

Exposure to organochlorine pesticides in the womb linked to poorer lung function in childhood

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Babies exposed to higher levels of organochlorine compounds in the womb go on to have worse lung function in childhood, according to new research presented today (Tuesday) at the European Respiratory Society International Congress.

These compounds, which include the pesticide DDT, as well as electrical insulators and other industrial products, are now banned in most parts of the world. However, because they degrade very slowly, they are still present in the environment and in foods.

Previous research has suggested links between exposure to these chemicals in the womb and parents reporting childhood respiratory diseases such as wheezing, asthma, and chest infections. The new study is the first to show a link with objective measures of [lung](#) strength and capacity in relation to low-level exposure to these chemicals.

The researchers behind the study say this finding is important in terms of trying to improve the health of all children through monitoring and controlling harmful substances, but that the effect on individual children's lungs is small.

The study was presented by Dr. Maribel Casas, assistant research professor at the Barcelona Institute for Global Health (ISGlobal), a centre supported by the "la Caixa" Foundation, Spain. She explained:

"We already have evidence that exposure to environmental chemicals including organochlorine compounds can have an impact on children's health. Even though this group of chemicals were banned in the 1970s, low but detectable levels are still present in pregnant women and in children. That means current populations and future generations are still exposed to these compounds."

Organochlorine compounds are thought to disrupt the hormone system and have been linked to a wide range of conditions including cardiovascular disorders, cancers and low birth weight babies. The main source of exposure is through the foods we eat but foetuses and newborns can be exposed via the placenta and breastfeeding.

Dr. Casas and her colleagues studied 1,308 babies who were born in the Valencia, Gipuzkoa, and Sabadell regions of Spain between 2004 and 2008. They measured the levels of seven different organochlorine compounds in the pregnant mother's blood or in blood taken from the umbilical cord.

As the children grew older, they were asked to take part in tests to measure their lung function at the age of four years, and again at seven years. This was done by trained nurses or by paediatric pulmonologists using a spirometer to measure children's lung volume and check for any signs of obstruction in the airways.

In particular, the researchers found that levels of DDE—a [chemical](#) formed when DDT breaks down—were linked with poorer lung function in children at both four and seven years old. For example, exposure to maternal concentrations of DDE between 0.23 and 0.50 nanograms per millilitre was associated with a 50-millilitre reduction in how much air children could blow out in one second (FEV1). Among those in the study the average (median) level of DDE was 0.28 nanograms per millilitre.

Dr. Casas said: "A reduction of this size in the amount of air a child can blow out would not be considered clinically relevant for a healthy child, but these smaller changes are highly relevant at population level and can be important in children with respiratory conditions.

"To reduce exposure to these chemicals, women of reproductive age can try to moderate consumption of foods with high levels of organochlorine compounds, such as fatty meats and oily fish.

"We know that this group of chemicals can interfere with the body's hormone system and we also know that hormone receptors play an important role in foetal development of the lungs, so this could be the mechanism for a link."

The researchers hope to study the impact of exposure to organochlorine compounds in the womb on older children and teenagers to understand whether this effect persists in the longer term.

Professor Mina Gaga is President of the European Respiratory Society, and Medical Director and Head of the Respiratory Department of Athens Chest Hospital, Greece, and was not involved in the study. She said: "We know organochlorine compounds are still in our environment so it's important that we continue to monitor their levels and try to learn more about their effects. Babies and children are the most susceptible population since their organs are still under development, and damage to the lungs at birth can have a huge impact in later life. A clear link has been demonstrated between low [lung function](#) in early adulthood and respiratory, cardiovascular and metabolic issues in later life, and ultimately premature death.

"There are other chemicals present in the environment, such as phthalates or phenols for example, that may also have the potential to interfere with children's developing lungs. Studies on these individual

[compounds](#), and assessing combination of chemicals, are needed to understand their effects on childhood respiratory and overall health."

More information: Abstract no: PA5015, "Prenatal exposure to organochlorine compounds and lung function until early adulthood", M. Casas; Primary ciliary dyskinesia and lung function tests in respiratory morbidities, 14:45 hrs CEST, Tuesday 18 September, Paris Expo Porte de Versailles.

Provided by European Lung Foundation

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