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Ignore e-cigarettes at your patient's peril

CIGARETTE SMOKING IS the leading cause of preventable deaths, with more than 1 billion tobacco smokers worldwide. This number has remained stagnant since 2007¹ despite extensive public health efforts and the availability of several smoking cessation medications. Pharmacotherapies such as nicotine replacement therapy (NRT), varenicline, and bupropion in combination with behavioral therapies are helpful but do not work for all smokers. In fact, long-term abstinence rates are modest for each attempt to quit. Quitting is especially hard for smokers with high levels of nicotine dependence. These subgroups are overrepresented by disadvantaged populations who carry a disproportionate burden of tobacco-related pathology.

As a tool to decrease morbidity and mortality associated with smoking, several countries have endorsed electronic cigarettes (also known as e-cigarettes, vapes, vaporization devices, and electronic nicotine delivery systems) as a therapeutic tool to help refractory smokers to quit or to switch to a less harmful way of using nicotine.⁴⁻¹⁰ These devices are used for the inhalation of vapor through a mouthpiece and may use disposable pods or cartridges or refillable tank systems.⁴⁻¹⁰ They may be single-use or rechargeable and can be used with or without nicotine (or other drugs).⁴⁻¹¹ E-cigarettes produce an aerosol by heating a solution that usually contains nicotine and volatile organic compounds, and may also contain flavorings.⁴⁻¹¹

Proponents of e-cigarettes view them as a harm-reduction strategy for refractory smokers.⁴⁻¹¹ Recent guidelines from the National Institute for Health and Clinical Excellence in the United Kingdom support the use of e-cigarettes for smoking cessation, and the

country is considering them as medications.^{4,12} In Australia, patients who failed conventional therapies may leave their doctor's office with an e-cigarette prescription.⁵

Last year, the US Food and Drug Administration (FDA) authorized marketing of the Vuse Solo electronic nicotine delivery system products,⁶ owing to the premise that the products exposed trial participants to fewer harmful constituents compared with combustible cigarettes (eg, nitrosamine, benzene) by switching to use of these products only.⁶ However, the FDA authorization is not considered approval for clinical use but rather for use as a consumer product. Similarly, the US Preventive Services Task Force found insufficient evidence to endorse e-cigarettes for smoking cessation.²

While US doctors remain wary of e-cigarettes and seldom discuss them with their patients, ^{2,5} their popularity remains high among smokers. ⁵ They mimic the hand-to-mouth movements of combustible cigarettes, have futuristic designs, and come in several attractive flavors. ^{7–10,13} In a systematic literature review, young e-cigarette users endorsed them as a safer option than combustible cigarettes and viewed them as an effective cessation aid. ¹³ As patients are already using these products, rather than dismissing use of e-cigarettes, we must provide accurate information to inquiring patients.

EVIDENCE

A meta-analysis of 38 studies found that the odds of quitting cigarettes were 28% lower in those who used e-cigarettes compared with controls.⁷ They determined that e-cigarettes were associated with significantly less quitting among smokers.⁷ However, a meta-analysis from Canada disputed these conclu-

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sions. 8 The Canadian investigators reported a positive relationship between e-cigarettes and smoking cessation for some smokers.8 In an effort to reconcile these findings, a Cochrane review evaluated the effects of e-cigarettes to help smokers achieve long-term abstinence.9 The analysis included 56 studies (N = 12,804), 29 of which were randomized controlled trials (RCTs). The researchers found evidence of moderate certainty that e-cigarettes with nicotine increase quit rates compared with e-cigarettes without nicotine and NRT for at least 6 months. The incidence of adverse effects was low across studies. Mild adverse effects were more common in persons randomized to nicotine e-cigarettes. These side effects included transient mouth and throat irritation, headache, cough, and nausea. However, the Cochrane review did not include the newest versions of e-cigarettes (eg, podbased devices), which may have higher nicotine concentrations.9

E-cigarettes are rapidly evolving, and nicotine concentrations and additives continue to change. For example, the cartridges for one of the more popular pod devices (JUUL brand) come in 3% and 5% nicotine strength and produce higher blood concentrations of nicotine than earlier devices or combustible cigarettes. ^{14–16} This higher concentration of nicotine could potentially provide better relief from cravings, particularly in severely nicotine-dependent individuals. However, the higher concentration, speed of delivery, and more rapid absorption also increase the potential for addiction to the product. ¹⁶

Overall, the evidence for e-cigarette use for smoking cessation appears mixed. While RCTs indicate a positive effect of e-cigarettes on quit rates, observational studies did not. Patients participating in RCTs often exhibit high levels of motivation to quit, whereas the general population shows varying levels of motivation. Altogether, this research suggests that e-cigarettes seem to work for smoking cessation under optimal conditions but not as well in naturalistic settings. On, what should we tell our patients?

CLINICAL IMPLICATIONS

Smoking remains epidemiologically and clinically significant, particularly in vulnerable populations.¹⁻³ Clearly, the best advice for smokers is to abstain completely and use FDA-approved medications with behavioral therapies.² As clinicians, we need to ascertain the patient's readiness to quit and receptivity to standard therapies.² Unfortunately, such strategies may not be acceptable for all smokers. Refractory

smokers may turn to e-cigarettes regardless of physician views.⁵ They may use e-cigarettes to quit, to switch to what they consider to be a less harmful alternative, or to complement combustible cigarettes ("dual use").¹³

There is some evidence that e-cigarettes may help some smokers quit and may appear as a less harmful option for those who do not want to guit.9,10 However, the patient needs to know that the FDA has not approved clinical use of e-cigarettes for smoking cessation, and that the newest e-cigarettes (eg, pod-based devices) have not been as extensively studied and often deliver higher nicotine concentrations, increasing the severity of dependence.¹⁵ Similarly, dual use of combustible cigarettes and e-cigarettes is associated with higher cardiovascular risk than when either is used independently and thus is not advisable. 17,18 Currently, there are no data on long-term health effects of e-cigarettes.⁴ Available research suggests that e-cigarette products appear less hazardous than the chemicals released by combustible cigarettes, but this is an evolving issue requiring further research.^{4–11}

■ WHAT PHYSICIANS CAN DO

If a patient is already using e-cigarettes, it is up to the physician to discuss risks and benefits of these devices and provide options with better-established safety profiles of FDA-approved NRT modalities and pharmacotherapy² (Figure 1). Refusing to broach the subject leaves the patient vulnerable to e-cigarette marketing.^{6,13} Clinicians should discuss the risks of dual use as well as the higher concentration of nicotine in pod devices and how it increases the potential for addiction.^{16–18}

If the patient chooses to continue to use e-cigarettes, clinicians should advise the patient regarding the following:

- E-cigarettes are not licensed medications, and long-term risks are not known. However, they may appear to be less harmful than combustible cigarettes.⁴ Do not engage in dual use, but rather switch completely to e-cigarettes.⁴
- Refillable devices are more likely to help patients quit, as they allow for gradual tapering of the nicotine concentration.^{12,19}
- Vape shops may assist patients in identifying the appropriate nicotine concentration to start at based on what is available for each device and how much they smoke. ^{12,19} It is important that patients receive enough nicotine to overcome withdrawal symptoms. ^{12,19}

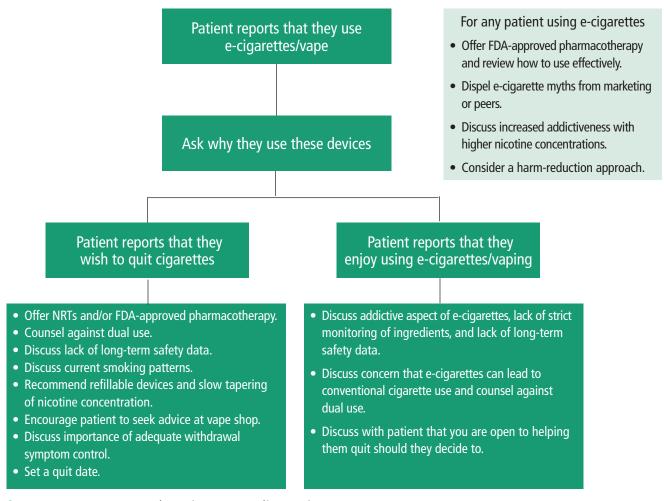


Figure 1. How to approach patients regarding e-cigarette use.

FDA = US Food and Drug Administration; NRT= nicotine replacement therapy

- Vape shops may also help patients identify the appropriate device for them. 12,19 It is also important to discuss patient goals. Do they want to replace cigarettes, decrease nicotine intake, or quit smoking altogether?4
- Finally, how long would the patient use the device if quitting is their goal?4 It is important to note that initially there will likely be a trial-and-error phase until the patient finds a nicotine concentration that controls withdrawal symptoms. 12 Patients must use the device for long enough that they are able to quit combustible cigarettes completely.4 Patients must be actively followed and progress assessed as they attempt to cut down. Clinicians

should also continue to keep an eye for short- and long-term issues resulting from e-cigarette use.

As clinicians, we must provide education on the risks of e-cigarettes and dual use and help patients transition to less harmful options after failing other smoking cessation therapies. With a lack of clear evidence, conflicting public health guidelines, and predatory marketing from e-cigarette companies, it is our duty as clinicians to educate ourselves and help patients make the best choices for their health.

DISCLOSURES

The authors report no relevant financial relationships which, in the context of their contributions, could be perceived as a potential conflict

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