E-cigarettes are rapidly increasing in use across all populations, particularly in adolescents and young adults. Smoking cessation is important for patients with cancer; however, evidence supporting e-cigarettes as an effective cessation strategy is lacking and not currently recommended. Information on risks, safety, and recommendations regarding vaping will be discussed. Oncology nursing considerations for e-cigarettes include communicating known and potential risks while using smoking cessation strategies for people at risk for cancer or who have cancer and are currently vaping.

AT A GLANCE

- Use of electronic nicotine delivery systems (ENDS) is increasing in adolescents and young adults and is associated with increased risk of combustible tobacco use.
- ENDS expose users to carcinogens and toxicants and are associated with nicotine addiction.
- The dual use of ENDS and combustible tobacco is associated with increased risk of myocardial infarction.

KEYWORDS
electronic nicotine delivery systems; e-cigarettes; nicotine; smoking cessation; cancer

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E-Cigarettes

Background and essential information for providers

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Electronic cigarettes, often referred to by researchers as electronic nicotine delivery systems (ENDS), contain a cartridge that holds nicotine-based fluid, a heating element that heats and vaporizes the fluid, a microprocessor that controls the heater, and a sensor that detects inhalation (National Institute on Drug Abuse, 2020). These devices are considered tobacco-containing products by regulatory agencies because the nicotine used is extracted from tobacco products (U.S. Food and Drug Administration [FDA], 2020).

History

E-cigarettes were introduced in the United States and European countries in 2006 and 2007 and were marketed as a way to replace cigarettes and to aid in smoking cessation (Fairchild & Bayer, 2014). First-generation devices were designed to look and feel like a combustible cigarette (Centers for Disease Control and Prevention [CDC], 2020c). Second-generation devices, called vape pens, focused on function and delivery. Cartridges in vape pens were filled by the user, who was able to modify the amount and type of fluid, the nicotine concentration, and flavor (CDC, 2020c). Third-generation devices had more modifiable aspects: the liquid, ingredients, and power of the vaporizer, and could be elaborate and expensive (CDC, 2020c). In addition, many explosive injuries were linked to this generation because of the ability to modify the devices (CDC, 2020c). Fourth-generation devices, which became available roughly in 2016, had the most impact on use (Cullen et al., 2018). Some brands have modifiable cartridges, and most devices are small, sleek, and concealable—often resembling thumb drives. Almost all cartridges, or pods, contain nicotine; concentrations of nicotine vary between products, from 11 mg/ml to 36 mg/ml, which is similar to the concentration in cigarettes (National Academies of Sciences, Engineering, and Medicine, 2018). In addition, novel popular methods for inhaling substances, such as dabbing or dripping, involve superheating substances often with high concentrations of cannabinoids (CDC, 2020c).

Most e-cigarette cartridges contain nicotine, propylene glycol, and toxicants and carcinogens, such as aldehydes, metals, tobacco alkaloids, and hydrocarbons (Rubinstein et al., 2018). Some flavors use glycerol and diacetyl, and diacetyl has been linked to bronchiolitis obliterans, also known as popcorn lung (Allen et al., 2016). In 2016, a report by the Office of the Surgeon General noted that, while many of these ingredients are linked to cancer, heart disease, and lung disease, e-cigarettes have smaller concentrations of these dangerous substances compared to cigarettes. Although referred to as vaping, the product is not expelled as a vapor, but, rather, as an aerosol with fine particulate matter inhaled and exhaled out of the lungs, which has the potential to cause lung damage (Jenssen & Walley, 2019).

Hundreds of e-cigarette brands and many types of flavor combinations are available to consumers (Office of the Surgeon General, 2016). The American Academy of Pediatrics has stated that e-cigarette marketing campaigns are specifically designed to target adolescents and