

Editorial

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# Environmental chemicals in breast milk and infant formula: measurements, interpretation, and communication

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A wide array of organic and inorganic chemicals have been identified in both outdoor and indoor environments, as well as in foods, personal care products, clothing, and numerous other sources. Many of these chemicals have been found at concentrations associated with an increased risk of adverse health effects<sup>[1]</sup>. Exposure to these substances can occur at all life stages through oral ingestion, dermal contact, and inhalation. Exposures during infancy are particularly concerning due to the increased susceptibility of infants<sup>[2]</sup>. Studies on the presence of chemicals in breast milk have been conducted since the 1950s<sup>[3]</sup>, while research on environmental chemicals in infant formula is a more recent occurrence.

Infant feeding serves as a direct pathway for contaminants from both the mother and the environment to reach infants, exposing them during a highly sensitive life stage. However, most communities worldwide lack a comprehensive understanding of actual exposure levels and of the relative contributions of breast milk and infant formula to these exposures. This knowledge gap complicates the development of evidence-based recommendations for infant feeding. In response to these challenges, the Editors of this Special Collection issued a Call for Papers, inviting authors to submit high-quality manuscripts addressing these concerns. This Special Issue features five papers that explore various aspects of infant exposure to



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environmental chemicals via breast milk and formula.

The papers cover research on brominated flame retardants, hexabromocyclododecanes, polybrominated diphenyl ethers, and dechlorane in breast milk in Copenhagen<sup>[4]</sup>, an improved and updated toxicokinetic model developed by the Minnesota Department of Health, which focuses on serum levels of per- and polyfluoroalkyl substances (PFAS)<sup>[5]</sup>, concentrations of 10 PFAS in 17 different powdered formulas sold in the USA and toxicokinetic modeling of serum perfluorooctanesulfonic acid (PFOS) concentration curves during the first year of life<sup>[6]</sup>, polybrominated diphenyl ethers (PBDEs) and hexabromocyclododecane (HBCD) in breast milk in Canada<sup>[7]</sup>, early-life exposure to di(2-ethylhexyl) phthalate (DEHP) and effects on the gastrointestinal tract in the neonatal pig<sup>[8]</sup>, and persistent organic chemicals in breast milk in Belgium<sup>[9]</sup>.

These studies advance our knowledge and understanding of infant exposure to environmental chemicals via feeding. The Editors of this Special Issue hope that these high-quality contributions can stimulate further research on the critical topic.

## DECLARATIONS

### Authors' contributions

Preparation and writing: Domingo JL, LaKind JS  
Both authors contributed equally to the article.

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### Conflicts of interest

Domingo JL is the Guest Editor of the Special Issue “Environmental Chemicals in Breast Milk and Infant Formula: Measurements, Interpretation and Communication”. LaKind JS is the Guest Editor of the Special Issue “Environmental Chemicals in Breast Milk and Infant Formula: Measurements, Interpretation and Communication” and an Editorial Board member of *Journal of Environmental Exposure Assessment*.

### Ethical approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

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