

## Methods

From 2007 to 2011, 948 pregnant women were recruited during the second trimester (baseline). Spot urine samples from the second and third trimesters were analyzed for 15 phthalate metabolites. Maternal anthropometric measurements and covariate data were collected at the second and third trimester as well as over seven additional visits through 72 months postpartum. Linear mixed models were used to estimate the relations of gestational phthalates exposure with GWG, PWR, and long-term weight differences.

## Results

None of the measured phthalate metabolite concentrations were associated with GWG between the second and third trimester. Individual urinary phthalate metabolite concentrations and molar sums of DEHP, DEHTP, DOP, and DiBP were associated with greater GWR between the third trimester and one year postpartum. mCPP, a metabolite of DOP and non-specific metabolite of several other phthalates, was additionally associated with higher maternal body mass index (BMI, kg/m<sup>2</sup>) from 12 through 72 months postpartum (0.28 kg/m<sup>2</sup> difference per interquartile range,  $p=0.02$ ).

## Conclusions

Prenatal exposure to several phthalates was associated with greater GWR, which may contribute to the development of obesity and other adverse metabolic health outcomes in women. Further studies are needed to explore long-term consequences and to develop interventions to reduce environmental contaminant exposures during pregnancy.

## Impact of rotavirus vaccination and piped water access on childhood diarrhea rates in Peru, 2005-2015

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OPS 24: Drinking water contamination and children's health, Room 411, Floor 4, August 27, 2019, 10:30 AM - 12:00 PM

**Background:** Peru has undergone several health and infrastructure developments since 2005, including increased access to piped drinking water and national introduction of oral rotavirus vaccination. We examined whether these factors were associated with lower diarrhea rates in children under five.

**Methods:** We fit a negative binomial model investigating the impact of rotavirus vaccination and piped water access on diarrhea rates in the 195 Peruvian provinces from 2005-2015, considering the interaction between these factors, and controlling for long-term and seasonal (El Niño) trends. We compared the "pre-(rotavirus) vaccine" (2005-2009) and "post-vaccine" (2010-2015) eras. Annual percentages of households in each province with access to piped water were analyzed in quartiles.

**Results:** The 2005 childhood diarrhea rate was ~27 annual clinic visits per 100 children and decreased ~3% per year. Higher access to piped water was associated with significantly lower childhood diarrhea rates in the post-vaccine era only. We found no effect of the rotavirus vaccine in the lowest quartile of piped water access. Controlling for long-term trend, compared to the pre-vaccine era, the diarrhea rate was lower in the post-vaccine era by 7% (95% confidence interval (CI): 2-12%), 13% (95% CI: 7-19%), and 15% (95% CI: 10-20%) in the 2nd, 3rd, and 4th quartiles of piped water access, respectively. Diarrhea rates were significantly higher (6%, 95% CI: 4-8%) during moderate or strong El Niño events.

**Conclusions:** Explanations for higher reductions in diarrhea rates from the pre- to post-vaccine era in provinces with better piped water access include: children without piped water may be predisposed to environmental enteric dysfunction, diminishing oral vaccine impact,

and/or the etiologic patterns of diarrhea (and effectiveness of a vaccine targeting a viral pathogen) may differ by water source. Improved access to piped water and rotavirus vaccination may operate synergistically to reduce childhood clinic visits for diarrhea in Peru.

## Air pollution exposure and cognitive and academic performance in children

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PDS 73: Neurological effects, Johan Friso Foyer, Floor 1, August 26, 2019, 10:30 AM - 12:00 PM

**"Background/Aim":** Air pollution could affect cognition due to its suspected role in oxidative stress, neuroinflammation, and brain functional and structural changes. Children are a population at risk since childhood is a crucial period of brain development. This study aims to explore the associations between air pollution and cognitive performance in children.

**"Methods":** Data from the UK Millennium Cohort Study was used. Concentrations representative of the 12-months prior to cognitive test performed at 7 years of age were calculated for each participant living in London. Exposures of NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, PM<sub>coarse</sub>, O<sub>3</sub>, and the PM exhaust and non-exhaust fractions were computed for each participant address (postcode centroid) from concentrations estimated at 20x20m resolution from dispersion models in London. Cognitive performance evaluation included the British Ability Scale test assessing word reading and pattern construction and the National Foundation for Educational Research test assessing progress in maths (n=442). Academic performance scores available from the linked Education Administrative datasets were also collected (N= 152). Multiple linear regression analysis evaluated the associations between air pollution and children cognitive and academic performance. Models were adjusted with age, gender, parent education level, ethnicity, birth weight, birth gestational age and maternal age at delivery.

**"Results":** Air pollution exposure was not associated with word reading, progress in maths scores, or academic performance. However, higher NO<sub>2</sub> concentrations were associated with lower pattern construction scores ( $\beta = -0.155$  points, 95%CI -0.295, -0.016 per each increase of 1  $\mu\text{g}/\text{m}^3$ ). Oppositely, higher O<sub>3</sub> concentrations were associated with higher pattern construction scores ( $\beta = 0.353$  points, 95%CI 0.116, 0.59 per each increase of 1  $\mu\text{g}/\text{m}^3$ ).

**"Conclusions":** NO<sub>2</sub> exposures were associated with worse visuo-construction abilities, whilst better results were associated with O<sub>3</sub>. Further analysis will consider other exposure time windows, further adjustments for potential confounding variables and extend the analysis to the full UK cohort.

## Urinary biomarkers of phthalates exposure in relation to thyroid hormone levels among thyroid disorder patients

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TPS 632: Health effects of flame retardants and plasticizers, Johan Friso Foyer, Floor 1, August 27, 2019, 3:00 PM - 4:30 PM

**Background:** Phthalates exposure has been reported to disrupt thyroid hormone homeostasis. However, the evidence from human studies is inconsistent.

**Objective:** To investigate the associations between exposure to phthalates and thyroid hormone levels in thyroid disorder patients, a population with potentially increased susceptibility to phthalates exposure.