

New study links 1 in 5 deaths in Bangladesh to arsenic in the drinking water

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Between 33 and 77 million people in Bangladesh have been exposed to arsenic in the drinking water—a catastrophe that the World Health Organization has called "the largest mass poisoning in history." A new study published in the current issue of the medical journal *The Lancet* provides the most complete and detailed picture to date of the high mortality rates associated with this exposure, which began with the widespread installation of tube wells throughout the country 30 years ago—a measure intended to control water-borne diseases.

Among the surprising findings of the study, conducted by a team of researchers at Columbia University's Mailman School of Public Health, Lamont-Doherty Earth Observatory, and the University of Chicago, and led by Dr. Joseph Graziano are these:

- One in five deaths in Bangladesh (population: 125 million) is associated with exposure to [water](#) from wells with [arsenic](#) concentrations greater than 10 micrograms per liter.
- Arsenic exposure was associated with increased mortality due to heart disease and other [chronic diseases](#) in addition to the more familiar medical consequences of arsenic exposure: skin lesions, cancers of the skin, bladder and lung.
- An increase of nearly 70 percent in all-cause mortality was found among those exposed to the highest concentration of arsenic in

water (150 to 864 micrograms/liter). But researchers found a dose-related effect that included increased mortality even at relatively low levels of exposure, including the Bangladesh safety standard (50 micrograms/liter) and the WHO recommended standard (10 micrograms/liter).

The study draws its results from a carefully designed, prospective, longitudinal study involving 12,000 people in Bangladesh who were tracked for over a decade. To gather data for the Health Effects of Arsenic Longitudinal Study (HEALS), researchers traversed the tropical landscape over wooden bridges to interview each of the 12,000 participants and take urine samples every two years. Lifestyle and health data were tracked, allowing researchers to control for factors such as smoking, blood pressure and body-mass index. In addition, nearly 6,000 wells were tested to establish the arsenic concentration of the water source for each participant.

In an accompanying commentary in the same issue of *The Lancet*, Margaret P. Karagas of Dartmouth Medical School, describes the study design as "a substantial advance over previous ecological studies."

The mass poisoning in Bangladesh was a result of well-intentioned efforts on the part of aid and development agencies in the 1970s, which built 10 million tube wells in an attempt to reduce water-borne diseases such as cholera and dysentery, according to Dr. Graziano, professor of Environmental Health Sciences at the Mailman School. While the new wells reduced exposure to the microbes causing such diseases, they yielded water contaminated with arsenic, which occurs naturally in the region. Arsenic can be avoided, however, by digging deeper wells—an approach that is already yielding safer drinking water for roughly 100,000 people. The Columbia Mailman School team has been at the forefront of this effort.

"The need for a global response is apparent because the situation goes far beyond the Bangladesh borders," says Dr. Graziano. "Arsenic in ground water is affecting 140 million people across many countries and especially in South Asia. "There needs to be a concerted effort to bring safe to millions of people. Investment has not been commensurate with the magnitude of the problem."

Provided by Columbia University's Mailman School of Public Health

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