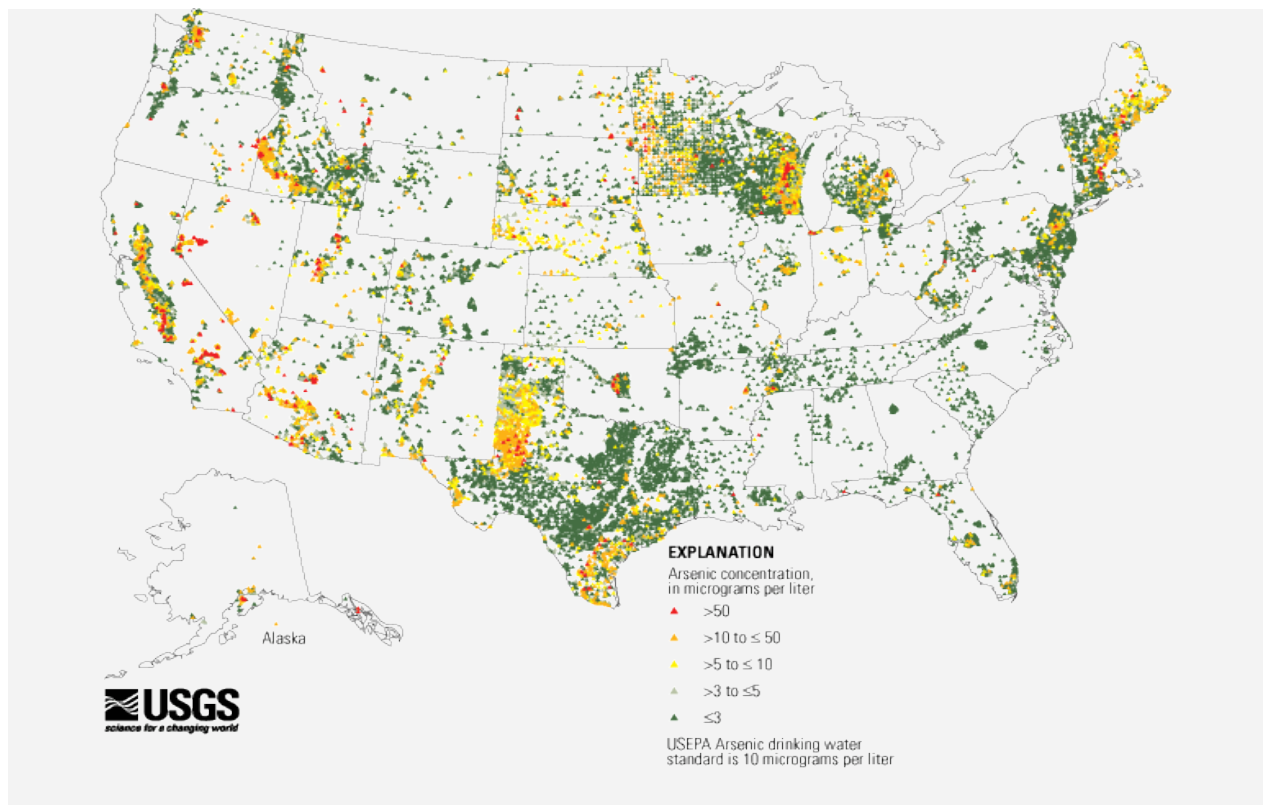


# ARSENIC IN DRINKING WATER: INCREASED RISK OF RESPIRATORY INFECTIONS AND LUNG DAMAGE FOLLOWING FETAL EXPOSURE

Odorless and tasteless, **arsenic** lurks everywhere – in rice and in chicken breasts, in apple juice and in **drinking water**. It's all around, but not in amounts sufficient to cause **acute** (short-term) poisoning. On the other hand, **chronic** (long-term) exposure to lower arsenic doses occurs way too often, and may lead to cardiovascular disease, diabetes, cancers and other human disorders.

**Contamination of drinking water by arsenic is a global health threat.** Presence of arsenic in groundwater is largely the result of minerals dissolving from weathered rocks and soils. In addition, arsenic enters the drinking water supply because of runoff from orchards, electronics production waste or other industrial activities.

Bangladesh is considered a **hot-spot** for groundwater contamination with arsenic – however, the water supply is contaminated in many regions all around the world. Results from a study recently published in the journal *Science* (August 2013) indicate that in China 19.6 million people are at risk of being affected by the consumption of arsenic-contaminated groundwater.



Arsenic in Groundwater of the United States, Trace Elements National Synthesis Project, U.S. Geological Survey.

Widespread high concentrations of arsenic are present in the **groundwater** of several areas of the U.S., including the West, the Midwest, parts of Texas, and the Northeast. The U.S. Geological Survey (USGS) develops maps that show where and to what extent arsenic occurs in groundwater across the country – The current maps are based on samples from 31,350 wells.

**Chronic exposure to arsenic through drinking water** is linked to respiratory diseases. Arsenic affects the function of the immune system as well as lung development and causes increased susceptibility to respiratory infections.

Results from a study carried out in Bangladesh and published in August in the journal *American Journal of Respiratory and Critical Care Medicine* show that arsenic induces lung damage similar to the damage induced by decades of tobacco smoking. The results also show that, especially in males, tobacco smoking makes arsenic-related damage even worse.

“Restrictive lung defects, such as we saw in those exposed to well-water arsenic, are usually progressive and irreversible,” said Habibul Ahsan, Director of the Center for Cancer Epidemiology and Prevention at the University of Chicago Medicine and lead author of the study. “They can lead over time to serious lung disease.”

As for many other pollutants, a major concern is **prenatal exposure**, which may lead to adverse health effects later on in life. Results from studies carried out in animal models suggest that arsenic exposure during adult and **fetal life** is linked to development of respiratory infections. In 2009, Courtney Kozul and collaborators published a study in the journal *Environmental Health Perspectives* showing that, in adult mice, arsenic exposure through drinking water significantly compromises the immune response to infection by influenza virus.

Following up on this study, just a few weeks ago, a team of researchers from Australia published in *Environmental Health Perspectives* a study in which mice were exposed to arsenic during fetal life (pregnant mice were given drinking water containing arsenic – arsenic crosses the placenta and, therefore, reaches the fetus). Results from the study show that pups born from exposed mothers exhibit abnormal responses to influenza infection in early life. In addition, results show that arsenic exposure in early life leads to lung damage in adulthood.

At this point, it is reasonable to ask whether or not similar effects could be present in humans. On the basis of published studies, the answer seems to be yes. During a study performed in Bangladesh a few years ago, Anisur Rahman and collaborators assessed maternal exposure by measuring levels of arsenic in urine samples collected during pregnancy. Once born, the babies were evaluated every month for symptoms of lower respiratory tract infection and diarrhea up to 1 year of age. The results of the study, published in *Environmental Health Perspectives* in 2011, show that arsenic exposure during pregnancy is associated with increased risk of contracting infectious diseases for the first year of life.

More recently, similar results were obtained by Shohreh Farzan and colleagues through a study conducted on a mother-infant US population and published in *Environmental Research* (June 2013).

The researchers evaluated the association between maternal levels of arsenic in urine during pregnancy and risk of infection in infants and found that elevated maternal concentrations of arsenic were associated with infant infections, including upper respiratory infections and colds.

Exposure to arsenic in the studies by Rahman and by Farzan could have occurred not just by drinking water – indeed, ingestion of contaminated food is often responsible for arsenic intake. Intake from air is also possible. However, both studies indicate that, in human populations, maternal exposure to arsenic during pregnancy leads to serious adverse health effects in the infants.

Source: <http://theglobalfool.com/arsenic-in-drinking-water-increased-risk-of-respiratory-infections-and-lung-damage-following-fetal-exposure/>