

Parliamentary Briefing on Endocrine Disrupting Chemicals (EDCs)

What are EDCs?

An Endocrine Disrupting Chemical (EDC) is any chemical that can interfere with normal hormone functions in humans and/or animals.¹ The human endocrine system is a collection of glands which secrete different types of hormones, (including oestrogen) that regulate the body's growth and metabolism, sexual development, and behaviour. Naturally occurring hormones are usually active at very low doses. A healthy endocrine system is essential to the normal functioning of the human body.

Where are EDCs found?

Some EDCs are present in our natural environment including phytoestrogens (found in plants), however, most EDCs are synthetic compounds, only a small fraction of which have been investigated in tests capable of identifying endocrine effects in intact organisms.²

EDCs are found in a wide variety products including personal care products and plastics, in pesticides and in various forms of environmental pollution, such as leaching from landfill sites and wastewater effluent.³ They are commonly detected in wild-life and human body fluids and tissues.⁴ EDCs enter the human body principally through ingestion of contaminated food and water, or through skin from personal care products and exposure to soil or dust particles.

The health effects of EDCs

There is now a large amount of scientific data that strongly suggests that exposure to EDCs could be causing long term, and in some cases, irreversible damage to wildlife, our environment and human health. Many synthetic EDCs are persistent organic pollutants, such as polychlorinated biphenyls (PCBs), and decompose very slowly. Their concentrations increase constantly up the food chain and will be highest amongst those at the top (including humans).

The detrimental effects of EDCs amongst wildlife are well documented. They include reproductive disorders including "testicular feminisation" in fish,⁵ cancers, adrenal and bone disorders,⁶ reduced biodiversity, population decline,⁷ greater susceptibility to infection,⁸ neurotoxicity and thyroid problems.⁹ The demonstrable effects of EDCs in wildlife could be indicative of long term effects in the human population.

¹ IPCS. (2002). Global assessment of the state-of-the-science of endocrine disruptors. Geneva, Switzerland, World Health Organization, International Programme on Chemical Safety.

² UNEP/WHO (2013). State of the science of endocrine disrupting chemicals 2012

³ WHO/UNEP (2012) State of the science of endocrine disrupting chemicals <http://www.who.int/ceh/publications/endocrine/en/>

⁴ UNEP/WHO (2013). State of the science of endocrine disrupting chemicals

⁵ Gross-Sorokin MY, et al., (2006). Assessment of feminization of male fish in English rivers by the Environment Agency of England and Wales. Environmental Health Perspectives 114 (1):147-51

⁶ UNEP/WHO (2013). Op.cit.,

⁷ EEA. (2012). The impacts of endocrine disrupters on wild-life, people and their environments—The Weybridge+15 (1996–2011) report.

⁸ Schwacke LH, et al., (2011). Anaemia, hypothyroidism and immune suppression associated with polychlorinated biphenyl exposure in bottlenose dolphins (*Tursiops truncatus*). Proceedings of the Royal Society B: Biological Sciences 279(1726): 48-57

⁹ Boas M, et al., (2012). Thyroid effects of endocrine disrupting chemicals. Molecular and Cellular Endocrinology 355 (2) 240-248.

Whilst it is more difficult to demonstrate their effects in humans, there is now strong scientific evidence that EDCs could be linked to a range of adverse health problems. This is also the view of the UN environment agency, the World Health Organisation¹⁰ and the European Environment Agency.¹¹

Some EDCs have been reported to cause adverse effects at very low dose levels. There is also concern that exposure to multiple EDCs can cause ‘combination effects’. Therefore, even when each individual chemical is present at a level below the threshold considered to cause harm, in combination with others could form a hazardous cocktail in the human body.¹²

Links to breast cancer

High levels of natural oestrogens, which stimulate growth and differentiation of breast tissue, are an important factor in breast cancer risk. Synthetic oestrogens are known to be associated with increased breast cancer risk.¹³ Hormone replacement therapy (oestrogen plus progesterone or oestrogen alone) used by postmenopausal women increases breast cancer risk significantly.

We are exposed to many EDCs which have been linked to breast cancer. Bisphenol A, phthalates, monoethyl phthalate, parabens, a number of metals, known as “metalloestrogens”, cadmium, and aluminium salts have all been linked to adverse effects on the mammary gland.

There is also considerable evidence that exposure to EDCs during critical moments of development, for example in the womb, during early infancy, childhood or during puberty, could increase the risk of developing breast cancers later in life.

The economic impact of EDCs

It has been estimated that the health cost to the UK of endocrine related diseases is likely to be in excess of €58 million a year.¹⁴ The World Health Organisation has acknowledged “a failure to adequately address the underlying environmental causes of trends in endocrine diseases and disorders” and highlighted that “the benefits that can be reaped by adopting primary preventive measures for dealing with these diseases and disorders have remained largely unrealized.”¹⁵

What is Breast Cancer UK calling for?

Breast Cancer UK calls for tougher political action on the chemical causes of breast cancer:

- For the prioritisation of the primary prevention of breast cancer;
- For the improved regulation of hormone disrupting chemicals;
- For advice to be given to pregnant women to help them reduce their exposure to potentially harmful chemicals during pregnancy;
- For a ban on the use of BPA in food and drinks packaging as low dose exposures to BPA have been linked to adverse effect on the developing mammary gland; and,
- For improved labelling laws to help consumers make more informed product choices.

¹⁰ UNEP/WHO (2013). Ibid.,

¹¹ EEA. (2012). Op.cit.,

¹² Kortenkamp, A. (2007). ‘Ten Years of Mixing Cocktails: A Review of Combination Effects of Endocrine-Disrupting Chemicals. Environmental Health Perspectives 115(1): 98–105.

¹³ Travis, RC. and Key, TJ. (2003). Oestrogen exposure and breast cancer risk. Breast Cancer Research 5: 239-247.

¹⁴ (HEAL 2014) Health costs in the European Union ‘How much is related to EDCs’ http://env-health.org/IMG/pdf/37_18122014_final_health_costs_in_the_european_union_how_much_is_related_to_edcs.pdf

¹⁵ Schwacke LH, et al., (2011). Anaemia, hypothyroidism and immune suppression associated with polychlorinated biphenyl exposure in bottlenose dolphins (*Tursiops truncatus*). Proceedings of the Royal Society B: Biological Sciences 279(1726): 48-57