

# Science for Environment Policy

## Exploring the exposome: study measures multitude of environmental influences on health

**Scientists have measured how children and pregnant women are exposed to over 120 environmental factors influencing our health — from air and noise pollution to green space and access to public transport.** The study gathered and analysed data from six European countries to build a picture of the 'exposome' — the array of environmental factors that humans are exposed to from the moment they are conceived. A better understanding of the exposome could help us understand the role of the environment in the onset of various diseases, including cancer and other chronic disorders such as cardiovascular disease.

**Our environment has a major influence on our health, particularly during the *in utero* (pre-birth) and childhood stages of life.** Exposure to contaminants and stressors of the urban and built environment during these vulnerable stages can modify our bodies' physiological and metabolic responses, increasing our chances of developing chronic diseases later in life.

There is, therefore, a growing interest in defining the exposome in order to better understand the environment's role in disease. The exposome consists of potentially hundreds of factors, many of which may be connected — and our knowledge of it remains scarce. To date, most research on environmental effects on health have only focused on single factors, such as air pollutants, and do not reflect the complexity of the real-world environment.

This new study, conducted under the EU [HELIX project](#)<sup>1</sup>, provides information that could help characterise the exposome for children in Europe. The researchers gathered data from environmental exposure studies of pregnant women and their children in six countries: France, Greece, Lithuania, Norway, Spain and the UK.

In total, 1301 women were assessed for exposure to 87 environmental and lifestyle factors during pregnancy. These included various air pollutants, surrounding natural spaces, the built environment (e.g. population density, access to bus stops), various persistent organic pollutants (POPs), diet, physical activity and smoking levels. Their children were assessed for exposure to 122 factors at a follow-up visit six to 11 years later.

The results demonstrate the complexity of the exposome; it varied significantly by location and time and could not be easily measured or summarised. There were few clear patterns in the data to suggest strong relationships between different types of environmental factors or lifestyle influences, or between the periods of pregnancy and childhood. However, in some cases this lack of pattern is noteworthy in itself — for instance, the low correlation between lifestyle factors and exposure to pollution may suggest that lifestyle is less influential on the health effects of pollution than studies often assume.

The researchers did notice some general clusters of factors — those more likely to occur alongside each other. For instance, higher blood concentrations of PFAS (per- and polyfluoroalkyl substances) and organochlorine POPs in pregnant women often occur alongside higher blood concentrations of arsenic, mercury and caesium, and in conjunction with consumption of alcohol, fish, fruit and vegetables. This pattern was very similar for their children, with some exceptions. For example, caesium levels were less closely linked with these factors than for pregnant women, but PBDE (polybrominated diphenyl ether — another POP) was more closely linked.

It should be noted that this study only assessed correlation, and did not look at cause and effect relationships or the impacts of exposure.



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10.1016/j.envint.2018.11.067. This study is free to view at:

<https://www.sciencedirect.com/science/article/pii/S0160412018316295?via%3Dihub>

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