PREVENTABLE HEALTH CRISIS

Scientific evidence 2023 - 2025

Plastic in numbers

Microplastics, endocrine-disrupting chemicals, and their documented effects on human health. The evidence is unequivocal; action is urgent and possible.

400
Million tons of plastic produced in 2023 (more than 2x the amount produced in 2000)
[1]

+10,000
Chemical substances in plastics, including carcinogens and endocrine disruptors
[2]

13.2
Billion tons of plastic waste projected in ecosystems by 2050 if no action is taken
[3]

MICROPLASTICS IN THE HUMAN BODY

Micro- and nanoplastics have been detected in the **blood, lungs, liver, placenta, breast milk, testicles, and heart tissue of people all over the world**. Their presence is no longer a hypothetical risk: it is a fact documented in the world's leading scientific journals.
[4] · [5] · [6]

TISSUES WITH CONFIRMED MICROPLASTICS

[4] · [7] · [8]

- Lung
- Small intestine
- Large intestine
- Heart tissue
- Blood
- Placenta and breast milk
- Brain / Bone
- Pediatric tonsils

52,000 –142,000

Microplastic particles are ingested per person per year through food and water

The main sources are tap and bottled water, seafood, salt, honey, beer, and ultra-processed foods. Estimates vary due to the lack of globally standardized methods.
[9] · [11]

Omnipresence

Microplastics in drinking water: rivers, tap water, and plastic bottles

The WHO identified microplastics in drinking water globally in 2019. In 2024, studies revealed hundreds of thousands of previously unaccounted-for nanoplastic particles in bottled water.
[10]

CARDIOVASCULAR RISK: THE MOST ALARMING FINDING

Higher risk of heart attack, stroke, or death in patients with microplastics in arterial plaques

4.5× more risk

A ground-breaking study published in the *New England Journal of Medicine* in 2024 analyzed 257 patients with carotid artery stenosis. Those with microplastics and nanoplastics detected in their atheromas presented 4.5x higher risk of suffering a major adverse cardiovascular event (MACE) during a 34-month follow-up, compared to those without them.
[11]

DOCUMENTED MECHANISMS OF DAMAGE

Chronic inflammation
Microplastics activate an inflammatory response in endothelial and immune cells, accelerating atherosclerosis.

Oxidative stress
Generation of free radicals that damage cell membranes, mitochondria, and DNA.

Thrombosis
Microplastics are found in human clots across multiple anatomical sites. These clots alter coagulation dynamics.

Myocardial fibrosis
Mitochondrial damage and death of cardiac muscle cells. Studies in human cardiac organoids confirm direct cardiotoxicity.
[11] · [12] · [13] · [14] · [15]

CHEMICALS IN PLASTIC: ENDOCRINE DISRUPTORS

Plastics contain thousands of chemical additives. The most extensively studied—bisphenol A (BPA) and phthalates—are endocrine disruptors known to impact multiple biological systems.

Bisphenol A (BPA)
MIMICS ESTROGEN

Found in food packaging, thermal receipts, baby bottles, and medical equipment. Classified as a Substance of Very High Concern by the EU. Associated with breast cancer, diabetes, premature puberty, and thyroid alterations.
[16]

Phthalates
HIGH REPRODUCTIVE RISK

Used as PVC plasticizers. Present in medical tubing (DEHP), toys, cosmetics, and packaging. They reduce testosterone and estrogen levels, and block thyroid hormone. Associated with infertility, miscarriages, insulin resistance, and obesity.
[16] · [17]

Lead and cadmium
NEUROTOXIC

Heavy metals are used as pigments and stabilizers in PVC and colored plastics. There is no safe level of lead exposure. It causes brain damage in children, alters cognitive development, and has hormone-disrupting effects.
[16]

PFAS
FOREVER CHEMICALS

Per- and polyfluoroalkyl substances are used in non-stick pans, food packaging, and textiles. Present in almost every person living in the US. Linked to cancers, immune alterations, and liver disease.
[18]

Plastics in the food and medical settings **transfer complex mixtures of hazardous chemicals** that act synergistically. A 2024 study analyzed 36 food containers from 5 countries and confirmed endocrine-disrupting activity in **all the tested plastic materials**, regardless of their country of origin.
[19]

MAP OF DOCUMENTED IMPACTS BY SYSTEM

Reproductive system
Reduced male and female fertility. Miscarriages, pre-eclampsia, and early menopause. Fetal and neonatal exposure via the placenta and breast milk. Epigenetic alterations across multiple generations.
[20]

Nervous system
Documented neurotoxicity. Microplastics found in brain tissue. Linked to cognitive decline and Alzheimer's disease progression in animal models. Neurodevelopmental damage during perinatal exposure.
[21]

Skeletal system
Microplastics found in bone tissue. They alter bone marrow stem cells and promote the generation of osteoclasts, which degrade bone. Linked to the global increase in osteoporosis.
[22]

Cardiovascular system
Accelerated atherosclerosis. Microplastics in carotid and coronary artery plaques. 4.5× increase of MACE risk. Associated with cardiac fibrosis, endothelial dysfunction, and coagulation disorders in clinical and experimental studies.
[11] · [12]

Metabolism
BPA and phthalates are linked to obesity and diabetes. They alter adipogenesis, insulin signaling, and appetite regulation. Plastic "obesogens" are cofactors in the global overweight epidemic.
[23]

Respiratory system
Higher concentration of microplastics in lung tissue. Inhalation of synthetic fibers and airborne nanoplastics. Linked to chronic lung inflammation, oxidative stress, and potential carcinogenesis.
[24]

Growing evidence indicates that plastic pollution is an emerging determinant of public health. Like other health crises, prevention is better than cure. Political and technical will are needed to reduce plastic production at the source and replace hazardous chemicals.

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