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Childhood exposure to DEHP, DBP and BBP
A comparative study of sources to aggregate exposure in Korea and in Denmark

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Introduction
Phthalates (DEHP, DBP, BBP) under several regulations:
- e.g. Toys, childcare products, cosmetics and food packaging
Since 1990s until 2007, the total production of DEHP, DBP and BBP in Europe has been decreased by 320,000 tons
- Plasticizers in Korea has been increased by 360,000 tons

Research Questions:
Q1. What is the childhood cumulative risk to these (anti-androgenic) phthalates?
Q2. What is the difference in indirect (via the environment and food) exposure levels to DEHP, DBP and BBP in different countries (Denmark vs. Korea)?
Q3. How close can exposure scenario modeling estimate to the real exposure?

Materials and methods
ESA vs. BCA
Exposure Scenario Approach (ESA)
Aggregated exposure = inhalation + ingestion + dermal contact
Back Calculation Approach (BCA)

Results and Discussions
Table 1. Regulations on phthalates in Denmark and Korea

Table 2. Daily childhood phthalate intake (µg/kg bw/day) from biomonitoring (A), from exposure modeling via the environment/food (B) and consumer products (D) (µg/kg bw/day)

Conclusions
1. Denmark has stricter regulatory standards on phthalates in the environment than Korea. However, product regulations are more similar.
2. The results show that indirect phthalate exposure from environment and food to Korean 2 year old children are higher than those to children in Denmark.
3. ESA can provide the information about different source intensities. However, the gap between BCA and ESA implies unknown sources which are not included in ESA.
4. Based on this result, we emphasize the importance of filling the gap between BCA and ESA to reduce the cumulative risks and to find efficient tools for chemical managements.

References