

BEYOND AIR AND NOISE POLLUTION:

UPSCALING BEST-COST RESEARCH METHODS ACROSS ENVIRONMENTAL STRESSORS AND HEALTH-PROMOTING FACTORS



ABOUT BEST-COST

[BEST-COST](#) is developing research methods to better understand the socio-economic costs of air and noise pollution. The results will contribute to improved policies and practices that reduce the harmful impacts of pollution and foster more health-promoting, equitable and sustainable environments across Europe.

HOW TO USE THIS FACTSHEET

This factsheet explores how the BEST-COST research methods can apply to environmental factors other than air and noise pollution influencing our health. It outlines the challenges and opportunities of transferring methods, and identifies what is needed from policymakers to help address the health costs of different environmental factors.

The environmental factors explored in this factsheet are chemicals, heat and green spaces. Key elements to enable transferability of methods are as follows:



CHEMICALS

Standardise research methods and establish additional data sources to quantify health impacts.



HEAT

Consider different geographic and socio-economic contexts that connect health, heat, and social inequalities.



GREEN SPACES

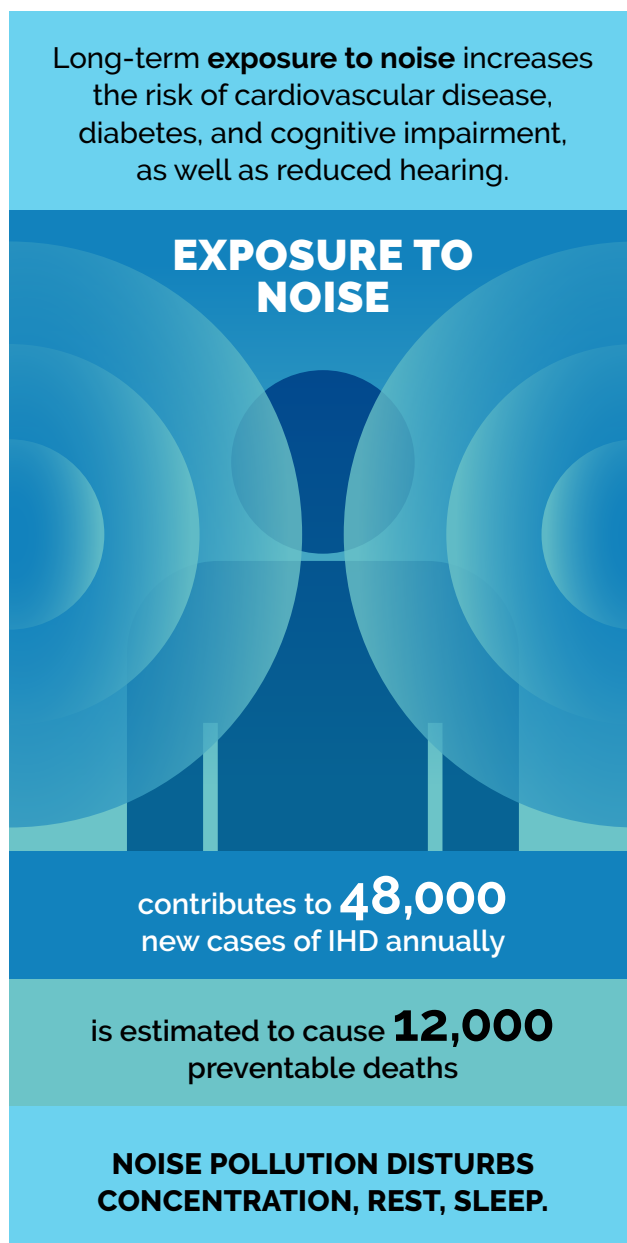
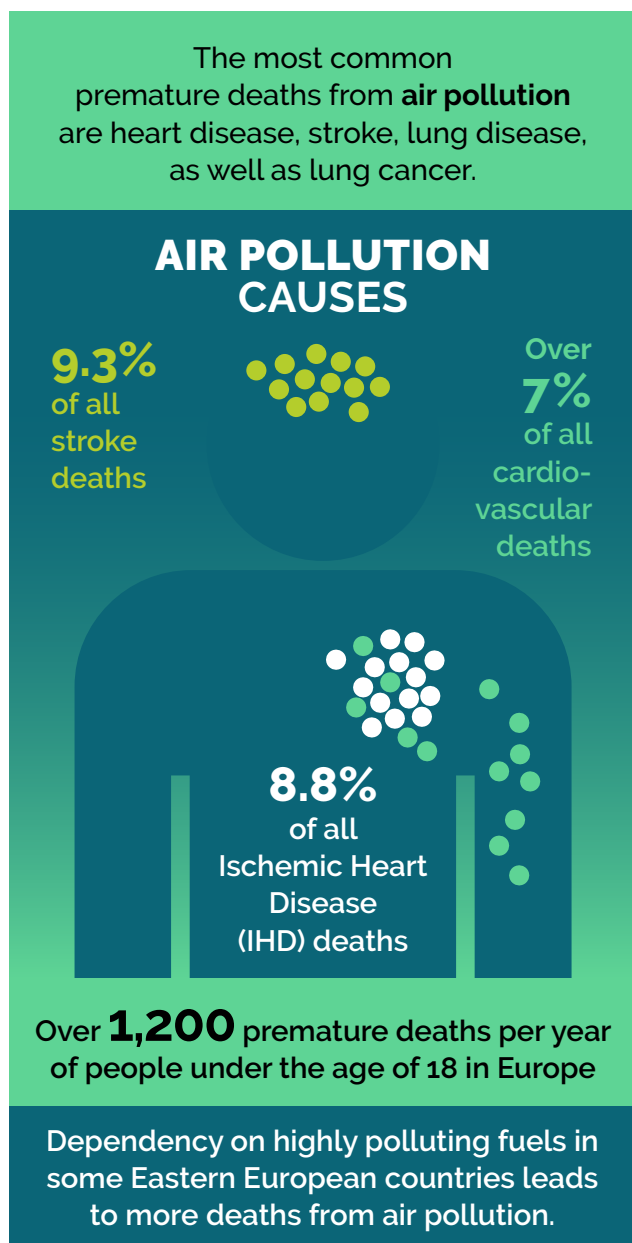
Look beyond mortality indicators for a more in-depth understanding of green spaces as a health moderator.

DEFINITIONS

CHEMICAL POLLUTION	The increased number and concentration of harmful chemical substances in our environment.
DEPRIVATION	A state of observable and demonstrable disadvantage relative to the local community or the wider society to which an individual, family or group belongs.
DISCOUNTING	Taking into account the impact of time on costs and benefits of health interventions and their outcomes.
EXPOSOME	The comprehensive measure of all environmental exposures an individual experiences throughout their life.
EXPOSURE-RESPONSE FUNCTION (ERF)	The mathematical relationship between exposure to the risk factor and the associated risk for a specific health outcome.
EXTREME TEMPERATURES	Temperature variations that exceed what is considered regular hot or cold temperatures.
GREEN SPACE	Areas with natural features in urban settings.
NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI)	A satellite-derived indicator of vegetation greenness and density.
THEORETICAL MINIMUM RISK EXPOSURE LEVEL (TMREL)	Exposure level below which no additional health risk is expected.
WILLINGNESS-TO-PAY (WTP)	The maximum price an individual is prepared to spend on an item or service, which indicates the value they place on that item.

POLLUTION IN EUROPE

Air and noise pollution are two of the biggest environmental risks to our health, often deriving from the same source. This impact is felt unequally, with those in lower socioeconomic communities more likely to be exposed and suffer more serious health impacts.



Our health is influenced by multiple environmental factors which interact and overlap with one another. Some, such as chemicals and heat, are harmful to our health. Others, such as green spaces, create overall health benefits.

The methods developed by BEST-COST to measure the socioeconomic costs of air and noise pollution can be adapted and applied to other environmental stressors to provide a fuller overview of environmental health threats for more effective policy interventions.

BEST-COST METHODOLOGIES

BEST-COST has improved three research methodologies that each look at a different aspect of the socioeconomic cost of pollution.

Environmental burden of disease (EBoD):
Measures the number of 'healthy life years' within a population lost due to environmental influences.

Health monetisation:
Calculates the monetary value of health interventions to identify the most effective measures.

Socioeconomic inequalities: Looks at health inequalities caused by environmental stressors, which are currently not monitored systematically.

UPSCALING BEST-COST METHODOLOGIES TO OTHER ENVIRONMENTAL STRESSORS

CHEMICALS

What is the link between chemical pollution and health?

People are exposed to various chemicals through food, drink, air, water, consumer goods and more. Chemical exposure is linked to a variety of health issues such as cardiovascular effects, reproductive toxicity, neurological disorders, hormone disruption, and cancer.

What is the current situation in terms of research?

Current methods to measure the health impact of chemicals often rely on single epidemiological studies, which risks oversimplification of information. To strengthen epidemiological evidence, there is a need to scale up sample sizes through advanced techniques like micro-sampling. While human biomonitoring (HBM) is commonly used to measure chemical pollution impacts within the body, it does not analyse exposure sources. Therefore models or environmental measurements including non-targetted analysis (NTA) are necessary. Scientists are now moving towards 'multi-pollutant exposure models' to assess the health effects of chemical pollution.

How can BEST-COST help?

- BEST-COST methodologies for selecting exposure response functions (ERFs) can help quantify existing health impacts using exposure data and prioritise regulatory responses.
- The BEST-COST healthiar R package can be used for estimating chemical exposure impacts.

What is needed?

- More data on exposures and spatial patterns for different sources of chemical pollution.
- Research on how to develop exposure-response functions for more accurate and standardised measurements of chemical pollution.
- Strengthening the evidence base — particularly for emerging chemicals – to integrate chemical exposure into EBoD frameworks. This can become a cornerstone of the 'one substance, one assessment' (OSOA) approach.
- Exploring systematic reviews (and meta-analysis) for priority chemicals, as well as multipollutant effect studies.
- Conducting a regular EU-wide Human Biomonitoring study for better coverage of information on chemical exposure, and linking this data to that routinely collected on health outcomes, e.g. claims data, hospitalisations, and death registries.
- Combining primary and exposure data with human biomonitoring methods to distinguish between exposure sources.
- Scrutinising the association between (multiple) deprivation indicators and chemical exposure to include in EBoD assessments.

HEAT AND EXTREME TEMPERATURES

What is the link between heat, extreme temperatures, and health?

Both extreme heat and cold temperatures are influenced by climate change and lead to poor health outcomes, such as respiratory and cardiovascular conditions. Other heat-related deaths are linked to heatstroke and dehydration, while extreme cold is linked to strokes and the spread of respiratory infections.

What is the current situation in terms of research?

A primary challenge in measuring the health impacts of heat lies in the non-linear nature of the exposure-response function (ERF). Research methods also need to consider the different geographic and socioeconomic contexts that impact population groups in different ways.

How can BEST-COST help?

- The BEST-COST [healthier R](#) package could be used for estimating heat-related health impacts.
- Air pollution (ozone, particulate matter, etc.) amplifies the health effects of heat, and the two interact in a synergistic way. Heat and air pollution should not be treated as independent stressors, but rather the heat-pollution correlation should be deepened.
- The BEST-COST consortium includes partners involved in estimating heat impacts in the EU and abroad (Middle East, Africa), which enhances knowledge sharing.

What is needed?

- Integrating adaptation, resilience and competitiveness into EBoD assessments of heat stressors.
- Integrating the various metrics that influence heat impacts, including co-exposures, both hot and cold temperatures, and direct effects of heat.
- A clear definition of a heat wave and to account for day-night differences, using a more nuanced ERF measurement.
- Explore utilising a TMREL (theoretical minimum risk exposure level) in heat measurements for context-specific value ranges adapted to geographical conditions.
- Establishing specific minimum temperature early warning triggers for morbidity and mortality across different geographic and socioeconomic contexts.

GREEN SPACES

What is the link between green spaces and health?

The availability of green spaces, including parks, gardens, and other types of landscaping, is vital for healthier living environments. Green spaces reduce stress, promote physical activity, and reduce morbidity and mortality.

What is the current situation in terms of research?

There is no current Europe-wide definition of green spaces, nor a singular 'perfect' indicator to calculate the EBoD of the lack of green spaces, which makes measuring the health impacts harder. While commonly used, Landsat Normalized Difference Vegetation Index (NDVI) as a measure of exposure to green space is insufficient for accurately assessing its health impacts. A set of nuanced indicators would help analyse how green spaces influence health in different ways.

How can BEST-COST help?

- Using BEST-COST research methods on burden of disease and socioeconomic measurements can help to look beyond the mortality impacts of green spaces to broader benefits for a more nuanced analysis of how green space can influence health.
- BEST-COST is looking into the indicators developed in the [URBREATH project](#) and how these can be calculated for the EU.

What is needed?

- Going beyond NDVI to differentiate between different kinds of mechanisms to measure exposure, including: short visual contact, availability for daily use, and access to larger green spaces.
- Considering exposure to green spaces as a moderator for other health effects.
- Accounting for less easily quantifiable outcomes such as mental health.
- Greater collaboration between research and policy to help standardise and improve health impact assessments (HIAs) on the lack of green spaces.

A SCIENCE-TO-POLICY APPROACH

As well as researchers, policymakers can also benefit from improved and up-to-date research methodologies. They can support:

- Evidence-based policies that consider multiple environmental stressors and allow for more effective interventions.
- Prioritised and targeted action on environmental stressors with proven links to burden of disease.
- Applying health monetisation-backed policies, meaning that initiatives are centred around people's needs.
- Acting on socioeconomic inequalities across Europe that are linked to health and environmental stressors.
- Tailored messaging to the public based on the needs of different population groups.

Existing policy areas where improved research methods can support better decision-making include:

- [8th Environment Action Programme](#) (EAP) – improved research methods can support the evaluation of the EAP to guide actions to move towards zero-pollution.
- [EU Zero Pollution Action Plan](#) – research can support evidence-based policies to steer Europe towards its zero-pollution ambitions, prioritising health in all actions.
- [EU Chemicals Strategy for Sustainability](#) – improved understanding of the health costs of chemicals can promote preventative measures in managing chemical pollution.
- [EU One Substance, One Assessment](#) (OSOA) – more accurate research outcomes can support more coherent health assessments and safety measures.

WHAT CAN POLICYMAKERS DO?

- **Use up-to-date evidence from research** when creating health and environment policies.
- **Account for socioeconomic considerations** in policies on health and the environment, bearing in mind the link between exposure and health inequities.
- **Encourage health impact considerations** within urban planning.
- **Support an EU-wide definition of green space** that considers different contexts.
- **Support research efforts to quantify health impacts from exposure**, using an 'exposome approach' to gather more data on different environmental stressors across the lifecycle.
- **Increase data access for researchers on different environmental stressors**, including their sources and exposure levels supporting the FAIR principle.
- **Support the EU-wide sharing of national representative exposure data** that allows for EU-wide estimates of EBoD.

GET INVOLVED

BEST-COST aims to collaborate and co-create with researchers and policymakers by providing opportunities for exchange and co-developing tailored resources. Policymakers can support the work of BEST-COST by:

- Taking part in the upcoming EU policy roundtable organised by BEST-COST to strategise how the research methodologies can be applied to policy action.
- Contributing to and draw on our policy recommendations and action framework.

If you are interested in learning more about or taking part in any activity, we would love to hear from you. Please get in touch: <https://best-cost.eu/contact/>

FIND OUT MORE

Follow BEST-COST to stay informed about project developments.



www.best-cost.eu



[BEST-COST](#)



[Subscribe to the newsletter](#)

More information on the work underlying this factsheet can be found in these reports produced by BEST-COST:

- [Report on the EU index of multiple deprivation methodology – Quantifying social inequalities using a multiple deprivation index](#)
- [Report on the quantification of social inequalities in the health burden of environmental stressors](#)
- [BEST-COST Factsheet 1: The unequal health burden of air and noise pollution in Europe](#)
- [25 November 2026: Final Conference "Health, environment, climate: an EU agenda to reduce the burden of disease and inequalities". Jointly organised by BEST-COST, UBDPolicy, and the METEOR cluster](#)



This factsheet has been produced by EuroHealthNet, in the context of BEST-COST project. The work was supported by VITO Belgium, Sciensano, the Norwegian Institute of Public Health, and the University of Porto.



BEST-COST is funded by the European Health and Digital Executive Agency (HaDEA) under the powers delegated by the European Commission. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of HaDEA. Neither the European Union nor the granting authority can be held responsible for them.