

Arsenic, It's Not What You Know. It's What You Don't Know That Kills.

It would be very easy to make the mistake in thinking that just because you know a little trivia about arsenic, such as that it's been a known lethal toxin for over a thousand years. The truth is that arsenic may be responsible for more deaths than the occasional assassination. In fact, arsenic may be the culprit behind what some are calling the largest mass poisoning in human history.

Over the last ten years, India's major investments into the education of their population have created a major boom in their economy and many people are beginning to gain access to some of the qualities of the Western living standard, namely potable water. Many in India rely upon surface sources of water, such as shallow rivers and ponds, but these sources can be full of bacteria from both animal and human defecation in very poor areas. Well-intentioned organizations spent lots of time, energy, and funds in order to switch these people onto cleaner sources of water, primarily by digging wells.

While well water is typically free from viruses and bacteria that are too large to seep through fine sand, dirt and rock and thus into the ground water, other contaminants, both natural and man-made, can leech into the water. One such contaminant that fits under both categories is arsenic.

An international team of researchers of both Americans and Indians studied over 12,000 people from 2000 to 2010 and monitored the drinking water and their health and morbidity. The study concluded that over 20% of the deaths that occurred within the study population were directly attributable to

elevated arsenic levels in their bodies from drinking well water. When this figure is applied to the entire exposed population of Bangladesh, you are talking about 77 million people who now have a 1 in 5 chance of dying from chronic arsenic exposure.

While in some parts of the world, high levels of arsenic are attributable to man-made sources, i.e. pesticides, industrial waste water, etc., but in Bangladesh the situation is different. The rock and minerals in the soils of this region are uniquely abundant in natural compounds of arsenic. This means that almost any well dug in this area will produce arsenic contaminated water.

Assuming that the arsenic doesn't kill you, it is also possible that a whole myriad of ailments and afflictions can affect millions of people. Because of the magnitude of this problem, Indian research into ways to filter arsenic from water, prevent human absorption, and mitigate internal damage are aggressively underway. One strategy being considered is to move the people off of well water and develop a municipal water supply infrastructure that will apply economies of scale to purifying the water of arsenic and prevent people from poisoning themselves by using their own wells. Whether or not this strategy and their purification technologies will be successful remains to be seen.

While one might think that only a country with such rampant poverty could be afflicted with such a primitive problem as foul water, the truth is much worse. In actuality, the entire region of New England has been discovered to contain random hot beds of natural arsenic in groundwater sources. Since well over 20% of this region's population relies on well water

for their drinking water source, the possibility that a Bangladesh style poisoning could occur is not out of the realm of possibilities. The EPA has been working in collaboration with private industries in order to educate the affected public about the dangers of low-dose arsenic poisoning from home wells and is working with state and local governments to provide testing resources so that residents can test their water, and if they are found to have unsafe arsenic levels in their water, that they can take appropriate measures to purify their water.

A problem that exists in this formula, however, is that there is controversy surrounding what amount of arsenic is "safe". Back in the 1940s the Public Health Service set the tolerable limit of arsenic at 50 parts per billion (ppb). The EPA around 2001 began making recommendations that the limit be changed to 10ppb based on new information. However, 10ppb some assert that the reason 10ppb was put forward instead of a lower number was because of limitations in the analytical technologies of the time to detect smaller quantities accurately. As of 2006, 10ppb became the new standard and many regions, particularly in California and New Mexico were discovered to have amounts that well exceeded this level.

In a ten minute film produced at Dartmouth College funded by the EPA as a public education tool called *In Small Doses: Arsenic*, the film describes how 10ppb is still too high and that epidemiological toxicity is occurring at doses as low as 7 parts per *trillion*. In one study mentioned, mice that had been exposed to a not unlikely amount of arsenic-laden water, roughly 100 ppb for 5 weeks, showed a severely impaired ability to fight a common influenza strain and

many of them even died of it. Whereas the mice who had not been poisoned still became ill, but none died from the virus.

The mechanism by which arsenic actually causes disease at such low dosages of chronic exposure is not well understood. What is known is that various forms of cancer can develop, severely impaired immune system conditions, and certain organs like the liver, kidneys, bladder, and even the brain can suffer damage from years of low dose exposure. There is even some evidence that low dose arsenic can contribute to the development of Type II diabetes.

In order to prevent ground water exposure to arsenic, it is crucial that if you get your water from a well, that you have it tested for arsenic. There are inexpensive test kits and methods to obtain laboratory testing of your home water in order to determine if you are bringing poisoned water into your home. In areas such as California, New England, New Mexico and even states surrounding the Great Lakes, it is especially important to make sure that your water is safe.

Home filtration is something every homeowner should consider, even if you use a municipal water source, because while they may be able to reduce the amount of arsenic and other contaminants down to legal levels, these may not be safe and filtration may be necessary to prevent low dose cumulative poisoning from arsenic as well as other chemical and elemental toxins.

There are a number of different types of filters and technologies and choosing the right one for your home and needs is something that you should research thoroughly. The Internet is a great resource.

While contaminated water supplies may be the greatest source of arsenic poisoning, it is not the only one and the others should not be discounted or ignored. Another major source of arsenic is food. Various arsenic compounds have been used as pesticides and insecticides for decades. They are sprayed on fruits and produce and eventually make their way into the ground waters of those agricultural communities as well.

Food contamination from arsenic in ground water and pesticide sources is not a problem unique to the US. In fact, China had a serious issue with rice contamination and for years there was great debate as to how to deal with it and what the tolerable contamination limits should be as far as rice was concerned. They eventually decided that 10ppb was a tolerable contamination limit for rice.

One of the largest uses of industrial arsenic, besides pesticides, was the treatment of wood in order to prevent and kill fungi, insects, and wood bacteria. This practice was discontinued as of 2004, but there are still some commercial type buildings that are allowed to use arsenic treated wood. The real concern is from fires and destruction of older buildings that were built with treated wood. This wood releases poisonous arsenic fumes when burnt, as well as releases arsenic onto the hands when touched. Many children's playgrounds were made from treated wood. Many of these have been torn down and replaced, but some may still exist. Another issue is when these torn down or burnt wood sources enter landfills, how much will this further contaminate the ground water from rain over years?

While sometimes it can seem like a lot of dangers and information to process,

there is always a solution and there are always methods to protect yourself. Besides limiting your exposure as best you can, taking substances and nutrients that improve your body's ability to process and safely excrete arsenic can be very effective. In India, some researchers have had success with adding garlic to the diet which has been shown to reduce the effects of arsenic poisoning at very low doses. This may be an inexpensive method of protection, but the level of effectiveness of garlic may vary.

Cilantro and chlorella, especially when taken simultaneously, are famous for improving the body's ability to capture toxic metals and remove them from the body.

If you are concerned that you have become toxic from cumulative exposure for a long period of time, there are several methods to test your level of toxicity, as well as programs like chelation using DMPS that may work for you in removing the heavy metals that have accumulated in your system.

Before you make any decisions regarding testing, treatment, or any major modifications in your supplement protocol, it is important that you seek the advice of a qualified medical professional who is familiar with your medical history and is knowledgeable about arsenic and available treatments.



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