

# **Variability in Biomarkers of Arsenic Exposure and Metabolism in Adults Over Time.**

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摘要

## **Abstract**

Background: Urinary arsenic metabolites (UAs) are used as biomarkers of exposure and metabolism. Objectives: To characterize inter- and intraindividual variability in UAs in healthy individuals. Methods: In a longitudinal study conducted in Bangladesh, we collected water and spot urine samples from 196 participants every 3 months for 2 years. Water arsenic (As) was measured by inductively coupled plasma-mass spectrometry and urinary As [arsenite, arsenate, monomethylarsonic acid (MMA), and dimethylarsinic acid (DMA)] were detected using high-performance liquid chromatography-hydride-generated atomic absorption spectrometry. We used linear mixed-effects models to compute variance components and evaluate the association between UAs and selected factors. Results: The concentrations of UAs were fairly reproducible within individuals, with intraclass correlation coefficients (ICCs) of 0.41, 0.35, 0.47, and 0.49 for inorganic As (InAs), MMA, DMA, and total urinary As (TUA). However, when expressed as a ratio, the percent InAs (%InAs), %MMA, and %DMA were poorly reproducible within individuals, with ICCs of 0.16, 0.16, and 0.17, respectively. Arsenic metabolism was significantly associated with sex, exposure, age, smoking, chewing betel nut, urinary creatinine, and season. Specificity and sensitivity analyses showed that a single urine sample adequately classified a participant's urinary As profile as high or low, but TUA had only moderate specificity for correctly classifying drinking water exposures. Conclusions: Epidemiologic studies should use both urinary As concentrations and the relative proportion of UAs to minimize measurement error and to facilitate interpretation of factors that influence As metabolism.