

# ASSOCIATION BETWEEN A URINARY BIOMARKER OF PRENATAL EXPOSURE TO DISINFECTION BY-PRODUCTS AND ADVERSE PREGNANCY OUTCOMES

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**Background and aims:** The microbiological control of drinking water through chlorinated disinfectants produces a large number of disinfection by-products (DBPs) suspected to have adverse reproductive effects. Most epidemiological investigations of the effect of prenatal exposure to DBPs on pregnancy outcomes used indirect measures of exposure combining estimated residential levels of trihalomethanes (THM) or haloacetic acids (HAAs) in tap water and eventually personal uses of water. Urinary trichloroacetic acid (TCAA) (one of the HAAs) has been validated as a biomarker of chronic exposure to DBPs via ingestion of chlorinated drinking water. We used it to study the association of DBP exposure with fetal growth and duration of gestation.

**Methods:** The PELAGIE birth cohort included 3,421 pregnant women in early pregnancy (<19 weeks of gestation) between 2002 and 2006. At inclusion, women were asked to complete a self-administered questionnaire and to provide a urine sample. Maternal urinary levels of trichloroacetic acid (TCAA) were assessed in a nested case-control study comparing 174 cases of fetal growth restriction, 114 preterm births, and 399 controls. Odds ratios were estimated with logistic models adjusted for high blood pressure, tobacco, alcohol, and coffee consumption, marital and employment status.

**Results:** TCAA was detected in 7% of the 611 maternal urine samples tested. The limit of detection was 0.01 mg/L. Women with detected TCAA in their urine had a significantly higher risk than others of fetal growth restriction (adjusted odds ratio=2.07; 95% confidence interval (CI): 1.00, 4.26). No association was found with preterm birth.

**Conclusions:** Prenatal exposure to DBPs as measured by detected urinary TCAA seems to affect fetal growth. This biomarker should however be considered as a marker of the whole mixture of DBPs and the causal agent(s), if any, remain to be identified.