ASSOCIATION BETWEEN BUILDING CHARACTERISTICS AND PLASTICISERS IN INDOOR SETTLED DUSTS

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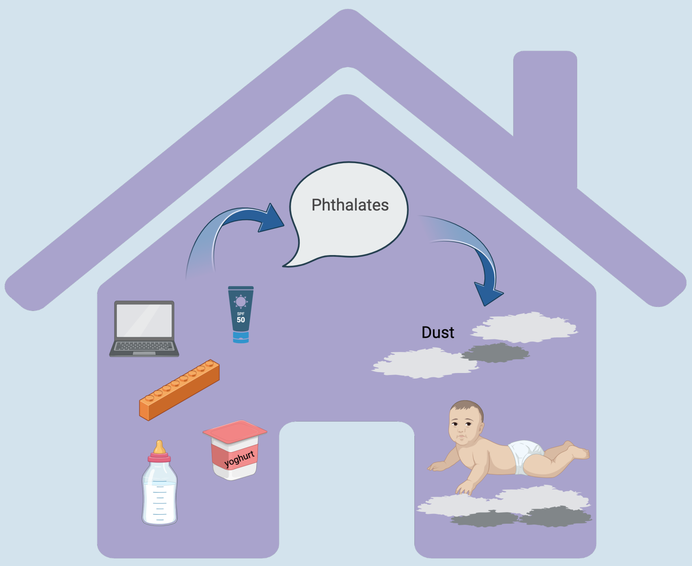
INTRODUCTION

Phthalates

- are plastic additives
- detected in µg/g in indoor settled dusts
- DEHP, DBP, DIBP and BBP are restricted in a wide range of products since July 2020, e.g. children's items, flooring, mattresses, office supplies[1]

Dust

- is an important exposure route for people, especially young children
- can offer insight into the properties of the indoor environment associated with high levels of plasticisers



AIM

To investigate the association between phthalates in indoor dusts and indoor and outdoor home characteristics, including age and type, primary building and flooring materials, and composition of the household.

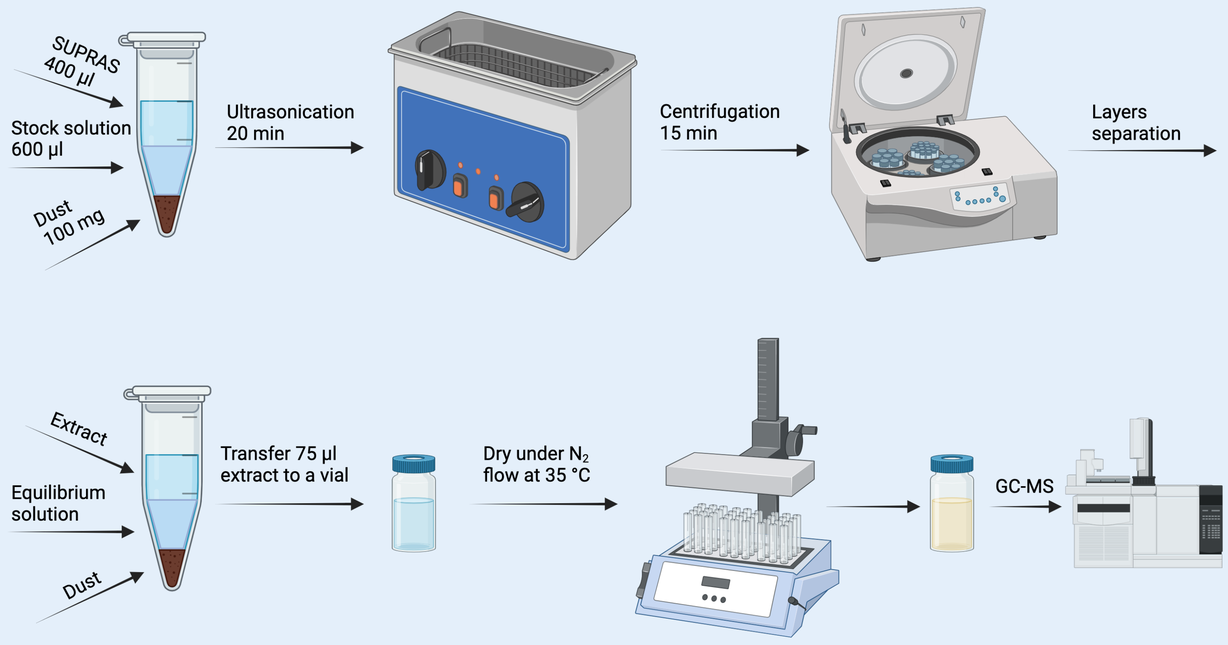
METHODS

Sampling

- 120 households with small children (< 5 y.) from Czech Republic, summer 2022
- Vacuum cleaner equipped with a customised vacuuming head for collection of particles < 1 mm
- Composite dust sample from the "most-used room"

Extraction

- Supramolecular solvent (SUPRAS)
  - Milli Q water : THF : Hexanol (70:20:10)

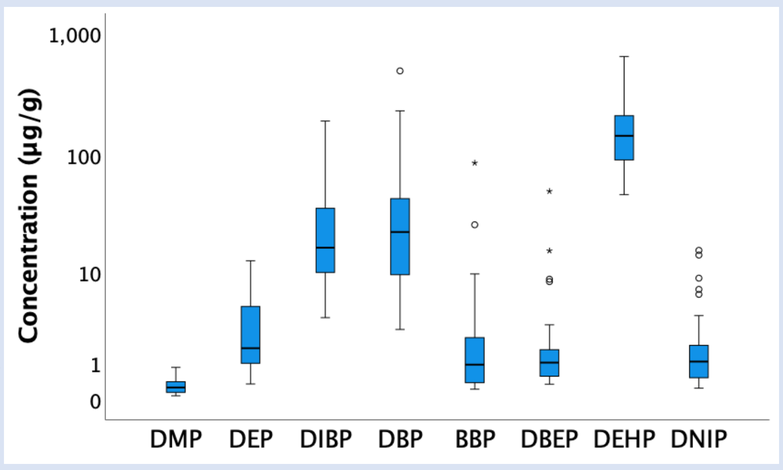


Analysis

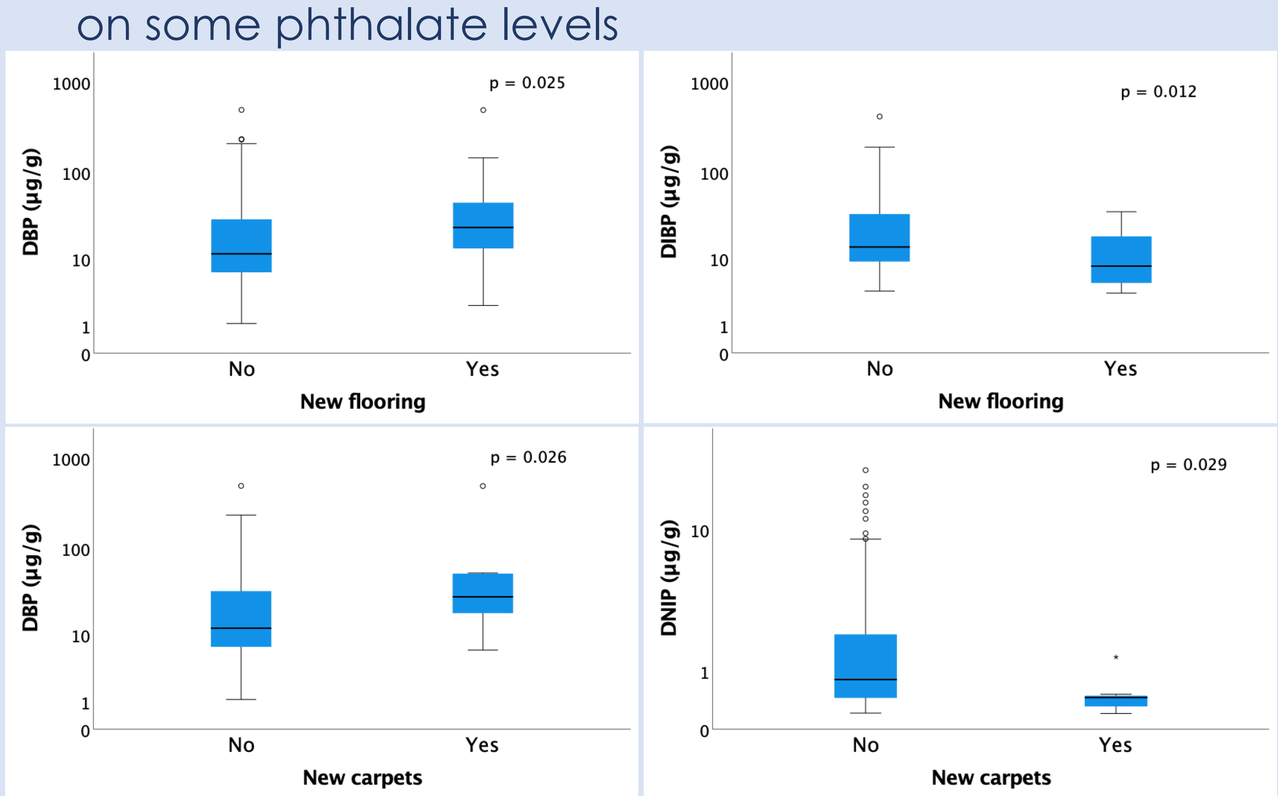
- 15 phthalates analysed using an Agilent 7890A GC coupled to a tandem mass spectrometer Agilent 7000B MS/MS

RESULTS

- 15 phthalates
  - 8 > 50% DF in 120 homes
  - 7 < 15% DF/ ND (DMEP, DMPP, DEEP, DPNP, DnHP, DCHP and DNOP)



- Variables tested
  - ✓ Building age
  - ✓ Reconstruction – total, flooring, carpets, insulation, etc.
  - ✓ Temperature and humidity
  - ✓ Sampled area characteristics – electronics, furniture, children's toys etc.
- New flooring and carpeting have significant effect on some phthalate levels



Levels of phthalates (µg/g) before and after floor change or carpeting. Results are displayed on log scale.

KEY OUTCOMES

- Phthalates consistently detected in µg/g levels
- DEHP highest: median = 98 µg/g
  - Most used phthalate until restricted in 2020
- DBP ⬆ after floor renovation and carpeting
- DIBP and DNIP ⬇ after floor renovation and carpeting

FUTURE PROJECTS

The dust samples are analysed for

- ✓ other *plastic additives*, e.g. flame retardants
- ✓ *legacy contaminants*, e.g. PCBs
- ✓ *combustion by-products*, e.g. PACs
- ✓ *personal care products*, e.g. synthetic musks
- ✓ *pesticides*

⇒ To evaluate overall exposure of children to chemicals detected in household dust

References
1) European Chemicals Agency, https://echa.europa.eu/hot-topics/phthalates#:~:text=REACH%20restrictions,of%20products%20since%20July%202020.

Acknowledgement
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