Radon Exposure: Using the Spectrum of Prevention Framework to Increase Healthcare Provider Awareness

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The radioactive properties of radon have been known for decades, but the risks of exposure have been understated in most professional healthcare curriculums. Healthcare providers in areas with low levels of radon exposure may not consider radon to be a main source of concern in the development of lung and other cancers. Just as nurses counsel patients to avoid tobacco exposure, they should advocate that patients have their homes tested for radon. This article aims to increase radon awareness and address opportunities for providers to work toward various objectives to reduce radon exposure.

At a Glance

- Radon is the second leading cause of lung cancer in the United States and worldwide.
- Prevention activities are needed to increase awareness of the risks of radon exposure and promote mitigation.
- Healthcare providers are trusted sources of information for patients and consumers and should recommend home radon testing, even after a diagnosis of lung cancer.

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Radon is a naturally occurring, odorless, colorless gas in everyday environments. Prolonged exposure to excessive levels is the second leading cause of lung cancer in the United States (World Health Organization [WHO], 2009). Because radon is primarily inhaled, lung cancer is the only recognized health condition officially linked to radon exposure by the Centers for Disease Control and Prevention (CDC) and WHO. However, new evidence has identified a connection between high levels of radon exposure and the development of hematologic malignancies (Teras et al., 2016). About 22,000 people die annually from radon-induced lung cancer. The five-year survival rate after a lung cancer diagnosis is only 54%; consequently, the efforts to reduce exposure to prevent lung cancer and promote early detection are a primary care issue (National Cancer Institute [NCI], n.d.). To help prevent cancer, clinicians must raise awareness of radon exposure risks and understand how to mitigate them, as well as support regulations to reduce exposure.

Radioactive Properties

Radon, a product of uranium decay, enters buildings or homes in a variety of ways, most involving areas at the soil-air junction (see Figure 1). In addition, radon is radioactive and has a short half-life, decaying within three days. As radon decays, it becomes electrically charged and attaches to particles in the air or water; these charged atoms are called radon progeny. Through decay, the products emit alpha radiation into pulmonary tissues when inhaled. Polonium-218 and polonium-214 are the particles with the shortest half-lives and provide the most radiation dosage to lung tissues. As alpha radiation affects the DNA in the pulmonary epithelium, tumor suppressor genes may be affected and free radicals may form. Additional genomic alterations from DNA strand damage may occur, such as mutation or transformation, and promote the development of cancer.

Effects on Health

Radon exposure poses a risk for the development of lung cancer in nonsmokers and smokers. Radon exposure is considered to have an intermediate risk for lung cancer development (Moyer, 2014). About 15%–20% of newly diagnosed patients with lung cancer are nonsmokers (Wakelee et al., 2007). However, the synergistic effect of smoking and radon exposure greatly increases the risk of lung cancer (Wakelee et al., 2007). According to the Agency for Toxic Substances and Disease Registry (2011), the risk of radon to a smoker is estimated to be 10–20 times greater than it is to a nonsmoker.

Screening for lung cancer may be recommended when exposure is combined with two of the following high risk factors: being aged 55–80 years, smoking at least a pack of cigarettes a day for at least 30 years or two packs a day for 15 years, or still smoking, or having stopped within the past 15 years (Moyer, 2014). Medicaid and Medicare, along