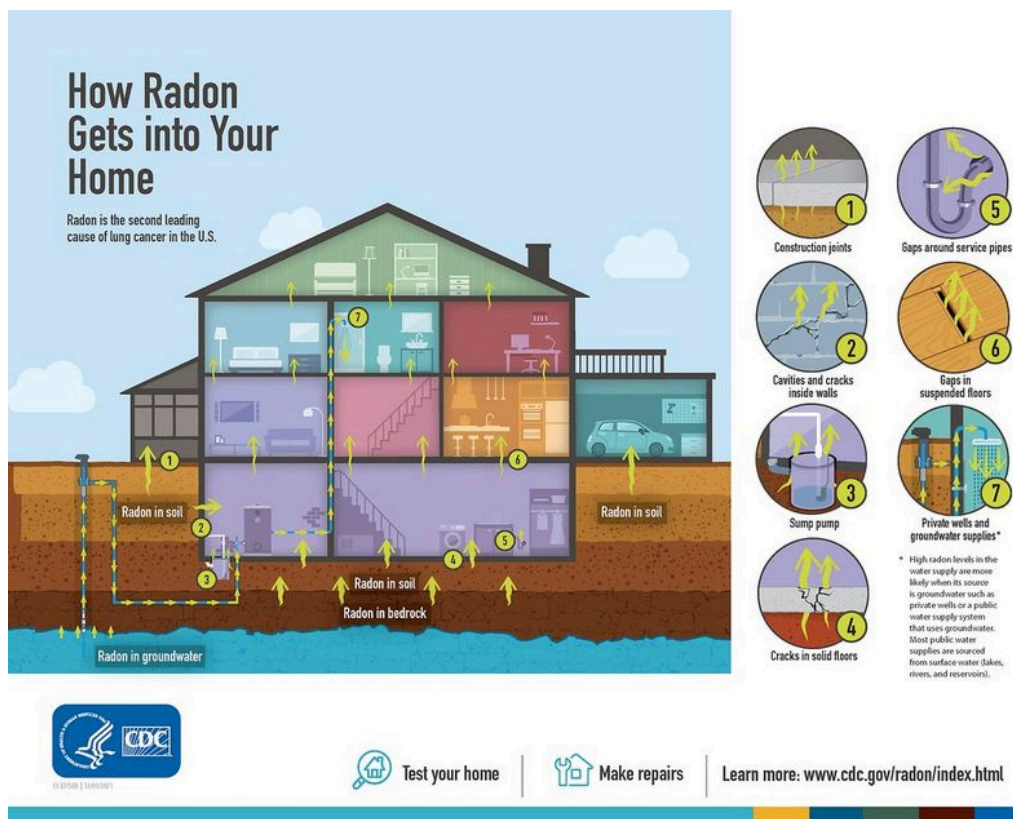


Radon linked to childhood leukemia: OSU study finds

October 2, 2024



A study of more than 700 counties across multiple U.S. states found a link between childhood leukemia and levels of decaying radon gas, including those lower than the federal guideline for mitigation.

The findings are important because there are few established risk factors for cancer in children and the role of the environment has not been explored much, said Oregon State University's (OSU) Matthew Bozigar, who led the research.

Radon, a naturally occurring gas, is a product of the radioactive decay of uranium, which is present in certain rocks and soils. Upon escaping from the ground, radon itself decays and emits radioactive particles that can get within the body and collect in many tissues, where they can damage or destroy the cells' DNA, which can cause cancer.

Odorless, tasteless and colorless, radon gas dilutes quickly in open air and is generally harmless before it decays, but indoors or in areas with poor air exchange, it can easily concentrate to dangerous levels and is

recognized as a significant risk factor for lung cancer.

Radon, measured with small, passive detectors and mitigated through passive or active ventilation in basements and crawl spaces, has not been linked to other cancers, according to the World Health Organization. But in an 18-year statistical modeling study of 727 counties spread among 14 states, Bozigar and collaborators not only found a connection between childhood leukemia and radon, but at concentrations below the Environmental Protection Agency's recommended guideline for mitigation

Becquerels per cubic meter is a unit for expressing the concentration of radioactive decay in a given volume of air. The EPA says no level of radon is safe and advises that mitigation efforts be taken when radon concentration reaches 148 becquerels per cubic meter; the study considered concentrations as low as half of that.

"This is the largest study of its kind in the U.S., but more robust research is necessary to confirm these findings on an individual level and inform decision-making about health risks from radon in this country and globally," said Bozigar, an assistant professor in the OSU College of Health.

Leukemia, the most common cancer in children, affects the blood and bone marrow. About 3,000 new cases of childhood leukemia – defined in the study and by the National Institutes of Health as involving patients up to age 19 – are diagnosed in the United States each year, according to the NIH. The annual incidence rate is 4.8 cases per 100,000 children.

Boys are more likely to receive a leukemia diagnosis than girls, but the research suggests radon increases the likelihood of leukemia in both sexes.

"Our study design only allows us to identify statistical associations and to raise hypotheses, so studies that can better determine whether radon exposure causes childhood leukemia are needed," Bozigar said.

Counties examined in this study were in the states of Washington, California, Idaho, Utah, New Mexico, Iowa, Louisiana, Kentucky, Michigan, Georgia, New York, New Jersey, Connecticut and Massachusetts. The counties are those that during the study period reported their cancer data to the Surveillance, Epidemiology and End Results registry, a program that collects and analyzes cancer information. Known as SEER, the registry is supported by the National Cancer Institute.

Collaborating with Bozigar were scientists from the National Cancer Institute, Harvard University and Imperial College London. The research, funded in part by the Environmental Protection Agency, was published in *Science of the Total Environment*.

For Bozigar, the research has its roots in personal experience. He grew up in Portland, which has pockets of high radon levels, and noticed what seemed to be a high incidence of cancer, particularly in younger age groups. There were multiple cancer diagnoses among his own family and friends.

"As an epidemiologist, I started considering possible environmental causes and connected with awesome collaborators who provided important data and other resources to enable innovative new analyses," he said.

“We are working on many different radon studies, and we are continuing to find harmful effects not limited to the lungs in adults. We will have more to share in the coming months and years as our studies are published.”

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