WHO/EURO ACTIVITIES ON RISK ASSESSMENT AND REGULATORY MEASURES CONCERNING PCDDs, PCDFs AND PCBs

Ulf G. Ahlborg[1], Maged Younes[2] and Erkki Yrjänheikki[3]
[1]Institute of Environmental Medicine, Karolinska Institute, Box 210
S-171 77 Stockholm, Sweden
[2]WHO European Centre for Environment and Health, P.O. Box 1,
3720 BA Bilthoven, The Netherlands
[3]Ministry of Labour, Occupational Safety and Health Division, P.O. Box 536,
SF-33101 Tampere, Finland

1. Introduction

Since 1985 the Regional Office for Europe of the World Health Organization (WHO/EURO) has been coordinating a comprehensive programme on PCBs, PCDDs and PCDFs. This programme has been developed as a result of the public concern throughout Member States caused by the discovery of these highly toxic chemicals in the environment, in certain foodstuffs and even in human milk. This concern led to a debate concerning the safety of breast-feeding. The above programme includes a series of planning meetings, studies, consultations, working groups and expert work, all carried out in collaboration with other international organizations and national institutions. It constitutes a major component of the European Chemical Safety Programme of WHO, which is being coordinated at the Bilthoven Division of the WHO European Centre for Environmental and Health (WHO/ECEH).

The main purposes of the programme are to:

- develop safety management strategies to evaluate, control and minimize exposure to these chemicals and to prevent environmental emissions;
- assess and minimize the health risks from these chemicals, especially to infants.

The activities developed within the programme can be divided into four categories. These are described shortly in this overview of completed and planned activities, as well as in the more detailed plans of activities. Of the completed activities only the most important are mentioned. Many reports and guidelines have been published so far which have been the focus of considerable international interest.

The working group on assessment of health risks in infants associated with the exposure to PCBs, PCDDs and PCDFs in breast milk in Abano Terme, Italy, in 1987 based its assessment of health risks in infants[1)] on the relatively limited research data available on infant exposure levels and toxicity of these chemicals. This assessment was therefore regarded as an interim evaluation and the meeting recommended that more reliable exposure data should be produced to improve risk assessment. WHO/EURO has therefore been

coordinating analytical exposure studies, the second round of which started in 1992. Samples from 19 countries were collected and analyzed at a qualified laboratory. A consultation was held in Berlin, Germany, in March 1994 to evaluate the results. The results revealed that levels of PCDD/Fs are not increasing in Europe, and that for certain countries a dramatic decrease was evident. With regard to health risks in infants, it was concluded that there was no reason to change the recommendations for breastfeeding. It was recommended that WHO should perform similar field studies periodically (at five-year intervals) to assess trends in time. Besides, it was considered necessary to reevaluate health risks in infants associated with exposure to halogenated organic compounds, in particular in view of the new toxicological data relating to neurodevelopmental effects. Based on the outcome of this evaluation, a reassessment of the TDI value recommended in 1990 might be necessary.

WHO/EURO has also been coordinating interlaboratory quality control studies, as recommended by previous consultations. The results from the second round of these studies were evaluated by consultation in Rovaniemi[2], Finland, in June 1990, and based on its recommendation, WHO/EURO has coordinated a third round of the studies which includes certain foodstuffs, i.e. cows' milk and fish, in addition to human milk and blood. The Consultation to evaluate the results was held in Volterra, Italy, in October 1992.

A consultation in Bilthoven, the Netherlands, in December 1990, developed a Tolerable Daily Intake for 2,3,7,8-TCDD from food[3]. 2,3,7,8-TCDD is the most studied and most toxic congener in the mixture of these chemicals. The meeting did not consider any other congeners of PCDDs and PCDFs, nor isomers of PCBs. It is, however, known that these congeners and isomers exists in environmental samples and in foodstuffs, including human milk. Some of the PCB isomers (so-called planar PCBs) are equally, or even more, toxic than some PCDDs/PCDFs, and their levels in environmental samples are much higher. In order to improve the evaluation of these mixtures and the management of health risks, many countries have developed various models for Toxic Equivalent Factors (TEFs), comparing the toxicity of the various PCDDs and PCDFs to that of 2,3,7,8-TCDD. Recommendations for international TEFs (I-TEFs) for PCDD/Fs were issued by NATO/CCMS in 1988[4]. WHO/EURO together with WHO/IPCS initiated a project to develop and recommend international TEFs for dioxin-like PCBs and that work was completed by a consultation in 1993[5]. The consultation derived interim TEFs for a set of dioxin-like PCBs and also recommended that the data base developed should be expanded to cover PCDD/Fs and that there should be a periodically updating of the TEFs as new data become available.

The above-mentioned activities are closely interlinked and support the overall programme which aims at developing and improving risk assessment and management measures in order to further minimize human health risks and prevent environmental exposure to and emissions of these toxic chemicals.

2. Completed and planned activities

2.1. Assessment of dietary exposure to PCBs, PCDDs and PCDFs: analytical exposure studies and interlaboratory quality control studies

2.1.1 Exposure studies

Analytical field studies on levels of PCBs, PCDDs and PCDFs in human milk[6], 1987. Twelve countries within as well as eight countries outside Europe participated. Consultation on results of studies, Copenhagen, Denmark, February 1988.

Second round of analytical field studies on levels of PCBs, PCDDs and PCDFs in human milk, 1992-1993. 17 countries within, as well as 2 outside Europe, participated. Consultation on the results of the studies, Berlin, March 1994. Summary report available from WHO/ECEH in Bilthoven. Full publication of the results is expected in 1995.

Third round of analytical field studies is planned to be organized in 1997-1998.

2.1.2 Interlaboratory quality control studies

First round of interlaboratory quality control studies on levels of PCBs, PCDDs and PCDFs in human milk[6], 1987. Eleven laboratories participated.

Second round of interlaboratory quality control studies on levels of PCBs, PCDDs and PCDFs in human milk and blood[2], 1989. Nineteen laboratories participated.

Third round of interlaboratory quality control studies on levels of PCBs, PCDDs and PCDFs in human milk, blood, cows' milk and fish, 1991-92. Consultation on the results of the studies, Volterra, Italy, October 1992. Summary report available from WHO/ECEH in Bilthoven. Forty laboratories participated. Publication of the results is expected in 1995.

Fourth round of interlaboratory quality control studies on levels of PCBs, PCDDs and PCDFs in selected media is planned for 1994-95.

2.2 Risk management and risk assessment of PCBs, PCDDs and PCDFs

WHO working group on PCDD and PCDF emissions from incinerators for municipal sewage sludge and solid waste - Evaluation of human exposure[7], Naples, Italy, March 1986.

Consultations on guidelines to control and prevent exposure to PCBs, dioxins and related compounds[8], Helsinki, Finland, August 1985 and January 1986.

WHO working group on assessment of health risks in infants associated with exposure to PCBs, PCDDs and PCDFs in breast-milk[1], Abano Terme/Padue, Italy, February 1987.

Consultation on tolerable daily intake from food of PCDDs and PCDFs[3], Bilthoven Netherlands, December 1990.

Development of new model for Toxic Equivalent Factors (TEFs) for PCDDs/PCDFs and dioxin-like PCBs[5]. Bilthoven, the Netherlands, December 1993.

Development and revision of harmonized TEFs for PCDDs and PCDFs. Planned for 1995 (jointly with IPCS).

Consultation on improvement of health risk assessment in infants based on new results from analytical exposure studies and new model for TEFs, 1994-96.

3. References

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