

RADON KNOWLEDGE AND TESTING AMONG PUEBLO COMMUNITIES IN NORTHERN NEW MEXICO

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NIEHS-EPA ENVIRONMENTAL HEALTH DISPARITIES RESEARCH
WEBINAR SERIES

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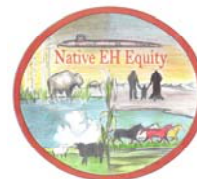
Education

- ASERT Post Doctoral Fellow, University of New Mexico
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Research

- Co-Director Center for Native Environmental Health Equity Research, University of New Mexico
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Mentorship

- Tribal Community Leadership
- Albuquerque Area Southwest Tribal Epidemiology Center
- UNM Native Environmental Health Equity Research

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Presentation Overview

Community Engaged Practices to address tribal environmental health issues

- Preparing Through Community Environmental Health Surveys and workshops
- Addressing Tribal Environmental Health Concerns
 - Assessing Home Indoor Radon Exposure Assessment
 - Designing Tribal/Community Sampling Framework
 - Applying Tribal-led Methodological Approach for Data Collection
- Impacts of Tribal Healthy Homes Projects
- Designing Culturally Tailored Education Materials
- Expanding and Developing Future Tribal EPHT Activities

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Community Environmental Health Survey

Environmental Concerns

- Air Pollution
- Water quality
- Radon Exposure
- Climate Change

Link between personal health and the environment

Available information on health issues in communities



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Based on survey, workshop feedback and conversations with community leadership

Focused Tribal Environmental Health Tracking Program on three key areas

1. Indoor radon exposure
2. Fall and injury prevention
3. Resident health

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Radon in the Southwest US

Open Access Article

Assessing the Impact of Housing Features and Environmental Factors on Home Indoor Radon Concentration Levels on the Navajo Nation

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Map developed to illustrate predicted Radon (Rn) organized into 3 zone regions

Zone 1: Rn > 4 pCi/L

Zone 2: Rn 2-4 pCi/L

Zone 3: Rn < 2 pCi/L

Average Rn levels

- Inside home 1.3 pCi/L
- Outside home 0.4 pCi/L

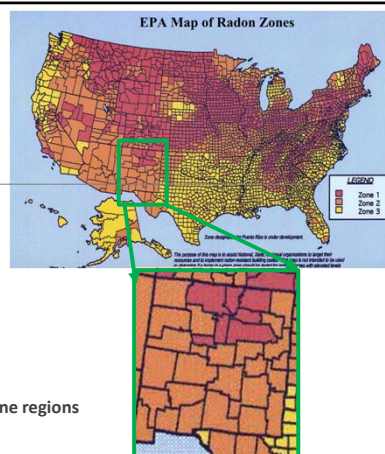


Figure: EPA Radon Zone Map
Source: Retrieved from <https://www.epa.gov/radon/epa-map-radon-zones>

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Radon

Naturally occurring

Radioactive noble (inert) gas formed from the decay of uranium, radium and other radioactive elements in the Earth's crust

- Tasteless, odorless and water soluble

Radon decays quickly – half-life of ~4 days

- Emits alpha particle during decay

When inhaled the alpha particle decay can cause damage to our lungs

- Second leading cause of lung cancer – behind cigarette smoking

Concentration in air

- Radon pCi/L (1pCi/L=37 Bq/m³)

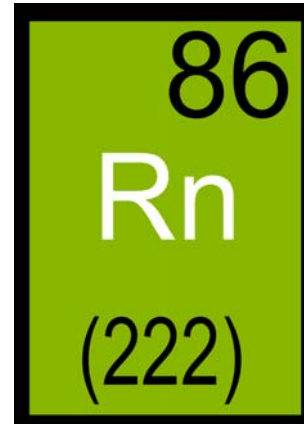


Figure: Radon Chemical Symbol
Source: Retrieved from
<http://commons.wikimedia.org/wiki/File:Radon.svg>

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Predictors of radon exposure

Home type

Pressure difference

Soil characteristics

Groundwater

- Movement/displaces radon
- Absorbs radon

Weather

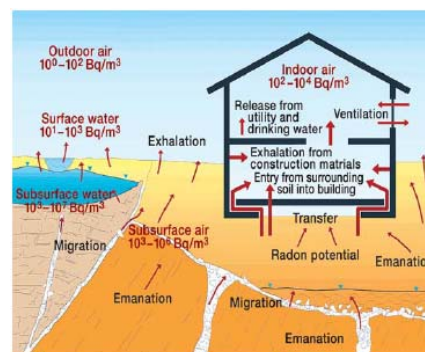


Figure: Radon In The Environment
Source: Schmid K., Kuwert T., & Drexler H. (2010)

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Radon Survey

Measurement Devices

- Short-term: 3-7 days
- Long-term: 91 days to 1 year

Testing Areas in Home

- Living room
- Bedroom
- Lowest level-basement

Radon Kit Information

- Date set up
- Date pick up

Units: picocuries per liter (pCi/L)



Figure: Air-Chek Short Term Radon Kit



Figure: Air-Chek Long Term Radon Kit

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Home Maintenance & Repair

Smoke Alarm Detectors

- Any in the house?
- When were they installed?
- Location?
- Missing/non-working?

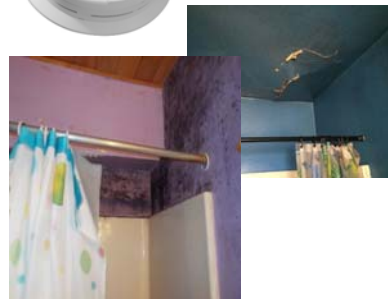


Condition

- Interior/Exterior walls
- Floors, Windows, Roof

Mold Issues

- Major
- Minor



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Home Occupants – Chronic Conditions

Occupants with Sensory Impairments

- Eye sensory impairments?
- Hearing impairments?

Any occupants with asthma?

- Adults
- Children
- Use of oxygen tanks?

Anyone with mobility issues?

Anyone with transportation issues?



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Home – Fall/Injury Risk Factors

Outside Home

- Any objects blocking pathway to door?
- Is pathway to door visible at night?

Floor Safety

- Are there any throw rugs on the floor?
- Are there cords or cables on the floor?

Are there any stairs/steps at the home?



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Community Sampling Design – Conversations with working group members

Buildings

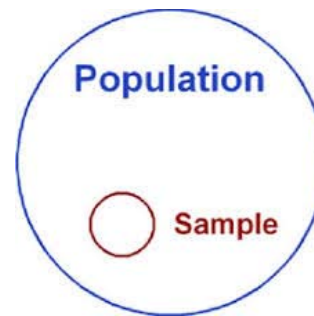
- Residential
- Public

Community 1

- Smaller
- Goal- sample
 - All residential
 - All public buildings

Community 2

- Larger
- Goal-sample
 - Over half of residential
 - All public buildings



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Data Collection & Training

Community working groups

Data Dictionary – loaded on Trimble device

Training

- Home assessments
- Radon exposure and assessment
- Fall injury prevention
- Hardware/Software Training
- Geographic Information System (GIS)

Field experience (Pilot testing)

Two Visits Per Home

- Home characteristics
- Geolocation



Figure: House Cartoon
Source: Google Images

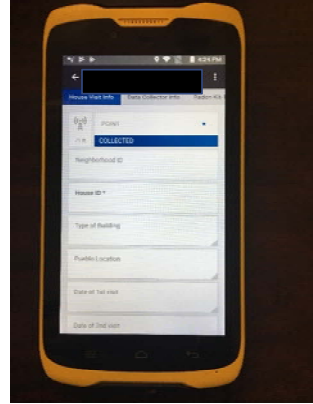


Figure: Trimble TDC 100 Device
Source: Trimble website

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Trimble TDC, Wi-Fi (Android)



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Accomplishments – An Example

Held 7 community meetings to design and implement the project

Trained 12 community members to set, pickup and ship Rn test kits

Community team members have:

- Placed short-term Rn test kits in 32 homes
 - Majority of kits placed in bedroom or living room
 - Testing duration ranged between 3.25 and 6.25 days
 - All quality control kits reported non-detectable Rn concentrations
- Placed long-term Rn test kits in 32 homes

Two community discussion groups (including Tribal leadership)

- Discuss radon knowledge and awareness
- Inform design of a radon knowledge and awareness survey

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Impacts of these projects

Short term


- Strengthened tribal capacity for conducting radon testing
- Updated indoor radon concentration levels (pCi/L)
- Update home characteristics and clinical services information

Long term

- Advanced training in utilizing geographical information system (GIS) software and hardware
- Integrating environmental health data with existing GIS will improve community capacity for addressing EH issues
- One community successfully applied injury prevention data to receive funds for home safety mitigation.
- Another community applied COVID-19 Response funds to mitigate homes identified with elevated radon levels for safe quarantine.

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Tribal Specific Radon Brochure



RADON TESTING

A GUIDE FOR TRIBAL COMMUNITIES

KEEPING OUR HOMES AND COMMUNITY SAFE: ONE TEST AT A TIME

HOW DO I TEST MY HOME FOR RADON?

- Testing is the only way to know your home's radon levels.
- Testing for radon is easy and inexpensive.
- You should first do a "short-term" test.
- These kits should remain in place for 3-7 days depending on the device.
- When testing, follow "closed house" conditions by keeping windows and outside doors closed as much as possible during the test except for normal exit and entry.

WHAT DO THE RESULTS MEAN?

- If the initial test is at or above 4.0 pCi/L, follow up with 2nd test.
 - 4.0 to 8.0 pCi/L: Long-term test (90 days to 1 year) under normal lived-in conditions.
 - Above 8.0 pCi/L: An immediate short-term test (48 hours)
- If your radon level is 4.0 picocuries per liter (pCi/L) or higher, take action to reduce your risk from radon.

1.0 2.0 3.0 **4.0** 5.0 pCi/L

4.0 The EPA recommended radon action level

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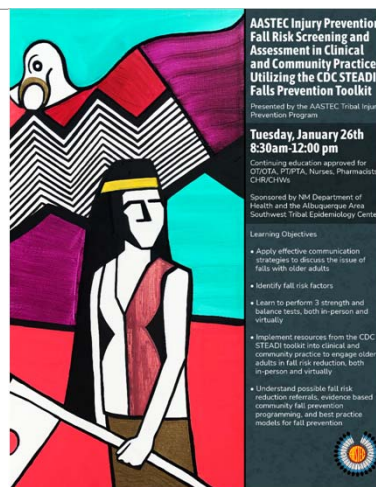
Working To Expand Tribal EPHT Activities

Benefits

- Household assessments
- Radon assessments
- Geospatial map of communities
- Community Education/Outreach

Expand

- Reach out to more tribal communities
- Explore additional environmental health concerns
- Funding available



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Comments/Questions?



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