with PCB congeners, predominately PCB170 and 178, and positively associated with PBDE153 and 99. Similarly, total T4 was inversely associated with PCB146, 170 and 178, and positively associated with PBDE153 and 99. Reverse T3 was positively associated with PBDE47, 99 and 153. Alb-T4 was positively associated with PBDE47 and 100 and TBG-T4 was inversely associated with PBDE47, 100 and 153.

In conclusion, recent developments in the analysis of multiple correlated exposures can expand our understanding of the impact of individual exposures on hormone dysregulation in historical data sets and identify which specific congeners may play a role in determining health outcomes.

Dietary Counseling on Risks and Benefits of Fish Consumption and Mercury Testing in Reproductive Age Women in a Health Clinic Setting

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TPS 631: Metals and health 1, Johan Friso Foyer, Floor 1, August 27, 2019, 3:00 PM - 4:30 PM

Consumption of fish low in mercury should be encouraged in reproductive age women because benefits of fish consumption for the fetus, including improved eye and brain development, outweigh risks if fish that are low in mercury are eaten. The Fish are Important for Superior Health Project was designed to intervene with reproductive age women to reduce mercury exposure in an area where elevated exposure in infants has been found.

At a clinic visit, 499 women answered detailed questions on fish consumed in the past year and donated blood for mercury and docosahexaenoic acid (DHA) measurements. A nurse delivered information on risk and benefits of eating fish and tailored advice on fish consumption based on the information reported by the participant in the survey. Laboratory results were reported to participants through letters from the clinics. After six months, all 15 women with blood mercury levels above the level equivalent to the EPA RfD (5.8 μg/L), and 30 with blood mercury below 5.8 μg/L completed a follow-up visit identical to their initial clinic visit. Longitudinal models tested changes in measures of mercury, DHA and fish intake and adjusted for season of assessment, usual fish portion size and omega-3 fatty acid supplement use.

At the 6 month follow up, we found a decline in blood mercury and in consumption of fish species with moderate Hg contamination (>0.22 ppm) that was significantly greater in participants with elevated mercury levels at the initial visit. No change in consumption of low mercury fish or plasma DHA levels was observed in either participant group. This investigation demonstrated the feasibility of administrating a tailored mercury reduction intervention to reproductive age women in a health clinic setting to reduce intake of fish with moderate levels of mercury while maintaining beneficial intake of fish with low levels of mercury.

The association between pediatric asthma and body composition in Lima, Peru

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TPS 752: Respiratory effects and allergies, Exhibition Hall, Ground floor, August 27, 2019, 3:00 PM - 4:30 PM

Background: The link between adiposity and asthma development is of growing concern in low-and-middle-income countries where pediatric asthma prevalence is high and childhood obesity rates are rising. Some adiposity phenotypes and body composition measures may be more strongly associated with asthma than others, yet most existing studies have focused only on body mass index (BMI) in adults. Our objective was to explore the association of body composition measurements with current asthma in children in a low-resource, urban setting in Peru. Methods: We evaluated 447 children aged 9-19 years, with persistent asthma over a period of 12 months. Asthma Control Test (ACT) was administered monthly. Uncontrolled asthma was defined as having an ACT ≤ 19. We measured adiposity at baseline using objective measures: body mass index (BMI), body fat percentage (BF), calculated lean muscle (LM), and calculated fat mass (FM) using bioimpedance (BIA) with the TANITA device. We used multiple logistic regression to analyze associations between body composition measures and asthma control, adjusted by sex, age, SES, site, baseline lung function, and temperature. Results: At baseline, 13% of asthmatics had uncontrolled asthma. In bivariate analyses, we measured greater adiposity for children with uncontrolled vs. controlled asthma for all body composition measurements; however, results were only significant for BF measurements (mean [sd]: 28% [8.9] vs. 26% [9.6], p<0.05). In multivariable analyses, an increase in adiposity was not significantly associated with any measures of uncontrolled asthma. Conclusions: In longitudinal analysis, we found no association between asthma control and body composition variables. These results highlight the importance of examining the relationship between multiple adiposity measures and controlled asthma.

Deficient calcium, zinc, and iron intake on absorption of cadmium from diet

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TPS 621: Exposure to metals, Johan Friso Foyer, Floor 1, August 26, 2019, 3:00 PM - 4:30 PM

Background/Aim: In vitro and in vivo studies have demonstrated that deficient calcium, zinc, and iron dietary intake upregulates metal ion transporters to increase intestinal absorption. However, these gut transporters are not specific and bind to other metals, including cadmium. Few human studies have investigated whether deficient calcium, zinc, and iron intake increases intestinal absorption of dietary cadmium. Methods: We used enrollment data (2010-2012) from the Study of Environment, Lifestyle & Fibroids, a cohort of 1693 African American women ages 23-35 who reside in the Detroit, Michigan area. Whole blood cadmium concentrations (proxy for cadmium absorption) were measured in 1548 participants. Dietary and supplemental calcium, zinc, and iron intake was estimated using Block 2005 Food Frequency Questionnaire data; deficient intake was defined as <80% of the recommended daily allowance. Daily dietary intake of total grains was used as the proxy for dietary cadmium intake as grains are a major source of cadmium exposure in U.S. diet. We estimated the percent difference in blood cadmium concentrations per median daily intake of total grains (4.55 ounce equivalents) using multivariable linear regression, stratified by deficient and sufficient calcium, zinc, and/or iron intake. We restricted the analyses to never smokers with plausible values for total energy intake (>400 and <5000 kcal/day) (n=1087). We adjusted for age at enrollment, total energy intake, body mass index, height, education, and natural log-transformed blood lead concentrations. Results: The observed percent difference in blood cadmium concentrations in relation to intake of total grains was stronger among those with deficient intake of calcium, zinc, and/or iron (28%, 95% CI; 6, 53%) than among

those with sufficient intake of all 3 essential nutrients (5%, 95% CI: -7, 19%). Conclusions: Our preliminary findings suggest that women with deficient calcium, zinc, and/or iron intake have increased absorption of cadmium from the diet.

Evaluation of the ERA5-based UTCI on mortality data in Europe

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TPS 664: Climate change: temperature effects 2, Exhibition Hall, Ground floor, August 27, 2019, 3:00 PM - 4:30 PM

The study was conducted on behalf of the MCC Collaborative Research Network (http://mccstudy.lshtm.ac.uk/).

Background: ERA5 is a novel climate reanalysis product from the ECMWF (European Centre for Medium-Range Weather Forecasts). It provides estimates of surface and atmospheric parameters at much higher resolution (31 x 31 km) than any previous climate reanalyses.

Methods: From ERA5 parameters the Universal Thermal Climate Index (UTCI) can be computed as a gridded parameter at the ERA5 resolution for the whole European continent. Using daily mortality data from European members of the MCC Collaborative Research Network, we will explore the potential of the ERA5-based UTCI as a health-related tool by evaluating UTCI-mortality relationships in 20 cities across 10 European countries. Distributed Lag Nonlinear Models (DLNM) will be used to analyse exposure-response relationships between mortality and UTCI in selected cities calculated from (i) the ERA5 reanalysis and (ii) station-based data.

Results: Preliminary results suggest that both ERA5- and station-based UTCI explain mortality in European cities in a comparable way.

Conclusions: The comparison of the exposure-response relationships between the ERA5- and station-based UTCI is an important step towards the development of a pan-European health-hazard warning system that would be able to assess thermal conditions in locations where high-quality station data are not available.

Persistent organic pollutants and the association with maternal and child thyroid hormone levels

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TPS 634: Health effects of pops, voc and other chemicals, Johan Friso Foyer, Floor 1, August 27, 2019, 3:00 PM - 4:30 PM

Background/Aim: Thyroid hormones regulate a wide array of biological functions in the human body. Exposure to persistent organic pollutants (POPs) has been linked to metabolic disturbances in epidemiological and animal studies, but their effects on thyroid hormone homeostasis remain controversial. We evaluated the association between maternal POPs exposure and thyroid function in 850 mother-child pairs from the RHEA pregnancy cohort in Crete, Greece.

Methods: Concentrations of several PCBs, dichlorodiphenyldichloroethene (DDE), and hexachlorobenzene (HCB) were determined in first trimester maternal serum. Thyroid hormones (thyroid stimulating hormone (TSH), free T(4), and free T(3)) were measured in serum samples collected from mothers (1st trimester) and their children at 4 years of age. Maternal hypothyroxinemia was defined as TSH within the normal range and fT4 below the 10th percentile. Adjusted associations were obtained via multivariable regression analyses.

Results: Elevated prenatal DDE levels (third vs. first tertile) were associated with 14.3% (95% CI: -27.2, 0.9) lower maternal TSH levels. Women in the medium and high tertiles of PCBs, had 18.1% (95% CI: -30.6, -3.4) and 16.61% (95% CI: -31.6, 1.7) lower TSH levels respectively, compared to women in the lowest tertile. Elevated odds of hypothyroxinemia were observed for women in the highest tertile of PCBs exposure (OR=2.5, 95% CI: 1.0, 6.3). Girls born to mothers within the high HCB tertile of exposure had -7.9 ng/dL (95% CI: -15.2, 0.03, p-interaction=0.027) lower mean concentrations of FT4 compared to girls born to mothers in the lowest tertile. We did not observe other associations between maternal POP concentrations and child thyroid hormones.

Conclusions: The present results suggest that low-level exposure to POPs can alter maternal and offspring thyroid homeostasis. Considering the importance of thyroid hormones during gestation and early life stages, further work is needed to examine the underlying mechanisms.

Association between prenatal exposure to air pollution and inflammatory markers in children

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TPS 911: Air pollution, epigenetics, biomarkers, Exhibition Hall, Ground floor, August 26, 2019, 3:00 PM - 4:30 PM

Background/Aim: Early-life exposure to ambient air pollution has been associated with adverse health effects in children but little is known about its potential effects on cytokine levels. We evaluated the association of pregnancy exposure to particulate matter with child inflammatory biomarkers in 500 mother-child pairs from the RHEA pregnancy cohort in Crete, Greece.

Methods: Mean concentrations of particulate matter with an aerodynamic diameter of less than 2.5 μm (PM2.5) and less than 10 μm (PM10) during pregnancy were estimated at maternal home addresses with temporally adjusted land-use regression models. Levels of several inflammatory biomarkers were determined in child serum at 4 years of age via immunoassay. Exposure-outcome associations were assessed using log-binomial or Poisson regression with robust variances, in cases of non-convergence. Potential effect modification from maternal and offspring characteristics was examined by introducing interaction terms in multivariate models.

Results: A 5 μg/m^3 increase in concentration of PM2.5 and PM10 during pregnancy was associated with an increased risk of high levels (in the 5th quantile) of child interleukin-6 (IL-6) levels at 4 years (RR=2.68, 95%CI: 1.38, 5.20 and 1.28, 95%CI: 1.04, 1.57, respectively). Effects of prenatal exposure to both PM2.5 and PM10 remained significant only for non-smoking mothers in stratified analysis by maternal smoking status (p-interaction: 0.037 and 0.071, respectively). Child overweight/obesity (p-interaction: 0.013 and 0.001) and asthma status (p-interaction: 0.007 and 0.001) more than doubled the effects of maternal exposure to PM2.5 and PM10 on IL-6 at 4 years. Similar effects were found with other inflammatory biomarkers under study.

Conclusions: Our results indicate alterations in systemic inflammatory markers in 4-y-old children in relation to prenatal exposure to traffic-related air pollution. Further work is needed to examine