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We need a global agreement to safeguard human health from plastic pollution

Unresolved disagreements hinder progress towards the UN led treaty that could protect human and environmental health from the harms of plastic pollution, write Cressida Bowyer and Stephen Fletcher

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In December 2024, negotiations led by the United Nations to finalise a treaty to end plastic pollution concluded without agreement, pushing discussions into 2025.[1] Plastic pollution is now recognised as not only an environmental crisis but also a critical human health crisis. The need for decisive international action to tackle plastic pollution has never been more urgent.

The health focus is reflected in the objective of the current treaty draft "to protect human health and the environment from plastic pollution."[2] With the world's annual plastic production at 400 million tonnes and projected to double by 2040, the scale of plastic pollution is staggering.[3] Without intervention on a global scale, this trajectory will worsen.

The treaty negotiations have highlighted divisions among countries on critical issues, including the treaty's scope, limits on plastic production, controls on toxic chemical additives in plastics, and financing for treaty implementation in the regions most affected. These unresolved disagreements hinder progress towards a treaty that could protect human and environmental health across the entire lifecycle of plastics, including their production, design, and disposal.

The case for action on health grounds alone is overwhelming. Two key issues—human exposure to microplastic pollution and the inhalation of toxic pollutants from open burning of plastic waste—illustrate how reducing plastic pollution can help safeguard health.[4 5] Microplastics (particles of plastic less than 5 mm in size) and nanoplastics (far smaller) are omnipresent in our environment. We find them wherever we look: in the air, ocean, rivers, lakes, polar ice, and soil. We ingest, inhale, and absorb microplastics when we eat, drink, and breathe. These particles have been detected in organs and tissue, including the brain, blood, placenta, and liver, as well as breast milk and semen.[6] Babies are exposed to microplastics from conception.

Burning and waste

Emerging research reveals substantial health risks associated with microplastic exposure. A recent study linked the presence of micro and nanoplastics in atherosclerotic plaques to an increased risk of stroke, heart attack, and death in patients with carotid artery disease.[7] Laboratory and animal studies have shown DNA damage, oxidative stress, and immune system disruption caused by micro and nanoplastics.[8-10] Other studies suggest that microplastics play a role in dementia.[11]

Thousands of chemical additives used in plastic production—many of which are known toxins, such as bisphenol A—leach into the environment and are then internalised through our diet, further exacerbating the health risks of plastic pollution.[12] While some microplastics are intentionally added to products, including facewash and toothpaste, the vast majority come from the degradation of larger plastic items. Tyres, synthetic textiles, and carpets are major contributors to shedding microplastics and microfibres during use. Recycling plants also generate substantial microplastic releases into the environment.

Burning plastic as a method of waste management poses severe health risks, particularly in regions with inadequate infrastructure, compounded by trade in plastic waste. Worldwide, 2.7 billion people lack access to formal waste management systems, leading to the accumulation of plastic waste in the environment.[13 14] As plastics degrade they release toxic chemicals and gases, polluting our air, water, and soil.

In many low income areas open burning reduces waste volume and deters pests, but it comes with considerable costs to health and the environment. Open burning emits a hazardous mix of toxic chemicals, greenhouse gases, particulate matter (including microplastics), and persistent organic pollutants. These emissions cause and exacerbate respiratory and cardiovascular diseases, disproportionately affecting vulnerable populations.[15] An estimated 16% of global municipal waste is openly burned, rising to 40-65% in low and middle income countries, with plastics—which are 99% derived from fossil fuels—making up a large proportion.[14 16]

The high combustibility of plastics makes them a readily available but dangerous fuel source for heating, cooking, and lighting in low income communities.[17] Similarly, industries in these regions often rely on plastics as an inexpensive energy alternative, further compounding the problem.[18 19] Indoor air pollution from burning plastics leads to elevated risks of respiratory infections, chronic obstructive pulmonary disease, and other life threatening conditions. Tackling unregulated plastic burning is essential to curbing air pollution and reducing the associated global disease burden.

Policies

The treaty to end plastic pollution represents a historic opportunity to protect human health. If the treaty is to meet this challenge, its text must include specific measures to mitigate the health effects of plastic pollution, human health targets and metrics to measure progress towards improved health outcomes, and a flow of finance dedicated to reducing the health risks posed by plastic pollution.[20 21]

Healthcare professionals have a critical role: to gather robust scientific evidence while also advocating for policies aimed at reducing human exposure to plastic pollution. If consensus can't be reached on a treaty text, action outside the UN system by the overwhelming majority of nations committed to tackling plastic pollution remains possible. This would demonstrate their commitment to protecting people and the planet from the harms of plastic pollution.

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