

# **Incidence of Transitional Cell Carcinoma and Arsenic in Drinking Water: A Follow-up Study Of 8102 Residents in an Arsenic-endemic Area in Northeastern Taiwan**

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## **Abstract**

A significant association between ingested arsenic and bladder cancer has been reported in an arseniasis-endemic area in southwestern Taiwan, where many households share only a few wells in their villages. In another arseniasis-endemic area in northeastern Taiwan, each household has its own well for obtaining drinking water. In 1991–1994, the authors examined risk of transitional cell carcinoma (TCC) in relation to ingested arsenic in a cohort of 8,102 residents in northeastern Taiwan. Estimation of each study subject's individual exposure to inorganic arsenic was based on the arsenic concentration in his or her own well water, which was determined by hydride generation combined with atomic absorption spectrometry. Information on duration of consumption of the well water was obtained through standardized questionnaire interviews. The occurrence of urinary tract cancers was ascertained by follow-up interview and by data linkage with community hospital records, the national death certification profile, and the cancer registry profile. Cox proportional hazards regression analysis was used to estimate multivariate-adjusted relative risks and 95% confidence intervals. There was a significantly increased incidence of urinary cancers for the study cohort compared with the general population in Taiwan (standardized incidence ratio = 2.05; 95% confidence interval (CI): 1.22, 3.24). A significant dose-response relation between risk of cancers of the urinary organs, especially TCC, and indices of arsenic exposure was observed after adjustment for age, sex, and cigarette smoking. The multivariate-adjusted relative risks of developing TCC were 1.9, 8.2, and 15.3 for arsenic concentrations of 10.1–50.0, 50.1–100, and >100 µg/liter, respectively, compared with the referent level of 10.0 µg/liter.

arsenic; carcinoma, transitional cell; drinking; incidence; risk assessment; urologic neoplasms; water supply

Abbreviations: CI, confidence interval; SIR, standardized incidence ratio; TCC, transitional cell carcinoma.