Environmental Risk Factors

The role of oncology nurses in assessing and reducing the risk for exposure

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BACKGROUND: The multifaceted origins of cancer are related to the dynamic interface between the human body and the environment. It is estimated that as many as 60% of cancers arise from environmental exposures.

OBJECTIVES: This article describes potential risks for exposure to radon, arsenic, pesticides, and antineoplastic agents, which can lead to the development of cancer.

METHODS: The authors performed a review of the literature on environmental exposures and their relationship to the development of cancer.

FINDINGS: Environmental factors are abundant in the home, workplace, and environment. Nurses can lead campaigns to educate the public about environmental risk factors and their effects on the development of cancer.

KEYWORDS
prevention; screening; carcinogens; environmental factors; exposure

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RECURRING OR PERSISTENT EXPOSURES CAN PRODUCE biologic responses that promote genetic mutations and cellular pathway disruptions for carcinogenesis (Parsa, 2012). Broadly defined, environmental exposures are those that individuals tend to have little or no control over and that can occur through interactions with natural or manmade agents that are encountered in activities of daily living (Boffetta & Nyberg, 2003). Environmental factors account for about 19% of all cancers and 1.3 million deaths worldwide (World Health Organization [WHO], 2011). It is estimated that 60% of cancer deaths in the United States may be attributed to environmental factors (Schottenfeld et al., 2013). In 2016, the National Toxicology Program listed 62 known carcinogens, with 248 suspected carcinogens reported. Likewise, the International Agency for Research on Cancer (IARC, 2020) regularly reviews the rigor of scientific data to determine carcinogenic risk (see Table 1). Exemplary of those risks, the long-term effects from asbestos and dichlorodiphenyltrichloroethane (DDT) have been publicly recognized as causes of mesothelioma and breast cancer, respectively (Boffetta & Nyberg, 2003; Cohn et al., 2019). This article describes four environmental exposures with increasing carcinogenic risk and the pivotal role of nurses for promoting prevention and screening strategies to mitigate exposure.

Radon

For more than 30 years, the carcinogenic effects of radon as an occupational exposure to miners have been under investigation, with increasing evidence of exposures within home and building construction (Boffetta & Nyberg, 2003; U.S. Environmental Protection Agency [EPA], 2016a, 2016c). Radon exposure is the leading cause of home-related deaths and the second leading cause of lung cancer in the United States. More than 20,000 people die annually of radon-related lung cancer in the United States, which equates to about 1 death every 25 minutes (Centers for Disease Control and Prevention [CDC], 2020). Radon is an invisible gas that has no odor or taste, limiting its early detection. Prolonged exposure to elevated levels of radon can cause serious health issues, including cancer. Radon exposure has also been associated with the development of hematologic malignancies (Teras et al., 2016) and gastric cancers (Messier & Serre, 2017).