NATURE AND BIODIVERSITY

Microplastics: Are we facing a new health crisis – and what can be done about it?

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Researchers are studying the impact of microplastics on human health.
Image: REUTERS/Eric Gaillard

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This article has been updated.

- Microplastics have been found in the land, sea and air, across the food chain and throughout the human body.
- While the full extent of the health impacts of microplastics are not yet known, studies indicate that they can increase the likelihood of heart attack, stroke and even Alzheimer's.
- With pollution ranked in the World Economic Forum's *Global Risks Report 2025* as a top 10 threat, concerted and urgent action is required.

There's a growing body of evidence about how widespread microplastics have become – across land, sea and air – and the impact they could be having on human health. It is estimated that people inhale 68,000 microplastic particles every day and some experts believe we are in the midst of a plastic health crisis.

Microplastics have now been detected throughout the human body – including the blood, lungs, liver and even lower limb joints. Scientists have found evidence of microplastics in our brains, and further studies have revealed how these microplastics are accumulating and rapidly rising.

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What are microplastics?

Microplastics are pieces of plastic debris under five millimetres in length, explains the US National Ocean Service.

Some – such as microbeads, typically found in cosmetics and toiletry products – are designed to be small, while other plastic gradually breaks down to this size.

Although microbeads are now banned in many countries, the problem of plastic pollution is far from resolved. According to UNEP, up to 23 million tonnes of plastic waste leaks into the world's water systems every year.

The many types of microplastics

Microplastics come in various forms, each with its own sources and environmental impacts. Primary microplastics are intentionally manufactured small plastic particles, including the microbeads used in cosmetics and the plastic pellets (nurdles) used in industrial manufacturing.

Plastic glitter, often made from polyethylene terephthalate (PET), is another common primary microplastic that poses environmental concerns.

Microfibers, typically shed from synthetic clothing during washing, are a significant contributor to microplastic pollution.

Secondary microplastics form from the breakdown of larger plastic items – such as abandoned fishing gear, plastic litter, cleaning sponges – through weathering and environmental exposure. A recent study even found that the breakdown of COVID-19 disposable face masks is contributing to microplastic pollution.

vehicle tyre wear are polluting the mountains there.

How do microplastics get into the food chain?

se tiny particles are often small enough to pass through water filtration systems, we can then unknowingly ingest them.

In the ocean, these particles can be eaten by marine life – from fish to shellfish. A study in the US state of Oregon found microplastics in 98.9% of seafood samples, while a 2022 study found broken-down microplastics in blue mussels off the Australian coast. The research added to the findings of an earlier study that concluded, "if you eat mussels, you eat microplastics".

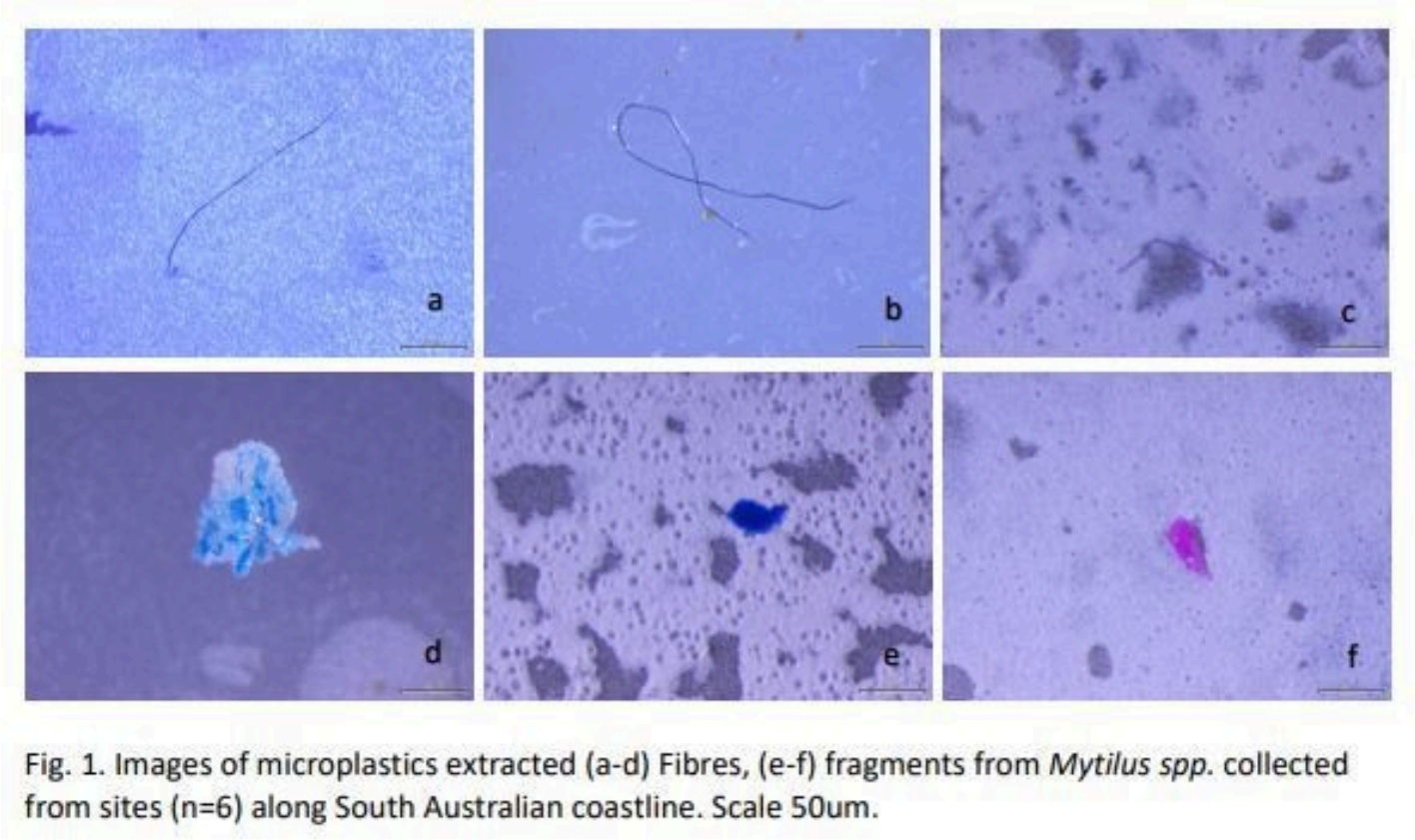

Fig. 1. Images of microplastics extracted (a-d) Fibres, (e-f) fragments from *Mytilus spp.* collected from sites (n=6) along South Australian coastline. Scale 50um.

Various microplastic particles found in water samples. Image: Flinders University

And it's not just marine life that could be affected. Microplastics have been found in foodstuffs including honey, tea and sugar, as well as in fruit and vegetables.

Microplastics are also making their way onto farmland through sewage sludge being used as fertilizer, according to a Cardiff University study. The BBC reports that much of this will then end up in waterways as a result of runoff from the top layer of soil.

Are microplastics harmful to human health?

While the full extent of the environmental and health impacts of microplastics are not yet known, a recent study found that nanoplastics and microplastics could be "emerging risk factors for cardiovascular diseases"; this research is backed by a 2024 study that points to the possibility that microplastics can increase the likelihood of heart attack, stroke or death. Another study, meanwhile, linked microplastics with inflammation and noncommunicable diseases.

In a 2025 study on mice, real-time imaging showed microplastics moving through their brains and blocking blood vessels. While the researchers said it would be "premature" to suggest that the process could replicate in human brains, the authors concluded that "the potential long-term effects of microplastics on neurological disorders such as depression and cardiovascular health are concerning".

The link between air pollution and premature births has already been established, and a study in the US has found both microplastics and nanoplastics in higher concentrations in the placentas from premature births than in those births that went

told *The Guardian*.

Meanwhile, microplastics in the placenta may be affecting hormone levels in the developing foetus, according to a study just published in ScienceDirect.

At the other end of the age spectrum, micro- and nanoplastics in the brain might be causing cognitive decline and even Alzheimer's disease, a US study recently found.

Some researchers say we're in the lull before the storm and that "alarmingly, a turning point is expected in the future, signalling a significant microplastic pollution outbreak if effective measures are not taken to mitigate it".

What's being done about microplastics?

With pollution ranked in the World Economic Forum's top 10 greatest threats to the world in the short and long term, concerted and urgent action is required if the world is to meet Sustainable Development Goal 14 to “prevent and significantly reduce marine pollution of all kinds” by 2025.

Certain measures are already in place. The Microbead-Free Waters Act of 2015 prohibits the manufacturing, packaging and distribution of rinse-off cosmetics and non-prescription drugs (such as toothpaste) containing plastic microbeads.

and recycling technology, among others. In 2023, the European Union banned the sale of loose plastic glitter. And in January 2025, the Forum's Global Plastic Action Partnership announced that seven new countries had joined the world's largest programme tackling plastic pollution.

In the EU, the Joint Research Centre has released "a world-first reference material which will help improve analysis of microplastic particles in water". The idea is that, with more consistent measurement methods in place, a more accurate global picture will be gathered of the microplastics issue, enabling policymakers and people to make more informed decisions about the best way forward.

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In the meantime, individuals and companies are coming up with innovative solutions.

For example, a team of researchers at Sichuan University has developed a tiny robot fish that can collect microplastics. The BBC reported on a removal method using vegetable oil, iron oxide and magnets. Following 5,000 tests, the technique was found to be 87% effective at extracting microplastics from water.

Operation CleanSweep and the US Environmental Protection Agency's Trash-Free Waters initiative are both working to remove harmful human-made rubbish from the ocean. The latter just produced the third part of its 'National Strategy to Prevent [illegible]tic Pollution'.

remove 95% of microplastics from water, and Orgro Fibre, which makes biodegradable sapling bags to replace the single-use plastic ones commonly used in gardening centres.

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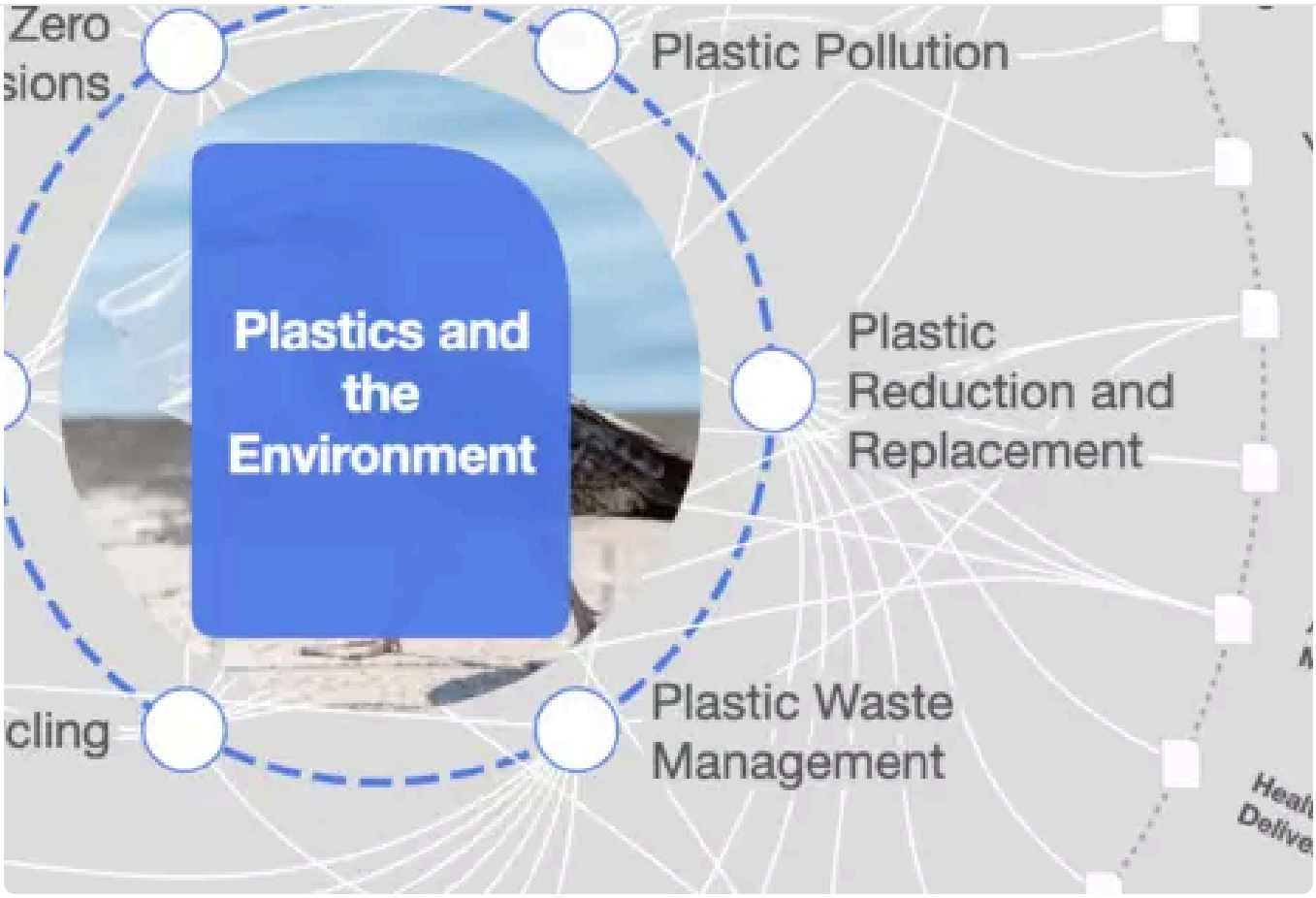

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