

CHILDREN AND EXPOSURE TO HIGHLY CHLORINATED CHEMICALS



In recent years, some people have expressed concerns about possible links between exposure to chemicals and subtle effects on the developmental health of children. There is particular concern about the trace quantities of highly chlorinated organic compounds – such as dioxins, PCBs and DDT - that are found in the environment, the food chain and thus in breast milk.

POSSIBLE HEALTH CONCERNS

A number of scientific studies have reported links between adverse neurobehavioural effects in infants and young children and the levels of organochlorine compounds in maternal blood and breast-milk.

The research suggests that high intakes of certain heavily chlorinated organic chemicals by breast-fed babies may retard their intellectual development and result in reduced intelligence, or IQ. Another worry is that a contaminated maternal blood supply might affect the unborn child and cause neurodevelopmental and thyroid hormone changes in later life. However, other studies have failed to find any association between these effects and chemical exposure.

There are many areas of disagreement among scientists who have studied these chemicals. Some of these involve the types of behavioural tests employed, the methods used to examine infants as well as whether tests can be consistently repeated and how data is interpreted. Other contentious areas include the analytical methods used to measure levels of organochlorines in blood and breast milk and the fact that delays in intellectual development - while apparently associated with high levels of organochlorines in breast milk - are not always related to concentrations in umbilical cord blood. Also, the reductions in IQ measured in early life seem to disappear by the time the child reaches about four years old.

DIOXINS: UNINTENTIONAL AND UNWANTED

Probably the best known of the persistent organochlorine compounds are dioxins and furans, which are toxic and bioaccumulative. Dioxins are created primarily as unwanted and unintentional impurities of many industrial or combustion processes (e.g. inadequately equipped waste incinerators, power stations and the metals industry).

DDT AND PCBs

Examples of intentionally manufactured persistent organochlorine compounds include PCBs and DDT (dichlorodiphenyltrichloroethane). PCBs were widely used for more than 40 years in various industrial applications. Production and marketing was banned in the EU in 1985 but enclosed use as dielectric fluids in existing transformers and large capacitors is permitted until 2010 when the PCBs must be safely destroyed.

KEY SCIENCE INFORMATION SHEET

One of a new series Euro Chlor is publishing to improve understanding by non-scientists of scientific issues. Each publication will focus on health or environmental aspects of the production, use and disposal of chlorine and its derivatives. Other information sheets in preparation cover topics such as dioxins, persistent organic pollutants and assessing the risk of organochlorines on the marine environment.

Children and exposure to highly chlorinated chemicals can be found on the Internet at chlorine online (<http://www.eurochlor.org>) where subsequent information sheets will be available.

DDT has been banned for agricultural use in industrialised countries since the early 1970s. However, it is still used as an insecticide to kill mosquitoes in some developing countries where millions of infants, children and adults are at risk from malaria. A global ban is being negotiated under the UN Environment Programme although most negotiators agree that there is a need for exemptions for developing countries struggling with the burden of re-emerging malaria. The WHO recognises that DDT house spraying is essential for public health.

INDUSTRY ACTIONS SHOW POSITIVE RESULTS

A combination of voluntary actions by industry and legislation has reduced environmental levels of persistent organochlorine compounds over the past few decades. The overall result has been a continuous decline in the levels of chemicals found in human milk in Europe and elsewhere. For example, levels of DDE (a breakdown product of DDT) measured in Swedish human milk declined almost 1,000% between 1970 and 1992. Similarly, a nine-year study of Norwegian breast milk showed a 70% decline in the levels of PCBs.

Nevertheless, because highly chlorinated organic chemicals tend to accumulate in fatty materials, during breast-feeding, babies are still exposed to relatively high doses in relation to their weight, over a relatively short period of time in early life. For example, a worst case analysis estimated that dioxin exposure of first born infants during the first two months of life may be 27 to 144 times higher than the tolerable daily intake recommended by the WHO.

A report prepared in 1999 for the European Commission DG Environment found that dioxins in human milk had declined at an average rate of about 8.3% per year over the five years from 1988 to 1993. The decline in the levels of dioxin in human milk is paralleled by reductions in overall dietary exposures of 9-12% annually over the past 20 years.

It is clear that actions taken by the chemical industry over the past decades have greatly reduced exposure of humans and the environment to highly chlorinated organic chemicals. Continuing efforts together with new initiatives - such as the international convention on persistent organic pollutants (POPs) - will continue to drive down exposures towards natural background levels.

WHO CONCLUSION

The WHO has concluded that any risk associated with breast-feeding is small as compared to its well-established benefits. Nevertheless, there are understandable concerns about children's health. This is especially true for specific groups of people or communities. For example, in high northern latitudes the Inuits may be at special risk because dioxins are especially soluble in fatty substances and these peoples consume high amounts of sea mammal fat.

EURO CHLOR POSITION

Euro Chlor member companies are committed to supporting the European chemical industry's voluntary multi-year scientific and testing initiative to address public health concerns. When appropriate, such research focuses on children's health and safety.

The chlor-alkali sector recognises its overall responsibility to consumers and through responsible handling and disposal of chemicals continues to minimise emissions, discharges and losses. As part of its commitment to *Responsible Care*, the chemical industry works with customers to ensure safe disposal and destruction of chemicals after use. Collaboration with governmental and other researchers to understand better suspected health effects will help avoid any chemical exposures which may contribute to these effects, particularly on fetuses or newborn infants.

FURTHER INFORMATION:

Prof. André Lecloux
Euro Chlor
Avenue E Van Nieuwenhuyse 4, box 2
B-1160 Brussels, Belgium

Tel: + 32 (0) 2 676 73 06
Fax: + 32 (0) 2 676 72 41
E-mail: ale@cefic.be

