MOD007691

Assignment E010

2050707

14/02/2022

# Introduction

1. The Chartered Institute of Environmental Health (CIEH) represents Environmental Health practitioners (EHPs) across the UK.
2. Since 1883 CIEH has developed and promoted environmental standards that contribute to better public health and is responsible for training and accrediting EHPs.
3. Our mission is:

*“Safer, cleaner and healthier environments for the benefit of all”*

1. EHPs work in local authorities and independently to ensure food safety standards, environmental protection and support general health improvement.
2. We welcome the opportunity to submit evidence on the growing threat plastic pollution poses to food safety, the environment and public health.

# Evidence

## The scale of the problem

1. Since the1950s more than 8.5 billion tons of plastic have been generated of which an estimated 600 million tons have been recycled (7%) and 5700 million tons (67%) has been discarded or burned.[[1]](#footnote-21) plastic waste.(Geyer, Jambeck, and Law (2017)) Over than 300 million tons are produced each year, of which 40% are single-use.(Waring, Harris, and Mitchell (2018))
2. In a single year over 10 million tons of plastic waste is estimated to enter the oceans from the 192 coastal countries around the world. (Jambeck et al. (2015))
3. Most plastic waste ends up in landfill sites, waterways and the oceans. (Ritchie and Moser (n.d.))
4. The effect of ultra-violet light in combination with attrition from wind and waves degrades larger plastic pieces into microplastics (MPs) - particles < 5mm in size; and nanoplastics (NPs) - particles under 0.1 micrometer.
5. Although macroplastics can directly harm larger animals, MPs and NPs are now ubiquitous in the environment and there is widespread human and ecosystem exposure.
6. Microplastic pollution has been found in the Antarctic (Cunningham et al. (n.d.)), and in deep-see marine animals in the Mariana Trench at a depth of 10,000m. (Jamieson et al. (2019))

## Human exposure to microplastics

1. There are 3 main routes for human MP exposure - ingestion, inhalation and transdermal (through the skin).
2. Ingestion occurs principally through consumption of contaminated drinking water and seafood.
3. Inhalation - microfibres from clothing, tyre and road wear

### Airborne

### Food and gut health

### Measuring exposure

## Plastic exposure and public health

### Cellular effects

### GI effects

### Neurotoxicity

## Future threats

# Recommendations

1. Actions to reduce exposure
2. Waste management
3. Improved measurement and surveillance of exposure
4. Sewage and water
5. Plastic

# References

Cunningham, Eoghan M, Sonja M Ehlers, Jaimie T A Dick, Julia D Sigwart, Katrin Linse, Jon J Dick, and Konstadinos Kiriakoulakis. n.d. “1 High Abundances of Microplastic Pollution in Deep-Sea Sediments: 2 Evidence from Antarctica and the Southern Ocean,” 29.

Geyer, R, K. L. Jambeck, and J. R. Law. 2017. “Production, Use, and Fate of All Plastics Ever Made.” *Science Advances* 3 (e1700782): 1–5. <https://www.science.org/doi/10.1126/sciadv.1700782>.

Jambeck, Jenna R., Roland Geyer, Chris Wilcox, Theodore R. Siegler, Miriam Perryman, Anthony Andrady, Ramani Narayan, and Kara Lavender Law. 2015. “Plastic Waste Inputs from Land into the Ocean.” *Science* 347 (6223): 768–71. <https://doi.org/10.1126/science.1260352>.

Jamieson, A. J., L. S. R. Brooks, W. D. K. Reid, S. B. Piertney, B. E. Narayanaswamy, and T. D. Linley. 2019. “Microplastics and Synthetic Particles Ingested by Deep-Sea Amphipods in Six of the Deepest Marine Ecosystems on Earth.” *Royal Society Open Science* 6 (2): 180667. <https://doi.org/10.1098/rsos.180667>.

Ritchie, H, and M Moser. n.d. “Plastic Pollution.” <https://slides.ourworldindata.org/plastic-pollution/#/1>.

Waring, R. H., R. M. Harris, and S. C. Mitchell. 2018. “Plastic contamination of the food chain: A threat to human health?” *Maturitas* 115 (September): 64–68. <https://doi.org/10.1016/j.maturitas.2018.06.010>.

1. The rest is still in use [↑](#footnote-ref-21)