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International Panel Discussion

Considering a Lower US Radon Action Level

Michael Kitto, PhD

mkitto@nycap.rr.com

Publications at Researchgate.Net

Background

2019: AARST Board proposed lower action level to the Standards Consortium's Exec Stakeholder Committee

2020: Scientific Advisory Committee (SAC) convened

2020-2021: SAC reviewed questions and data
Suspended work pending updated EPA data

2026: SAC may resume discussion

Objective

Determine whether the National Action Level for the US, which is used in national radon standards and federal agencies, should be a health-based action level equivalent to the World Health Organization (WHO) radon reference level of 100 Bq/m^3.

Scientific Advisory Committee

Member	***Affiliation***	***Seat***
Wallace Akerley, MD	Huntsman Cancer Institute Lung Cancer Disease Center	Oncologist, MD
William Field, PhD	University of Iowa	Occupational and Environmental Health Scientist
David Jacobs, PhD	National Center for Healthy Housing	Environmental Engineer
Michael Kitto, PhD	New York State Department of Health	Environmental Health Scientist (chair)
Timothy Mullett, MD	University of Kentucky	Lung and Thoracic Cancer, MD
Mary Puckett, PhD	US Centers for Disease Control and Prevention	Health Scientist
Jonathan Samet, MD	Dean, Colorado School of Public Health	Epidemiologist, MD
Rod Thompson, PhD	Indiana and Purdue University School of Public / Environmental Affairs	Environmental Toxicologist
David Wilson	Retired - US Dept of Energy ORNL	Building Scientist

Lowering the Action Level: capable mitigation technology already exists

Economic impact associated with a change in the radon action level from 4.0 pCi/L to 2.7 pCi/L?

1. What number of additional number of homes will need mitigation?
2. What number of additional lung cancer cases will be prevented?

   How many lives will be saved per unit over 50 years with change from 4.0 to 2.7, based on existing data?

1. What is the economic impact of each prevented lung cancer case: Reduced medical cost? Lifetime contributions to the economy and family?
4. What percentage of mitigation installations would require more complex solutions to achieve 2.7 pCi/L?

   What are the circumstances, solutions, and estimated additional unit cost beyond the baseline cost of a typical mitigation?

   What are additional economic benefits of a residential mitigation system (e.g. moisture reduction, air quality/musty smell)?

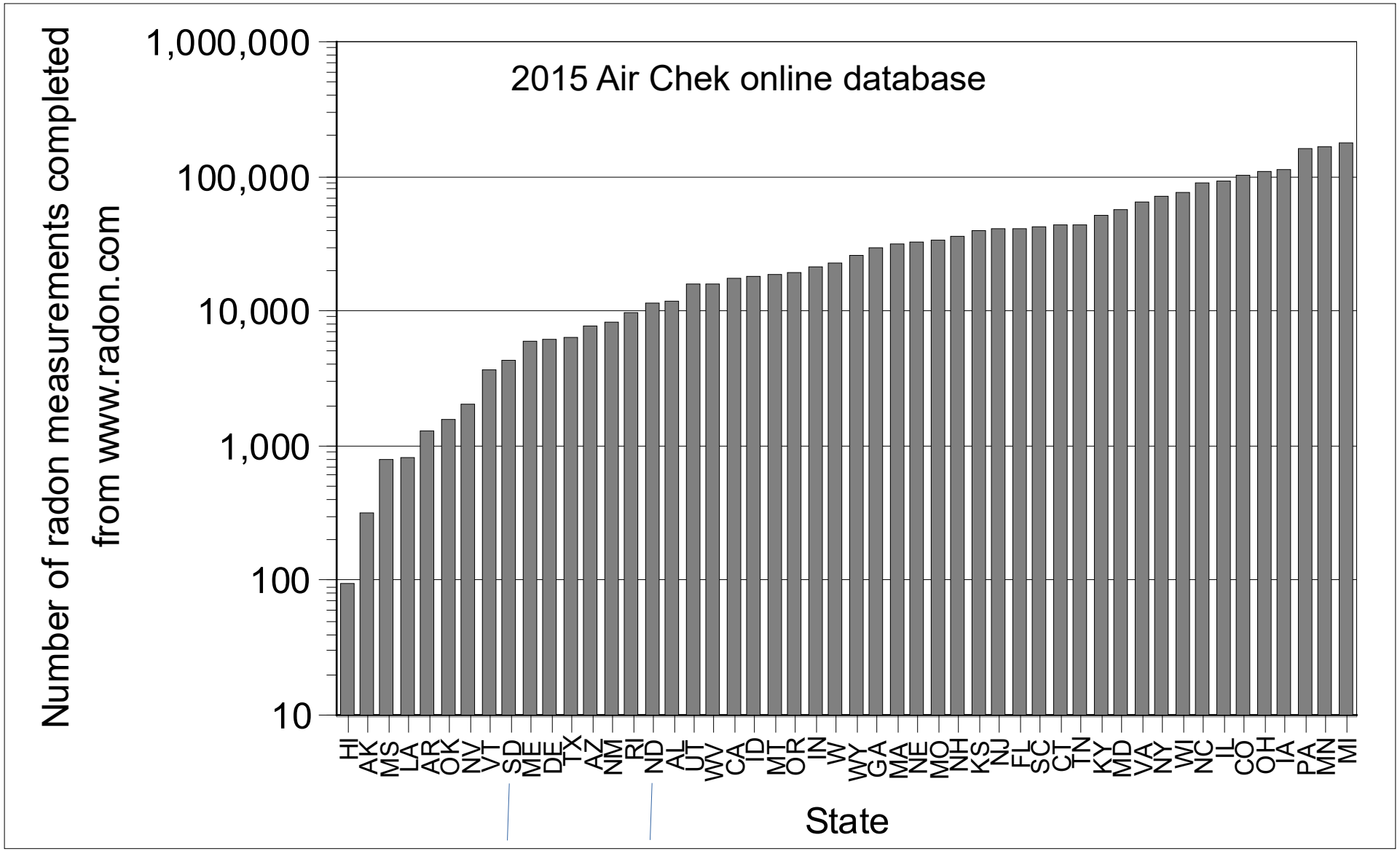
4. What is the additional cost to radon labs and measurement equipment to assess 2.7 pCi/L beyond the baseline cost of X? What is the additional cost to users of changes in devices; would replacement exceed typical replacement costs considering changes in standards and lifecycle?

1987 : EPA estimates 7 million homes have radon ≥4 pCi/L

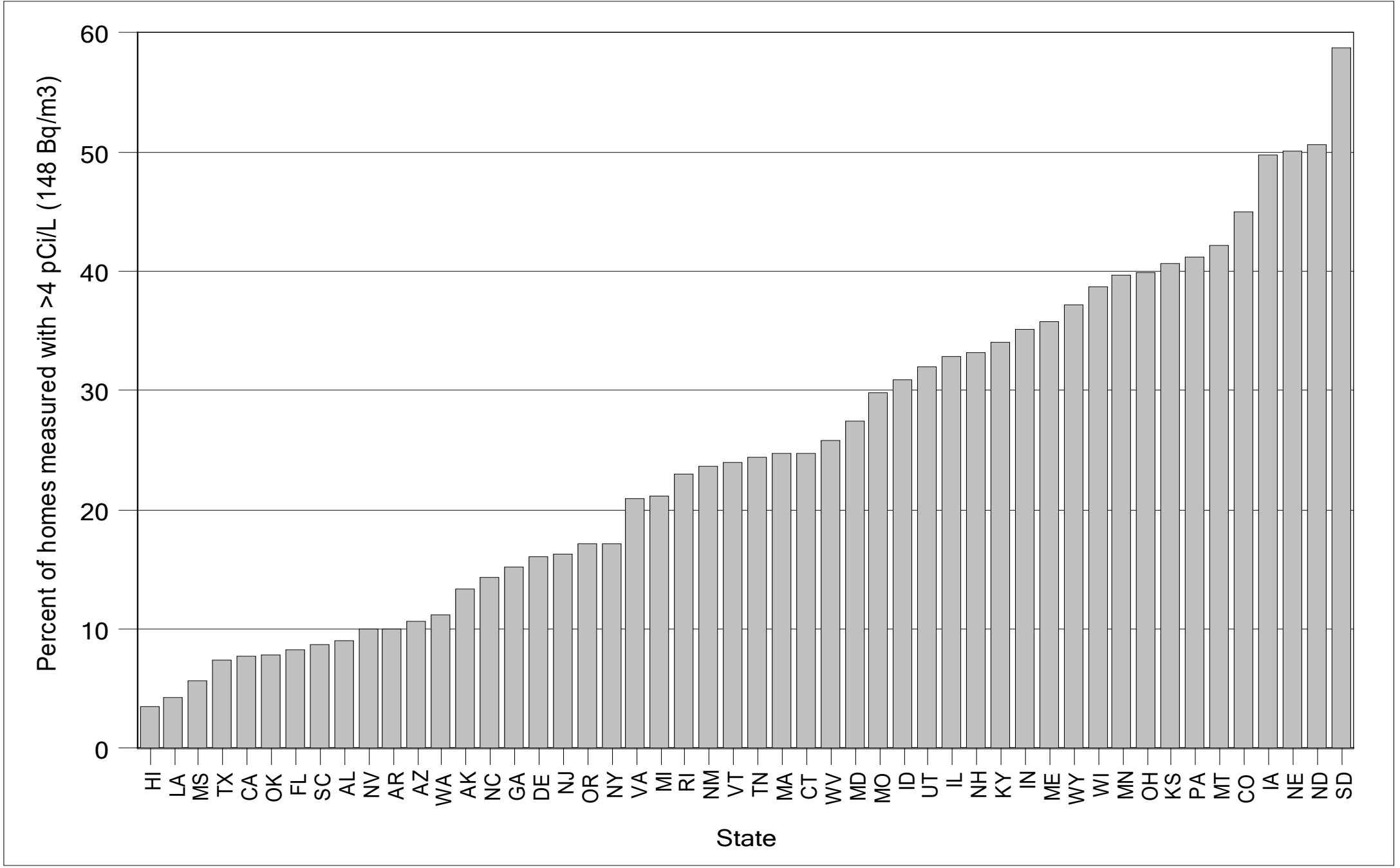
1992 : NRRS (5694 homes in 3142 counties) estimate in U.S. housing

64% <1 pCi/L
16% >2 pCi/L
6% >4 pCi/L (148 Bq/m^3) (quoted as '1 in 15 homes')
0.7% >10 pCi/L

Conclusion: 5.8 million U.S. homes have ≥4 pCi/L



States considered to have low radon potential have fewer radon measurements completed.

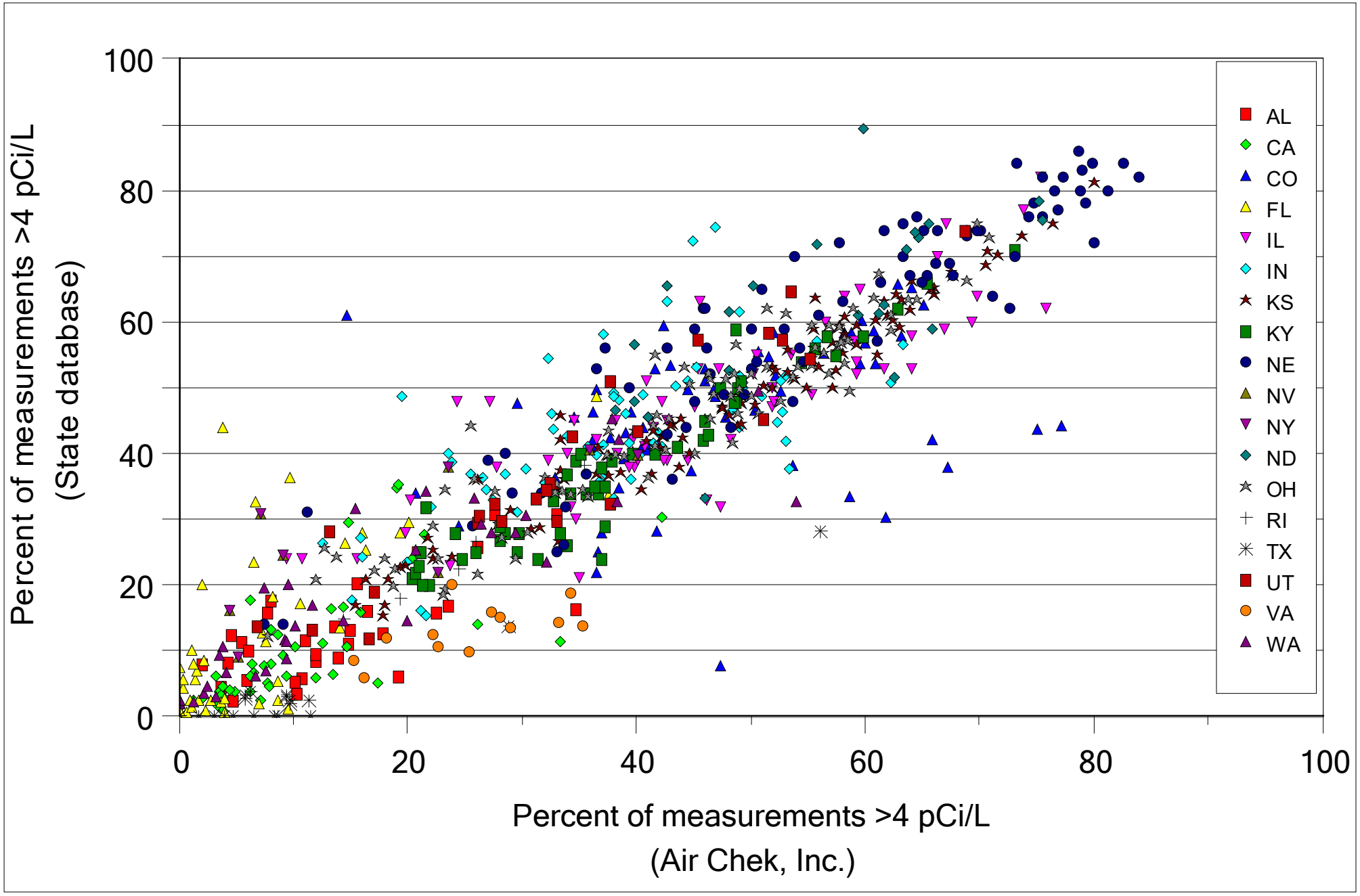

Percent of homes measured with >4 pCi/L (148 Bq/m3)
60
50
40
30
20
10
0
HI
LA
MS
TX
CA
OK
FL
SC
AL
NV
AR
AZ
WA
AK
NC
GA
DE
NJ
OR
NY
VA
MI
RI
NM
VT
TN
MA
CT
WV
MD
MO
ID
UT
IL
NH
KY
IN
ME
WY
WI
MN
OH
KS
PA
MT
CO
IA
NE
ND
SD
State

18 U.S. States had their radon measurement data available

Alabama
California
Colorado
Florida
Illinois
Indiana
Kansas
Kentucky
Nebraska
Nevada
New York
North Dakota
Ohio
Rhode Island
Texas
Utah
Vermont
Washington

Information includes :

- Total number of measurements
- Number of measurements ≥4 pCi/L
- Percentage of measurements ≥ 4 pCi/L


Percent of measurements >4 pCi/L
(State database)
100
80
60
40
20
0
0
20
40
60
80
100
Percent of measurements >4 pCi/L
(Air Chek, Inc.)
AL
CA
CO
FL
IL
IN
KS
KY
NE
NV
NY
ND
OH
RI
TX
UT
VA
WA

Comparison of EPA zone designations with www.radon.com and States' data

EPA zone designation	Meas. zone designation	AirChek radon.com counties[1]	18 States' counties[1]	Description of agreement
3 (low)	3	244 (75%)	36 (74%)	Zone agrees with EPA
	2	73 (22%)	14 (26%)	Greater radon potential
	1	9 (3%)	3 (6%)	Much greater radon potential
2 (medium)	3	99 (13%)	31 (17%)	Less radon potential
	2	393 (53%)	63 (34%)	Zone agrees with EPA
	1	249 (34%)	92 (49%)	Greater radon potential
1 (high)	3	6 (1%)	0	Much less radon potential
	2	170 (17%)	24 (8%)	Less radon potential
	1	791 (82%)	261 (92%)	Zone agrees with EPA

[1] Number of counties with sufficient measurement data (23 results) to assign to a zone.

Summary of counties	radon.com	State's with data
Agreement with EPA zone designations:	1428 of 2034 (70%)	360 of 524 (69%)
More radon than EPA predictions:	331 of 2034 (16%)	109 of 524 (21%)
Less radon than EPA predictions:	275 of 2034 (14%)	55 of 524 (10%)

How well did 1992 EPA National Residential Radon Survey identify radon risk ?

Estimate of radon level in U.S. housing:

	1992	2016 Airchek & States' data
<1 pCi/L	64%	
	+	
1-2 pCi/L	20%	61% (<2 pCi/L)
>2 pCi/L	16%	39%
>4 pCi/L	6%	18% of all occupied housing
U.S. homes with ≥4 pCi/L	5.8 million	up to 20 million (2010 census)

THE END

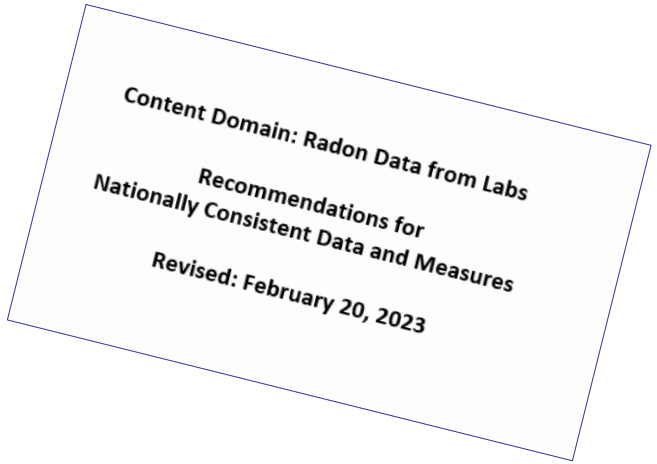
Radon and CDC National Environmental Public Health Tracking Network

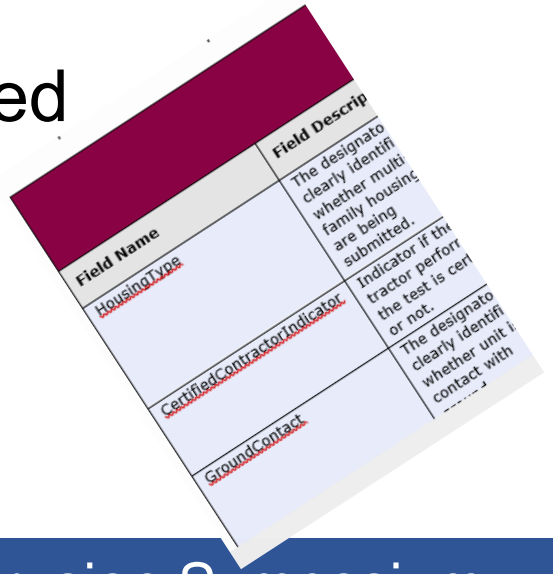
- CDC – State Collaboration 2011- Present
  - Radon Task Force 2011 - 2012
    - Radon White Paper
  - EPA State Radon Data Exchange
  - Radon Pilot Phases 1 & 2 – 2013 - 2016
  - Radon Work Group – 2016 – present

- CDC - Private Lab Collaboration – 2018
  - Data from 2005-2017
  - AccuStar, AirChek, Alpha Energy, EMSL, RAL, Radalink
  - Resume in 2026

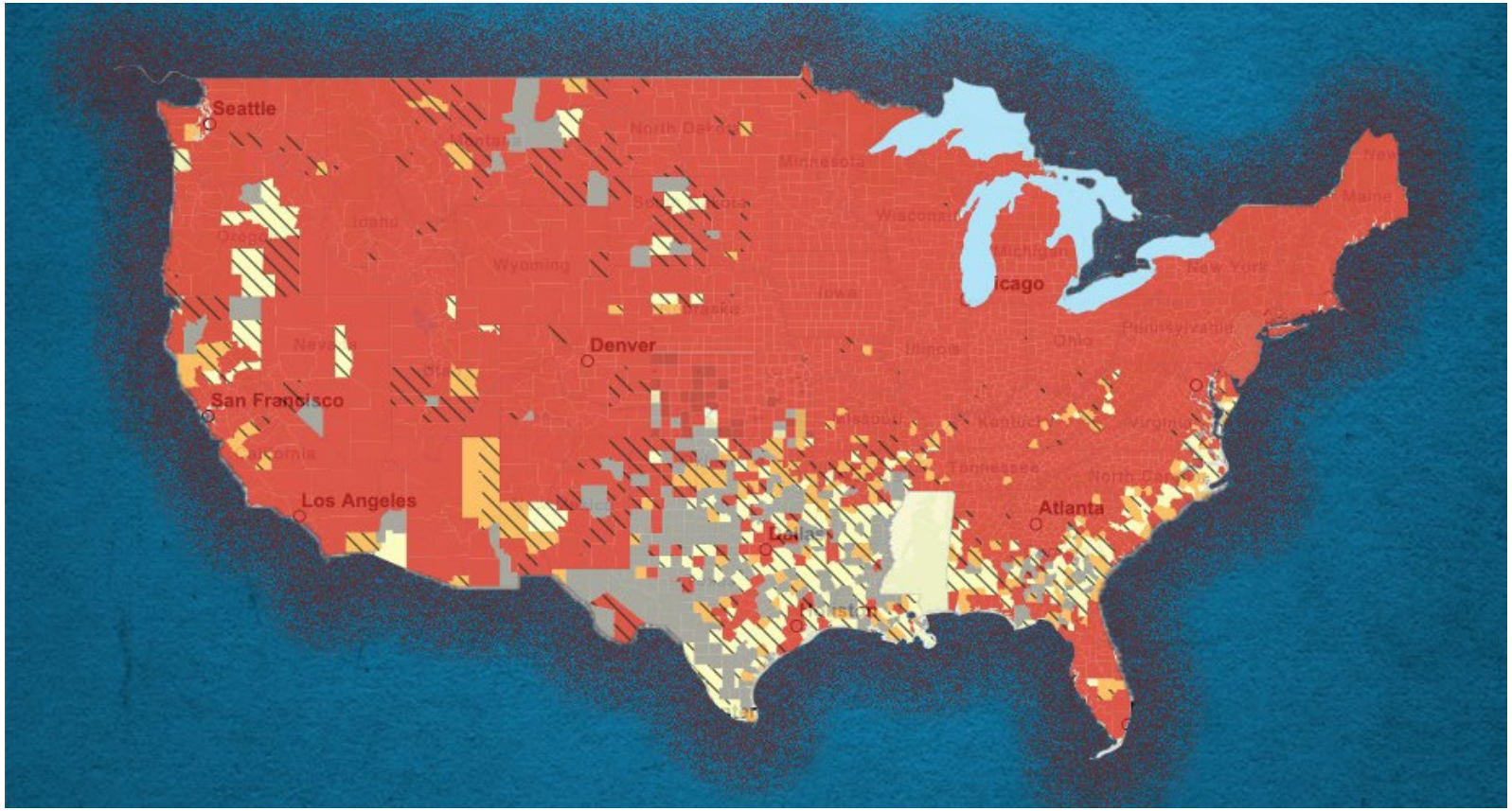
Radon Indicators and Measures

- Four Indicators / Data Dictionaries:
  - Radon Tests from States
  - Radon Tests from Labs
  - Multifamily Radon
  - Tribal Radon Data
- Largely the same measures in all
  - Standardization/Improvements needed





CDC EPHT:
US Counties: Maximum Rn Levels



CDC-EPHT
Pre-Mitigation Radon Test Results (from Labs) 2008-2017