breakout ABSTRACT

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TITLE

Preliminary Analysis of Area-Level Drinking Water Arsenic and Bladder Cancer Incidence Rates in New Mexico, 1988–2002

THEME

Advance Environmental Public Health Science and Research

KEYWORDS

bladder cancer, arsenic, ecologic study, drinking water, census tract

BACKGROUND

Arsenic is a known bladder carcinogen; populations exposed to high arsenic levels in their water supply have reported elevated bladder cancer mortality and incidence rates. To explore possible effects of lower levels of arsenic exposure on bladder cancer incidence, we conducted a preliminary ecological study at the census-tract level in New Mexico, where drinking water arsenic levels above 10 ug/l are commonly found in public water supply systems.

OBJECTIVE(S)

The objective of the study was to explore methods for area-level linkage and analysis of bladder cancer incidence rates and drinking water arsenic concentrations.

METHOD(S)

Incidence bladder cancer cases registered with the New Mexico Tumor Registry between January 1, 1988 and December 31, 2002 were geocoded to census tract based on Census 2000 boundaries using a combination of automated and manual address-matching techniques. To create population estimates for the 15-year analysis time period, we obtained 1990 and 2000 U.S. Census data at the block, block-group, and census-tract level and used 1990 block and block-group data to develop age-, race/ethnicity-, and gender-specific population-count data for the 1990 Census in Census 2000 tract boundaries. We multiplied the averaged 1990 and 2000 tract populations for each age, race/ethnicity, and gender group by 15 to generate population estimates for incidence rate calculation.

The exposure assessment was conducted by assigning an arsenic exposure concentration initially at the census tract level where appropriate. This assessment was based on the variation in exposure concentrations from drinking water data collected for public supply wells within the census tract. If the variation was acceptable for all wells and data, the exposure concentration was assigned. For tracts where the variation was not acceptable, or where no supply wells were present, concentrations were determined and mapped for a smaller geographic unit, including block groups and water distribution systems. Methods explored for validating the exposure assessment include hydrogeologic aquifer system mapping and biomonitoring.

We then performed a gender- and racial/ethnic-specific analysis of bladder cancer incidence rates stratified by several exposure assignment schemes to explore the sensitivity of the rates to differing methods of exposure classification.

RESULT(S)

Results of the study are preliminary and will be presented during the oral presentation.

DISCUSSION/RECOMMENDATION(S)

These results are the preliminary utilization of a data linkage tool to evaluate arsenic exposure in drinking water and bladder cancer. The methods development continues to be enhanced to address potential confounders, such as smoking, socioeconomic status, and migration, as well as additional data for exposure assessment, such as biomonitoring.

AUTHOR(S)

Len Flowers
New Mexico Department of Health
len.flowers@doh.state.nm.us

Will Athas, UNM: wathas@unm.edu
Orrin Myers, UNM: omyers@salud.unm.edu
Shirley Baros, UNM: sbaros@edac.unm.edu

epht@cdc.gov
www.cdc.gov/nceh/tracking
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