



World Health  
Organization

REGIONAL OFFICE FOR **Europe**



# Environmental health inequalities in Europe

Second assessment report

## Summary



Address requests about publications of the WHO Regional Office for Europe to:

Publications  
WHO Regional Office for Europe  
UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark.

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office website (<http://www.euro.who.int/pubrequest>).

### © World Health Organization 2019

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization.

**Suggested citation.** Environmental health inequalities in Europe. Second assessment report. Copenhagen: WHO Regional Office for Europe; 2019. Licence: [CC BY-NC-SA 3.0 IGO](https://creativecommons.org/licenses/by-nc-sa/3.0/igo).

**Cataloguing-in-Publication (CIP) data.** CIP data are available at <http://apps.who.int/iris>.

**Sales, rights and licensing.** To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

**Third-party materials.** If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**General disclaimers.** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

Language editing: Lydia Wanstall

Layout and design: Imre Sebestyén/Unit Graphics

## Acknowledgements

The WHO Regional Office for Europe gratefully acknowledges funding and support from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

# Executive summary

---

Safe environments are a prerequisite for health and well-being. Environmental risk factors, however, account for at least 15% of mortality in the WHO European Region. Further, environmental conditions are not the same everywhere and for everyone; in fact, disparities in distribution of and exposure to environmental risks occur both between and within countries. The uneven distribution of environmental risks within societies and the related impacts on health and health equity are therefore of increasing concern.

This report provides a second assessment of environmental health inequalities in the Region. It updates and expands on the evidence base provided by the baseline assessment report of 2012, and aims to:

- quantify the magnitude of environmental health inequalities within countries in the Region, using international databases;
- assess the temporal trends of inequalities in environmental risk exposure and injury by comparing current data with the 2012 baseline assessment; and
- identify the most significant inequalities and the most affected population groups for follow-up at the national or local level.

The report uses data from international databases, stratified by socioeconomic, demographic or spatial variables, to highlight differences in environmental exposure or injury outcomes between population subgroups within the same country.

The assessment considers various environmental settings and presents 19 environmental health inequality indicators, categorized into five domains:

- **housing-related inequalities**
  - lack of a flush toilet
  - lack of a bath or shower
  - overcrowding
  - dampness in the home
  - inability to keep the home adequately warm
  - inability to keep the home adequately cool in summer
- **basic service inequalities**
  - lack of access to basic drinking-water services
  - lack of access to basic sanitation services
  - energy poverty
- **inequalities related to urban environments and transport**
  - exposure to air pollution
  - self-reported noise annoyance
  - fatal road traffic/transport injuries
  - lack of access to recreational or green areas
  - chemical exposure
  - contaminated sites
- **work-related inequalities**
  - work-related injuries and mortality
  - risks in working environments
- **injury-related inequalities**
  - fatal poisoning
  - fatal falls

The assessment findings indicate that:

- environmental health inequalities occur in all countries, irrespective of the level of development and the environmental or economic status;
- the occurrence of environmental health inequalities has tended to persist or even increase over time, despite the improvement of environmental conditions observed in most countries in the WHO European Region;
- inequalities can often be significant, with some population subgroups exposed or affected five times more than others;
- higher levels of environmental or injury risk are most often associated with – and are partly explained by – socioeconomic deprivation (notably poverty and low income) or other forms of disadvantage, such as those related to demographic or spatial determinants;
- in some cases, environmental exposure may also be higher among affluent or socially advantaged population subgroups;
- the lack of data on inequalities in environmental conditions restricts a broad assessment in many countries and therefore represents a major concern.

Differential exposure to environmental risks translates into health inequalities, but the available environmental monitoring data do not allow an accurate quantification of these.

In addition to the uneven distribution of environmental pressures, however, variable vulnerability of different population subgroups can further amplify the resulting health outcomes and inequalities, through synergistic effects.

Individual countries show different patterns of environmental health inequalities, indicating that countries may have somewhat different priorities for national review and follow-up action. Nevertheless, some challenges are shared across the Region: inequalities related to energy poverty, thermal comfort, damp homes and noise perception have increased in most countries, representing a common challenge to be tackled by many national and local governments.

The report's findings underline the importance of environmental disparities for health and health equity, and provide warning signals about environmental and injury inequalities that require follow-up at the national level. Using more detailed national data to assess and contextualize the reported disparities, national and local actors can identify those inequalities that are systemic and unfair and call for policy action. Such evidence on the magnitude and occurrence of environmental health inequalities will support policy-makers' efforts to reduce health inequalities through environmental interventions and enable informed decision-making to identify and protect those who already carry a disproportionate burden of environmental risk. Addressing inequalities in environmental risk will thus help to prevent avoidable health inequalities, and contribute to fairer and more socially cohesive societies.

# Key messages and conclusions

**Matthias Braubach, Gabriele Bolte, Sani Dimitroulopoulou, Jon Fairburn, Catherine Ganzleben, Firmino Machado, Marco Martuzzi**

## KEY MESSAGES

- 1.** Environmental conditions have improved markedly in most countries in the WHO European Region, and the incidence of fatal injuries has decreased. These improvements are marred by marked inequalities, however, as many population subgroups cannot benefit from them.
- 2.** Inequalities in environmental exposure occur between countries and, even more worryingly, within countries and local communities, where they contribute to avoidable health inequalities.
- 3.** Despite environmental improvements, inequalities in environmental exposure and injury mortality often persist or have even increased, in some cases.
- 4.** In addition to the uneven distribution of environmental pressures, variable vulnerability of different population subgroups can amplify the resulting health inequalities.
- 5.** Disadvantaged population subgroups can have five times higher exposure levels or injury rates than advantaged subgroups. The resulting health inequalities are therefore preventable, to a great extent, through environmental interventions.
- 6.** Individual countries show different patterns of environmental health inequalities; therefore, country-specific strategies are necessary to mitigate these inequalities.
- 7.** For energy poverty, thermal comfort, damp homes and noise perception, increasing inequalities are found in most countries in the Region, representing a common challenge.
- 8.** The lack of data on inequalities in environmental risk exposure is a key concern, especially in the eastern part of the Region.
- 9.** Governance of environmental health equity requires all-of-society involvement and all-of-government action, combined with careful consideration of targeted interventions.
- 10.** Equity-sensitive monitoring and surveillance systems are needed at various scales to document environmental inequalities and the most affected population subgroups adequately.

# Conclusions

## 1. Environmental conditions have improved markedly in most countries in the WHO European Region, and the incidence of fatal injuries has decreased. These improvements are marred by marked inequalities, however, as many population subgroups cannot benefit from them.

In the last decade, countries in the WHO European Region have witnessed a reduction of many environmental health risks, indicating that environmental governance and regulations are effective mechanisms to protect the population. The Region still has some unfinished business, however, and various environmental challenges should be dealt with by individual countries – as reflected in the background document and the Declaration of the recent Sixth Ministerial Conference on Environment and Health in Ostrava, Czechia (WHO Regional Office for Europe, 2017a; 2017b).

One challenge – relevant for many countries – is that progress in environmental conditions is not equally shared by all. Environmental health and injury inequalities occur in spite of declining environmental pollution levels, indicating that the most affected population subgroups do not benefit from the improvements achieved and are left behind. Addressing inequalities in environmental risk therefore remains a priority for all national and local governments.

## 2. Inequalities in environmental exposure occur between countries and, even more worryingly, within countries and local communities, where they contribute to avoidable health inequalities.

Inequalities in risk exposure and injury mortality (as well as inequalities in environmental goods or access to environmental resources) can be found in all countries in the WHO European Region, irrespective of the overall level of exposure prevalence or mortality. While a certain degree of variability is intrinsic, the magnitude of inequality varies greatly. Preventable disparities are apparent in each

country and the provision of equitable living conditions is thus a challenge in all countries. Since environmental factors account for at least 15% of the overall burden of disease in the WHO European Region (WHO Regional Office for Europe, 2018), environmental equity action is clearly a key mechanism to mitigate health inequalities through reductions of the exposure differential.

Inequalities are most relevant and apparent when they occur within countries and at the local scale, when people living in close proximity experience very different environmental conditions. This is due to powerful determinants (such as, for example, material deprivation, discrimination relating to certain demographic characteristics or geographical location) that have a direct impact on a person's opportunities and choices in life, and thus affect environmental exposure risk.

## 3. Despite environmental improvements, inequalities in environmental exposure and injury mortality often persist or have even increased, in some cases.

Although many countries report declining averages of risk exposure or injury mortality, environmental inequalities often remain stable or even increase in magnitude. This is reflected in several environmental health indicators in this report, as well as a number of systematic reviews (see Annex 3). The report therefore provides strong evidence that environmental progress is not equally shared, and that especially disadvantaged population subgroups and deprived areas are most affected by environmental problems.

For several indicators, high levels of relative inequalities can be found in countries with comparatively low absolute exposure levels. This is reflected in Figs. 7, 12 and 41, showing that overall low prevalence levels are no indication of low levels of inequality. In countries with high overall exposure levels, significant environmental inequalities exist with even higher burdens among socially disadvantaged subgroups.

#### **4. In addition to the uneven distribution of environmental pressures, variable vulnerability of different population subgroups can amplify the resulting health inequalities.**

The environmental inequality indicators presented in this report can only describe the exposure differential between population subgroups; they cannot document the vulnerability differential. This relates to the varying levels of vulnerability to environmental impacts that a person, population subgroup or community may have. Higher vulnerability can cause stronger health effects, resulting in larger impacts for specific people. Using only exposure data may neglect these interactions and underestimate the impact of environmental inequalities on health and well-being.

Vulnerable groups that may react more strongly to environmental risks or may be more susceptible to developing health effects include children, elderly people, pregnant women and people with pre-existing health limitations. Similarly, socially disadvantaged population subgroups may be more vulnerable due to, for example, psychosocial stress or fewer resources to cope with an environmental burden.

#### **5. Disadvantaged population subgroups can have five times higher exposure levels or injury rates than advantaged subgroups. The resulting health inequalities are therefore preventable, to a great extent, through environmental interventions.**

Environmental inequalities are most often associated with (and at least partly explained by) different forms of social or demographic disadvantage. Almost all indicators presented in this report show that socioeconomic disadvantage (notably poverty and low income) is associated with higher exposure to various environmental pressures. Inequalities of risk and exposure can be very high between population subgroups within the same country; relative inequalities can frequently exceed a ratio of 5:1 between disadvantaged and advantaged subgroups.

In extreme cases, inequality ratios can even reach 20:1 in some countries. This can be observed, for example, for energy poverty and drinking-water and sanitation services by wealth quintile (see Table 6 and Fig. 23) and for fatal work injuries by sex (see Fig. 48).

Although these inequalities in risk exposure are largely driven by sociodemographic determinants, it is obvious that the universal provision of healthy environments and basic services for all citizens, irrespective of social status or other forms of disadvantage, can help to mitigate health inequalities through the reduction of environmental health risks – especially for those who are most exposed and/or vulnerable.

#### **6. Individual countries show different patterns of environmental health inequalities; therefore, country-specific strategies are necessary to mitigate these inequalities.**

Countries show different inequality levels across the whole indicator set: national patterns of inequalities are very diverse, indicating that countries may have somewhat different priorities for review and follow-up. A good understanding of national inequalities in environmental risks and injury mortality is essential, however, and will contribute to more effective policies, based on a clear identification of the priorities for action and the most affected people to be protected.

Each country also has a unique profile of “inequality performance” over recent years.<sup>1</sup> These profiles identify the environmental conditions for which countries have been successful (or not) in reducing inequalities over recent years. The evidence may help countries to assess which policies may have been effective from an equity perspective, and for which environmental inequalities new strategies may need to be considered.

---

<sup>1</sup> For further detail, see the country profile supplement to this report, available at <http://www.euro.who.int/en/EHinequalities2019>

## **7. For energy poverty, thermal comfort, damp homes and noise perception, increasing inequalities are found in most countries in the Region, representing a common challenge.**

Despite the diversity of national priorities, four environmental inequality indicators show an increase in most countries for which data are available: energy poverty, thermal comfort, damp homes and noise perception (see Chapter 8). Three of these factors relate to material housing conditions that are directly linked to financial resources, and in all three cases the disadvantaged subgroups are those below the relative poverty threshold or in the lowest income quintile. The same applies to noise perception, which largely affects poorer population subgroups but also sees affluent subgroups reporting higher noise levels in some countries.

The increase in these inequalities shows that socioeconomic status is at the centre of the most urgent factors to be tackled across the Region and suggests that housing policies and access to affordable good-quality living space are key measures to reduce environmental inequalities.

## **8. The lack of data on inequalities in environmental risk exposure is a key concern, especially in the eastern part of the Region.**

This report compiles data from international databases, and the inequality indicators were selected according to the data availability for a wide range of countries in the WHO European Region. National data and statistics were not systematically identified, so relevant data may be available in some countries through domestic reporting and surveillance systems. Nevertheless, it must be acknowledged that environmental monitoring and related databases often tend to be “equity blind” – collecting environmental information but rarely compiling information on the population subgroups most affected.

Within this report, the lack of data is most critical in the eastern part of the Region, where no harmonized international surveys and monitoring are established (in comparison to EU-coordinated monitoring frameworks), and the main source of comparable information tends to come from surveys coordinated by the United Nations. If no national data can fill this gap, inequality assessments cannot be carried out and no identification of disadvantaged subgroups (and no insight into the determinants causing the inequalities) is possible. The lack of data on the distribution of environmental risks is therefore a major challenge to be tackled in these countries.

## **9. Governance of environmental health equity requires all-of-society involvement and all-of-government action, combined with careful consideration of targeted interventions.**

In the last decade, environmental regulations and governance actions on healthy environments have proved to be effective in many countries; these need to be fully implemented to prevent harmful conditions. These general approaches may, however, be less effective in reducing environmental inequalities. Targeted interventions are a key strategy when universal approaches to environmental protection do not provide equal benefits to disadvantaged population subgroups.

Effective interventions against inequality require multisectoral and all-of-government action, connecting social services and employment and education sectors with decision-makers in environmental protection, urban planning and health promotion. In neighbourhoods with high levels of social deprivation and environmental pollution, local interventions should target both the socioeconomic and demographic determinants of inequalities and the environmental conditions. In many cases, such interventions will have multiple benefits for disadvantaged people and create co-benefits for health and well-being, as well as social cohesion.



To tackle existing inequalities, national and local politics also need to become more aware of the importance of “procedural justice”. This refers to a fair and equal political approach to responding to environmental problems and emission sources (such as industrial areas, transport infrastructure, contaminated sites or landfills). These are too often located in areas that have an excessive amount of environmental disadvantage already but less power to influence decision-making. Accessible forms of engagement and participation, as well as equal rights in the decision-making process, are needed to ensure that disadvantaged population subgroups are not left behind, and social, environmental and health actors require preparedness to engage in negotiations over environmental health to protect the most exposed and the most vulnerable people.

**10. Equity-sensitive monitoring and surveillance systems are needed at various scales to document environmental inequalities and the most affected population subgroups adequately.**

To improve future assessments of environmental inequalities, enable the quantification of related health impacts and develop effective intervention, national and local monitoring systems are needed. These should include a range of data to enable the collection and analysis of:

- the socioeconomic and demographic characteristics of the exposed population;
- the level or concentrations of environmental risks; and
- the occurrence of relevant health outcomes by subgroup.

While most of the personal characteristics are usually collected through surveys, it is difficult to make a reliable assessment of environmental risk exposure (as well as access to environmental goods and resources) through surveys that rely on self-reporting. A connection to housing conditions databases and cadastres, urban and environmental monitoring data, and objective measurements of concentrations would therefore be strongly desirable. All countries would benefit from a review of the effectiveness of their existing monitoring systems, to ensure that relevant data can be deployed in a holistic and integrated manner to address environmental inequalities and their health impacts.

Data sharing and the connection of existing databases at the national and local levels could, together with a careful extension of survey items and questions to incorporate equity issues, significantly improve the knowledge base on inequalities and help with assessments of the equity impact of policies or interventions. Further opportunities to be explored are the SDG indicators, which are applied for national and international progress evaluations of the 2030 Agenda for Sustainable Development and include various stratifications by sex, age or urbanization level, among others. Such data will enable stakeholders at the national and local levels to understand the magnitude and causes of environmental inequalities, and to identify the most disadvantaged population subgroups, which should therefore be at the centre of political action.

## The way forward

---

Population subgroups with lower socioeconomic capacities, less influence and other social, demographic or local disadvantages suffer most from inequalities in environmental risk exposure and injury outcomes. Many of these inequalities are systemic, as they result from societal structures and processes, and unfair, as they distribute environmental goods and bads unequally and create an environmental underclass with an increased likelihood of risk exposure and negative health impacts.

These inequalities can be tackled, reduced and prevented by public authorities at the national and local levels through:

- equity-sensitive environmental policies and decision-making;
- intersectoral collaboration between social, environmental and health actors and stakeholders;
- integration of equity concerns in urban and infrastructural planning and related impact assessments;
- full-scale implementation of environmental regulations and standards, with a specific focus on pollution hotspots and contamination sources;
- targeted interventions addressing environmentally disadvantaged subgroups or neighbourhoods;
- better integration of equity dimensions in environmental monitoring and surveillance; and
- recognizing the needs of disadvantaged communities and giving them a voice in decision-making processes.

The commitment to shape healthy environments for all is strongly associated with a range of other political frameworks, such as the Agenda for Sustainable Development (aiming at leaving no one behind and focusing on reducing inequalities), the WHO Health 2020 European health policy framework (featuring key objectives of reducing inequalities and establishing health-supportive environments) and the recent Ministerial Declaration on Environment and Health (calling for the prevention and reduction of inequalities as a cross-cutting objective for any environmental action).

In line with the theme of the Sixth Ministerial Conference on Environment and Health (“Better Health. Better Environments. Sustainable Choices.”), these policy frameworks and political commitments request and facilitate action to identify population subgroups that are left behind. For these disadvantaged parts of the population, the commitment to “better environments” and thus “better health”, providing equal environmental conditions that will enable sustainable choices for all, is yet to be realized. It is hoped that the data presented in this report, informing national governments about the inequalities and discrepancies in environmental conditions within their countries, may be a foundation for national follow-up and a strong argument for integrating environmental inequalities into national portfolios of action on environment and health.

## References

- WHO Regional Office for Europe (2017a). Environment and health in Europe: status and perspectives. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/health-topics/environment-and-health/pages/european-environment-and-health-process-ehp/environment-and-health-in-europe-status-and-perspectives>, accessed 9 April 2019).
- WHO Regional Office for Europe (2017b). Declaration of the Sixth Ministerial Conference on Environment and Health. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/media-centre/events/events/2017/06/sixth-ministerial-conference-on-environment-and-health/documentation/declaration-of-the-sixth-ministerial-conference-on-environment-and-health>, accessed 9 April 2019).
- WHO Regional Office for Europe (2018). Healthy environments for healthier people. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/healthy-environments-for-healthier-people-2018>, accessed 9 April 2019).
-

## The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

### Member States

Albania  
Andorra  
Armenia  
Austria  
Azerbaijan  
Belarus  
Belgium  
Bosnia and Herzegovina  
Bulgaria  
Croatia  
Cyprus  
Czechia  
Denmark  
Estonia  
Finland  
France  
Georgia  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Israel  
Italy  
Kazakhstan  
Kyrgyzstan  
Latvia  
Lithuania  
Luxembourg  
Malta  
Monaco  
Montenegro  
Netherlands  
North Macedonia  
Norway  
Poland  
Portugal  
Republic of Moldova  
Romania  
Russian Federation  
San Marino  
Serbia  
Slovakia  
Slovenia  
Spain  
Sweden  
Switzerland  
Tajikistan  
Turkey  
Turkmenistan  
Ukraine  
United Kingdom  
Uzbekistan

Environmental conditions are a major determinant of health and well-being, but they are not shared equally across the population. Higher levels of environmental risk are often found in disadvantaged population subgroups. This assessment report considers the distribution of environmental risks and injuries within countries and shows that unequal environmental conditions, risk exposures and related health outcomes affect citizens daily in all settings where people live, work and spend their time.

The report documents the magnitude of environmental health inequalities within countries through 19 inequality indicators on urban, housing and working conditions, basic services and injuries. Inequalities in risks and outcomes occur in all countries in the WHO European Region, and the latest evidence confirms that socially disadvantaged population subgroups are those most affected by environmental hazards, causing avoidable health effects and contributing to health inequalities.

The results call for more environmental and intersectoral action to identify and protect those who already carry a disproportionate environmental burden. Addressing inequalities in environmental risk will help to mitigate health inequalities and contribute to fairer and more socially cohesive societies.



### World Health Organization Regional Office for Europe

UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark  
Tel.: +45 45 33 70 00  
Fax: +45 45 33 70 01  
Email: [eurocontact@who.int](mailto:eurocontact@who.int)  
Website: [www.euro.who.int](http://www.euro.who.int)