SPÉCIFICITÉS LIÉES AUX EXPOSITIONS CHEZ LES FEMMES

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Les spécificités liées aux expositions chez les femmes

- Les femmes peuvent porter et allaiter des enfants
- À la ménopause, des changements physiologiques peuvent influencer l'élimination des composés chimiques



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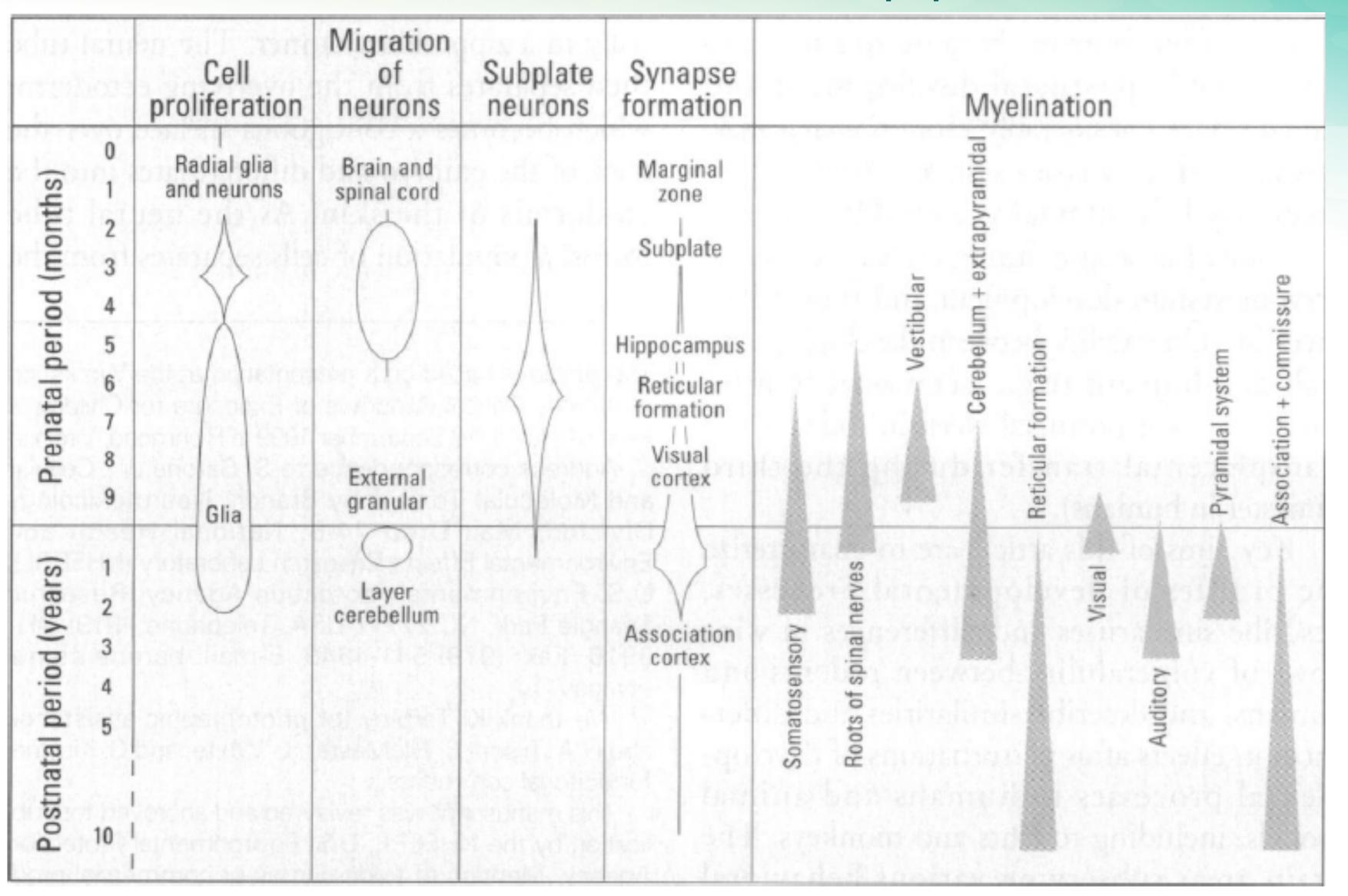


Femme enceinte ou allaitante



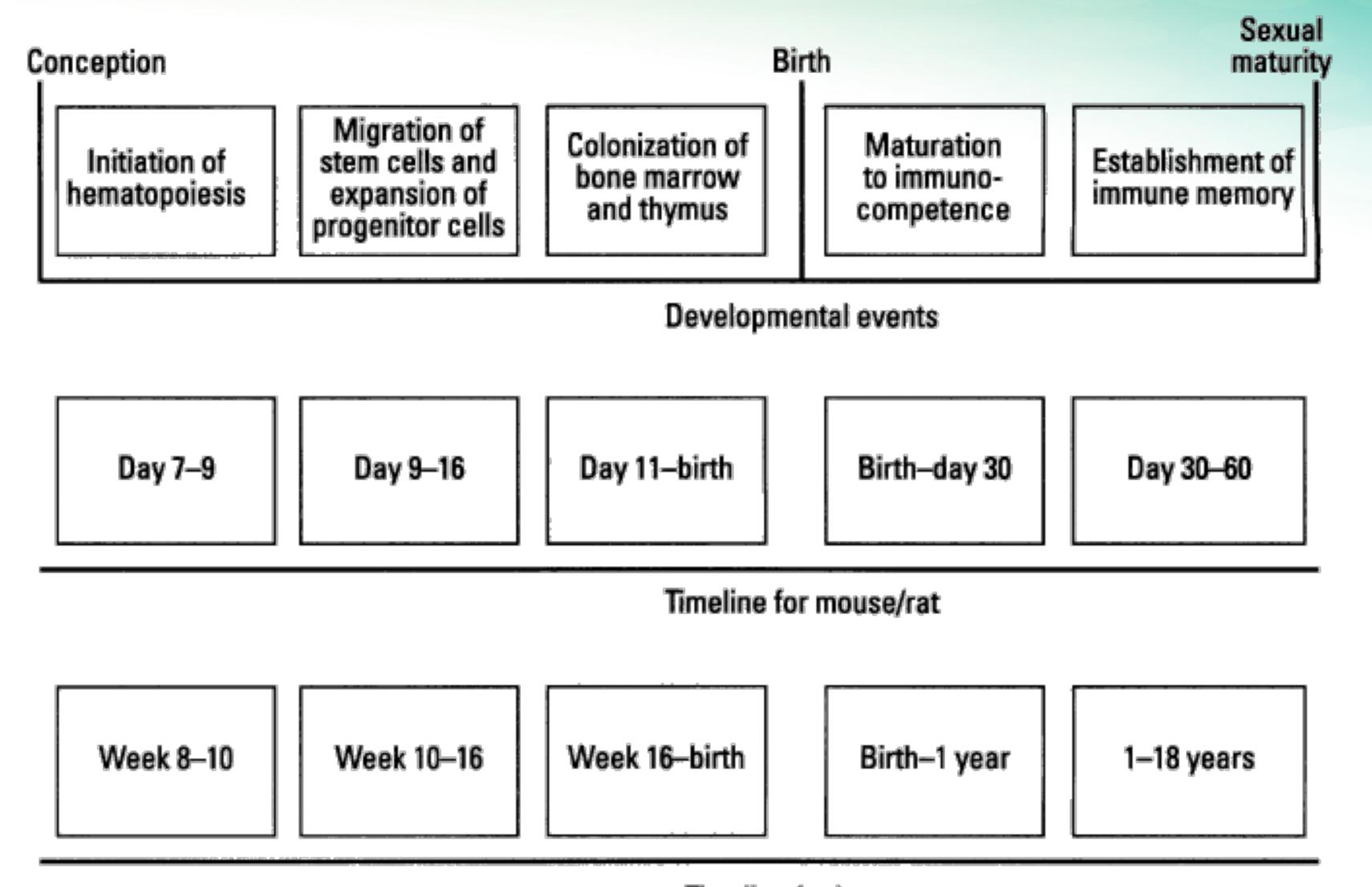
- Cas particulier puisque le fœtus et le jeune enfant peuvent être plus susceptibles aux atteintes toxiques
- Expositions en bas âge peuvent avoir des répercussions sur la santé des enfants à long terme (hypothèse de Barker)

Développement du cerveau



Rice & Barone 2000

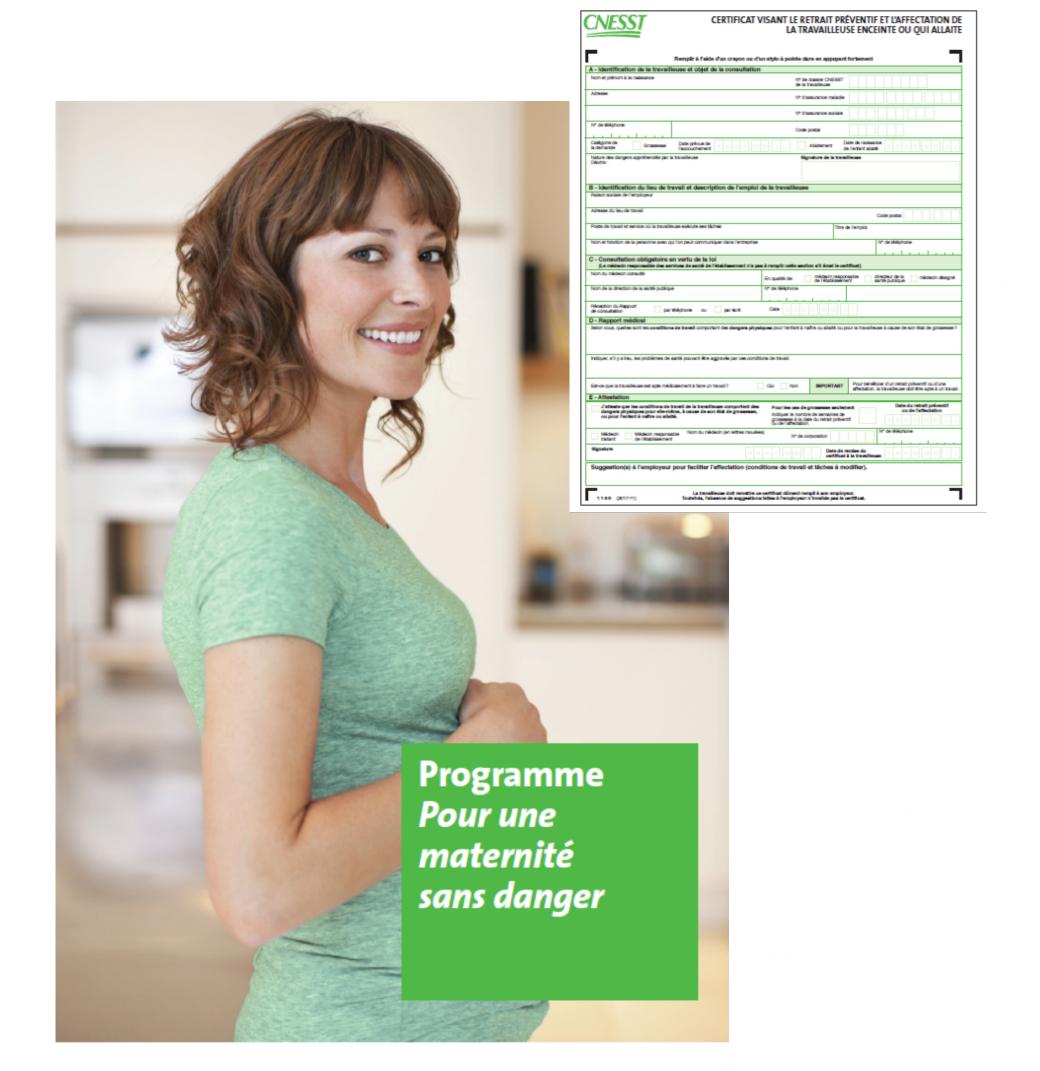
Développement du système immunitaire



Timeline for human

Dietert et al. 2000

Programme Pour une maternité sans danger



Commission des normes, de l'équité, de la santé et de la sécurité du travail cnesst.gouv.qc.ca



- Éliminer le danger
- Modifier la ou les tâches
- Adapter le poste de travail
- Affecter la travailleuse à d'autres tâches qu'elle est raisonnablement en mesure d'accomplir
- Retrait préventif

Limites du programme PMSD

- Exposition entre le moment de la conception et le test de grossesse
- Limité aux dangers connus
- Ne tient pas compte de l'exposition passée aux composés persistants





Cite This: Environ. Sci. Technol. XXXX, XXX, XXX-XXX

Article

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Tri(2,4-di-t-butylphenyl) Phosphate: A Previously Unrecognized, Abundant, Ubiquitous Pollutant in the Built and Natural Environment

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△Occupational Cancer Research Centre, Can

Supporting Information

ABSTRACT: Using high-resolution mass s tri(2,4-di-t-butylphenyl) phosphate (TDTBI a previously unsuspected pollutant that had in the environment. To assess its abundance measured its concentration in e-waste dust, the Chicago Ship and Sanitary Canal, Indian filters from high-volume air samplers depl provide a context for interpreting these qu measured the concentrations of tripheny structurally similar compound, in these s trations of TDTBPP and TPhP were 1 respectively, in e-waste dust and 4900 and house dust. TDTBPP was detected in sedi median concentrations of 527 ng/g, 3700 pg comparable to those of TPhP in all media absorption in the e-waste recycling facility a waste recycling facility (pro-rated for an 8 respectively, in residential environments.

■ INTRODUCTION

Many common, commercial chemicals have decades, but they have escaped the attention c chemists. In the 1970s, when the U.S. Te Control Act (TSCA) was passed, over 85 000 "grandfathered in". This meant that they wer regulatory scrutiny and, unless they were goin new purposes, no further information on the Because of this regulatory approach, a la mer products contain chemicals about little knowledge concerning their chemical pro mental fates, or toxicities. Eventually, many of leak into the environment and, in so bioaccumulated throughout the food web.





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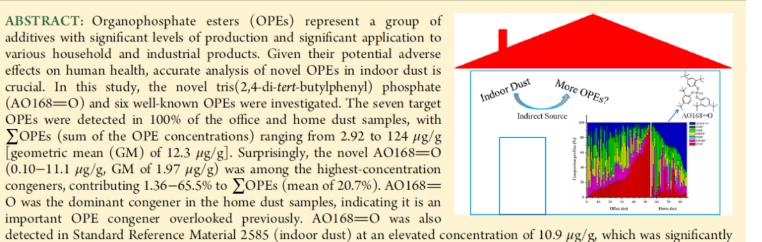
Unexpectedly High Concentrations of a Newly Identified Organophosphate Ester, Tris(2,4-di-tert-butylphenyl) Phosphate, in **Indoor Dust from Canada**

Runzeng Liu* and Scott A. Mabury

Department of Chemistry, University of Toronto, 80 St. George Street, Toronto M5S 3H6, Ontario, Canada

Supporting Information

ABSTRACT: Organophosphate esters (OPEs) represent a group of additives with significant levels of production and significant application to various household and industrial products. Given their potential adverse effects on human health, accurate analysis of novel OPEs in indoor dust is crucial. In this study, the novel tris(2,4-di-tert-butylphenyl) phosphate (AO168=O) and six well-known OPEs were investigated. The seven target OPEs were detected in 100% of the office and home dust samples, with Σ OPEs (sum of the OPE concentrations) ranging from 2.92 to 124 μ g/g [geometric mean (GM) of 12.3 μ g/g]. Surprisingly, the novel AO168=O $(0.10-11.1 \ \mu g/g, GM \text{ of } 1.97 \ \mu g/g)$ was among the highest-concentration congeners, contributing 1.36–65.5% to Σ OPEs (mean of 20.7%). AO168= O was the dominant congener in the home dust samples, indicating it is an important OPE congener overlooked previously. AO168=O was also



higher than the concentrations of the other target OPEs (0.38–2.17 μ g/g). Despite the high concentrations measured in this study, no industrial production or application could be identified for AO168=O. The precursor of AO168=O, tris(2,4-di-tertbutylphenyl) phosphite, was detected in 50% of the dust samples, with a GM concentration of 1.48 ng/g. This study demonstrates that human OPE exposure in indoor environments is greater than was previously reported. This is the first report of the occurrence of AO168=O, its precursor, and its hydrolysis products in the environment.

■ INTRODUCTION

Organophosphate esters (OPEs) are produced in massive quantities and widely applied in various household and industrial products. 1,2 After the phase-out of polybrominated diphenyl ethers, the production and application volume of their replacements, the OPEs, has increased rapidly in recent years.3 The global consumption of OPEs was reported to be 500000 tons in 2011, which increased to 680000 tons in 2016.⁴ Besides being used as flame retardants, OPEs are also used as plasticizers and antifoaming agents in many products, including furniture, textiles, cables, building materials, insulation materials, paints, floor polishes, hydraulic fluids, and electronics. In most cases, OPEs are used as additives and are not chemically bonded to the original materials. Therefore, OPEs can be slowly released into the environment by abrasion and volatilization. As a result, many OPE analogues, including aryl, alkyl, and halogenated alkyl

alterations to steroidogenesis and estrogen metabolism.¹¹ Tris(1,3-dichloro-2-propyl) phosphate (TDClPP) can be transferred to the offspring of adult zebrafish exposed to the compound, leading to thyroid endocrine disruption and developmental neurotoxicity. 12 Triphenyl phosphate (TPHP) has also been shown to reduce fecundity in zebrafish by significantly increasing plasma estradiol levels and inhibiting

In recent years, more and more new OPE analogues are being identified in both commercial products and environmental matrices. For instance, novel OPE analogues such as isopropylated and tert-butylated triarylphosphate were recently identified in commercial flame retardant mixtures. 14 They were also detected in house dust Standard Reference Material (SRM) 2585. 14 2,2-Bis(chloromethyl)propane-1,3-diyltetrakis-(2-chloroethyl)bisphosphate (known as V6) was detected in both house and car dust and had a strong positive relationship

Dangers inconnus

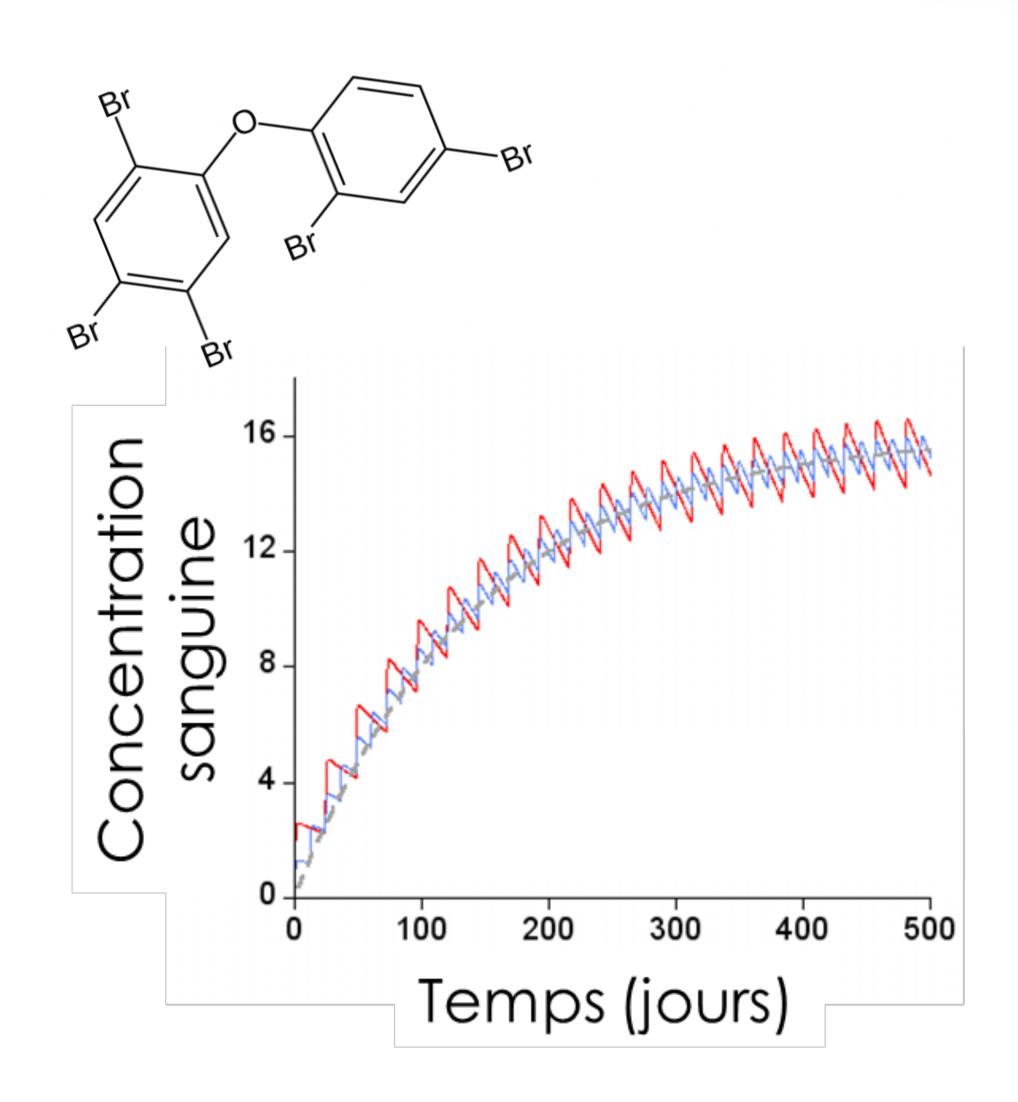
- On ne connaît pas tous les contaminants qui se retrouvent dans le milieu de travail
- Certains de ces contaminants sont susceptibles d'être toxiques pour le fœtus et l'enfant

^{*}Department of Physical and Environmental S

⁸Air Quality Processes Research Section, Envi Department of Earth Sciences, University of ¹Research Centre for Toxic Compounds in th

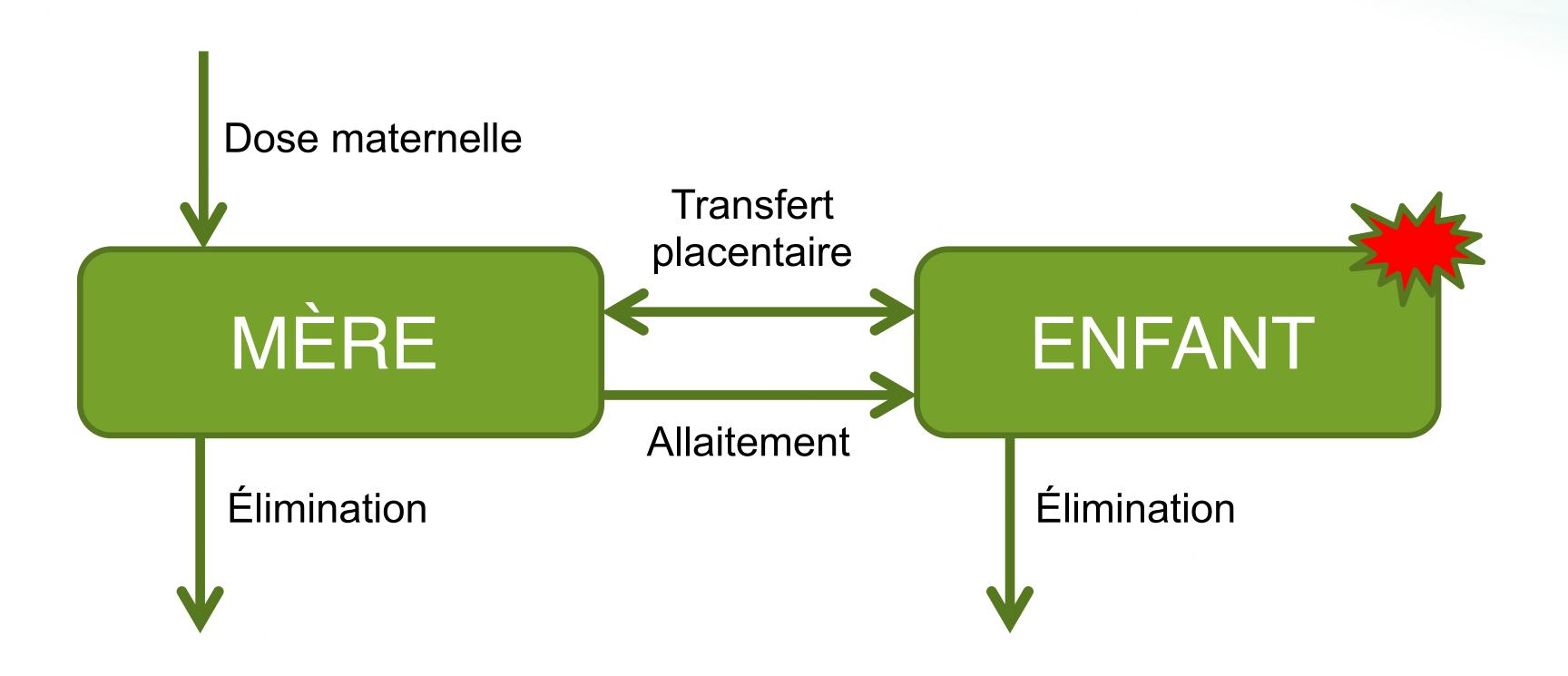
⁶²⁵⁰⁰ Brno, Czech Republic *Dalla Lana School of Public Health, University

Composés persistants

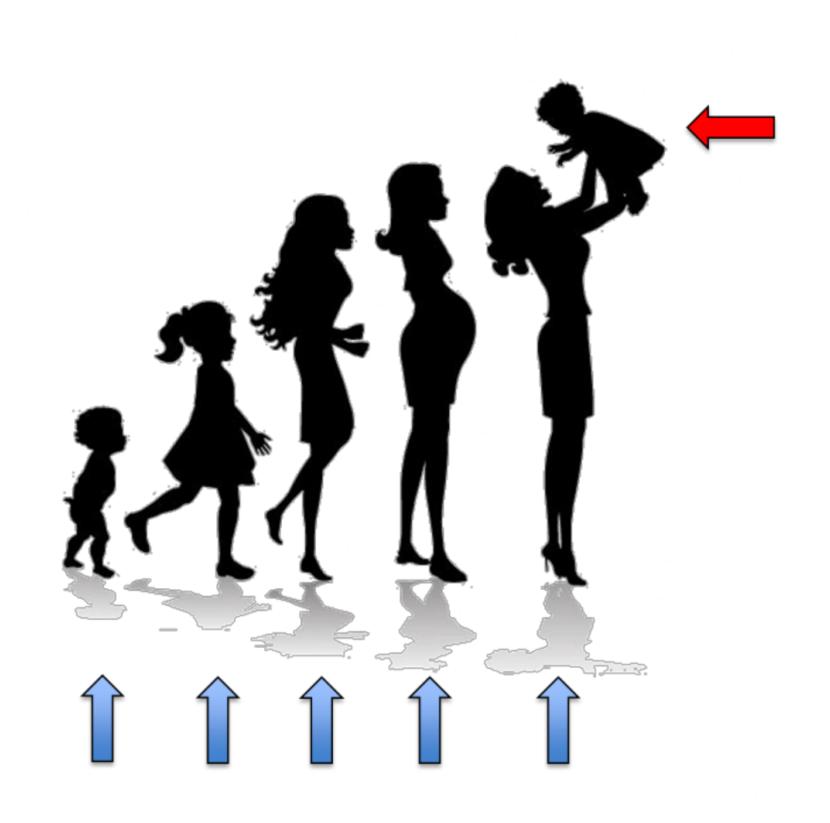


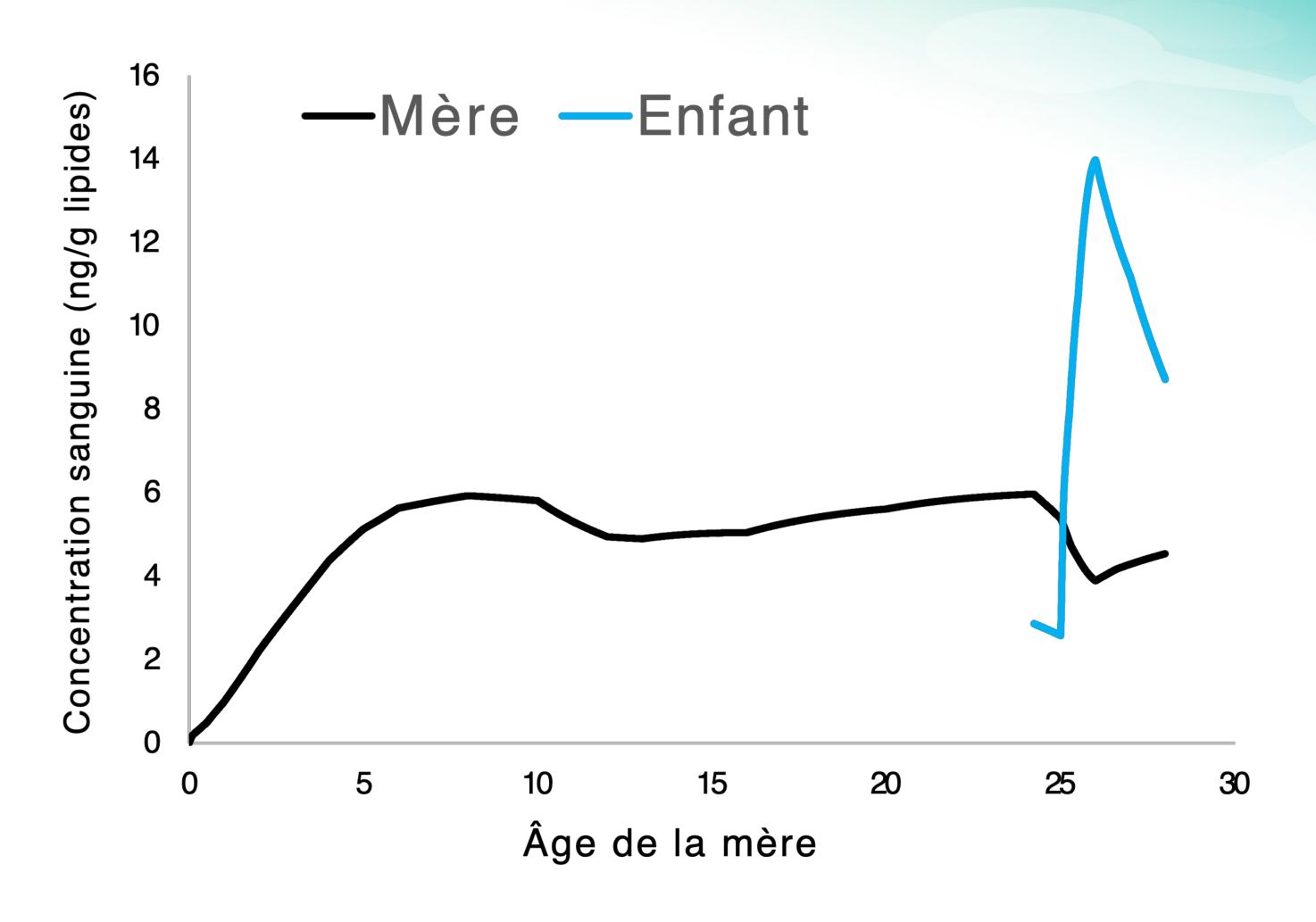


Estimation de la dose de l'enfant

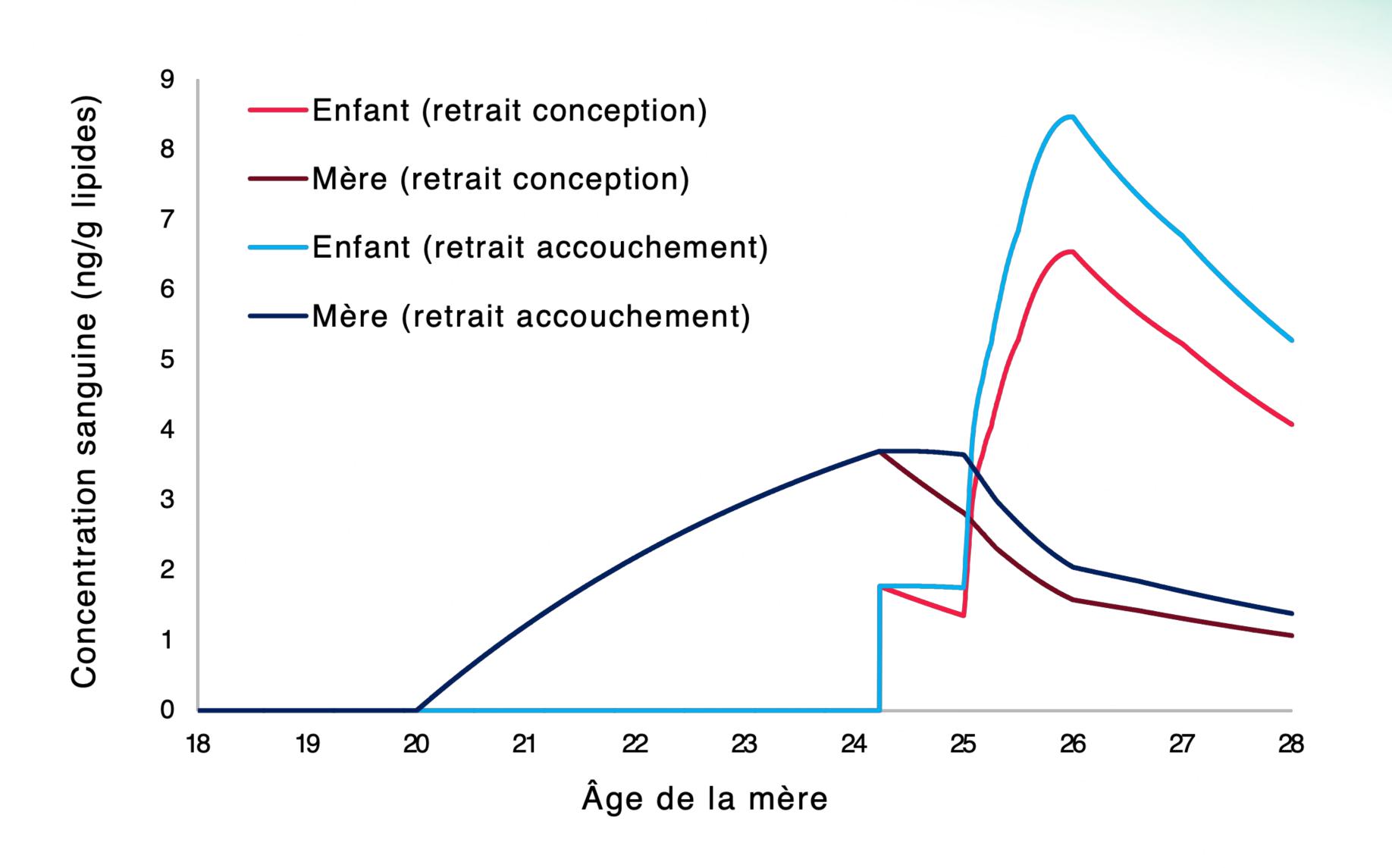


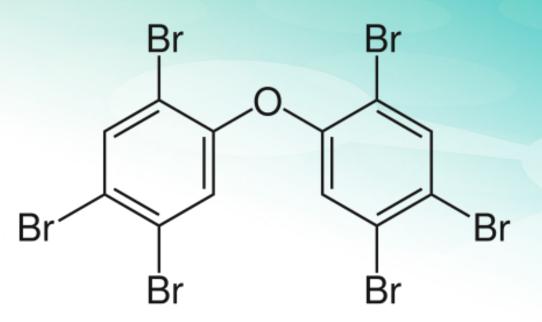
Exemple: PBDE-153



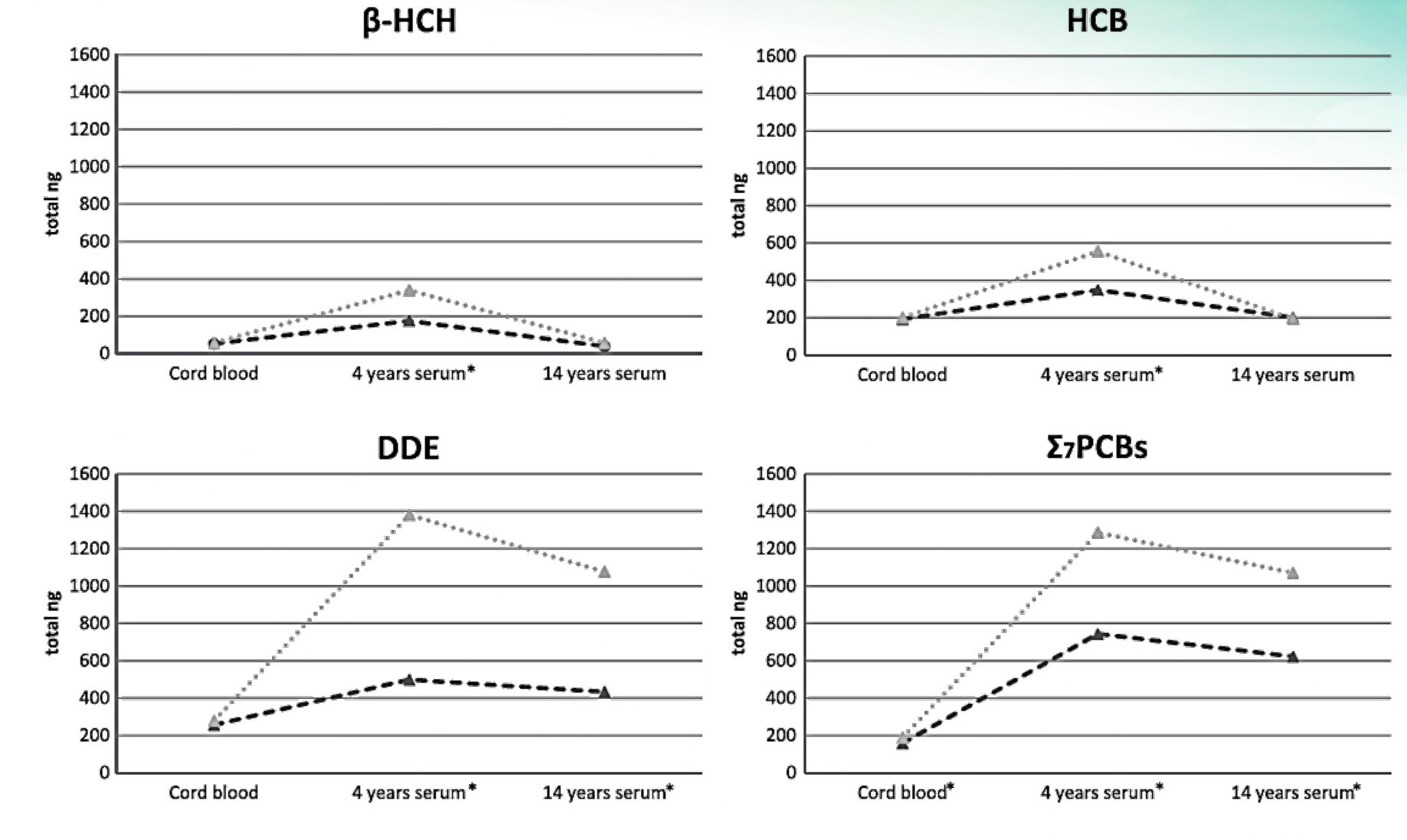


Retrait préventif... quel est l'impact?



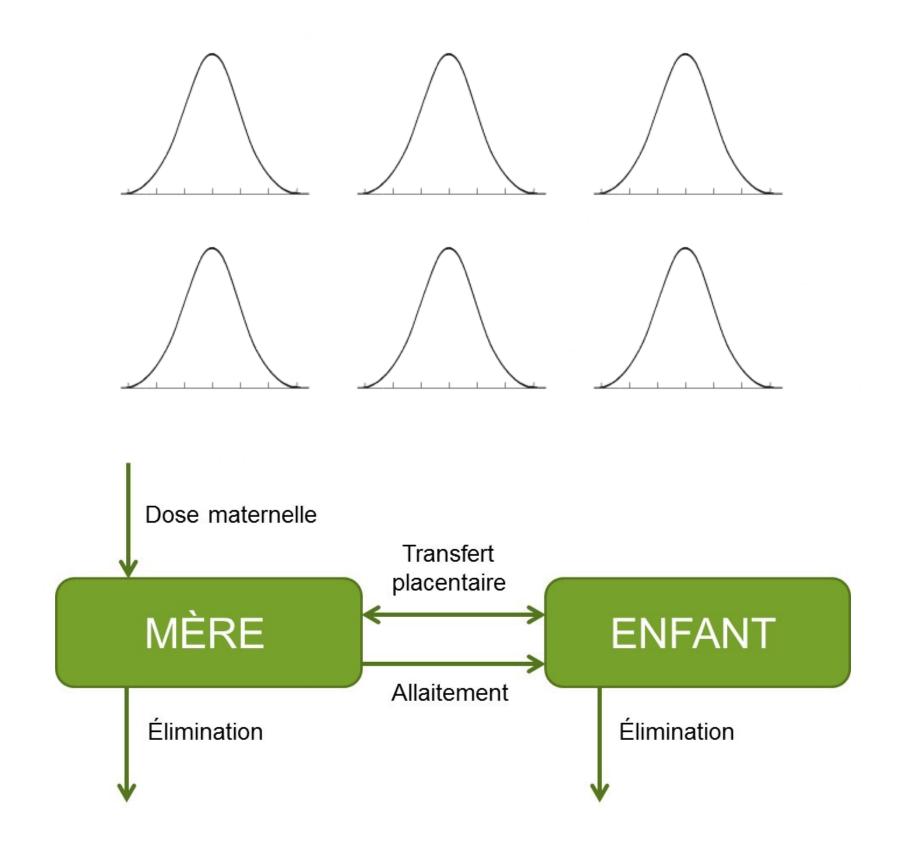


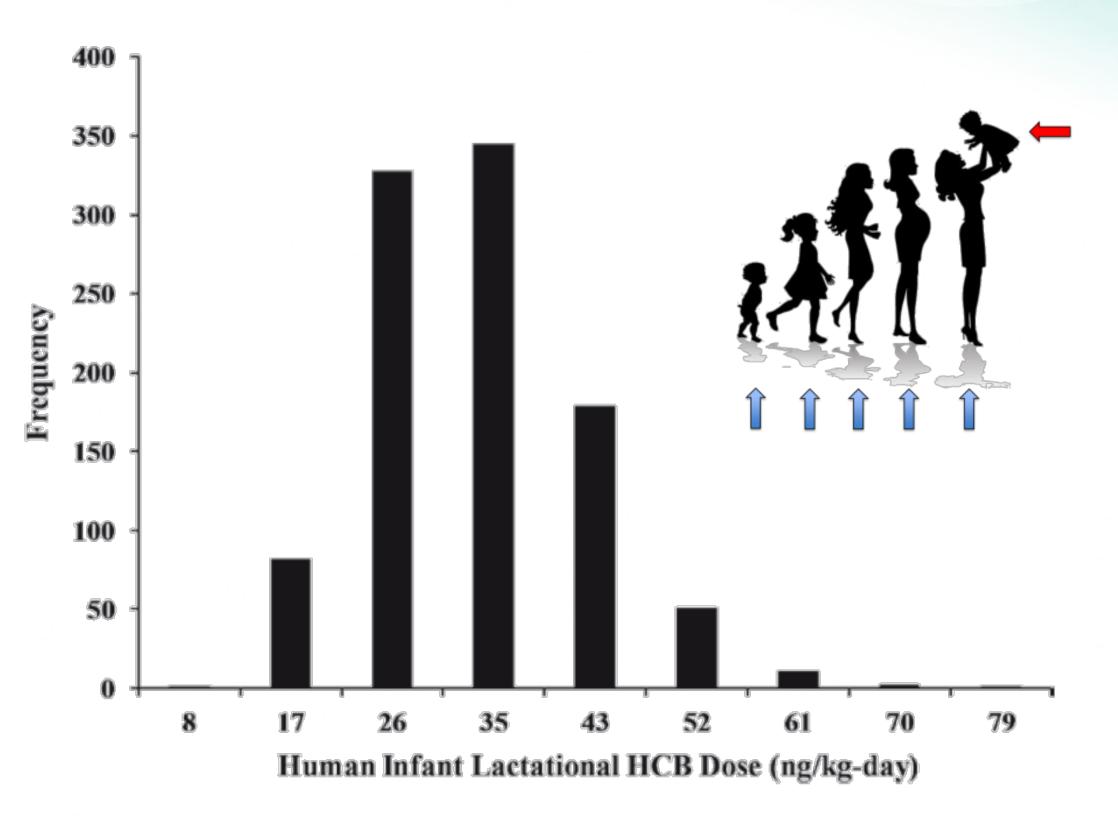
Influence de l'allaitement jusqu'à 14 ans



Gascon et al. 2015

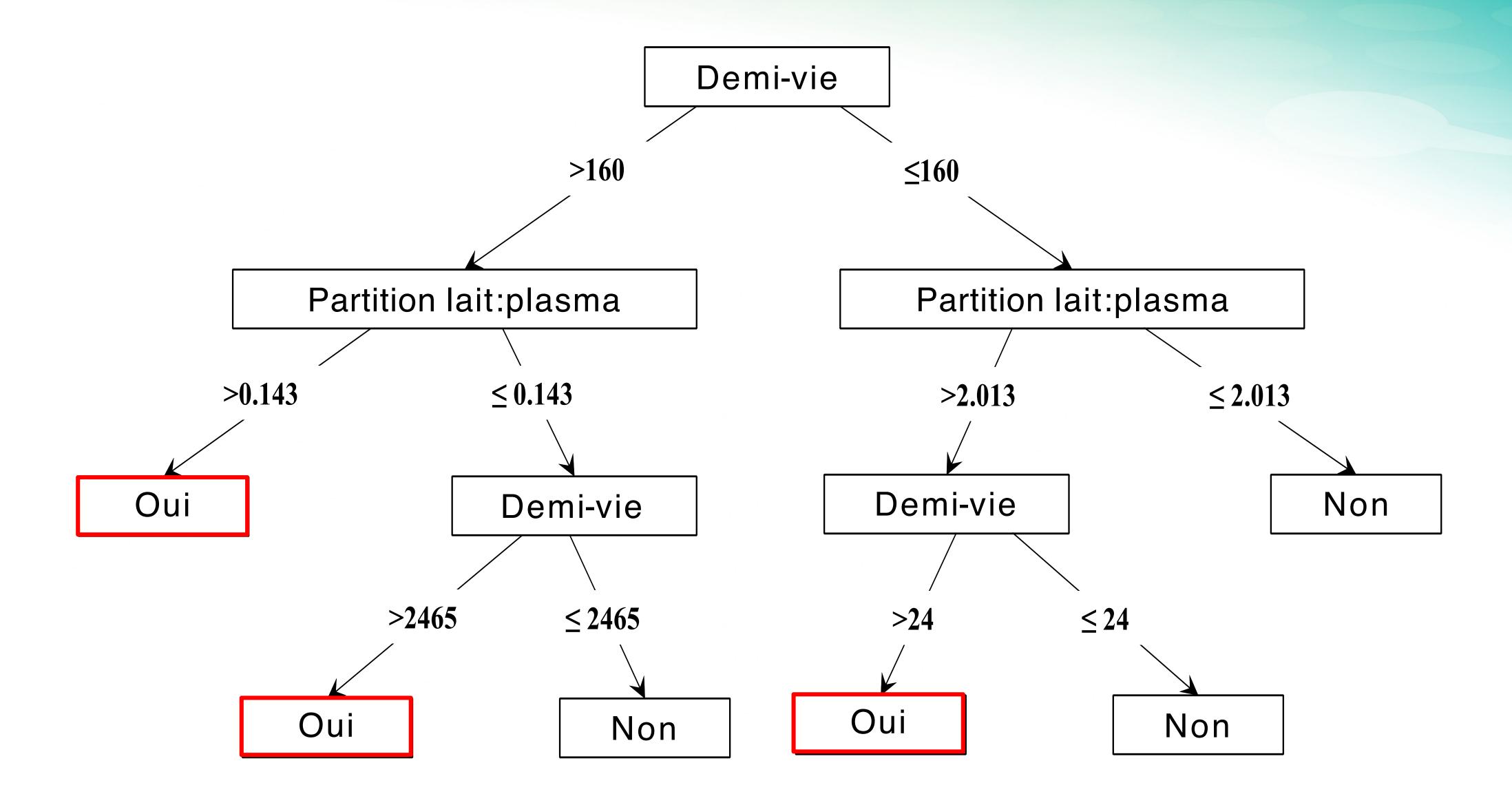
Amplification de la dose





Lehmann et al. 2014

Quand la dose de l'enfant > dose de la mère



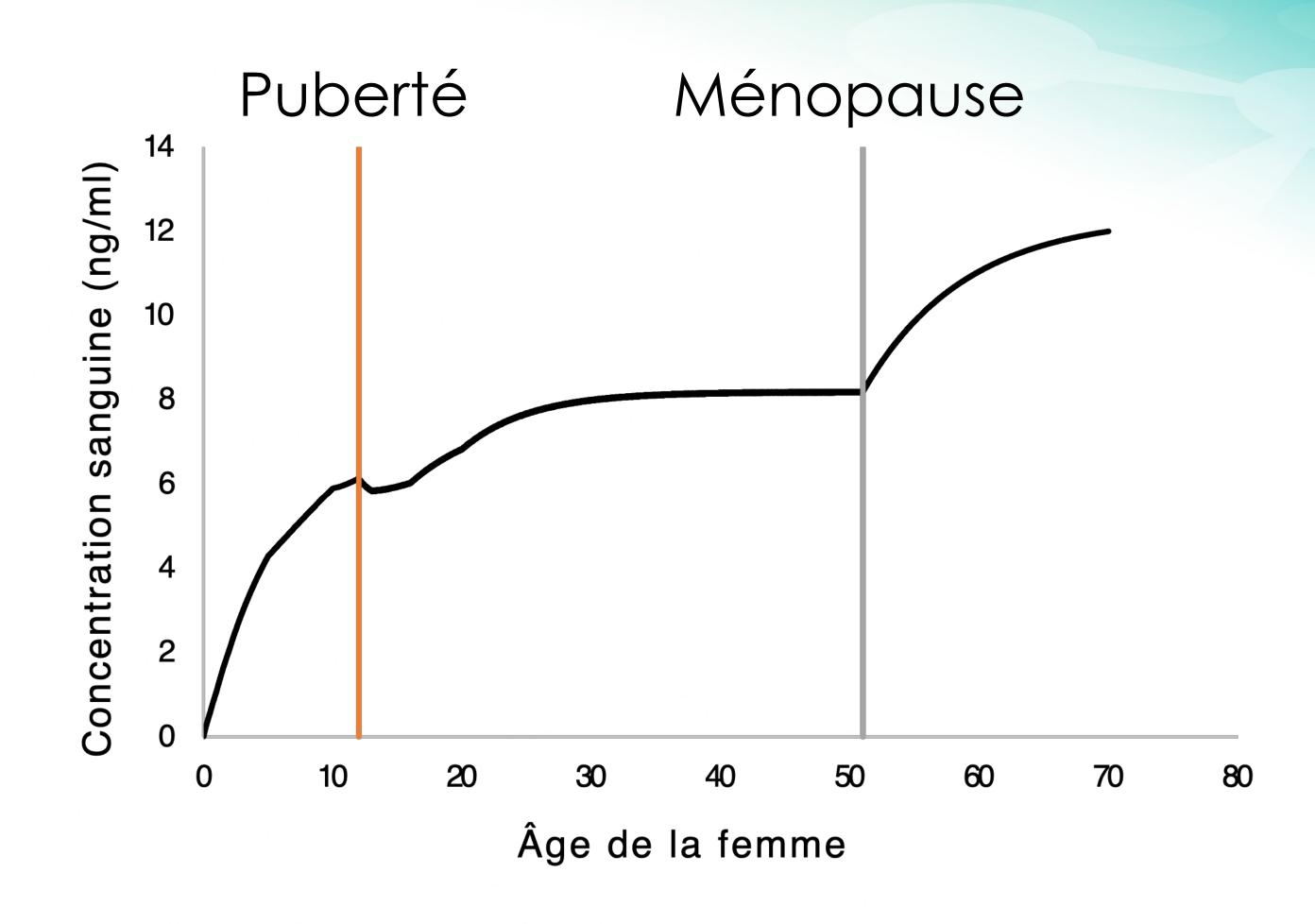
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Élimination par les menstruations : Le PFOS

- Certains composés chimiques sont éliminés par les menstruations
- À la ménopause, les concentrations sanguines peuvent être plus élevées qu'avant la ménopause pour une même dose journalière



Concentrations sanguines pré- et post-ménopause

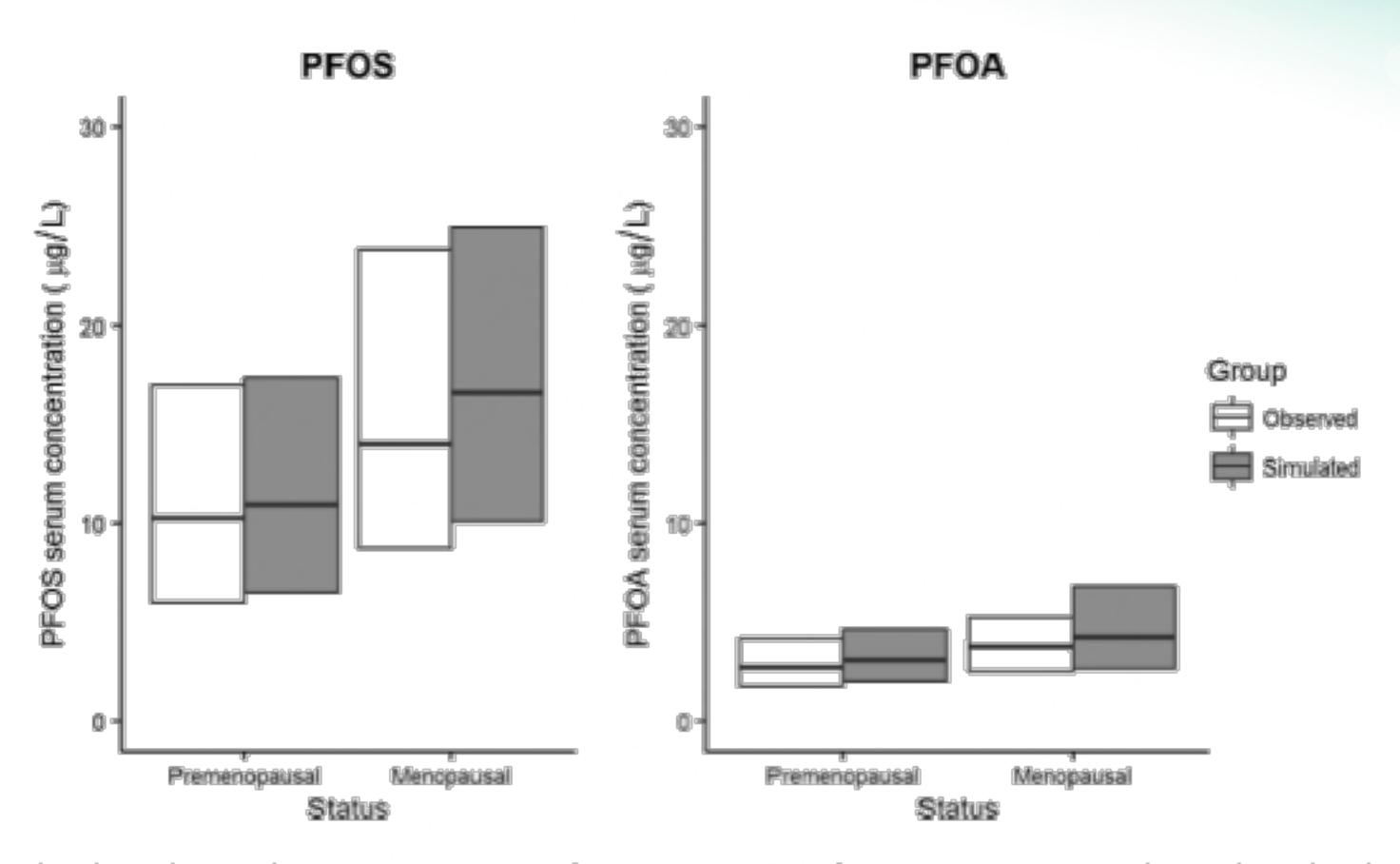


Fig. 6, Simulated vs. observed PFOS and PFOA serum concentrations for women 20-65 years of age in Taylor et al., 2014, Median, tertile 1 and tertile 3 are shown,

Conclusions

- L'exposition des femmes peut également vouloir dire exposition des enfants
- Des spécificités propres à la physiologie des femmes peuvent influencer la dosimétrie des contaminants en milieu de travail

Financement













