

# ARSENIC BIOMONITORING IN RURAL NOVA SCOTIA, CANADA

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## **Background and Aims**

Groundwater arsenic remains a significant global public health concern. Rapid, portable, noninvasive biomonitoring methods to assess chronic exposures in human populations are not currently available. The purpose of this investigation was to survey arsenic exposures for selected subjects in communities with historically elevated groundwater arsenic concentrations. Collaborators tested biological samples for arsenic concentration and genetic damage to determine relationships among the laboratory test results and survey exposures.

## **Methods**

Study participants (n=179) were from 2 Nova Scotia communities, selected in consultation with government hydrogeologists, with documented high levels of arsenic in drinking water from residential wells. Participants completed a previously validated, 24-hour recall dietary survey (adapted for Nova Scotia based on pilot study responses), and allowed collection of a well water sample, which was tested by inductively coupled plasma mass spectrometry. Other possible arsenic exposures (eg. medications, smoking) were also included in the survey.

## **Results**

Water arsenic concentrations ranged from below detection limits (0.07 µg/L) to 309 µg/L (median: 4.00 µg/L, 95% CI: 1.03 – 8.27 µg/L), with 41%  $\geq$  10 µg/L. Daily water arsenic consumption ranged from 0 µg – 1,799 µg (median: 2.86 µg, 95% CI: 1.1 – 12.9 µg). Estimated daily food arsenic consumption ranged from 0 µg – 1,606 µg (median: 19.6 µg, 95% CI: 14.70 – 59 µg). Estimated total arsenic ingestion ranged from 0 µg – 2,874 µg (median: 80.2 µg, 95% CI: 53.6 – 125 µg). Linear regression analyses indicated that water arsenic concentration, rice consumption, and seafood consumption were significant predictors of total arsenic consumption (*p-value* < 0.01), with no other exposure, demographic or location factors remaining significant in the final model.

## **Conclusions**

The study population had 41% of water arsenic concentrations  $\geq$  10 µg/L (recommended maximum, World Health Organization), but well within reported levels for Canadian populations. The main sources of arsenic in this population were water, seafood and rice.