

RADON IN HOMES AND BUILDINGS

ENVIRONMENTAL HEALTH ISSUE PROFILE

Community Action for a Renewed Environment (CARE)
Environmental Sustainability for the Salina Community

Issue: Radon exposure in homes and buildings

Background: Radon gas is a naturally occurring gas found worldwide. It is produced as uranium in soil breaks down. It can be found in background readings everywhere and its levels increase where contact with earth is increased, such as basements. Radon enters a home or building through cracks in the foundation or walls, through basement floors, and in water supplies (such as private wells). If the water supply contains radon, it may enter the air in the home through faucets, showers, dishwashers, or washing machines. Radon may also enter the home through pipes, sumps, or drains.

Exposure to certain levels of radon gas has been directly linked to an increased risk of lung cancer and is the second leading cause of lung cancer in the United States today. Lung cancer risk is increased because as radon gas is breathed into the lungs, small bursts of radiation are emitted as it breaks down. The lower the level of radon, the lower is the risk of lung cancer.

Standards: The Environmental Protection Agency (EPA) has set 4 picocuries per liter of air (pCi/L) as the recommended level for radon in indoor air. They further recommend remediation in homes that have a level of 2 pCi/L. The Kansas Legislature also passed HB 2772 that went into affect on July 1, 2009. It amends KSA 58-4102, 58-4103, 58-4117 and 58-4118 and requires the contracts for sale of all residential real property to contain language with a “disclaimer” stating the property may present exposure to radon gas; that it places the occupant at risk for lung cancer; that all information known to the seller be disclosed about radon gas; and that KDHE recommends all homes sold be tested.

Community-specific indicators:

While radon is found in outside air at the average reading of 0.4 pCi/L and the average reading in the United States for indoor air is 1.3 pCi/L, readings higher than that are often found in homes in Salina. In 1988, the Salina-Saline Co. Health Department offered radon test kits for a reduced fee to the community. Individuals filled out questionnaires, took the test kits home, administered the test, submitted it, and received the results. They were also aware that the health department was to receive the results as well. The department processed the information and kept the data.

What does the data say? The existing data was recently reviewed and only addresses from the city of Salina were placed in a separate data base. This new data was to be used for GIS identification and for statistical review. It was found that 64% of the homes contained readings of radon over 4 pCi/L – the recommended level above which EPA does not want exposure. It was also noted that 85% of the homes tested were over the limit of 2 pCi/L, where EPA recommends that remediation start.

Collecting radon data was voluntary and done by concerned citizens. Citizens had to purchase their own test kits; therefore, results may not represent a cross section of the community. This leaves a gap in knowledge about radon levels in sections of the city with rentals, lower income individuals, and in older homes.

What are the environmental conditions? Who is affected?

Radon gas enters the home through openings in the walls and floors of basements, and through soil contact in at-grade homes. How **much** radon gas enters the home is often dependent on construction techniques used by builders. Lung cancer is considered to be a product of extended exposure to harmful elements.

Therefore, the younger the individual exposed to radon gas and the longer they are exposed, the higher the

risk. Also, anyone who spends long periods of time in areas of the home with higher radon gas levels, i.e. the basement, is at greater risk. A home that has a basement with a bedroom in it would pose a higher risk, as well as one that has a recreation area (TV, pool table) where individuals spend longer periods of time. Overall, the greatest risk would be for children and those who spend extended time indoors and especially in the basement. However, the risk could be in any part of the home and in any house within the city limits.

How is the community affected? Most cases of lung cancer have no early symptoms and therefore are not diagnosed soon enough to be helped. At 4 pCi/L, approximately 0.7% of non-smokers could get lung cancer, and 6% of smokers could get lung cancer. Increasing the radon gas level to 20 pCi/L (which some homes had) will increase risk of cancer to 3.6% in non smokers and 26% in smokers. Cancer treatments can be lengthy and expensive. This can be a tremendous financial drain on the individual, family, and community. With a survival rate of between 10% and 14%, the loss-of-life factor must be considered. Deaths from lung cancer cut short earning capabilities of individuals for their families and community. It also can have far-reaching effects from loss of emotional support and family structure received by the family and the community from individuals.

What are the contributing factors and behaviors of the community?

The percentage of homes that could be impacted with elevated radon is quite large. Because the survey data was voluntary and done by concerned citizens, most of the tests were done by home owners and were done in the more affluent areas of the city. This leaves a gap in knowledge about the levels in homes in sections of the city with rentals, lower income individuals, and older homes. Almost 80% of the homes in the city of Salina were built after 1978. Since radon enters a home through openings where there is contact with the soil, those who have older basements with cracks, old drains, and sump pump openings run the risk of having higher levels of radon. Those are most usually found in older homes and those not well maintained.

There are very few contractors with training on radon mitigation or home construction with radon-resistant features. New homes are not being built to exclude radon and older homes have few choices for contractors to mitigate existing radon problems. Lower income home owners and renters have even fewer options.

How does the community protect itself?

Training for contractors, education for homeowners and landlords, and education for the general public to raise awareness is needed.

Data sources:

Where did the data come from? Age of data?

Salina-Saline Co. Health Dept., 1988, radon testing data

EPA "A Citizen's Guide to Radon," 2004, lung cancer statistics based on radon gas exposure

American Cancer Society, 2009, survival rates from lung cancer

Saline County Appraiser, December 2009, number of homes in Salina, number built before 1978

Additional data needed?

Testing on rental, older home, and homes in designated areas in Salina

Contractor knowledge of radon-reduction construction

Statistics on number of lung cancer cases in Salina

Data on cost of treating lung cancer and the loss of life from lung cancer

Paper prepared by Jo Funk, January 2010.