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# The Health Impacts of Endocrine Disrupting Chemicals and Climate Change on Children

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## ABSTRACT
Throughout the past 20 years, there have been numerous ecological, economic, and public health crises that have rocked the world, frequently exposing low levels of self-sufficiency and extreme unpreparedness on the side of both European and non-European nations. Adverse events have demonstrated their effects and direct detrimental impact mostly on the population aged 0–18 years, with important repercussions for families and communities. Generally, the most vulnerable suffer the consequences. Environmental pollution and climate change rank highly among the natural disasters that have an effect on children's health. Particularly, there has been a growing correlation between environmental pollution events and many health disorders, such as respiratory diseases, cardiovascular diseases, infectious diseases, diabetes, and allergic diseases linked to elevated allergen production. Data from the literature have demonstrated the detrimental effects of chemicals on children's health, with endocrine disruptors receiving particular attention due to the potential harm they may bring to a variety of endocrine and non-endocrine systems. In order to further increase pediatricians and public health authorities' understanding of this crucial issue for the future of children's health, this brief overview examines the significant effects of environmental pollution and climate change on children's health.

**Keywords:** Climate Change, Endocrine Chemicals, Child Health, Child Obesity.

## INTRODUCTION
Natural disasters, global economic downturns, and public health emergencies that have periodically rocked the world over the past 20 years have frequently exposed poor levels of self-sufficiency and severe lack of readiness on the part of both European and non-European nations nations (European., 2022; Karanikolos et al., 2013 & Fauci et al., 2020). Adverse events have demonstrated their effects and direct detrimental impact mostly on the population aged 0–18 years, with important repercussions for families and communities. Generally, the most vulnerable suffer the consequences. In order to research, identify, and clarify what priorities govern the management of significant health emergencies at all levels in this demographic group, it makes sense to draw lessons from past unfavourable experiences in order to appropriately address public health catastrophes in the future. Among the natural disasters that affect children's health, pollution and climate change rank highly (Council., 2022). The research that shows environmental pollution and global climate change have a significant impact on children's health was recently highlighted by the European Paediatric Association, Union of National European Paediatric Societies and Association (EPA-UNEPSA) in a commentary (Ehrich et al., 2016). The idea that children, especially those from lower socioeconomic backgrounds, are more likely to suffer illnesses for which climate change may be directly or indirectly responsible has been highlighted by EPA-UNEPSA (Council., 2022; Ehrich et al., 2016). Numerous studies have been conducted on the possible health implications of climate change and related unfavourable events that have recently impacted people worldwide (Jochen et al., 2022). These include natural disasters brought on by heat waves and other extreme weather, an increase in zoonoses, respiratory illnesses brought on by aeroallergens and air pollution, a shortage of water, and food that is not very nutritious (Council., 2022; Ehrich et al., 2016; Jochen et al., 2022).

## NATURAL DISASTERS AND CLIMATE CHANGE
Health emergencies and natural and economic disasters are related phenomena (Pettoello et al.,2016; Schnyder et al.,2013). Since the turn of the 20th century, researchers have been studying for decades how public health emergencies and natural disasters affect economic instability. However, because natural, economic, and

public health emergencies seem to be viewed by governments and legislators as unpredictable events, interest in, studies of, and analyses of these phenomena seem to be restricted to experts and practitioners in the fields of public health, economics, and disaster management. Trauma is a widespread issue [11Around the world, terrible natural disasters and disasters happen on a regular basis. These occurrences require relief and recovery efforts, including suitable health methods (Schnyder et al., 2013). Because these disasters are impacted by multiple causes, such as population movements, economic interconnectedness, climate change, and the broader phenomena of globalisation, their nature and repercussions become increasingly complex (Centre., 2022). About 1.3 million people, including 320,000 children, have died as a result of geophysical and climate-related disasters over the past 30 years, while an additional 4.4 billion have been injured, left homeless, displaced, or in need of emergency assistance (Centre., 2022). Over 90% of all disasters were caused by floods, storms, droughts, heat waves, and other extreme weather phenomena. The majority of casualties were caused by geophysical events. More than two billion people were impacted by floods, and an additional 1.5 billion people were impacted by droughts (Centre., 2022). During that time, storms, such as hurricanes and tropical cyclones, killed 233,000 people and earthquakes killed close to 750,000. One-off incidents can have catastrophic consequences; the 2008 Chinese earthquake claimed around 70,000 lives, injured close to 375,000, and left about 18,000 unaccounted for (Cheng et al 2018). More than 170 million children are thought to be impacted by natural disasters linked to climate change each year, and a significant number of children are reported to be killed or severely injured as a result of these disasters each year, while the exact figure is yet unknown (Codeanu et al., 2018; Pass Philipsborn et al., 2018). Over $2900 billion is estimated to have been lost in direct economic losses as a result of all natural disasters. Around the world, economic hardship and poverty are caused by climate-related disasters, which resulted in an estimated $23 trillion in losses last year, or 77% of overall economic losses. Children account for at least 85% of the population that contracts diseases linked to climate change(Codeanu et al., 2018; Pass Philipsborn et al., 2018).

## ENDOCRINE DISRUPTORS (EDCS) AND THEIR CONSEQUENCES ON CHILDREN'S HEALTH

One notable development in the field of environmental contaminants is the study of EDCs, which have several classifications. According to the World Health Organisation, these are exogenous compounds or mixes that have the potential to disrupt the endocrine system's functioning and, as a result, have a negative impact on whole organisms, their progeny, or particular subpopulations. The internationally renowned Endocrine Society uses this word to describe any kind of interference with any part of hormone function caused by exogenous (non-natural) substances or a combination of them. Since the end of World War II, an estimated 140,000 chemicals have been generated, with an average of 1000–2000 produced year, of which roughly 800 are recognised or suspected to interfere with the endocrine system. But only few of them have undergone in-depth, methodical research. EDCs are man-made chemicals that are present in many commonplace items, such as clothing, medications, toys, medical equipment, disinfectants, food and its containers, furniture, building supplies, and cosmetics and personal care items. Humans and animals also frequently come into contact with these chemicals. EDCs may enter the body through the skin, respiratory, or oral channels. Because EDCs may be present in contaminated water and food through direct contamination or migration from so-called "Food Contact Materials" (FCMs), which are materials that come into contact with food during production, packaging, transportation, storage, processing in the kitchen, and serving style, the oral route is generally regarded as the most significant (Groh et al., 2021). There is still a dearth of information regarding FCMs' roles, thus more research is required. It is noteworthy, nonetheless, that over half of the additives approved for use in the US lack sufficient toxicological testing, and that over 175 compounds have been identified as potentially migrating (Groh et al., 2021).

It has also been shown that interference affects the enzymatic processes that define neurotransmitter production and steroidogenesis. Thyroid hormones, whose significance for appropriate brain development is widely recognized, were previously believed to be negatively impacted by EDCs in terms of their influence on neuro-cerebral development, a key contemporary issue for fetal health. It has been suggested that the term "endocrine and nerve disruptors" (ENDs) be used in place of the prior definition of EDCs because it is now thought that over 80% of the effect takes place through alternative pathways (Raja et al., 2021).

## ABSENCE OF RESEARCH ON POPS AND CHILDHOOD OBESITY

Given that adipose tissue is heavily contaminated with POPs, it is crucial to take into account the role of POPs in obesity and related obesity studies (Lee et al., 2017). Studies examining their levels in connection to childhood obesity are scarce, nevertheless. It would be a significant accomplishment to measure the levels of these endocrine-disrupting substances in children, as it seems that exposure during early life might cause changes that persist into maturity and are irreversible (Janesick & Blumberg., 2016). Because endocrine disruptors are linked to poor neurobehavioral outcomes, delayed pubertal development, and an increased risk of obesity, they may be especially dangerous for children (Braun., 2017). Furthermore, there is evidence to show that early exposure to certain environmental toxins is linked to a higher risk of metabolic illnesses in childhood (Russ K, Howard.,2016). Despite significant evidence being available, the exact method by which POPs may change a child's metabolism is still not entirely known. POP exposure changes mitochondrial function and raises oxidative stress in rats and cultured cells (Lee et al., 2017). It is also well recognised that the primary anomaly responsible for insulin resistance and cardiovascular disease is mitochondrial malfunction (Cho K et al., 2017). Therefore, it would be crucial to elucidate the relationship between POP and mitochondrial dynamics in obese children in order to conduct further research in this area of POP activity.

## CONCLUSIONS

Although the whole growing and development stage is thought to be crucial for maturity, fetal life has received extra attention recently. In fact, it has been shown that specific types of EDCs are present in mother blood, urine, and hair at different points throughout pregnancy. They have the potential to influence healthy growth, hormonal balance, and inflammatory responses at the placental level. It has also been reported that they travel through the placenta passively or via particular, as of yet unknown, routes of transport. It is suggested that the placenta metabolizes no more than 20 percent of the chemicals tested based on differences in concentrations between the mother and the fetus. In addition to the previously mentioned changes in fetal development of the male genital apparatus, this may also lead to changes in the course of pregnancy (miscarriages), maternal pathologies (preeclampsia and gestational diabetes), and damage to neuro-cerebral development as well as decreased pre- and postnatal growth. EDCs have a significant negative influence on children's health, and little is currently known about how these toxins work. Given that environmental pollution and climate change represent one of the biggest dangers to world health in the twenty-first century, pediatricians ought to be trained in environmental health. This would entail investigating a wide range of alternatives to potentially damaging activities, taking preventive action in the face of uncertainty, and enhancing public engagement in decision-making. Lastly, pediatricians need to be proactive in identifying diseases linked to pollution and climate change, as well as in creating early warning systems that can help with prevention and the development of significant mitigation plans.

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