

# Cigarette smoking and arsenic exposure: A deadly combination

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Arsenic exposure and smoking each elevate the risk of disease. But when combined together, the danger of dying from cardiovascular disease is magnified, a new study finds.

Exposure to high or even moderate levels of the toxin arsenic through drinking water can elevate the [risk of cardiovascular disease](#) mortality, according to a new study published in [British Medical Journal](#). Exposed individuals who smoke were hit with a dangerous double whammy: a combined [mortality risk](#) that exceeded the influence of either factor alone.

"Cigarette smoking is pervasive all over the world, and arsenic exposure on top of it creates a major public health problem," said Habibul Ahsan, MD, MMedSc, Professor and Director of the Center for Cancer Epidemiology and Prevention at the University of Chicago Medical Center and senior author of the study. "This tells us that there are some individuals who are dying from cardiovascular disease solely because of the presence of both factors, not because of the presence of one or the other."

The epidemiological study was part of an ongoing project to measure the [health consequences](#) of arsenic exposure in Bangladesh. Millions of people in the South Asian country have been accidentally exposed to unsafe levels of arsenic via drinking water from wells installed by health organizations in the 1970's to fight water-borne infectious disease.

For the past 11 years, researchers from the University of Chicago, Columbia University, and New York University have studied the [health effects](#) of this long-term toxic exposure in nearly 12,000 recruits from the country. The new study sought to characterize the effect of prolonged arsenic exposure upon death from cardiovascular disease – an effect less strongly established than the toxin's links with cancer, skin lesions, and respiratory disease.

Researchers collected urine samples from 11,746 men and women and water samples from the wells they used to measure arsenic exposure. Subjects were tracked for an average of 6.6 years, with causes of death noted in those who died during that time. Of the 460 deaths observed during the study period, 198 were because of cardiovascular disease.

When arsenic exposure levels were compared across the population, a significant effect on mortality was found for those exposed to levels higher than 12 parts per million – just slightly above the World Health Organization recommended safe limit of 10 parts per million.

Individuals who drank water containing higher than 12 parts per million arsenic (ranging from 13 to 864 parts per million) were nearly 50 percent more likely to die of cardiovascular disease than those drinking water below that concentration.

"We were able to show that, even at lower doses than previously reported, there seems to be a deleterious effect of arsenic regarding cardiovascular disease mortality, particularly from ischemic and other heart diseases," Ahsan said.

When the data was further compared according to smoking behavior, another interaction was observed. The risk of dying from ischemic and other heart diseases associated with moderate or high arsenic exposure was even higher in people who currently smoke or have smoked.

Non-smokers exposed to high levels of arsenic exposure (over ten times the safe limit) were 50 percent more likely to die of cardiovascular disease than those exposed to safe levels of the toxin. By comparison, current smokers were more than 300 percent more likely to die of [cardiovascular disease](#) if exposed to high levels of arsenic.

The result is relevant both for Bangladeshis exposed to unusually high concentrations of arsenic and people around the world, including in the United States, who may be exposed to moderate levels of arsenic in water and could exacerbate the harmful effects of smoking.

"This highlights the importance of eliminating smoking from a population," Ahsan said. "It's one more reason to pay attention to arsenic exposure, but yet another reason that will underscore the importance of smoking cessation."

In an accompanying editorial, Allan H. Smith of the University of California, Berkeley and Craig M. Steinmaus of the California Office of Environmental Health Hazard Assessment agreed that the study's results reinforce the worldwide dangers of even moderate arsenic exposure.

"There is enough evidence to highlight a serious public health concern because exposure to groundwater containing arsenic is widespread throughout the world," the authors write. "Arsenic poses far higher health risks than any other known environmental exposure, with about one in 10 people dying because of high concentrations of arsenic in water."

**More information:** The study, "Arsenic exposure from drinking water and mortality from cardiovascular disease in Bangladesh: prospective cohort study," will be published online May 6, 2011 by *BMJ*.

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