Human health in the global plastics treaty: Summary ahead of INC 5.2

Why is human health important in the Global Plastics Treaty?

- The right to enjoy the highest attainable standard of health,[1] and to a safe, clean, healthy, and sustainable environment[2] are fundamental human rights.
- Human health is a critical consideration for guiding the identification and evaluation of responses to plastic pollution.
- Human disease and premature mortality associated with plastics presents a substantial cost to society, including through burdens on healthcare systems and lost productivity.[3] A successful treaty will mitigate these public health costs.
- Exposure to plastics begins in the womb[4] and continues throughout the entire human lifespan.[5]
- Scientific evidence highlights health concerns that must be explicitly addressed in the treaty to mitigate harms caused by plastics, for example chemicals contained in plastics that migrate during normal use[5-7] and throughout plastics life cycles.[5]
- Alternatives and substitutes to plastics may also have harmful impacts on human health.[8,9] Measures in the treaty should ensure the safety and sustainability of these alternatives: in particular, by establishing health-centred criteria for reducing and replacing plastics, which can help to avoid regrettable substitutions.[10]

How can the Global Plastics Treaty protect human health?

There is consensus amongst global health experts, including the World Health Organization, that protecting human health is a priority in the treaty.[11-13] This can be achieved by combining **a stand alone article (Art. 19) on health** with comprehensive integration of health throughout relevant provisions, including inter alia the following:

- **Ensuring a clear objective to protect human health across all stages of the plastics lifecycle** (Preamble, Article 1).
- **Adopting legally binding global targets to reduce plastics production** (Articles 3 and 6).
- **Reducing the overall number of chemicals used to make plastics[14] and eliminating hazardous substances, for example by restricting entire groups of concern** (Articles 3 and 5).
- **Establishing safety criteria for plastics and their alternatives across all lifecycle stages, including safe product design** (Article 5).
- **Promoting mandatory transparency and traceability throughout all stages of the plastics lifecycle** (Articles 3, 4, 5, 6, 7, 8, 9, 17, 18).
- **Preventing blanket sectoral exemptions, including for the health sector** (there are no provisions in current Chair's text, formerly under Article 1bis: Scope).
- **Providing mechanisms to support and integrate emerging science following the adoption of the treaty** (Articles 3 + Annex, 5, 6,19, 20 and 24).
- **Including health considerations to guide financing criteria** (Article 11).

What are key relevant scientific considerations on plastics and health?

- **Plastic chemicals and micro- and nanoplastics (MNPs) are released throughout all plastics life stages.**[5] This begins from plastics production and transportation, including spills of plastic pellets[15], during the use phase (from tyres, textiles, food packaging), from plastic waste management[16] (landfill, incineration, recycling) and mismanagement (open burning, dumpsites)[17] and the weathering of plastics in the environment.[4]
- Plastic products and microplastics also **leach hazardous chemicals and chemicals that have not been tested for safety** into food[6] and the environment.[4] These chemicals enter human bodies through ingestion, inhalation and dermal absorption.[18] The chemical composition of plastics lacks transparency.[19]
- At least **1481 plastic chemicals have been found to migrate from food contact materials** into foods, making human exposure very

likely.[6] At least **1396 plastic chemicals are present in human bodies**, including several with reliable causal links to health impacts.[8]

- Plastic products are a **source of MNPs**, including from their normal and intended use, for example, as food contact materials.[21]
- Emerging studies show that **MNPs have been detected in several organs of the human body (including human blood, placenta, liver, and kidney)**, and may be associated with adverse health outcomes.[4] More research is needed to understand MNPs in the human body and how they impact health.[4]
- **Reusing and recycling plastics leads to MNP generation and the release of plastic chemicals**, human exposure and environmental emissions.[16,22] The contamination with, and accumulation of, **hazardous chemicals in recycled and reused plastic products** has been demonstrated.[16,23]
- **Greenhouse gases are emitted across the plastics lifecycle, particularly during extraction, production and open burning.**[5] This results in direct and indirect human health impacts from rising temperatures, extreme weather events, infectious diseases and disrupted food systems.[24]
- **Exposure to toxic substances from plastics production to poorly regulated and unsafe recycling and recovery** practices poses serious occupational and public health risks to workers and fenceline communities, especially in informal and low-resource settings,[5,22] raising urgent concerns for environmental justice and health equity.[16]
- **Air pollution is a leading cause of global human disease and mortality.**[25] Plastics are predominantly produced from petrochemicals. High levels of air pollution are found near petrochemical production and processing facilities, which can exceed safe levels.[26] Open burning of plastics and urban fires also release chemicals and black carbon to the air, elevating risks of respiratory diseases.[27,28]
- **Macroplastic waste can compromise sanitation and energy systems**, exacerbate flooding,[29] spread invasive species harmful to local biodiversity,[30] transmit pathogens,[31] and act as breeding grounds for disease vectors.[32]
- **Plastics, plastic chemicals and MNPs have significant effects on wildlife and ecosystems** which directly and indirectly impair human health, as considered under the One Health approach.[33]

Authors: Jane Muncke, Megan Deeney, Juan Jose Alava, Susanne Brander, Xavier Cousin, Elise Granek, Sedat Gundogdu, Dorte Herzke, Anita Jemec Kokalj, Nur Kaluç, Eva Kumar, Ravinder Kumar, Dana Kühnel, Muriel Mercier-Bonin, Noreen O'Meara, Hervé Raps, Andrés Rodríguez-Seijo, Peter Stoett, Sam Varvastian, Costas Velis, Judith Weis

Reviewers: Justin Boucher, Bethanie Carney-Almroth, Winnie Courtene-Jones, Marie-France Dignac, Trisia Farrelly, Dannielle Senga Green, Dorte Herzke, Melanie Macgregor, Emmy Nøklebye, Shige Takada, Richard Thompson

Citation: Scientists' Coalition for an Effective Plastics Treaty (2025). Article 19: Human health in the global plastics treaty. **https://doi.org/10.5281/zenodo.15639130**

References

[1] United Nations General Assembly. (1948). Universal Declaration of Human Rights. Resolution 217 A (III), adopted 10 December 1948. **https://www.un.org/en/about-us/universal-declaration-of-human-rights**

[2] United Nations General Assembly. (2022). The human right to a clean, healthy and sustainable environment. Resolution 76/300, adopted 28 July 2022. UN Doc A/RES/76/300. **https://docs.un.org/en/A/RES/76/300**

[3] Cropper et al. (2024). The benefits of removing toxic chemicals from plastics. Proceedings of the National Academy of Sciences of the United States of America. **https://doi.org/10.1073/pnas.2412714121**

[4] Thompson et al. (2024). Twenty years of microplastic pollution research—what have we learned? Science. **https://doi.org/10.1126/science.adl2746**

[5] Landrigan et al. (2023). The Minderoo-Monaco Commission on Plastics and Human Health. Annals of Global Health. **https://doi.org/10.5334/aogh.4056**

[6] Geueke et al. (2023). Systematic evidence on migrating and extractable food contact chemicals: Most chemicals detected in food contact materials are not listed for use. Critical Reviews in Food Science and Nutrition. **https://doi.org/10.1080/10408398.2022.2067828**

[7] Aurisano et al. (2021). Chemicals of concern in plastic toys. Environment International. **https://doi.org/10.1016/j.envint.2020.106194**

Scan the QR code to see all of our resources and to learn more about the Scientists' Coalition.

[8] Geueke et al. (2024). Evidence for widespread human exposure to food contact chemicals. Journal of Exposure Science & Environmental Epidemiology. https://doi.org/10.1038/s41370-024-00718-2

[9] Canellas et al. (2024). Exploring soda contamination coming from paper straws through ultra-high-pressure liquid chromatography coupled with an ion mobility-quadrupole time-of-flight analyzer and advanced statistical analysis. Food Packaging and Shelf Life. https://doi.org/10.1016/j.fpsl.2024.101237

[10] Scientists' Coalition for an Effective Plastics Treaty (2024). Policy Brief: The Essential Use Concept for the Global Plastics Treaty. https://doi.org/10.5281/zenodo.11001117

[11] World Health Organization (WHO). (2024). Ensuring the integration of health, including in the marine environment, in the binding instrument on plastic pollution. Information paper for INC-5. https://cdn.who.int/media/docs/default-source/chemical-safety/plastics/who-inf-paper-for-inc5.pdf

[12] Health Care Without Harm. (2024). Open letter from medical and public health professionals on the plastics treaty 4th negotiation meeting (INC-4). https://resolutions.unep.org/incres/uploads/open_letter_inc4_hcwh.pdf

[13] Scientists' Coalition for an Effective Plastics Treaty. (2024). Scientists' declaration for the global plastics treaty—Updated for INC-5. https://ikhapp.org/wp-content/uploads/2024/11/Scientists_Declaration_INC_5.pdf

[14] Carney Almroth et al. (2023). Chemical simplification and tracking in plastics. Science. https://doi.org/10.1126/science.adk9846

[15] Karlsson et al. (2018). The unaccountability case of plastic pellet pollution. Marine Pollution Bulletin. https://doi.org/10.1016/j.marpolbul.2018.01.041

[16] Cook et al. (2023). Plastic waste reprocessing for circular economy: A systematic scoping review of risks to occupational and public health from legacy substances and extrusion. Science of The Total Environment. https://doi.org/10.1016/j.scitotenv.2022.160385

[17] Maalouf et al. (2020). From dumpsites to engineered landfills: A systematic review of risks to occupational and public health. EngRxiv Preprint. https://engrxiv.org/preprint/view/1371/2859

[18] Symeonides et al. (2024). An umbrella review of meta-analyses evaluating associations between human health and exposure to major classes of plastic-associated chemicals. Annals of Global Health. https://doi.org/10.5334/aogh.4459

[19] Wagner M, et al. (2024). State of the science on plastic chemicals: Identifying and addressing chemicals and polymers of concern. https://doi.org/10.5281/zenodo.10701705

[20] Geueke et al. (2024). Evidence for widespread human exposure to food contact chemicals. Journal of Exposure Science & Environmental Epidemiology. https://doi.org/10.1038/s41370-024-00718-2

[21] Shruti et al. (2024). Migration testing of microplastics in plastic food-contact materials: Release, characterization, pollution level, and influencing factors. TrAC Trends in Analytical Chemistry. https://doi.org/10.1016/j.trac.2023.117421

[22] Cook et al. (2022). Scaling up resource recovery of plastics in the emergent circular economy to prevent plastic pollution: Assessment of risks to health and safety in the Global South. Waste Management & Research. https://doi.org/10.1177/0734242X221105415

[23] Geueke et al. (2023). Hazardous chemicals in recycled and reusable plastic food packaging. Cambridge Prisms: Plastics. https://doi.org/10.1017/plc.2023.7

[24] Intergovernmental Panel on Climate Change (IPCC). (2023). Fact Sheet: Health – Climate Change Impacts and Risks. Sixth Assessment Report Working Group II. https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Health.pdf

[25] World Health Organization. (2024). Ambient (outdoor) air pollution: Key facts. https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

[26] Robinson et al. (2024). Ethylene oxide in Southeastern Louisiana's petrochemical corridor: High spatial resolution mobile monitoring during HAP-MAP. Environmental Science & Technology. https://doi.org/10.1021/acs.est.3c10579

[27] Velis et al. (2021). Mismanagement of plastic waste through open burning with emphasis on the Global South: A systematic review of risks to occupational and public health. Environmental Science & Technology. https://doi.org/10.1021/acs.est.0c08536

[28] Pathak et al. (2024). The open burning of plastic wastes is an urgent global health issue. Annals of Global Health. https://doi.org/10.5334/aogh.4232

[29] MacAfee et al. (2024). Multi-scalar interactions between mismanaged plastic waste and urban flooding in an era of climate change and rapid urbanization. WIREs Water. https://doi.org/10.1002/wat2.1708

[30] García-Gómez et al. (2021). Plastic as a vector of dispersion for marine species with invasive potential: A review. Frontiers in Ecology and Evolution. https://doi.org/10.3389/fevo.2021.629756

[31] Ormsby et al. (2024). Toxigenic Vibrio cholerae can cycle between environmental plastic waste and floodwater: Implications for environmental management of cholera. Journal of Hazardous Materials. https://doi.org/10.1016/j.jhazmat.2023.132492

[32] Maquart et al. (2022). Plastic pollution and infectious diseases. The Lancet Planetary Health. https://doi.org/10.1016/S2542-5196(22)00198-X

[33] Prata et al. (2021). A One Health perspective of the impacts of microplastics on animal, human and environmental health. Science of the Total Environment. https://doi.org/10.1016/j.scitotenv.2021.146094