Human Milk Survey: Human health implications of POPs measured in human milk

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Overview

1. Brief Introduction – GMP POPs

2. Scope of the Survey

3. Human Health Implications
   - Risk of Breastfeeding (Epidemiological studies)
   - Safety standards
   - Benefits of breastfeeding

4. Conclusion
Global Monitoring Plan for POPs

- Article 16 of the Stockholm Convention establishes a **harmonized framework** for the collection of comparable monitoring data on POPs.

- **Two core matrices** for monitoring of POPs: air and human milk and blood.

- Support the effectiveness evaluation under the Stockholm Convention: establishing **trends in levels over time**.
UNEP/WHO human milk survey

- Jointly implemented by the Secretariat, WHO and UNEP DTIE Chemicals Branch.

- Samples collected by participating countries following a comprehensive protocol according to WHO Guidelines.

- All samples are analyzed by the WHO reference laboratory, the State Institute for Chemical and Veterinary Analysis of Food, Freiburg, Germany.

- Per fluorinated chemicals are analyzed at the MTM Research Centre, Örebro University, Sweden.
Scope of the survey

Number of participating countries per region and year

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<td>Total per year</td>
<td>12</td>
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<td>26</td>
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Benefits and Risks of Breastfeeding

**Risks:** dioxins and PCBs, DDT/E

**Benefits:** for child and mother
Dioxin-related health risks

- Several epidemiological studies on health effects in relation to pre- and postnatal exposure to dioxin-like compounds.

- Effects on thyroid hormones, psychomotor development, immunology and physical development observed in the breastfed infant.

- Effects were often transient and considered not to be clinically relevant.
DDT health risks

- DDT and/or DDE shown to cause adverse health effects in the period immediately before and after birth or in early childhood.

- **Transient effects** (e.g. on thyroid hormones and body growth) are minor and possibly not clinically relevant.

- More significant effects have been observed on neuro-cognitive development.
# Safety standards

<table>
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<th>Organization</th>
<th>Safety Standard</th>
<th>Level in Milk</th>
<th>Endpoint</th>
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<tr>
<td><strong>PCDD/PCDF/PCB (TEQs)</strong></td>
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<tr>
<td>WHO (2000)</td>
<td>TDI</td>
<td>1-4 pg/kg bw day</td>
<td>Perinatal effects rodents and monkeys</td>
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<td>WHO (2002)</td>
<td>PTMI</td>
<td>70 pg/kg bw/month</td>
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<td>US EPA (2010)</td>
<td>RfD (proposed)</td>
<td>0.7 pg/kg bw day</td>
<td>Postnatal/childhood exposure humans</td>
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<td>1 pg/kg bw day</td>
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<td><strong>Total PCBs</strong></td>
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<tr>
<td>ATSDR (2004)</td>
<td>MRL subchronic</td>
<td>0.03 μg/kg bw .d</td>
<td>Postnatal effect monkeys</td>
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<tr>
<td><strong>DDT</strong></td>
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<tr>
<td>WHO (2001)</td>
<td>TDI</td>
<td>10 μg/kg bw day</td>
<td>Developmental toxicity in rats</td>
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<td>2300 μg/kg lipid</td>
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Comparison of ‘safe’ levels with exposure

- Uptake of dioxin TEQs via breastfeeding reported in a range of 30 to > 200 pg TEQs/kg bw per day.

- Results of the human milk survey are in line with these estimates.

- For dioxins and PCB, WHO TDI or PTMI is exceeded by one to two orders of magnitude. (several months to 1 yr)

- In all countries except one, human milk levels of DDT are below or around those considered as safe based on the WHO TDI.
Benefits of breast feeding

Based on extensive recent reviews:

- Reduced risk of otitis, gastroenteritis, lower respiratory tract infections, dermatitis, asthma, obesity, and others
- Overall postnatal survival ↑, SIDS ↓, hospitalization ↓

Compelling evidence for overall reduced morbidity and mortality
Conclusions

- Effects arising from exposure to POPs via lactation appear less relevant when compared with in utero exposure.

- Potential health effects of most concern regarding exposure to POPs is reduction of cognitive performance, which may persist in later life.

- Benefits of breast feeding outweigh potential risks.

- All efforts should be directed to further reducing environmental input and human exposure to POPs.

- Remedial actions are necessary in all regions of the world.
2nd phase human milk survey

- Launch of the second phase UNEP/WHO milk survey to detect trends over time for a larger number of POPs.

- Risk benefit assessment taking into account the effects of possible interactions among various POPs measured in human milk.

- Information to be synthesized in regional monitoring reports under the GMP (2015).
Breastfeeding is one of the most effective ways to ensure child health and survival.

If every child was breastfed within an hour of birth, given only breast milk for their first six months of life, and continued breastfeeding up to the age of two years, about 800,000 child lives would be saved every year.

WHO actively promotes breastfeeding as the best source of nourishment for infants and young children.
Thank you

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