existing vulnerabilities, and capacity.[13][14] Targeted responses must be focused on improving methods for risk quantification, especially cascading and overlapping exposures, and strengthening climate resilience and environmental sustainability of health systems. This can be accomplished by understanding the magnitude and pattern of climate-related health risks, at various spatio-temporal scales; identifying adaptation strategies that will ameliorate impacts;[2][15] and establishing mitigation strategies that will reduce the environmental impacts of health systems themselves.[16][17]

Although the climate-health research base is growing rapidly, the current literature is dominated by impact studies, with relatively few studies focusing on human response to climate

change, climate adaptation and climate mitigation for human health.[18][19] Synthesizing this research, to identify what works, why, for whom and in what circumstances, will be vital for guiding policy and practice decisions.[20][21] Syntheses can also help identify what doesn't work and the associated harms of interventions that may also provide some benefits, thereby attenuating the risks of unintended consequences and locking in effects of maladaptation; increasing efficiency of healthcare spending; and helping to identify gaps in current knowledge.[22] This is no small challenge. The body of relevant evidence – both published research and grey literature – is extensive and multidisciplinary, transcending the traditional boundaries of health research.[20]

Cochrane has already identified climate change as a key issue in its strategic plans in the coming years. It is now time to translate that high-level awareness into action. Internally, it is our responsibility to maintain an understanding of the organization's carbon footprint and to develop a plan to reach net zero.[23] It must also be an organizational priority to contribute research efforts towards understanding the health effects of adaptation and climate mitigation interventions. Specifically, Cochrane can help meet decision makers' needs in the following ways:

- supporting the identification and prioritization of important and unaddressed research questions for evidence syntheses;
- producing, in conjunction with stakeholders, new living reviews that address key questions;
- evaluating new methods and supporting the development and implementation of these where appropriate;
- supporting the engagement of diverse and vulnerable communities at all levels;
- working with other organizations to improve the efficiency of knowledge production and usage, and reducing research waste.[24]

To accomplish these goals, some foundational work must occur. In order to produce the actionable, policy-relevant syntheses that decision makers will need, the health evidence synthesis community must broaden its definition of evidence to include mechanistic understanding, theory, data, projections of how risks could evolve over spatial and temporal scales, and expert judgement.[20] The nature of climate change as a

multi-disciplinary topic with hard-to-define system boundaries means that search strategies will yield very large numbers of hits with low precision, making the tasks of screening, data extraction and analysis highly resource-intensive. Technologies like machine learning and linked evidence ecosystems could be a vital means of dealing with these broader evidence bases.[\[19\]\[20\]\[21\]\[22\]\[23\]\[24\]\[25\]](#)

For effective syntheses, we need to improve existing methods, while repurposing some from other fields and sometimes developing new ones. Improving evidence synthesis for public health interventions, such as considering effectiveness from a population perspective and incorporating non-randomized, economic and qualitative evidence, as well as equity considerations, can be relevant to work on complex climate-health topics.[\[26\]\[27\]\[28\]](#) This includes innovation of methods to incorporate modelling studies into synthesis where direct evidence is not available.[\[29\]](#) As well, review authors should be encouraged to conduct analyses that incorporate not just changing exposures, but also changing contexts, such as demographics, economic growth, urbanization, etc, and consequently author teams will need to encompass the range of disciplines that bring the competency to do this kind of work.[\[14\]\[15\]](#)

Those producing health-related evidence syntheses have much to learn from other synthesis traditions, such as those in the environmental science community. This will help to avoid duplication and waste; to explore questions that intersect across health, the environment and other sectors of policy; and to learn from their work in novel methods not yet considered in Cochrane Reviews, such as synthesis across multiple lines and types of evidence relevant to the health impacts of environmental risks and exposure.[\[20\]\[30\]](#) It will be important to establish and strengthen relationships with other climate-orientated evidence synthesis organizations, such as the Collaboration for Environmental Evidence and the Campbell Collaboration's Climate Solutions Coordinating Group.

It is worth noting that synthesis that supports decision making can be facilitated by enhancing the research base of primary studies. Designing and implementing climate-resilient health policies and programmes will involve evaluation of a range of potential future scenarios in a range of geographic settings.[\[13\]\[31\]](#) This work would be facilitated by researchers developing consensus guidelines around the design, conduct and reporting of climate health-impact projections.[\[28\]](#) Such guidelines, particularly if incorporated into editorial standards, should support higher-quality research, and should facilitate synthesis by leading to less heterogeneity between studies, which can increase possibilities for meta-analysis.[\[28\]\[32\]](#) It would also be valuable to have more studies on how climate-relevant interventions are implemented, as success of an intervention is affected by the strategies for addressing aspects of the context into which it is introduced and (ideally) sustained.[\[14\]\[33\]\[34\]\[35\]](#) Cochrane could also support decision makers by identifying existing Cochrane Reviews that address climate-sensitive health impacts, but are not necessarily explicitly stated by authors to be relevant to climate change.[\[36\]\[37\]](#)

When the COVID-19 pandemic hit, Cochrane mobilized to produce syntheses needed for global decision making in an unprecedented and rapidly evolving health emergency. Climate change is also

a health crisis, and the evidence synthesis community must respond to decision-making needs with equivalent vigour. We must optimize, and where appropriate, repurpose methods to synthesize available evidence and speed the generation of relevant new evidence to support decision making. Throughout, ongoing engagement with stakeholders and decision makers will be important to ensure that Cochrane is focusing its resources where they are most needed. As we witness changes to the climate now, we do so knowing that the future will likely look nothing like the present. It is time for Cochrane to bring our expertise to the work of informing the decision making needed to avert or mitigate the ongoing health effects of global climate change.

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Declarations of interest

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meeting. EP is also a consultant on the Nashville Sustainability Advisory Committee, Co-author of an editorial in *The Journal of Climate Change and Health* and interviews in *Dermatology Digest* and *CURE Magazine*, is Assistant Professor of Dermatology at Vanderbilt University Medical Center and is a member of the American Academy of Dermatology, International Society of Dermatology, and Cochrane Climate-Health Working Group. RP works at the UK Health Security Agency as a Public Health Practitioner. DT is part time Co-Editor in Chief at the *Journal of Clinical Epidemiology* and receives grants/contracts as part of this role. DT is also Cochrane Emeritus Editor in Chief, and feedback editor for two Cochrane Review Groups. EvE is a member of the Cochrane Council. RW has an editorial role for Cochrane Climate-Health Working Group. TY has received grants on behalf of the Federal Ministry of Education and Research (BMBF), Foreign Commonwealth and Development Office and Foundation for the National Institutes of Health.

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