



# ARSENIC

## What Health Care Providers Should Know

### DRINKING WATER FACT SHEET #3

#### What Is Arsenic and Why Is There Concern about Its Presence in Drinking Water?

Arsenic is a poisonous heavy metal, and exposure to it can occur through inhalation, dermal contact and ingestion. Most exposure, however, occurs through consumption of arsenic-contaminated food and water.<sup>1</sup> Contamination of drinking water supplies with arsenic can occur by runoff of arsenical pesticides, dissolution of natural mineral deposits, atmospheric deposition, industrial releases, or improperly disposed chemicals.

While domestic production of arsenic ceased in 1985, the U.S. imported around 4.4 million pounds of arsenic metal and compounds per year from 1993 to 1996, primarily for use in agricultural chemicals and wood preservatives.<sup>2</sup> Arsenic is also found in naturally occurring mineral and ore deposits. In the U.S., the highest levels of naturally occurring arsenic in groundwater are found in regions of the Western, Midwestern and Northeastern parts of the country.<sup>3</sup>

#### What Are The Health Effects of Arsenic in Drinking Water?

Chronic arsenic ingestion from drinking water is known to cause skin cancer, and there is substantial evidence that it increases risk for cancers of the bladder, lung, kidney, liver, colon, and prostate.<sup>2,4,5</sup> Recent studies have also shown that arsenic is associated with a number of non-neoplastic diseases, including cardiac disease,<sup>4, 5, 6</sup> cerebrovascular disease,<sup>7</sup> pulmonary disease,<sup>8</sup> diabetes mellitus,<sup>9,10</sup> and diseases of the arteries, arterioles, and capillaries.<sup>11</sup> Symptoms of chronic arsenic ingestion are usually delayed, with at least 5 years of exposure to initiate known disease processes.<sup>12</sup> Other factors such as genetics, age, metabolism, diet and health status may also increase health risks associated with arsenic exposure, because they potentially affect one's ability to clear arsenic.<sup>8</sup> Individuals with chronic Hepatitis B infection, protein deficiency or malnutrition may be more sensitive to the effects of arsenic.<sup>5,12</sup> Children and older adults may be other groups at special risk.<sup>13, 14, 6, 15</sup>

Much of the evidence for adverse health effects of arsenic in drinking water is derived from studies conducted outside the United States, in areas with significantly higher levels of

arsenic. Few epidemiological studies have examined chronic exposures to arsenic in drinking water at levels typically found in the U.S., and this remains an important priority for future research. However, based on available data, the National Research Council (NRC) recently estimated that the excess cancer risk from exposure to arsenic at the current U.S. drinking water standard of 50 parts per billion (ppb, or micrograms per liter) could be as high as 1 in 100.<sup>8</sup> The U.S. Environmental Protection Agency (EPA) generally regulates chemical contaminants to reduce cancer risk to a level no higher than 1 excess cancer death for every 10,000 persons.

#### How Is Arsenic in Drinking Water Regulated?

The arsenic standard for drinking water has been the source of considerable debate. The 1999 NRC study described above concluded that EPA's long-standing drinking water standard of 50 ppb did not adequately protect public health, and should be revised downward. Based on this recommendation, the EPA promulgated a revised standard of 10 ppb in January 2001.<sup>16</sup> Although this decision reflects a significant strengthening of the standard, there remains concern that long-term exposure to arsenic, even at 10 ppb, could still contribute to the incidence of certain chronic diseases in this country. To address these concerns, EPA included a provision in its final rule that would require water utilities to alert their customers in their annual Consumer Confidence Reports if the arsenic level in their drinking water was between 5 ppb and 10 ppb. This new standard is currently under review by the Bush Administration and if the standard is approved, water utilities will have until 2006 to meet it.

#### What Can Health Professionals Do to Reduce the Public Health Threat from Arsenic?

Health care providers can play a vital role in reducing exposures to arsenic in drinking water. Following are practical steps that health care providers can take with their patients and communities:

- If your patients live in an area of high arsenic levels, or you suspect arsenic-related illness, screen patients by using a 24-hour urine test. Treatment of patients with a body burden of arsenic is best undertaken by physicians who have experience in occupational medicine or medical toxicology.
- If drinking water is identified as the source of arsenic exposure, patients should be advised to stop drinking from that source, and consider bottled water, distilled water, or home treatment units that are effective for arsenic removal. Bottled water might also contain contaminants. In choosing a source of bottled water, consumers should contact bottler(s) to request a copy of product test results for chemical contamination.
- Encourage your patients to read the annual Consumer Confidence Reports from their local water utility, and to ask questions. Individuals who obtain drinking water from private wells should be encouraged to have their water tested for possible contaminants, including arsenic.
- Educate your patients, peers, and community about potential sources of arsenic in their drinking water, and ways to reduce exposure. If man-made sources such as improper waste disposal or pesticide runoff are suspected, become involved in local efforts to protect sources of drinking water.

### Sources of Additional Information and Guidance

- Physicians for Social Responsibility: 202-898-0150 or [www.psr.org](http://www.psr.org)
- Campaign for Safe and Affordable Drinking Water: (202) 895-0420 or [www.safe-drinking-water.org](http://www.safe-drinking-water.org)
- U.S. EPA Safe Drinking Water Hotline: (800) 426-4791
- U.S. EPA Office of Ground Water and Drinking Water: (202) 260-5543 or [www.epa.gov/ogwdw](http://www.epa.gov/ogwdw)

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This document is one in a series of Drinking Water Fact Sheets developed specifically for health care providers by Physicians for Social Responsibility. These fact sheets provide practical and concise information to assist health care providers in recognition and prevention of disease caused by exposure to drinking water contaminants.



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