Elevated Radon in Colorado: Connecting Programs and Data to Increase Public Health Awareness

Colorado Environmental Public Health Tracking
First - A little bit about Colorado Environmental Public Health Tracking (Tracking)

- CDC grant supported.
- Collaboration between CDC, states, and universities
- Leveraged between state agencies, private labs
- Ultimate goal to leverage products to locals and support PHAs
- CDC and states develop nationally consistent measures
- States an also develop state level measures, like radon
Colorado Environmental Public Health Tracking homepage: colorado.gov/coepht
Radon Tracking Page

Radon in Colorado

These maps show estimates for radon levels in indoor air in Colorado counties based on three different sources.

Figure 1 shows an updated map based on earlier USGS model that produced the original EPA radon map of the United States. The updated map shows the potential for high levels of radon in indoor air across the state.

Figures 2 and 3, based on results of indoor air radon tests collected from 2003-2012 and voluntarily reported to the Colorado Department of Public Health and Environment (CDPHE), also show high levels of radon across the state. A small number of tests may not accurately represent the entire county.

Figure 4, shows the a chart depicting 2012 BRFSS results for the question, “Do you know what radon is?” Results indicate disparities in awareness based on age, gender, education level, income, race and ethnicity.

It is important that all Colorado residents test their homes for radon. Testing provides residents with information about radon levels in their home, and it also aids to the CDPHE radon data set presented here to help give a better understanding of radon levels in the state.

Homeowners need to be educated about the need to test their homes for radon and about what actions are appropriate based on their radon test levels. Information should be developed for specific target audiences who currently have low awareness of radon risk.

Figure 5 shows counties where Colorado residents responding to the 2012 Behavioral Risk Factor Surveillance System (BRFSS) random telephone survey were less likely to report a high radon test result in their home. This finding was in contrast to test results reported to CDPHE which indicate a high percentage of high radon levels for most Colorado counties.

Figure 6 Figure 6 shows data from over 140,000 home radon tests voluntarily conducted and reported to CDPHE from 2003 through 2012. Some of these data are mapped in Figures 2 and 3 above. This table provides details of the number of tests that were reported in each county during this time period. State-wide, almost half of all radon tests reported to the state exceed the mitigation level.
Radon specific Tracking activity to date

- Colorado specific radon measure created in 2012
- The Colorado specific radon measure uses indoor test results from the Colorado radon program and BRFSS data to support portal
- Radon Task Force (national) 2012, sunsetted
- Radon, smoking and lung cancer co-display team 2013, sunsetted
- National radon data base pilot project attempting to use work previously done by:
  - EPA, EPA radon states, CDC, CDC Tracking radon states
- Looking at using National Tracking Portal or possibly the Exchange Network as a national clearing house for radon data.
Evaluation of Indoor Radon Test Results

• Received by Colorado Radon Program annually.
• Began partnering in approximately 2012 to create state level radon measures and displays for Colorado Tracking using data from 2005 - 2009.
• Current data set is 2005 - 2014.
• Applied recommendations of radon task force, geospatial team under Tracking for consistent measure and display of data.
• At this time not following guidance created as part of Radon Data Pilot team for state level analysis, however are submitting data to CDC as requested, including flags that allow data exclusion.
Average radon based on USGS delineation

These provinces, or radon potential areas, were developed based on the USGS matrix referenced on the previous slide.

Identified pre-mitigation samples 2011 – 2014 only.
N= approximately 30k.
Original N= approximately 1200.

This map was re-created from an image available in the original hardcopy report from EPA and USGS.

This is one example of the effect of significantly improved radon sampling data from the Radon Outreach Program.
When we re-apply the same indexing method that the USGS applied in 1993 we actually see that Colorado has only High radon potential. That is, you can expect to see a result over the action level, 4 pCi/L.
Updated Radon Potential 2013: Zone 1 (> 4 pCi/L)

Notes: Radon potential is calculated based on indoor radon measurements, geology, soil, construction type and aerial radiation measurements. Previously 12 of Colorado's counties were shown to have a medium potential of 2 - 4 pCi/L, Zone 2 of the EPA map. However, new evaluation based on more robust indoor radon testing shows that there is potential for all counties to exceed 4 pCi/L. 4 pCi/L is the EPA action level for indoor radon.
What are the chances of having a high radon test in Colorado? Between 20 – 80% depending on where you live!

Percent of Tests Over 4 pCi/L from indoor radon samples received by the Radon Outreach Program 2005 – 2014.

Interestingly the counties with higher rates of radon levels over 4 pCi/L aren’t the same as the ones with the highest average values (next slide).

The highest rate of tests over 4 pCi/L was Crowley County at approximately 84%.

All counties returned some tests over 4 pCi/L with all counties except one returning high tests at a rate greater than 1 in 5 (over 20%).
The average radon test result in Colorado is 6.34 pCi/L and ranges from 0 to 4277.7!
County averages range from less than 2 pCi/L to over 20 pCi/L

57 Counties have average radon levels over 4 pCi/L

The median radon value is 3.7 pCi/L

The 95th percentile radon value is 18.9

median and 95th percentile values give us a picture of middle and high values by reducing the effect of outliers, or possibly exaggerated high measurements.
Behavioral Risk Factor Surveillance System (BRFSS)

- Funded by CDC and the States.
- Longest ongoing telephone survey program in the world.
- Collects health behavior data from participants.
- Participants are asked a core set of national questions.
- States add an additional set of questions to gather information on content of priority concern to them.
- In Colorado we contact about 5500 people annually and use those numbers to make estimates.
Regional BRFSS Results: *Do you know what radon is?*

72% of people in Colorado say that they know what radon is.

However, people in Saguache, Mineral, Rio Grande, Alamosa, Conejos and Costilla county were less likely to know what radon is.

People in Douglas, Dolores, San Juan, Montezuma, La Plata and Archuleta counties were more likely to know what radon is.
Regional BRFSS Results: Have you had your home tested for radon?

Only about 42% of people in Colorado say that they have had their home tested for radon.

People in Saguache, Mineral, Rio Grande, Alamosa, Conejos, Costilla, Adams, Morgan, Washington, Yuma, Logan, Sedgwick and Phillips counties were less likely to test for radon.

People in Douglas and Larimer were more likely to test for radon.
Regional BRFSS Results: *Were the results of your test >4 pCi/L?*

About 16% of people say that their test was over 4 pCi/L.

However, people in Saguache, Mineral, Rio Grande, Alamosa, Conejos and Costilla county were less likely to have a high radon test.

People in Douglas, Dolores, San Juan, Montezuma, La Plata and Archuleta counties were more likely to have a high radon test.
Health Disparities in Radon Awareness in Colorado

- Black and Hispanic less likely to know - White only/non-Hispanic more likely to know.
- 18-29 less likely to know what radon is - > 50 more likely to know.
- Less than high school less likely to know - college grads more likely to know.
- $15,000 - $35,000 less likely to know - > $35,000 more likely to know.
- Females less likely - males more likely
Conclusions from Tracking and BRFSS:

- Approximately 30% of Coloradans do not know what radon is.
- Side note: The BRFSS also indicated that about 60% of Coloradans do not test their house even though they know what radon is.
- Both of these rates increase among Hispanics, people that didn’t go to college, people that make less than $35k / year, and smokers.
- If you don’t know what radon is you won’t test for it (even though some people won’t test anyway!).
Environmental Public Health Tracking in Action!

- Radon Program has used Tracking and BRFSS to prioritize resources and grant allocation.
- Radon Program has coupons for free tests available.
- Radon Program currently working on a program to subsidize low income mitigation.
- Radon Program currently working on radon resistant new construction at the local level.
- Colorado Environmental Public Health Tracking and Radon Program hope to have radon questions on 2016 BRFSS.
- Colorado Tracking continues to work with Radon Program to develop data sharing agreements to facilitate finer resolution data analysis.
- Colorado Environmental Public Health Tracking continues to take a very active role with the national program to develop national radon data repository.
- Colorado Tracking continues to foster relationships and develop new partnerships at all levels to increase radon awareness, utilize available radon data in community assessments and support policy development at the state and local level.

- Currently UT, KS have done this and WA, VT and NJ have done something similar.
- The methods and guidance are available to any states, Tracking or Non.
- Colorado was recently approached by state of VA for guidance on dialing in their radon program.
References
3) USGS Radon Province Map, USGS Open-File Report 93-292-H.

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Thank you

Questions?