



# Human exposure to POPs

## RESULTS OF THE UNEP/WHO HUMAN MILK SURVEY

---

*Ana Priceputu*

*Secretariat of the Basel, Rotterdam and Stockholm Conventions*

*Angelika Tritscher*

*World Health Organization*

30 April 2013

---

- 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**.

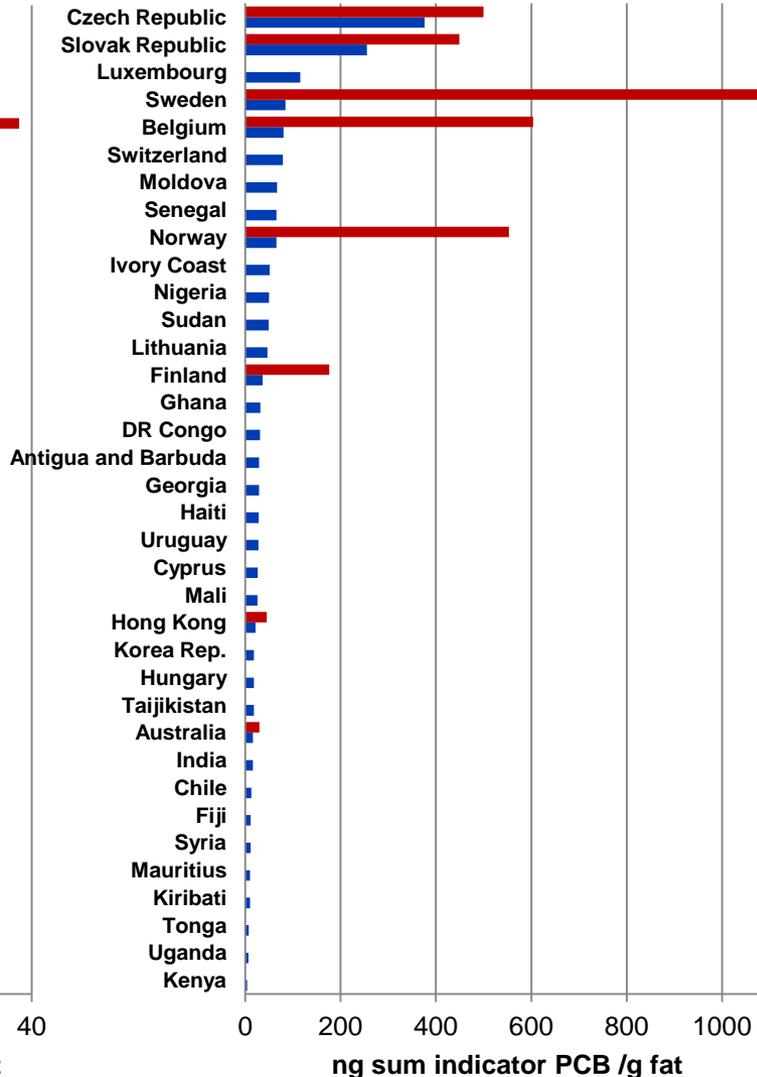
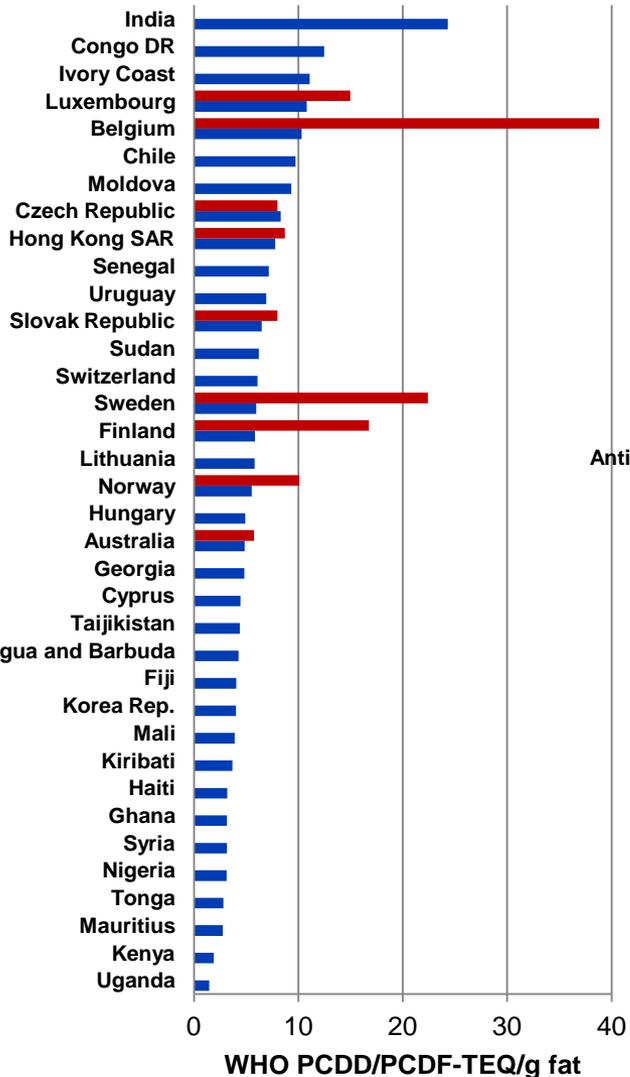
- Jointly implemented by the Secretariat, WHO and UNEP DTIE Chemicals Branch.
- Samples collected by participating countries following a comprehensive protocol according to **WHO Guidelines**.
- All samples are analyzed by **the WHO reference laboratory**, the State Institute for Chemical and Veterinary Analysis of Food, Freiburg, Germany.
- Perfluorinated chemicals are analyzed at the MTM Research Centre, Örebro University, Sweden.

## Number of participating countries per region and year

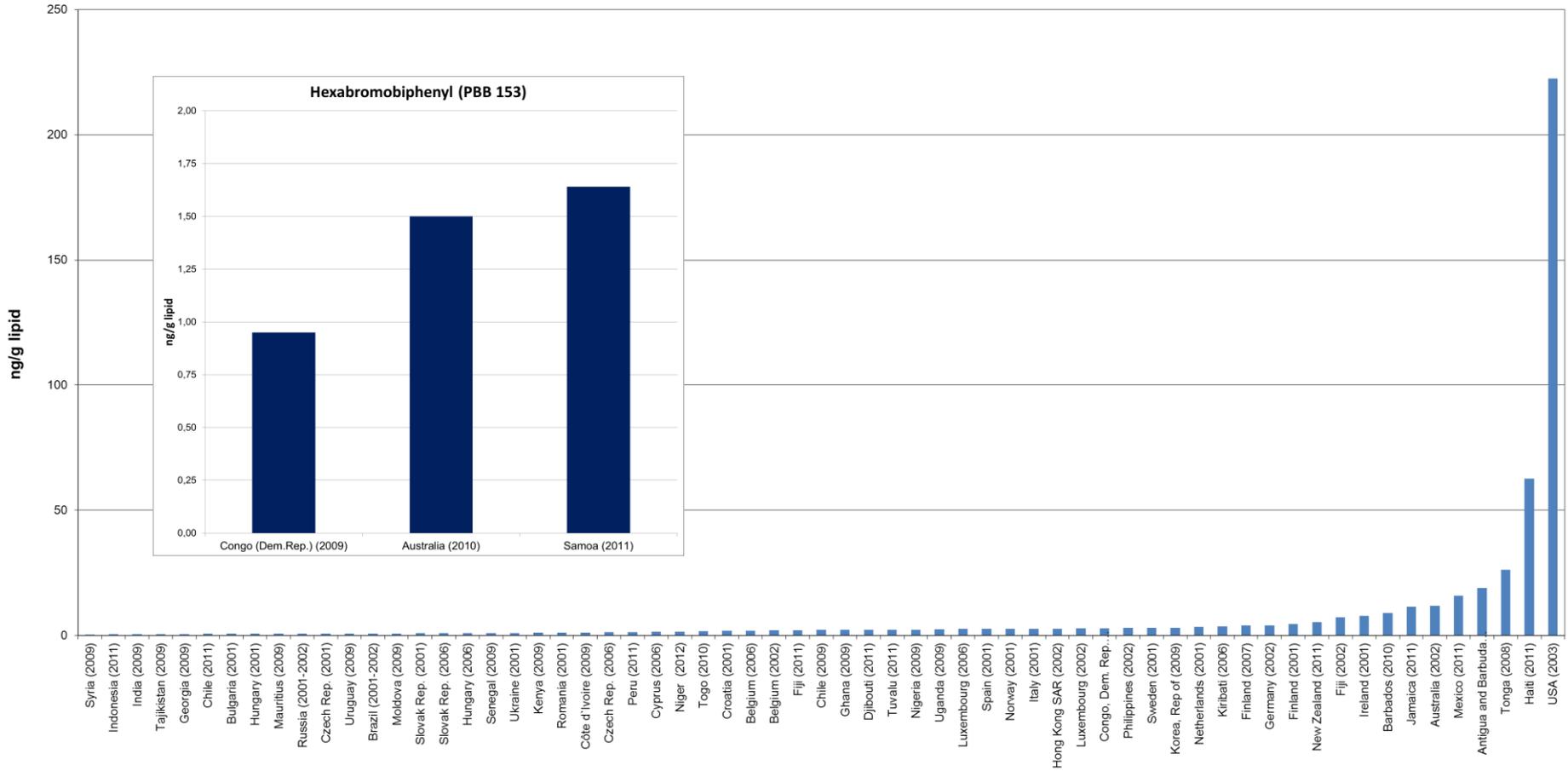
Region	1987-1989	1992-1993	2000-2003	2004-2007	2008-2012	Total per region
Africa			1	2	12	<b>15</b>
Asia and Pacific	1		4	3	16	<b>24</b>
CEE			8	3	3	<b>14</b>
GRULAC			1	1	9	<b>11</b>
WEOG	11	10	12	5	5	<b>43</b>
Total per year	<b>12</b>	<b>10</b>	<b>26</b>	<b>14</b>	<b>45</b>	<b>107</b>

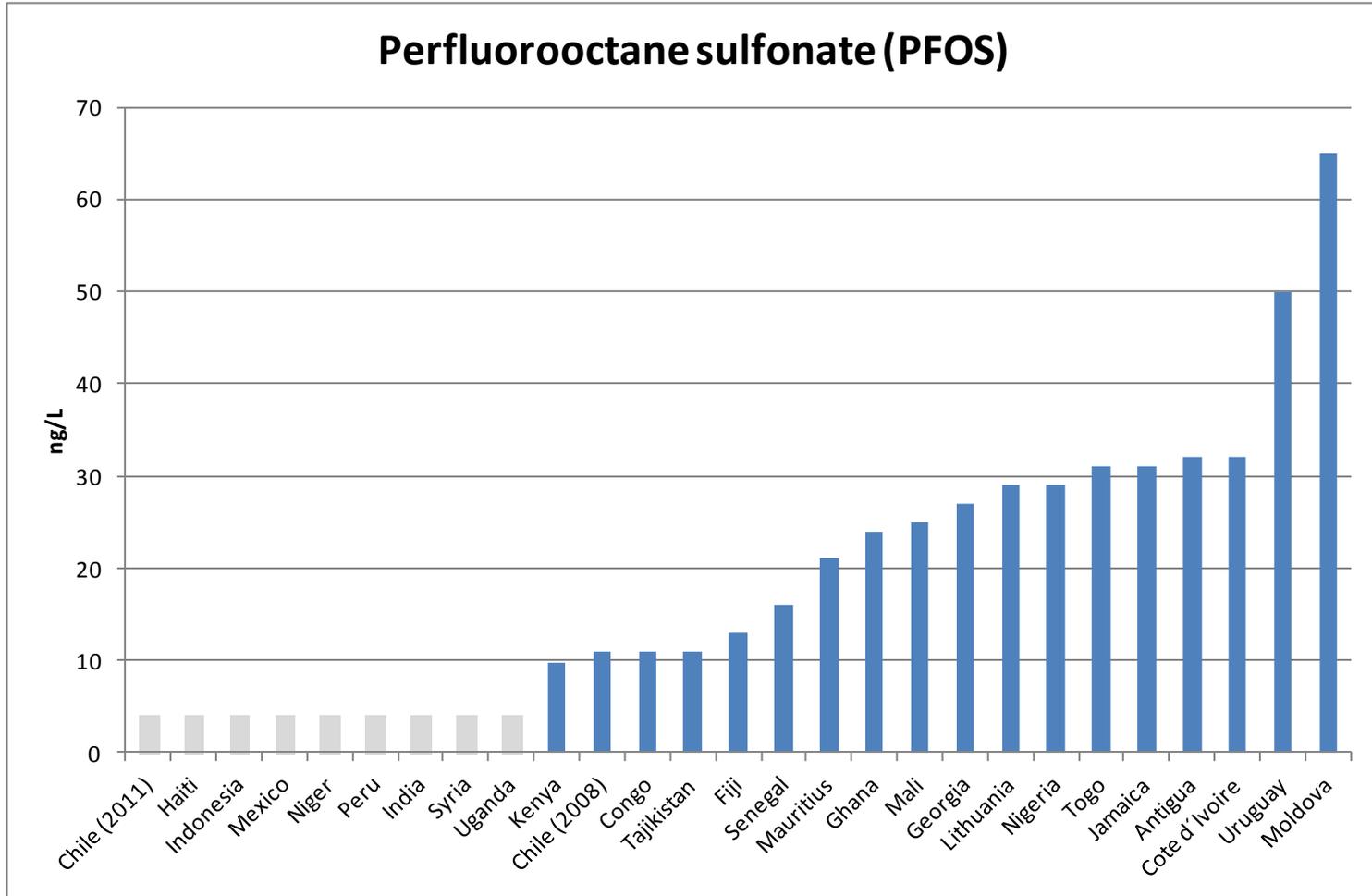
■ 1987-2002 ■ 2005-2010

■ 1987-2002 ■ 2005-2010



### Sum PBDE (6)





- Trends indicate success in eliminating certain **POPs pesticides**, such as aldrin, dieldrin, mirex, toxaphene
- Decreasing trends in **PCDD/PCDF and indicator PCB concentrations** show effectiveness of intervention measures to decrease environmental releases.
- Among the **newly listed POPs**, PFOS could be detected at values above LOQ for a majority of samples showing that contamination and human exposure to PFOS is of significant concern.



# Human health implications of POPs measured in human milk

Benefits and Risks of Breastfeeding

Risks: dioxins and PCBs, DDT/E

Benefits: for child and mother

- 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 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.

Organization	Safety Standard	Equivalent milk level	Endpoint	
<b>PCDD/PCDF/PCB (TEQs)</b>				
WHO (2000)	TDI	1-4 pg/kg bw day	0.2 - 0.9 pg/g lipid	Perinatal effects rodents and monkeys
US EPA (2010)	RfD (proposed)	0.7 pg/kg bw day	0.2 pg/g lipid	Postnatal/childhood exposure humans
ATSDR (1998)	MRL subchronic	1 pg/kg bw day	0.2 pg/g lipid	Postnatal effect monkeys
<b>Total PCBs</b>				
ATSDR (2004)	MRL subchronic	0.03 µg/kg bw .d	7 ng/g lipid	Postnatal effect monkeys
<b>DDT</b>				
WHO (2001)	TDI	10 µg/kg bw day	2300 ng/g lipid	Developmental toxicity in rats

- **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.**

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

- **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.

- 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).



**Further information available at  
chm.pops.int**

**and**

**[http://www.who.int/foodsafety/chem/pops/  
en/index.html](http://www.who.int/foodsafety/chem/pops/en/index.html)**

**Thank you**