What is the Return on Investment for Radon Reduction Programs?

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Indoor Air Quality (IAQ)

HISTORY

TEST. FIX. SAVE A LIFE

- 1992 EPA evaluates benefits and costs of efforts to reduce radon
- 2003 Risk assessment estimates 21,000 radon induced lung cancer deaths for the year of 1995
 - models used modified from BEIR VI



NEW DATA

- 2006 Darby, S. et al. 2006. "Residential Radon and Lung Cancer: Detailed Results of a Collaborative Analysis of Individual Data on 7,148 Subjects With Lung Cancer and 14,208 Subjects Without Lung Cancer From 13 Epidemiologic Studies in Europe." Scandinavian Journal of Work, Environment & Health
 - Pooled analyses of 13 European Case-Control Studies
- 2022 Richardson, D.B., Rage, E., Demers, P.A., Do, M.T., Fenske, N., Deffner, V., Kreuzer, M., Samet, J., Bertke, S.J., Kelly-Reif, K. and Schubauer-Berigan, M.K., 2022. "Lung Cancer and Radon: Pooled Analysis of Uranium Miners Hired in 1960 or Later. *Environmental Health Perspectives*
- AKA PUMA for Pooled Uranium Miner Analysis



PURPOSE

- Compare Benefits and Costs associated with programs that implement national radon recommendations on testing and mitigation
- Provide more current analysis than 1992
- Add radon CBA analysis to available literature to balance smoking cessation claims
- Create CBA user tool to allow for variable assumptions
- EPA's radon program recommendations.

Benefits:

-Avoided Lung Cancer Cases

<u>Costs:</u>

-Testing

-Mitigation of Existing Homes



METHODOLOGY

- Analysis examines
 - Net benefit and ROI for a sample radon program that tests 2 million homes and mitigates elevated homes
 - ROI for a radon program to build 2 million RRNC homes
- Sensitivity Analyses
 - Explores effect of different data inputs and policy assumptions on the results
 - Three different models were used
 - Updated BEIR VI
 - PUMA
 - Darby Residential Studies



RESULTS: OVERVIEW

Risk Scenario	Total Number of Reduced Cancer Fatalities With Intervention	Net Present Value (Billions of Dollars, B-A)		Return on Investment (B/A)	
rest and mitigate Existing nomes					
Discount Rate		3%	7%	3%	7%
BEIR VI	6,391	\$8.1	\$1.1	\$9.06	\$3.22
PUMA	9,986	\$12.5	\$1.8	\$13.51	\$4.54
Residenti al	3,902	\$6.0	\$0.9	\$7.00	\$2.72
Build Radon-Resistant New Construction in High-Radon Potential Areas					
Discount Rate		3%	7%	3%	7%
BEIR VI	38,899	\$53.3	\$8.7	\$30.54	\$9.58
PUMA	60,781	\$80.4	\$12.7	\$45.53	\$13.50
Residenti al	23,749	\$40.8	\$7.2	\$23.60	\$8.09



DISCUSSION

- Radon interventions have positive ROI across a wide range of assumptions
- Radon intervention is a very effective strategy to reduce lung cancer
- Results can help state and local agencies budget properly
- Small budget, targeted programs can substantially reduce the risk of lung cancer
- Radon intervention compares favorably with smoking cessation (ROI of \$0.86–\$2.52) and other public health programs
- More research is needed on post-mitigation levels

