

Infant growth affected by exposure to environmental pollutants

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Credit: Norwegian Institute of Public Health

Even though the levels of two environmental pollutants have declined over the last 20 years, they may still have adverse effects on children's development, according to a new study by the Norwegian Institute of Public Health. This is the largest study of environmental pollutants and infant growth to date.

Researchers investigated whether exposure to two [persistent organic pollutants](#) before and after birth was associated with rapid growth in infancy, a known risk factor for obesity in later life:

- polychlorinated biphenyl 153 (PCB153), a chemical used

extensively in windows and electrical equipment in Norway before being banned in the 1990s

- p,p'-dichlorodiphenyldichloroethylene (p,p'-DDE), a metabolite of the controversial pesticide
1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane (p,p'-DDT), now only used in malaria control

Due to their long half-lives, these pollutants accumulate and become concentrated in the food chain. Humans are exposed to them through food, particularly seafood and breast milk.

Affects growth

The researchers found that maternal levels of DDE (indicating the levels to which the foetuses were exposed to in utero) were significantly associated with rapid growth in early life. They also found that levels of PCB153 in milk and the amount transferred through breastfeeding were associated with decreased infant growth and falling below expected growth curves.

"Although PCB and DDE levels have declined markedly over the last 20 years, our study shows that even the lower levels that European infants are exposed to today may affect their development. This is important information for regulatory bodies, and emphasises the need to continue to reduce these pollutants in the environment," says Merete Eggesbø, Principal Investigator of the HUMIS cohort study at the Norwegian Institute of Public Health.

"We also need to identify any unwanted effects from pollutants transferred through [breast milk](#) so we can establish optimal breastfeeding recommendations," she adds.

About the study

The study was led by Eggesbø and Hein Stigum and analysed by Nina Iszatt, all from the Division of Epidemiology at the Norwegian Institute of Public Health. Firstly, an advanced model for estimating exposure in the breastfeeding period was applied. Then data from 7 European birth cohort studies, including the Norwegian HUMIS cohort study, were combined to give a study group of 2500 mother-child pairs.

The study was funded by the EU grant OBELIX and the Norwegian Research Council, as well as by the governments and/or local funding agencies in the countries of the participating cohort studies.

Earlier research

Animal studies suggest that exposure to these chemicals contributes to obesity by affecting endocrine and neuronal pathways. Previous studies in humans have been small, and focused mainly on the intrauterine/prenatal period, not taking the transfer of pollutants during breastfeeding into account.

The majority of previous studies also report a positive association between [prenatal exposure](#) to p,p'-DDE and growth/body mass index in childhood.

According to the researchers, the significant decline in [birth weight](#) reported by Govarts et al. (2012) supports these results. It was indicated that PCB-153 in utero may cause low birth weight, with continued exposure during breastfeeding causing further suppression of growth that is not explained by the lower birth weight.

Limitations

Even though this is the largest study to date in this field and the results are convincing, there is always the risk of unmeasured and unknown confounding factors. Also the data, especially about breastfeeding, have certain degrees of inaccuracy that may have diminished our results. The inconsistency across cohorts also indicates factors involved that we do not yet understand.

We could have had a better estimate of prenatal exposure (unconfounded by postnatal [exposure](#)) if we restricted our analysis to babies who were not breastfed. However, there were not enough cohorts with non-breastfed babies to make this possible.

More information: Iszatt N. et al. "Prenatal and postnatal exposure to persistent organic pollutants and infant growth: a pooled analysis of seven European birth cohorts." Environ Health Perspectives 2015: [DOI: 10.1289/ehp.1308005](https://doi.org/10.1289/ehp.1308005)

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