

## Radon exposure risk could be greater than expected, effects difficult to measure

**Editor's note:**

This article is the first of a two-part series and was produced as a project for The California Endowment Health Journalism Fellowships, a program of the University of Southern California's Annenberg School for Communication & Journalism.

JULY, 20 2011  
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SPECIAL TO THE TRIBUNE

RENO — More than two decades after U.S. regulators first issued guidelines on radon infiltration into homes and buildings, the World Health Organization reports that the radon threat to human health is much more serious than previously known.

The news could be particularly significant to communities in the Sierra Nevada, rich with radon exposure from the presence of decomposing granite. Forty percent of the homes tested in South Lake Tahoe have elevated levels of radon, according to the California Department of Health Radon Database. That's at or above 4 picocuries per liter — the Environmental Protection Agency's "fix-it" standard for radon.

Two years ago, the WHO set a lower standard for fixing residential radon: 2.7 pCi/L, moving more homes into the danger zone.

Radon gas is linked to 21,000 lung cancer deaths a year, second only to cigarette smoking, according to the EPA. It is the leading cause of lung cancer deaths among nonsmokers.

"Radon increases lung cancer among everyone," said Lisa Sheretz, lung health program manager for the American Lung Association in Reno.

A 2009 report from the California Geological Survey showed residential radon as a significant risk to residents of the Lake Tahoe Basin, particularly on the South Shore.

"Radon Potential in the Lake Tahoe Area, California" found that an estimated 23,400 people in the Lake Tahoe-area live in buildings where radon is likely to equal or exceed 4 pCi/L, according to El Dorado County's Department of Environmental Management.

The basement measurement from one house from the survey was more than 20 times the EPA's recommended action level, according to the report.

It's unknown whether elevated levels of radon are affecting the health of Lake Tahoe residents. State cancer databases don't list the causes of lung cancer deaths. The national death toll of 21,000 is an estimate, since radon-caused lung cancer does not present any differently than cancer caused by smoking and other carcinogens. The estimates are based on the levels of radon found in a patient's home, coupled with their health behaviors, including whether they smoked. The risk grows depending on length and concentration of exposure.

Susan Howe, radon education program director for the University of Nevada Cooperative Extension, likens the risk factor to a blindfolded person tossing darts at a dartboard: If you toss a single dart at a time, it will probably take a long time before you hit the bull's eye. On the other hand, if you throw a handful of darts during each turn, less time will pass before you hit the target.

In other words, the risk would be low for an occasional Lake Tahoe visitor, much greater for a smoker who spent their lifetime in a Sierra Nevada home with elevated levels of radon.

The EPA puts it this way: If 1,000 nonsmokers were exposed to 4 pCi/L of radon over their lifetime, seven would develop lung cancer. That equals the risk of dying in a car accident. But if 1,000 smokers were exposed to the same level of radon over their lifetime, 62 would develop lung cancer. That's five times the risk of dying in a car accident.

The message can be hard to get across, said Howe, who delivers frequent presentations on the importance of radon testing. Among the reasons: Radon is invisible, odorless and colorless. It's naturally occurring, with no real "villains" to hold accountable. There's a long latency period. The story isn't sensational and lacks press coverage.

"There are reasons why there's not a big public outcry," Howe said. "Some people aren't going to buy into it being a health risk. There are no sensory reminders: There's nothing unsightly, like mold, or odorous, like sewer gas, so they don't see it as an immediate problem or danger."

In the mid-'80s, the EPA first released its recommendations for testing residential radon. The news was met with "so much controversy," said Dr. Jonathan M. Samet, a pulmonary physician and epidemiologist at the University of Southern California's Keck School of Medicine.

People resented being told what to do in their own homes, said Samet, who was appointed to the National Cancer Advisory Board in March by President Barack Obama.

But with newer studies and national awareness campaigns, including the EPA's designation of January as "Radon Action Awareness Month," the tide of skepticism that first met radon regulation is retreating.

"Yes, there are skeptics, but among individuals with actual knowledge about radon — the skeptics are few," said R. William Field,

occupational/environmental epidemiologist and an internationally recognized expert on the health effects of radon gas.

Field oversaw the Iowa Radon Lung Cancer Study, considered the most comprehensive residential radon study ever performed. The study found a 50 percent increased lung cancer risk at the EPA's radon action level of 4 pCi/L.

"I have talked to many ill-informed physicians in the past who were skeptical, but the skepticism decreased within this medical community when several of the physicians who never smoked developed lung cancer," said Field, a professor at the University of Iowa. "I receive numerous calls each week from individuals who developed lung cancer and never smoked. They ask me, 'Why was I not told about the risk?'"

"It is unfortunate in so many cases, real interest in radon only arises after the development of the lung cancer and not before," Field added.

Thousands of El Dorado County residents are listening. The California Department for Public Health recently contacted homeowners in high-risk areas of El Dorado, Placer and Plumas counties and asked them to participate in the latest round of home radon screenings. More than 5,900 households have volunteered to participate, said Willy Jenkins, radon program environmental scientist for the state.

Outside of the current survey, residents concerned about radon can test their homes with a free or low-cost test kit through cities, counties, health departments and hardware stores. The average cost to correct a radon problem in a home is about \$1,200, although it can range from about \$500 to about \$2,500 for "sub-slab depressurization," a technique that removes radon-laden air from beneath the foundation and vents it outside the house. Other fixes are free, including opening sub-level air vents.

"In areas with high-radon potential, testing makes a lot of sense," said USC's Samet, who led early studies of radon-related cancer with thousands of underground miners in New Mexico. "If nothing else, to protect your health and your property values. There are very few carcinogens you can measure cheaply."

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