

Metabolomic Profiles and Urinary Concentrations of Phenols and Phthalates in Mother-Infant Dyads

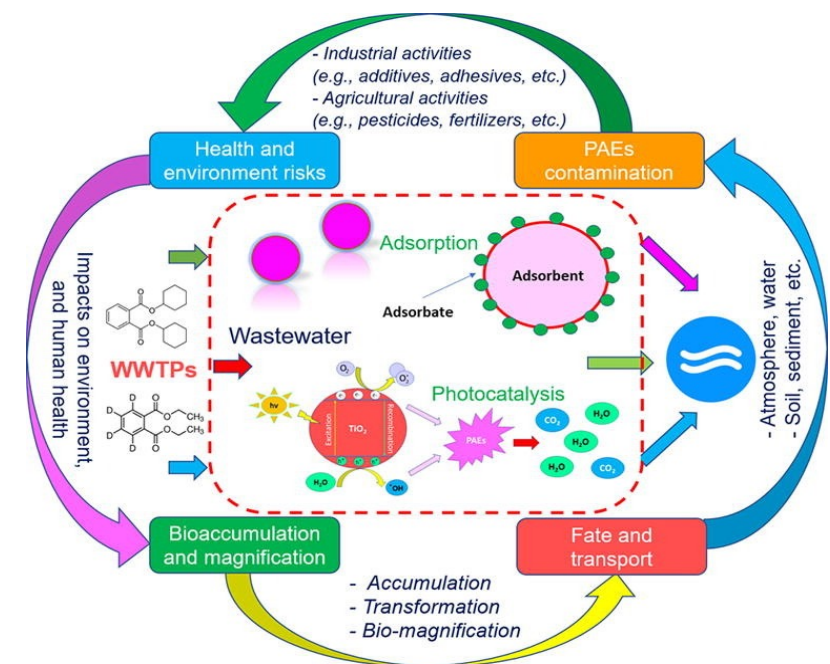


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Introduction

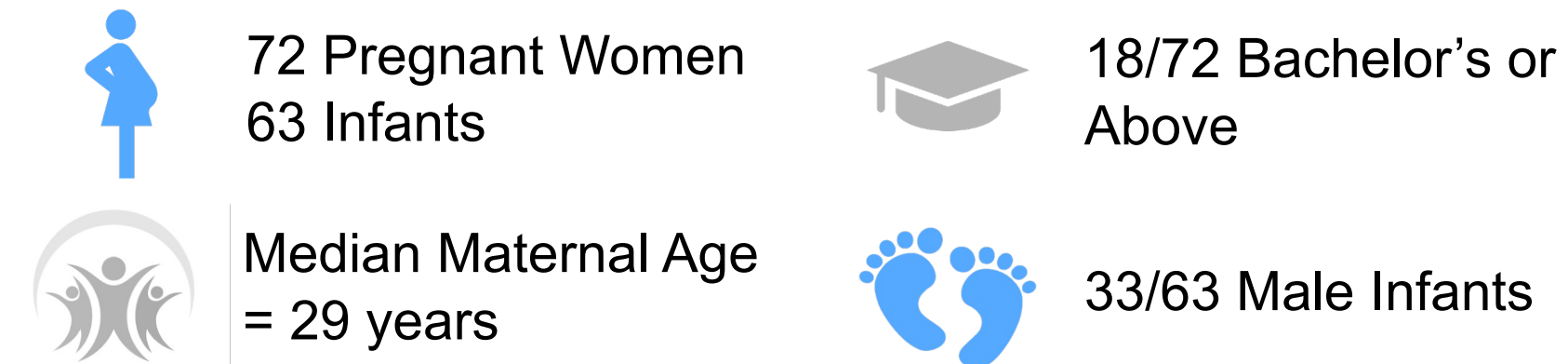
Phthalates and phenols are ubiquitous organic compounds found in hundreds of consumer products. Prenatal exposure to these chemicals have been associated with adverse birth outcomes.



Studies of these exposures during pregnancy and maternal and infant metabolome are scarce. This study investigates the associations of phthalate and phenol chemical exposure with maternal and infant metabolome.

Methods

Participant Characteristics



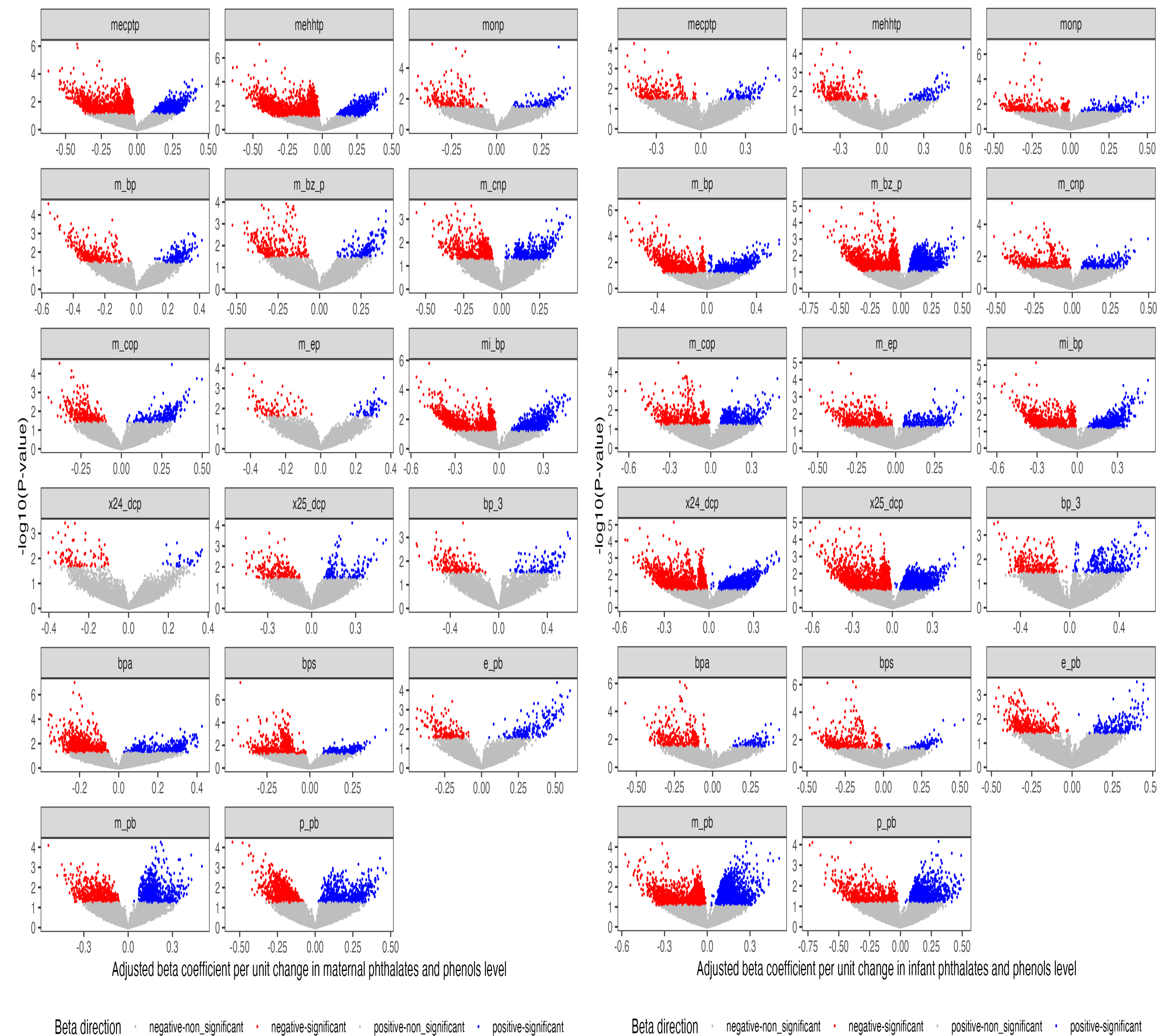
Metabolome-Wide Associations

- **9 phthalate metabolites** (Mono-2-ethyl-5-carboxypentyl terephthalate, Mono-2-ethyl-5-hydroxyhexyl terephthalate, Mono-oxononyl phthalate, Mono-n-butyl phthalate, Mono-benzyl phthalate, Mono-carboxynonyl phthalate, Mono-carboxyisooctyl phthalate, Mono-ethyl phthalate, Mono-isobutyl phthalate)
- **5 phenol metabolites** (1,4-Dihydroxybenzene, 2,5-Dichloro-1,4-benzoquinone, 2,4-Dihydroxybenzophenone, Bisphenol A, ester of p-hydroxybenzoic acid)
- **Maternal urinary creatinine at delivery for dilution adjustment**

Linear Regression with Benjamini-Hochberg

- **Maternal covariates:** maternal BMI, age, tobacco use, education, race
- **Infant covariates:** maternal BMI, age, tobacco use, education, race, maternal parity, and newborn's sex
- **FDR rate = 0.2**

Results



Beta direction · negative-non_significant · negative-significant · positive-non_significant · positive-significant

Beta direction · negative-non_significant · negative-significant · positive-non_significant · positive-significant

Figure 1: Adjusted beta coefficient per unit change in maternal (left) and infant (right) phthalates and phenols level Positive significant = blue, Negative significant = red

There were various significant associations between phthalate and phenol chemical exposure and metabolome in the data set analysis among the mother-infant pairs. This association supports the potential adverse health outcomes related to phenol and phthalate chemical exposure in the pairs.

Conclusion / Future Studies

There is evidence supporting the role of phenol and phthalate metabolites as endocrine disruptors, but further evidence is needed to examine long term effects on the metabolic system of women and infants.



Mother-infant pairs will need to have their metabolome investigated over an extended period to gather a concrete conclusion on the potential disruptions on their developmental and reproductive health.



Precautionary measures are recommended to most vulnerable populations to reduce exposure to these chemicals. In this study the target group is the pairs of mothers and their infants.



Another consideration is the different metabolic pathways which phenols and phthalates affect.

Acknowledgements

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References

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