
Scientific Workshop Report | [Burden of Disease due to Climate Change]

1. Workshop Information

Full Title

Developing a Concept to Measure the Burden of Disease due to Climate Change (BoDCC)

Place and Date

Berlin, Federal Ministry of Health, 4–5 November 2025

Number of Participants

On site: 35



2. Workshop Summary

Background and Context

Climate change is increasingly recognized as having major impacts on population. However, systematic approaches to quantify these impacts using Burden of Disease (BoD) methodology are still limited. The workshop “Developing a Concept to Measure the Burden of Disease due to Climate Change (BoDCC)” brought together experts from epidemiology, climate science, environmental health, public health surveillance, risk assessment, and statistical modelling. The workshop was hosted by the Robert Koch Institute (RKI) with support from the German Alliance for Global Health Research (GLOHRA).

The aim of the workshop was to explore how BoD metrics (YLL, YLD, DALY) can be linked with climate change, with specific climate-sensitive exposures, and to elaborate on a methodological foundation for such analyses. Feasible use cases should be identified as a first step to establish a future BoDCC framework in Germany and Europe.

Objectives

The workshop aimed to:

- Discuss methodological foundations and challenges in assessing climate-related health impacts within a BoD framework.
- Identify specific use cases across climate-sensitive hazards (heat, air quality, unusual weather/floods, vector-borne diseases).
- Bring together interdisciplinary expertise and build momentum for a multi-institutional network.



- Map stakeholders, data holders, and next steps for coordinated research and funding opportunities.

Methods

The workshop combined sessions with keynote presentations, methodological spotlights, and structured group work. Two keynotes from international speakers (Stephanie Gordon - AIHW Australia, Paulo Nogueira - University of Lisbon) presented established approaches on BoD estimates and heat-related mortality and the challenges of integrating climate change into a BoD estimation. Participants with different institutional ¹ and scientific backgrounds contributed expertise from statistical modelling, health surveillance and reporting, climate-related projections and exposure, excess mortality, social determinants, and BoD research. A Structured *Open Innovation Space* facilitated thematic group work on:

1. Air quality (& wildfire smoke)
2. Unusual weather events & floods
3. Heat (non-optimal temperature)
4. Vector-borne diseases
5. Inequalities (cross-sectional)

In two participatory sessions relevant methods, data sources, analytical approaches, challenges, and stakeholders were discussed. Working on potential use cases allowed for differentiated development of a starting point for data research and calculations which was presented by the thematic groups.

Statistical methods to assess the BoDCC discussed included Comparative Risk Assessment (CRA), distributed lag non-linear models (DLNM), exposure–response functions, scenario modelling, hydrological models, AI/ML-based approaches, transmission models, and socioeconomic stratification analysis.

Findings

Thematic groups produced detailed reflections on suitable BoDCC methods, data availability, and key analytical challenges across hazards:

- Air Quality & Wildfire Smoke: Strong potential for exposure–response and PAF-based estimates using measured and modelled PM_{2.5} and ozone data. Key challenges include indoor-outdoor transfer, wildfire–climate interactions, and avoiding double counting between heat and air pollution.

¹ Bernhard Nocht Institute, Charité, Charité Center for Global Health, German Environment Agency, HAW Hamburg, Heidelberg Institute of Global Health, Helmholtz Centre for Infection Research, Helmholtz Munich-Environmental Health Center, Hessian Agency for Nature Conservation, Environment and Geology, Leibniz BIPS, Potsdam Institute for Climate Impact Research, Robert Koch Institute, Technical University Munich, University for Health Sciences, Medical Informatics and Technology Tirol, University Medicine Halle, University of Bayreuth, University of Bielefeld, University of Düsseldorf, University of Heidelberg,



- Unusual Weather & Floods: Complex causal pathways (injury, post-traumatic stress disorder, access to care) and heterogeneous data sources. High uncertainty and context specificity make CRA difficult, hydrology experts are needed. Machine learning, e.g. Long Short-Term Memory (LSTM) and modelling system to produce a flood risk assessment model would be useful.
- Heat: Most mature use case. DLNM and excess mortality methods allow robust estimates, but questions remain concerning: heat vs. cold, counterfactual definition, morbidity pathways, microclimate differences.
- Vector-Borne Diseases: Attribution difficult due to multi-step climate–vector–pathogen chains. Transmission and suitability models needed; possible full attribution under specific assumptions.
- Inequalities: Socioeconomic status (SES) modifies exposure, vulnerability, and adaptive capacity. Proposed approaches include stratified DALY and exposure–deprivation mapping.

Across groups, participants highlighted more general conceptual uncertainties: *What is climate change in a BoD sense? Should we model attributable DALY or counterfactual climate scenarios?*

In general, a high need to integrate climate change into BoD estimations was recognized across the group of participants. Various methodological and contentual questions need to be discussed in the process but it is necessary to start the process. It is not realistic to assess the total of BoDCC at once, rather smaller steps need to be taken. Also, there seems to be no general method which can be applied to all thematic domains but specific solutions and modelling strategies need to be discussed.

Outlook

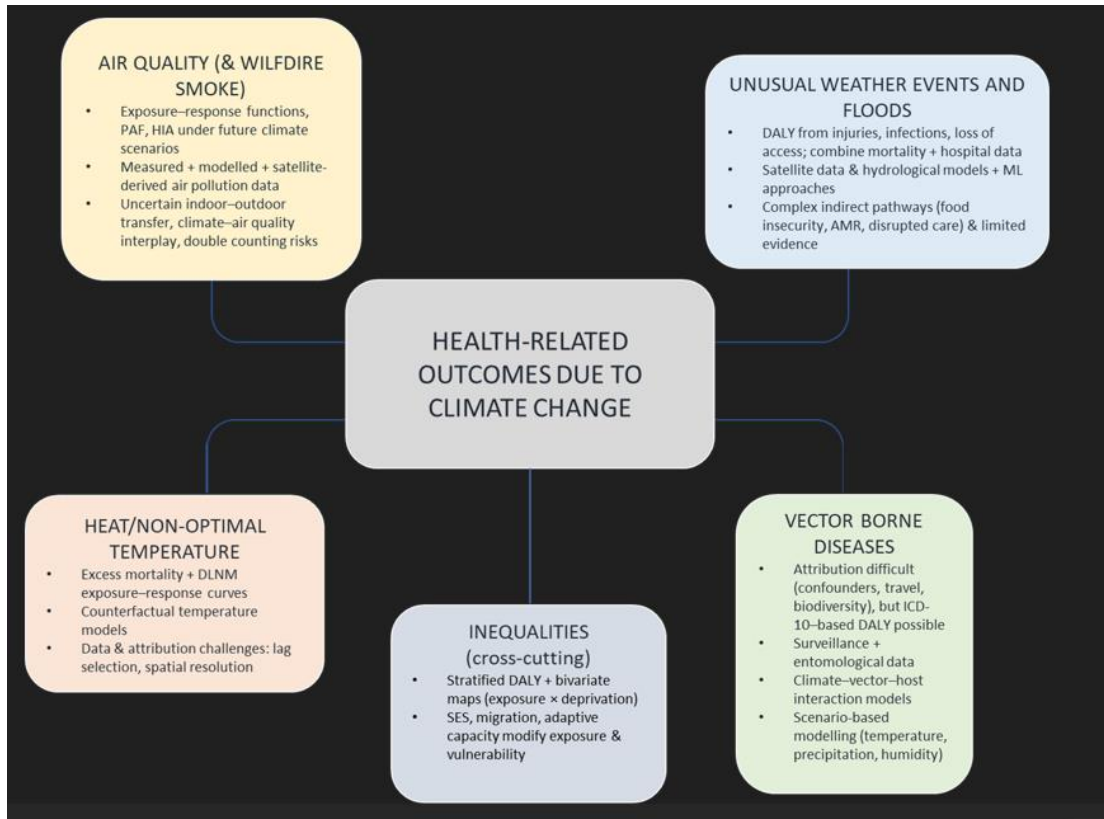
Participants expressed strong motivation to continue as a BoDCC network. Identified next steps include:

- Continued virtual meetings and creation of a shared workspace.
- Identifying funding pathways (GLOHRA, Horizon Europe, COST Actions).
- Developing collaborative outputs, including a methodological paper summarizing challenges and use cases.
- Mapping institutional partnerships, next to the ones of the participants mentioned under ¹ (e.g., Federal Office for Radiation Protection, BfS; Federal Office of Civil Protection and Disaster Assistance, BBK; European Environment Agency, EEA; World Health Organisation, WHO; Helmholtz Centre for Geosciences, GFZ).

Two scientists who registered for the workshop but could not participate in the end were contacted afterwards (including an online meeting to get to know each other). They will stay with the group and provide contact information on whom to also include. Colleagues interested in joining can do so at any time and, for example, be integrated during the next coordination call.

Insert participant impressions or quotes if available

3. Additional Resources (optional)



- Related websites: www.daly.rki.de

4. Organizers and Partners

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With funding from the:

globalhealth.de | [LinkedIn](#) | [YouTube](#)

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