Changes in background exposure to pollutants for German children

Children are thought to be at greater risk from exposure to environmental pollutants than adults because their bodies are still developing and their lower body weight means that relative exposure is higher. A new study reports background exposure levels in German children aged 3-14.

Exposure to environmental pollutants can be measured by monitoring pollutants in the human body, known as ‘biomonitoring’. Germany has a long history of biomonitoring and its Human Biomonitoring Commission has established reference values to assess exposure. A reference value indicates the upper level of background exposure (or exposure naturally present in the environment) of a certain pollutant for a certain population at a certain time. Due to changing environmental conditions, reference values need to be regularly updated.

Results from the German Environmental Survey on Children 2003-2006 (GerES IV) on pollutant levels in blood and urine were used to update the reference values in Germany. The sample consisted of 1790 children living in 150 different locations in Germany.

Compared with previous data, the measured concentrations of cadmium, lead and mercury in blood and urine had decreased and the reference values were adjusted to reflect this change. The lower levels of these pollutants may be due to the control of industrial emissions, replacement of lead water pipes and limited use of amalgam fillings in children. Arsenic’s reference value remained the same and, for the first time, reference values were derived for antimony, nickel, thallium and uranium.

First-time reference values were also set for several compounds associated with the toxic effects of polycyclic aromatic hydrocarbons (PAHs). PAHs are produced by burning carbon-containing fuels and are carcinogenic. The data indicated there was a higher level of PAH exposure in eastern Germany probably due to higher air pollution from fuel and industry.

Three first-time reference values were established for compounds associated with the toxic effects of pesticides. In addition the reference values for two other pesticide-related compounds (DMP and DMTP) were lowered and reference values of three others (cis-Cl2CA, trans-Cl2CA and 3-PBA) were confirmed.

Although the production and use of the most persistent organic compounds was banned, the effects of organochlorine compounds are still present in the environment. Four reference values for these compounds were confirmed and two were lowered.

The research stressed that reference values are based on statistics and do not represent exposure limits above which the pollutants become toxic. They can be used to assess exposure of individuals or groups and classify them as “elevated” or “not elevated” compared with a general background exposure. Work on a coherent approach for a harmonised HBM in Europe is progressing. The COPHES network to further implement HBM on the European scale commenced in December 2009.

1. See www.umweltbundesamt.de/gesundheit-e/monitor/index.htm
2. See www.eu-humanbiomonitoring.org/
3. See www.umweltbundesamt.de/gesundheit-e/survey/us03/uprog.htm
4. COPHES is supported by the European Commission under the Seventh Framework Programme. See: www.eu-humanbiomonitoring.org/sub/news.htm


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