

Radon in Basements: New Findings on a Persistent Health Risk

Study Highlights Ongoing Risks of Radon in Basements

New research has brought renewed attention to the issue of radon in basements, a problem that affects millions of homes across North America and Europe. The study, released by a consortium of environmental health researchers, found that radon levels in basement spaces frequently exceed recommended safety thresholds, even in homes with modern ventilation systems. This has prompted calls for more rigorous testing and mitigation measures.

Radon is a naturally occurring radioactive gas that forms from the decay of uranium in soil and rock. It enters buildings through cracks in foundations, gaps around pipes, and other openings. Because basements are the lowest living spaces in a house, they often accumulate the highest concentrations of this gas. The new findings underscore that radon in basements is not merely a problem for older homes or those with known structural issues. Modern construction, while more energy-efficient, can also trap radon indoors if proper sealing and venting are not part of the design.

What the Research Reveals

The study analyzed data from over 10,000 residential properties across varied geological regions. It found that nearly one in three homes had basement radon levels above the action level set by the Environmental Protection Agency. The researchers noted that seasonal variations were significant, with winter months showing the highest concentrations due to reduced natural ventilation and the stack effect drawing radon upward from the soil.

Another key finding involved the relationship between radon concentration and building age. While older homes with dirt floors or unsealed masonry walls were expected to have higher levels, the data showed that newer homes with poured concrete foundations could also host dangerous accumulations. The common factor was the presence of pathways for soil gas entry, rather than the age of the structure itself.

The study further highlighted that [radon in basements](#) often goes undetected because homeowners rely on general home inspections that do not include radon testing. A separate survey conducted alongside the air sampling revealed that only 15 percent of the households had ever tested for radon. Among those, fewer than half had taken any action to reduce levels after receiving elevated results.

Health Implications of Prolonged Exposure

Radon is the second leading cause of lung cancer after smoking, according to health authorities. The risk is amplified for people who spend significant time in basements, such as those who use these spaces as home offices, bedrooms, or recreation rooms. Children are particularly vulnerable because their faster breathing rates and developing lungs can absorb more radiation per unit of exposure.

The research team modeled lifetime cancer risks for residents in homes with elevated radon in basements. They found that the risk for a person living 20 years in a home with radon levels at the EPA action level of 4 picocuries per liter was comparable to the risk of smoking half a pack of cigarettes daily. For those with levels twice that high, the risk increased proportionally. These figures underscore why mitigation is not an optional upgrade but a necessary health measure.

Mitigation Strategies That Work

Several proven methods exist for reducing radon in basements. The most common and effective approach is sub-slab depressurization, which involves installing a vent pipe through the basement floor and connecting it to a fan that draws radon from beneath the slab and exhausts it above the roofline. This system can reduce indoor radon concentrations by 90 percent or more when properly designed.

Sealing cracks and openings in basement floors and walls is another important step, though it is rarely sufficient on its own. Soil gas retarders such as heavy polyethylene sheeting can be laid beneath new concrete slabs during construction to block radon entry. For existing homes, active soil depressurization remains the gold standard.

Homeowners should also consider installing a radon monitor that provides continuous readings and alerts when levels spike. These devices have become more affordable and reliable in recent years, making it easier to track the effectiveness of mitigation over time. Natural ventilation, such as opening basement windows, is not a reliable long-term solution because it depends on weather conditions and does not address the source of the gas.

Regulatory and Policy Gaps

Despite the known dangers, radon testing is not mandatory in most jurisdictions when homes are sold or rented. The study authors point out that this is a significant gap in consumer protection. While some states and provinces have disclosure laws requiring sellers to reveal known radon levels, enforcement is inconsistent and penalties rare.

Building codes in many areas do not require radon-resistant construction features, even in high-risk zones. The researchers argue for updated codes that mandate passive radon systems in all new homes, regardless of location, because soil radon potential can vary even

within a single neighborhood. Such systems add minimal cost during construction but can be expensive to retrofit later.

The study also calls for public health campaigns that go beyond general awareness. Many homeowners know radon is bad but do not understand how radon in basements specifically poses a greater risk than radon on upper floors. Clear, actionable guidance on testing and mitigation could close this knowledge gap.

What Homeowners Can Do Now

Testing for radon is the only way to know whether a home has a problem. Short-term test kits are inexpensive and widely available at hardware stores or through local health departments. They should be placed in the lowest lived-in level of the home, typically the basement, and left in place for the manufacturer's recommended period. After the test, the kit is mailed to a laboratory for analysis.

If results show levels at or above 4 picocuries per liter, the EPA recommends hiring a certified radon mitigation contractor. The cost of mitigation typically ranges from the equivalent of several hundred to a few thousand dollars, depending on the home's foundation type and the complexity of the system. This is a fraction of the potential healthcare costs associated with radon-induced lung cancer.

For those who cannot afford immediate professional mitigation, interim steps include increasing air circulation in the basement, sealing major cracks with polyurethane caulk, and avoiding the use of basement spaces as bedrooms or long-term living areas until radon levels are reduced. These measures are not substitutes for full mitigation but can lower exposure in the short term.

Looking Ahead

The new study adds to a growing body of evidence that radon in basements is a widespread and under-addressed public health issue. Advances in sensor technology and building science are making it easier to detect and fix the problem, but policy and public awareness have not kept pace. The researchers hope their findings will spur more consistent testing requirements and more inclusive building codes.

For the media and public health community, the message is straightforward. Radon is a silent hazard that can be managed with existing technology. The barrier is not technical but behavioral and regulatory. Addressing radon in basements systematically could prevent thousands of lung cancer cases each year without requiring new inventions or extraordinary expense. It simply requires action from homeowners, builders, and policymakers alike.