

Podcast transcript: Keeping Your Home Safe from Radon

[Theme music]

Ashley Ahearn (AA): You're listening to Environmental Health Chat – a show from the National Institute of Environmental Health Sciences that explores the connections between our health and our world.

I'm Ashley Ahearn.

[Music fades out]

Most of us can guess the leading cause of lung cancer in the U.S. But how about the second most common cause?

It's actually an odorless, colorless gas that occurs naturally around certain rock formations and can get into our home and indoor spaces.

Can you name it?

Ellen Hahn (EH): So, radon is a naturally occurring radioactive gas, and it comes from the breakdown or the decay of uranium, thorium, and radium, which you may remember from your chemistry classes.

AA: Dr. Ellen Hahn is a professor in the College of Nursing at the University of Kentucky where she directs the BREATHE team and the UK Center for Appalachian Research in Environmental Sciences.

EH: Radon really can occur anywhere. And in fact, your neighbor could have high radon and maybe you don't. There's still a lot we don't know about it.

AA: But Dr. Hahn has been working hard to learn more. For the past four years, with funding from the NIEHS Research to Action Program, she's led a transdisciplinary team to study and raise awareness about radon exposure in four counties in rural Kentucky, where radon is prevalent and could be affecting public health.

EH: When you breathe radon in, it can release high energy alpha particles. And those alpha particles kind of change the nature of the cells in the lining of our respiratory tract.

AA: And that, Dr. Hahn says, can lead to lung cancer. But radon exposure can be even more harmful when combined with smoking cigarettes or being exposed to tobacco smoke.

EH: Radon absorbs onto dust and other particles and it gets transported into our lungs when we breathe it in. So, radon kind of attaches to the tobacco smoke particles and that co-exposure to these harmful chemicals, gasses, and particles is really amplified. So even though you can get radon-induced lung cancer if you're a never smoker, your risk of getting radon-induced lung cancer is dramatically higher if you've also used tobacco in your lifetime.

AA: ...about 10 times higher in fact, Hahn said. And, exposure to radon is also associated with breast cancer, certain skin cancers, emphysema, and COPD.

Radon is a noble gas. It's heavy, so it tends to accumulate in basements or lower levels of homes and other buildings. It seeps in through pipes and cracks in foundations.

But it's surprising how few people regularly test for radon, especially in lower income and rural areas.

EH: So, the bottom line is we're trying to increase access to radon testing and accessible, adequate, and affordable radon mitigation – which is what they do to fix it if you find that you have radon. And the focus is rural communities.

AA: The project is known as RADAR – Residents Acting to Detect and Alleviate Radon – and it brings together scientists and public health experts from a broad set of backgrounds. From geologists who go out and do home visits to take soil and core samples, to statisticians to nurses to public health communication experts...

EH: ...And then we also have an interesting blend of principal investigators out in the community on site. We have one director of a public library, who's actually our site principal investigator in one of the counties. We have an economic development organization, called the Area Development District in Kentucky, and they are kind of the site PI's in one of the counties. And then the other two counties are both headed up by the Area Health Education Centers and they're there really to promote health provider education as well as public education. So, we have a wide range of folks who are actively engaged in this project.

AA: But her list of collaborators doesn't end there. Dr. Hahn and her team have actively engaged members of the public – 60 residents total from the four counties – to be citizen scientists and ambassadors for radon awareness in their communities.

EH: It's one of the most exciting projects I've ever had for that reason...and they've been trained and supported to test their homes for radon and work with our geologists to understand the radon exposure in the rock and the soil on their property where they live.

AA: The study participants were asked to gather weather and precipitation data and they were issued radon detection devices called "AirThings" to gather radon readings inside their homes.

EH: And then once they did that, they participated in focus groups with us to tell us how we could make the instructions better and kind of how it was for them, and how to upload their data and all of that. And then they also helped us think about how we can spread the word about radon.

AA: Hahn and her colleagues worked with the citizen scientists to establish a library loan program where people can check the AirThings out of their local library, gather radon readings in their homes, and then share their data with the scientists.

EH: Basically all you have to do is have a valid library card, and if you're at least 18 years old, you can check these things out just like you would check out a book or a cake pan or a hotspot...And I mean, they were just flying off the shelf, and we almost can't keep up, you know, so it's exciting, really, really exciting.

AA: Through the library loan program Dr. Hahn and her team have been able to gather radon readings from hundreds of homes across the four counties.

EH: We asked them, have they ever tested for radon and 81% of the library loan participants said they had never tested. So, I think we're really meeting a need. And the goal was to increase access, and we surely have done that.

AA: Unfortunately, the findings confirmed public health concerns about radon exposure in the four counties. Of the citizen scientists who gathered data in their homes, 55% had high radon and 40% of the library loan samples showed high radon.

That's well above the national average.

Another interesting finding: older homes had lower radon – probably because they tend to be more drafty than newer, more energy efficient homes where there can be less ventilation.

People naturally wanted to know what to do about their radon exposure.

EH: First of all – you don't panic. But generally, if they have a value and they want to fix it, we connect them with certified radon measurement and mitigation professionals. And then we also provided them with a voucher for 30% of the cost, up to \$600.

AA: But, Hahn found, that didn't necessarily translate into people taking action. Only 19% of study participants with high radon have fixed the problem. And that could be for several reasons, she says. Bringing in a professional to mitigate radon can cost up to \$2,500 dollars, depending on the age and size of your home. Or, if you are a renter, you may not be in a position to push your landlord to mitigate radon. And, in rural parts of Kentucky the service providers are few and far between.

EH: Sixty-four percent of the companies we have that are certified to do this work in Kentucky are in the urban centers. They're not in the rural community. So that's a huge environmental justice issue. You know, for those that don't have the financial means as well. But even if you have the financial means to do it, people just aren't taking that step to actually lower their radon level.

AA: People can reduce their radon exposure a bit by ventilating their homes and shoring up leaky pipes or cracked foundations themselves, but Hahn said these measures are not likely to have a significant effect on radon levels.

Instead, Hahn is more optimistic about policy changes that can require home sellers to disclose radon levels and mandate that new construction be radon-safe.

EH: As part of this project, we have made really good strides developing partnerships with Habitat for Humanity. In one of the counties in every new build, they put a radon mitigation system in from the start. It's called radon resistant new construction, and it's a lot less expensive.

AA: Dr. Hahn also sees a huge opportunity for the healthcare system to both raise awareness and protect people from radon exposure. Health insurance companies could cover radon testing kits – just like they pay for mammograms – Dr. Hahn suggests.

She and her colleagues have heard from study participants that doctors rarely ask about their radon exposure or encourage their patients to test for it.

EH: And it's really too bad. And they need to, it's a great opportunity, and we need more research. But we also need more practice guidelines to say, let's do this, you know, and not just people with tobacco exposure, although they are more at risk of radon-induced lung cancer, but really anyone with lungs – which is everyone [laughs] – needs to test for radon. And that's how I talked to people about this, “Hey, do you have lungs?” and people kind of looked at you like, “ah, yeah, I have lungs.” And if you have lungs, you need to test. And I think providers are the perfect conduit.

AA: Dr. Hahn says there's much more work to be done, but she's inspired by the citizen scientists she gets to work with. They have made her research more responsive to the needs of the community and they've given her great ideas about how to encourage people to mitigate their radon exposure in their homes.

EH: And one of the things they said to us is, you guys really need to crunch your numbers to show what are the radon levels before mitigation and after mitigation, and then share that with us. So, we did. We created a chart showing, okay, of these five homes that mitigated here's was their radon level was before and then after – and they were reduced by 99% or more. And we had a lot of feedback from that newsletter.

AA: Dr. Hahn believes that when information like this gets out into the community – that shows concrete results that can happen when people take the steps to reduce their radon risk – more people will take action to make their homes and loved ones safe.

That's what citizen science is all about.

EH: It's really translating the research to action. And then the opposite. Like I just said, like the citizen science saying, “Well, why don't you analyze this and give it to us – it's kind of like a multi-directional opportunity. It's very fun and I might say as a scientist, my whole scientific career, I've done more traditional randomized trials and intervention work and this is the first time I've done a citizen science project, and I'm convinced it's the way to go. I've learned so much, and I've seen so much energy around this topic because it really empowers people that they not only know, but they can do something about it. It's very powerful.

[Music comes up]

AA: I'm Ashley Ahearn. Thanks for listening to Environmental Health Chat.