VARIABILITY OF URINARY PHTHALATE CONCENTRATIONS BEFORE AND DURING PREGNANCY

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Background and Aims: Phthalates are a diverse class of chemicals used in a wide variety of consumer products. Gestational exposure to phthalates may increase the risk of adverse infant/child health outcomes. Urinary phthalate concentrations are variable and the ability of a single spot-urine sample to classify gestational exposure remains uncertain.
Methods: We collected 1,065 urine samples before and during pregnancy from 168 women who delivered live-born infants in Boston, MA. Women provided up to three urine measurements during each trimester of pregnancy. We measured concentrations of monoethyl phthalate (MEP), monobutyl phthalate (MBP), monobenzyl phthalate (MBzP), and four metabolites of di-2-ethylhexyl phthalate (DEHP). We used intraclass correlation coefficients (ICC) to characterize urinary phthalate concentration variability before and during pregnancy. We averaged phthalate concentrations from at least 2 pregnancy urine samples and estimated the sensitivity and specificity of trimester specific spot-urine samples to classify the top tercile of mean gestational exposure.
Results: The ICCs of most urinary phthalate metabolite concentrations were similar before and during pregnancy. During pregnancy, ICCs were low for DEHP metabolites (<0.16) and MBzP (0.28) and higher for MBP (0.43) and MEP (0.50). Third trimester urine samples had the highest sensitivity and specificity for classifying the upper tercile of mean MBP (sensitivity: 0.68, specificity: 0.84), MEP (sensitivity: 0.68, specificity: 0.95), and MBzP (sensitivity: 0.75, specificity: 0.86) concentrations during pregnancy. The sensitivity and specificity were variable depending on the DEHP metabolite examined.
Conclusions: Urinary phthalate concentrations were variable before and during pregnancy, but the magnitude of variability depended on the individual phthalate metabolite. Our results suggest that a single spot-urine sample in the third trimester may accurately rank-order exposure to some phthalates during pregnancy. These results may be related to unique features of the women studied and studies with serial urine measurements should conduct their own exposure assessments.