Vania Modesto-Lowe, MD, MPH
Medical Director, Hartford Behavioral Health, Hartford, CT; Department of Psychiatry, University of Connecticut, Community Faculty, University of Connecticut, Farmington, CT

Lakshit Jain, MD
Department of Psychiatry, Assistant Clinical Professor, University of Connecticut, Farmington, CT; Connecticut Valley Hospital, Middletown, CT

Roberto León-Barriera, MD
Department of Psychiatry, Consultation Liaison Psychiatry Fellow, University of Pennsylvania-Perelman School of Medicine, Philadelphia, PA

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.[1,2] This number has remained stagnant since 2007[1] despite extensive public health efforts and the availability of several smoking cessation medications.[1,2] Pharmacotherapies such as nicotine replacement therapy (NRT), varenicline, and bupropion in combination with behavioral therapies are helpful but do not work for all smokers.[3] In fact, long-term abstinence rates are modest for each attempt to quit.[3] Quitting is especially hard for smokers with high levels of nicotine dependence.[3] These subgroups are overrepresented by disadvantaged populations who carry a disproportionate burden of tobacco-related pathology.[1]

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, pod-based 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.[7] While RCTs indicate a positive effect of e-cigarettes on quit rates, observational studies did not.[7] 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.[10] So, 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 quit.[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 pharmacotherapy[2] (**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]

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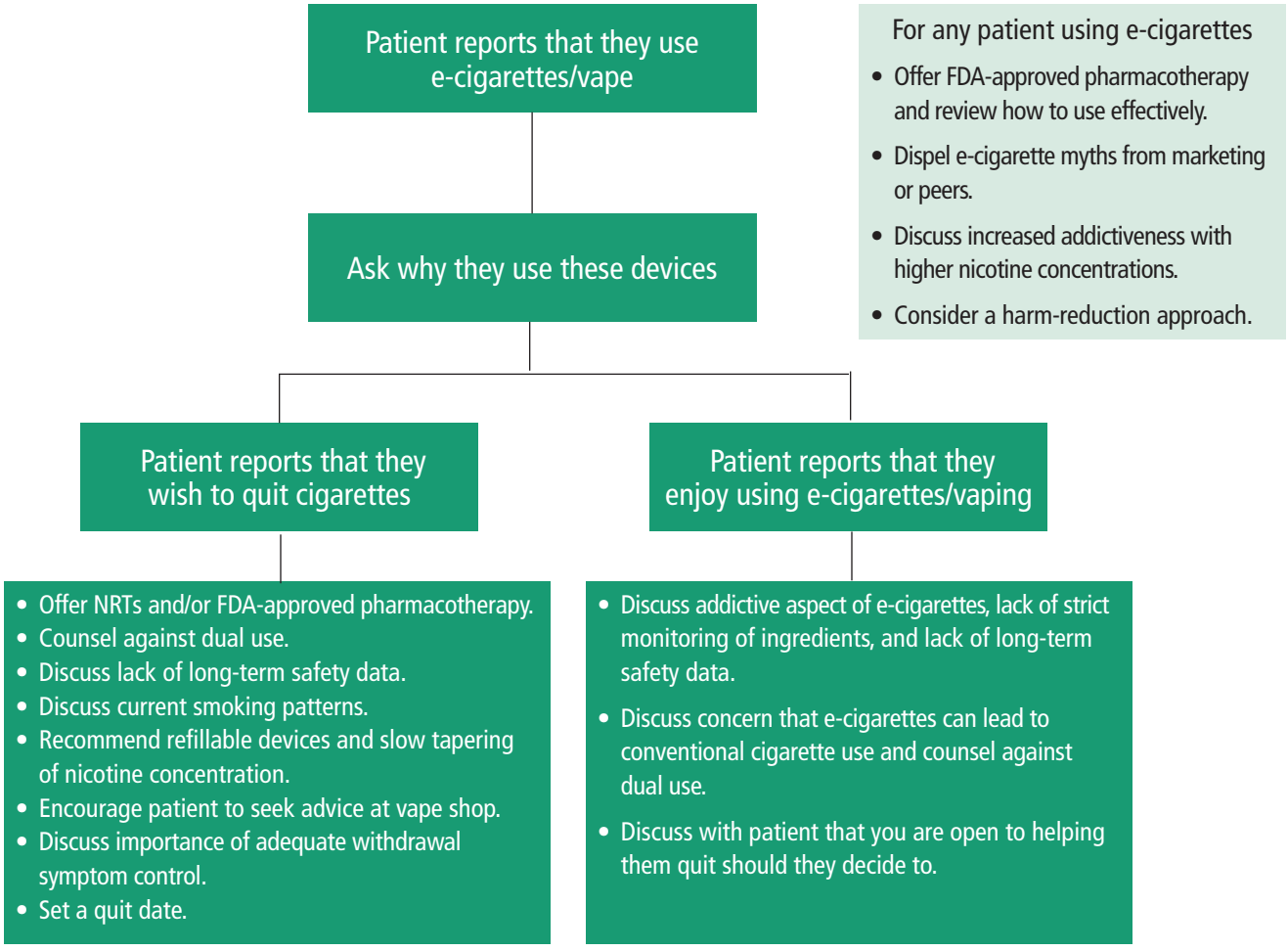

Figure 1. How to approach patients regarding e-cigarette use.

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 of interest.

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Address: *Vania Modesto-Lowe, MD, MPH, Department of Psychiatry, University of Connecticut, 263 Farmington Avenue, Farmington, CT 06030; modestolowe@uchc.edu*

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