



## Radium in Groundwater

This fact sheet provides answers to questions about radium in drinking water. It will explain what radium is, how it can enter groundwater, how it can affect your health, and what you can do to prevent or reduce exposure to it.

**Radium (Ra) is a naturally-occurring radioactive element that can be present in rocks and soil in the earth's crust. Small amounts of radium can also be found in groundwater supplies. Radium can be present in different forms, called isotopes. The most common isotopes in Illinois groundwater are Ra-226 and Ra-228. The main type of radiation emitted by radium is an alpha particle.**

### HOW MIGHT I BE EXPOSED TO RADIUM?

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Surface water is usually low in radium, but groundwater can contain high levels of radium depending on local geology. Deep bedrock aquifers used for drinking water sometimes contain levels of Ra-226 and Ra-228 that exceed health-based standards. In Illinois, high radium levels occur primarily in the northern third of the state due to radium in the deeper subsurface bedrock. Wells that draw water from these bedrock aquifers, which are typically more than 500 feet deep, may have elevated levels of radium.

Most of the private wells in Illinois draw their well water from aquifers that are much shallower than those used by public water supplies. Most shallow aquifers do not contain higher levels of radium. Still, radium has been found in some private and public wells.

Radium cannot be seen, tasted, or smelled in your drinking water. Unless your private water supply has been tested for radium, you should not assume your water is radium-free. All community public water supplies are tested regularly for radium.

### HOW CAN RADIUM AFFECT MY HEALTH?

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Radium in water may pose a hazard to human health when the water is used for drinking or cooking. A small portion of swallowed radium is absorbed by the digestive system and distributed throughout the body. The rest is passed unchanged from the body in feces. Some absorbed radium is excreted in urine.

Absorbed radium behaves like calcium and is deposited in bone and other tissues where calcium accumulates. This internal radium emits alpha particles that may damage surrounding tissue. Studies have shown that workers exposed to high levels of radium and other sources of alpha radiation for extended periods experienced weakened immune systems, anemia, cataracts, and fractured teeth. Exposure to high levels of radium also increases the risk of bone, liver, and breast cancer.

Any radium contacted outside the body during showering, washing, or other uses is not a hazard because alpha particles do not travel through your skin.

## IS THERE AN ACCEPTABLE LEVEL OF RADIUM IN MY WATER?

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Based upon our current knowledge, it is assumed that any radiation exposure carries some degree of risk. Knowing this, the U.S. Environmental Protection Agency (EPA) has established a maximum contaminant level (MCL) for radium in public water supplies of five picocuries per liter (5 pCi/L). The MCL for radium has been set much lower than levels at which health effects have been observed and is assumed to be protective of public health. Community public water supplies whose radium levels exceed 5 pCi/L are required to notify the public that the water exceeded the MCL. They also must evaluate ways to reduce the radium levels in the water. Individuals may test their private wells and use 5 pCi/L as a guideline for making decisions about their water use.

## HOW CAN I GET MY WELL WATER TESTED FOR RADIUM?

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Illinois does not certify environmental laboratories to test drinking water samples for radionuclides, including radium, so the Illinois Department of Public Health (IDPH) recommends using a laboratory that is certified by the U.S. Environmental Protection Agency or another State or Federal agency. For more information and assistance identifying a laboratory certified to test drinking water samples for radium contact IDPH at 217-782-5830.

## IS THERE A MEDICAL TEST FOR RADIUM?

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If you have health concerns about being exposed to elevated levels of radium in your drinking water, you should consult your doctor. A urine test can determine if you have been exposed to radium. Another test measures the amount of radon (a breakdown product of radium) in exhaled breath. These tests cannot tell how much radium you have been exposed to or if adverse health effects will occur.

## CAN RADIUM BE REMOVED FROM MY DRINKING WATER?

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Several treatment methods are available to remove radium from water. Ion exchange, lime softening, and reverse osmosis are the most common and can remove up to 70 percent of radium present. Ion exchange (i.e., water softeners) can often remove 90 percent of radium present along with water hardness. For some people, an undesired effect of ion exchange is the addition of sodium to the treated water. Those on low sodium (salt) diets should consider this before installing a softener. Reverse osmosis does not add sodium to the water.

## WHERE CAN I GET MORE INFORMATION?

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217-782-5830  
TTY (hearing impaired use only) 800-547-0466

