The National Radon Action Plan 2021–2025

Eliminating Preventable Lung Cancer From Radon in the United States by Expanding Protections for All Communities and Buildings

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Radon Is the Leading Environmental Cause of Lung Cancer Death[1]

Radon exposure leads to more lung cancer deaths every year than any other environmental source in the United States—an estimated 21,000 lives are lost to lung cancer from radon each year.[2]

Radon is a radioactive, odorless, invisible gas that is found in soil and rocks. It seeps undetected into cracks and gaps in buildings, where it can be present in high concentrations. Because people spend most of their time indoors, high levels of radon can put their health at risk. The only way to find out if indoor air has high radon levels is through a simple test.

When dangerous levels of radon are found indoors, the solution can be quite straightforward. Qualified professionals can install a system that prevents high levels of radon from accumulating inside the building. New buildings can be designed and built using radon-resistant construction techniques. These efforts save lives today and into the future.

Despite 40 years of clear evidence that radon exposure indoors can cause lung cancer and undisputed knowledge that proper testing and mitigation can greatly reduce exposure, too many Americans still die from radon-induced lung cancer every year. Tragically, most never knew they faced a risk from indoor radon before receiving a lung cancer diagnosis.

The key steps to reduce radon-induced deaths from lung cancer are to increase public awareness of the threat, test all types of buildings for elevated radon levels, build a workforce of credentialed radon professionals who can fix radon problems following proven-effective standards, and ensure the availability of adequate funding to pay for testing and repairs.

Radon Is a Health Equity Challenge

Although radon is a potential risk in all communities, and EPA recommends that all buildings be tested, there is evidence that the benefits of radon risk-reduction measures are not equally shared. Homeowner households led by people of color and by those with low incomes are less likely to have their homes tested for radon than others.[3] Some people are not aware that exposure to indoor radon can cause lung cancer and that testing for radon is easy. Others may face challenges protecting their homes because they are renters or because they cannot afford the cost of radon testing and mitigation. Because repairing high radon in homes and other buildings is expected to result in important health benefits, access to life-saving radon protections must be made more equitable.

The Solution Is Straightforward

The benefits of fixing indoor radon to prevent lung cancers are enormous. For example, it is estimated that within typical multifamily housing, every dollar spent on radon testing and repairs returns $11 to $20 in avoided health care costs. More importantly, fixing radon levels could save years of healthy life for affected citizens.[4] Finding and fixing high radon is an excellent investment in the health of our nation. It requires coordinated action from sectors and industries that, at first glance, may not appear to have strong points of intersection or overlapping missions—environment, housing, public health, real estate, development, finance, energy, service providers, health care, radiation science and others.

Under the inaugural National Radon Action Plan (NRAP) and this National Radon Action Plan for 2021–2025 (**NRAP | 2021–25**), leaders from across multiple sectors have worked together for more than a decade to plan, guide and sustain nationwide radon action in an effort to protect every building in every community. With the costs of radon so great, the benefits of investment so clear, and the technical solutions to improve health so straightforward and available—it has never been more important to continue to drive action.

Coordinating National Radon Action Saves Lives: NRAP and NRAP | 2021–25

NRAP | 2021–25 is the third installment of a strategy anchored by the U.S. Environmental Protection Agency (EPA) to ramp up action on radon. The Federal Radon Action Plan (**FRAP**), released in 2011, directed an expansion of

government financing toward radon and spurred testing and repairs by certified professionals in additional federally owned or assisted buildings. The FRAP also solidified federal partners' commitment to (1) the development of American National Standards for radon testing and mitigation in all building types, (2) multi-agency efforts to explore the effect of energy upgrades on indoor radon levels, and (3) public health leadership to encourage state cancer control programs to examine radon risks and solutions.

These federal efforts attracted the attention of national champions eager to save more lives more quickly from radon-induced lung cancer. In 2015, a 12-member private–public partnership of industry; FRAP federal agency leaders; and health, housing, radiation, energy, cancer and building science experts joined under the leadership of the American Lung Association to launch the **NRAP.**

The NRAP Leadership Council unites different perspectives on the challenge of finding and fixing preventable radon exposures. The Council has sustained its collaboration to guide national radon action for the decade (2015–2025). The NRAP Leadership Council takes seriously the need to accelerate progress with every iteration of the NRAP (see the report Reflections on the NRAP's Progress, 2015–2020). ***In 2021, the NRAP set a goal for the nation to find, fix and prevent high indoor radon levels in 8 million buildings by 2025; prevent an average of at least 3,500 lung cancer deaths per year; and save one-quarter of a million lives in those buildings during the next 74 years.***[5]

As in the first NRAP, the strategies in **NRAP | 2021–25** remain focused on actions that will save lives by fixing buildings, constructing buildings with radon-resistant features, and preparing a certified, professional radon workforce. The Plan spotlights addressing radon as a health equity challenge and prioritizes new strategies to reduce radon risk in underserved communities, including communities of color. **NRAP | 2021–25** also prioritizes work that can be measured in lives saved and emphasizes the need to continuously improve the quality of and access to reliable data to quantify NRAP progress, radon risk reduced and national rates of lung cancer from radon.

We invite leaders who are serious about—

- saving lives
- building in health protection where we live, work and learn
- eliminating preventable disease
- realizing a high return on investment in a healthier future

—to join the NRAP Leadership Council.

★Acronyms

ANSI	American National Standards Institute
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
FHA	Federal Housing Administration
GSA	General Services Administration
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
USDA	U.S. Department of Agriculture
VA	Veterans Administration
Wx	Weatherization Assistance Program

BUILDINGS PROTECTED
(IN MILLIONS)

National Leaders Expand Strategies to Save Lives in All Buildings

NRAP | 2021–2025

8 Million by 2025

Build In Radon Risk Reduction

- Lenders require tests in transactions.
- Radon risk is disclosed in transactions.
- Codes require radon controls.

Support Risk Reduction

- Radon testing and mitigation are eligible expenses under tax incentives.
- Funds for radon controls for low-income owners exist.
- Radon is in all cancer control plans.

Build Capacity Using Professional Radon Services

- Robust data on national radon risk exists.
- Radon credentialing approaches are aligned.

Increase Awareness

- Partners increase focus in occupant health and radon.
- Health equity partners are engaged.
- Tailored risk information for underserved groups exists.

Public–Private Partnership Builds on Federal Action

NRAP | 2015–2020

3.8 Million 2020

- HUD expands radon requirements in multifamily and residential care facility mortgage insurance programs and FHA loans.
- Progress with building codes is achieved.
- Precautionary steps for radon are adopted by Wx.
- Funding is secured for grants to support testing and mitigation in HUD public housing.
- Precautionary steps created for Wx are required in some green and healthy homes programs.
- ANSI standards are finalized for all building types.
- FHA references ANSI for radon in new requirements.
- Radon is named in 85% of state cancer control plans.
- Physician's guide for radon is released and promoted to oncologists.

Federal Agencies Ramp Up Radon Action

FRAP | 2010–2015

1.6 Million 2015

- HUD, USDA and VA approve radon expense.
- HUD creates new radon testing and mitigation requirements for some multifamily housing mortgage insurance programs in 2013.
- DOI and GSA test buildings.
- EPA supports development of ANSI standards for all building types.
- DOE tests radon in Wx.[6]
- HHS focuses on radon in environmental health tracking and cancer control programs.

★ Please see page 3 for a list of acronyms found in this graphic.

NRAP | 2021–25's Four Goal Areas for Saving Lives From Radon

After 5 years in partnership, the NRAP Leadership Council continues to collaborate, sharing ideas about how best to move critical, life-saving radon action forward. This multisector group shares the work—each member organization leading in its area of knowledge, responsibility and capacity—to advance four related priorities that they all share for saving lives from radon.

Build In Risk Reduction

Rules, codes and standards that govern how buildings are financed, developed, constructed and maintained provide opportunities to require and invest in radon testing and repairs. Wherever possible, the NRAP calls for embedding radon testing, remediation and construction provisions into these requirements to integrate radon risk reduction as a standard practice in ongoing work.

In NRAP | 2021–25, Goal Area 1 seeks to include radon requirements within real estate, including rental and mortgage transactions for all types of buildings. The goal is to maximize risk reduction for all buildings by testing, sharing information about and reducing radon risks through repairs when building transactions occur between homeowners or between landlords and renters, or when repairs and rehabilitations and construction projects are financed. The Plan remains focused on the enormous life-saving potential of protective building codes to require radon controls in new buildings and of testing and repairs of existing buildings as needed, particularly for schools and rental properties.

Support Radon Risk Reduction

People who have control of their built environments and can afford to test for and reduce high radon levels can be encouraged to address the risk through education and incentives. For them, the NRAP aims to spur radon action by making it obvious and easy. For others, however, educational messages alone are not sufficient to initiate action. Many people do not have the authority to test and repair the rental housing, workplaces and schools that they occupy, and even for those who do, the cost burden of repairs may be too great. Funding support from legislative and health care budgets, along with grants and charity, will be needed to cover the cost of radon testing and repairs in all buildings to eliminate preventable lung cancer from indoor radon.

In NRAP | 2021–25, Goal Area 2 focuses on the critical need for increasing access to government-backed and other sources of housing financing, identifying new funding sources and help for states and tribes to fund radon controls in all buildings—especially in low-income communities and communities of color—and directing cancer prevention resources toward radon risk reduction. The Plan focuses on outcomes that can be connected to preventable cancers from radon. These outcomes include working with state cancer control programs to expand radon policies; new financing and funding flowing to more testing and repairs of high radon in low-income properties; and rising priority for radon action in federal, state and philanthropic health promotion investments.

Build Capacity to Test and Mitigate Using Professional Radon Services

Consensus standards and guidance now exist to govern radon testing, mitigation, laboratory quality assurance and new construction methods in all buildings—all home types, schools and large buildings, and occupational settings. Radon work requires rigorous training and standards-based credentialing in accordance with the American National Standards Institute to ensure that service providers are equipped to assess radon levels, make decisions about mitigation, and, when necessary, install mitigation systems that save lives from lung cancer by reliably preventing radon from entering buildings.

In NRAP | 2021–25, Goal Area 3 builds on NRAP success by seeking to spread recognition of the standards nationwide and facilitate identification of a qualified workforce by aligning current credentialing approaches to one quality standard. The Plan prioritizes improved data collection and analysis, envisioning a landscape in which radon work can be counted on to save lives because it is conducted by credentialed professionals following national standards, and where annual radon risk reduction can be reliably estimated using a robust, nationally representative dataset.

Increase Awareness of Radon Risk and Control Strategies

Each year an estimated 21,000 people die from lung cancer caused by radon exposure, yet hundreds of thousands of Americans are still breathing in high levels of radon in buildings where they live, work, study and play. The risk from radon also disproportionately affects low-income households not able to test for radon and fix when necessary, the same population that suffers from poorer health and greater exposure to other residential hazards compared to more affluent individuals. The first NRAP aimed to expand coordinated messaging and outreach on radon risks across all types of buildings through trusted sources, such as health care providers and schools. Progress in this area was limited and still needs expansion.

In NRAP | 2021–25, Goal Area 4 seeks to address historic inequities in knowledge of radon risk and opportunities for risk reduction through increased engagement of intermediaries with responsibility for protecting constituents' health in homes, workplaces, schools and childcare settings. The strategies in the Plan include outreach to target audiences that have not historically played a role in radon risk communication, such as social service providers, faith leaders and health care providers, including federally qualified and community health centers.

Looking Ahead With NRAP | 2021–25

In 2021, the NRAP Leadership Council affirmed its commitment to expand national efforts to eliminate preventable lung cancer from radon in the United States. In implementing **NRAP | 2021–25**, the Council will look for strategic opportunities to guide the use of existing tools, standards, smart financing and investment to save lives; support a strong buildings workforce; and eliminate preventable radon-induced lung cancers with an increased focus on low-income communities, racial and ethnic minorities, tenants, employees, and children. **NRAP | 2021–25** goal areas, strategies for action and target outcomes for the next 5 years are shown in Table 1 below.

TABLE 1. NRAP | 2021–25: STRATEGIES FOR EXPANDING PROTECTIONS FOR *ALL BUILDINGS*

GOAL AREA	NRAP STRATEGIES, 2021–25	OUTCOMES WE SEEK
Build In Radon Risk Reduction	1.1 Embed comprehensive radon notification and health risk warning statements, and radon test result disclosure, in real estate sales and rental transactions.	Prospective buyers, tenants and loan borrowers receive and acknowledge receipt of information that equips them to take self-protective actions, including obtaining radon testing and mitigation.
	1.2 Work with government, quasi-governmental and private sector lending entities to adopt radon testing and mitigation requirements.	Lending entities require radon testing and mitigation in all residential, educational and commercial buildings.
	1.3 Promote radon control requirements for new construction within building codes and standards.	State and local building codes require that buildings be built to allow for radon control.
	1.4 Seek local, state and federal policies and codes that require all existing buildings to be tested for radon and mitigated as needed.	Building owners and managers, employers, and school districts ensure that the radon levels in their buildings are protective of occupant health.
Support Radon Risk Reduction	2.1 Increase access to government-backed and other sources of housing financing for property owners of low-income housing to cover radon testing and mitigation.	Property owners are able to obtain financing for radon testing and mitigation in low-income housing from new and existing funding sources.
	2.2 Support establishment of tax incentives to cover radon mitigation costs.	Tax incentives exist that increase voluntary radon testing and mitigation.
	2.3 Increase radon testing and as-needed mitigation by local, state and tribal programs that conduct physical upgrades of existing housing.	Radon testing and mitigation is routinely addressed by housing rehabilitation, home repair, energy upgrade, weatherization and similar programs.
	2.4 Support state cancer control programs to include radon indicators and interventions.	All state cancer control programs include radon risk-reduction interventions in their primary prevention strategies for lung cancer.
Build Capacity to Test and Mitigate Using Professional Radon Services	3.1 Expand the scope and usability of radon testing data in the National Environmental Public Health Tracking Network by increasing the number of participating states and laboratories.	Decision-makers nationwide have access to a robust national data set for use in characterizing radon exposures, quantifying risk reduction actions and informing a research agenda.
	3.2 Continue to promote adherence to consensus standards for testing, mitigating and measurement device accuracy.	Quality professional standards to support the effectiveness of radon services are widely recognized, disseminated and adopted.
	3.3 Support issuance and implementation of a federal framework to align private and state radon credentialing programs.	A clear standard of quality for assessing radon service provider competencies and skills is widely recognized and adopted, and credentialing programs are more consistent in standards and practices used to license and certify service providers.
	3.4 Promote the adoption of radon credentialing by states that do not currently regulate radon service providers.	Radon testing, mitigation and laboratory services nationwide are provided by credentialed professionals.
	3.5 Expand the availability of credentialed radon practitioners through the training and certification of qualified professionals.	Credentialed radon professionals are available nationwide to meet increasing demand.
Increase Awareness of Radon Risk and Control Strategies	4.1 Promote integration of radon into coordinated messaging to decision-makers about health risks in housing, schools and workplaces.	Decision-makers with responsibility for occupant health in housing, schools and workplaces include radon risk reduction in their policies and practices.
	4.2 Promote radon awareness through nontraditional radon stakeholders—including clinical, health equity, social service and faith-based organizations—through consistent outreach using targeted materials.	Nontraditional radon stakeholders educate and equip their constituents to take radon risk-reduction action.
	4.3 Tailor effective radon messaging to underserved racial, ethnic and low-income populations.	Culturally competent information about radon risk reduction is available to underserved racial, ethnic and low-income groups.

Endnotes

[1] Field, R.W., and B.L. Withers. 2012. "Occupational and Environmental Causes of Lung Cancer." *Clinics in Chest Medicine* 33 (4): 681–703.

[2] U.S. Environmental Protection Agency (UESPA). 2003. *EPA Assessment of Risks from Radon in Homes*. EPA-402-R-03-003. Washington, D.C.: USEPA. www.epa.gov/sites/production/files/2015-05/documents/402-r-03-003.pdf.

[3] U.S. Department of Housing and Urban Development (HUD). *American Housing Survey, 2015* (unpublished analysis). Washington, D.C.: Offices of Lead Hazard Control and Healthy Homes and Policy Development and Research, HUD.

[4] Estimates of lives saved through radon mitigation in the HUD Federal Housing Administration (FHA) Multifamily Loan Program are based on HUD data on loan transactions, 2013–18; an estimate of the number of affected individuals; and a range of estimates for the distribution of radon risk. The low end of the estimated lives-saved range is grounded in EPA's 1992 National Residential Radon Survey (NRRS); the high end of the estimated lives-saved range is grounded in industry self-reported data. The percentage of homes predicted to test above EPA's action level in Zones 1 and 2, where FHA's policy applied during the years analyzed here, based on the NRRS is 13%, and this assumption grounds the low end of the estimated range of lives saved. Industry members of the NRAP believe that the percentage of homes that would test above the action level of 4 picocuries per liter of air (pCi/L) for radon in Zones 1 and 2 is 18–22%, and this assumption grounds the high end of the estimated range of lives saved. Additionally, radon laboratory data collected by the Centers for Disease Control and Prevention in its Environmental Health Program Tracking database since 2016 indicate premitigation radon prevalence could be considerably higher, with 37% of homes in the database testing above the EPA action level. It is important to note that there is no peer-reviewed citation for the latter two estimates at this time. The cost-benefit analysis is based on a currently unpublished draft 2020 EPA memorandum developed to estimate the impact to date of expanded radon requirements in FHA programs.

[5] UESPA. 1992. *Technical Support Document for the 1992 Citizen's Guide to Radon*. EPA-400-R-92-011. Washington, D.C.: USEPA. nepis.epa.gov (enter 400R92011).

[6] U.S. Department of Energy (USDOE). 2021. "Weatherization Assistance Program." Office of Energy Efficiency & Renewable Energy, USDOE. www.energy.gov/eere/wap/weatherization-assistance-program.