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CLINICAL DECISIONS

INTERACTIVE AT NEJM.ORG

E-Cigarettes and Smoking Cessation

This interactive feature addresses the approach to a clinical case. A case vignette is followed by specific options, neither of which can be considered correct or incorrect. In short essays, experts in the field then argue for each of the options. Readers can participate in forming community opinion by choosing one of the options and, if they like, providing their reasons.

CASE VIGNETTE

A Man Considering the Use of E-Cigarettes

James S. Yeh, M.D., M.P.H.

Mr. O'Malley is a 29-year-old man whom you are seeing for the first time for a routine health check-up. He has a medical history of obesity, hypertension, and childhood seizures. During the visit, he mentions that he is interested in quitting smoking. He started smoking cigarettes when he was 15 years old, while "hanging out" with his friends, and in those days smoked about half a pack a month.

During college, he began smoking more frequently and more heavily; for the past 6 years, he has been smoking up to 1.5 packs per day. Several times in the past, he has reduced his cigarette consumption by up to half, using various nicotine-replacement regimens, or has stopped smoking altogether by quitting "cold turkey." Each time, he was able to sustain his efforts for 2 to 3 weeks before resuming his previous smoking habits.

Mr. O'Malley is an auto mechanic, and he consumes 3 to 4 beers weekly. He has been married for 3 years and has no children. He smokes inside the house on occasion; his wife does not smoke.

His only medication is chlorthalidone, which he takes at a dose of 25 mg daily. He has no known drug allergies. A review of systems is

unremarkable. He reports no chronic cough, wheezing, or dyspnea.

On physical examination, his blood pressure is 128/76 mm Hg, his weight is 95.3 kg (210 lb), and his body-mass index (the weight in kilograms divided by the square of the height in meters) is 31. Both lungs are clear to auscultation; there is no wheezing, and no crackles are heard. The rest of the physical examination is unremarkable.

After obtaining the history and performing the physical examination, you discuss smoking-cessation aids. The patient mentions that he has read about electronic cigarettes (e-cigarettes); he has friends who use them on a regular basis and have stopped smoking cigarettes altogether. He is interested in trying e-cigarettes as a smoking-cessation aid and asks for your opinion.

OPTIONS

What is your recommendation for this patient?

1. **Recommend trying e-cigarettes for smoking cessation.**
2. **Do not recommend trying e-cigarettes for smoking cessation.**

To aid in your decision making, each of these approaches is defended in a short essay by an expert in the field. Given your knowledge of the patient and the points made by the experts, which option would you choose? Make your choice, vote, and offer your comments at NEJM.org.



Choose an option and comment on your choice at NEJM.org

OPTION 1

Recommend Trying E-Cigarettes for Smoking Cessation

Christopher Bullen, M.B., Ch.B., M.P.H., Ph.D.

A routine check-up has prompted Mr. O'Malley, a heavily dependent smoker, to ask about quitting. Clinicians should take such opportunities to as-

sist people to quit smoking — even people who are unwilling or ambivalent about doing so. Like most smokers, Mr. O'Malley has tried to quit before, using a variety of methods. Other factors besides his friends' experience may be motivating; for example, the fact that his wife doesn't smoke may be influential. Since Mr. O'Malley is young, smoking-related health problems are not

yet apparent; however, he is being treated for elevated blood pressure and is obese. He should be advised that quitting smoking would substantially reduce his risk of a future cardiovascular event.

In the first instance, clinicians should offer evidence-based treatments along with behavioral support. However, Mr. O'Malley's pharmacologic treatment options are limited: in people with a history of seizures, bupropion is contraindicated, and varenicline should be prescribed with caution. He has used nicotine-replacement therapy multiple times before but has been unsuccessful in maintaining smoking cessation with this therapy for more than a few weeks; thus, suggesting another prescription of nicotine-replacement therapy is unlikely to instill confidence that he can adhere to nicotine-replacement therapy and abstain from smoking.

In these circumstances, patients such as Mr. O'Malley should not be actively discouraged from trying e-cigarettes: they are a reasonable and useful aid to consider. E-cigarettes can deliver nicotine and thereby reduce urges and encourage withdrawal as effectively as a nicotine inhaler and can replace many of the habitual behavioral aspects of smoking tobacco. Evidence from a large randomized trial in which a first-generation e-cigarette that delivered relatively little nicotine was evaluated in 657 participants suggested that e-cigarettes could be as effective for cessation as nicotine patches and could also aid in smoking reduction.¹ A 2014 Cochrane review provided evidence that nicotine e-cigarettes, as compared with placebo e-cigarettes, help smokers stop smoking.² In a "real world" setting, a large survey-based study in the United Kingdom showed that in 6000 participants' most recent attempt to quit smoking, the odds of abstinence were 60% greater among those who used e-cigarettes than among those who used either no quitting aid or over-the-counter nicotine-replacement therapy.³

Using e-cigarettes is far safer than continuing to smoke,⁴ but evidence regarding the safety of long-term use is limited. Therefore the aim should be to reduce the use of e-cigarettes over time, with the ultimate goal of complete abstinence or intermittent "rescue" use only. Advice to patients should include the need to commit to a firm date for quitting smoking entirely — with not a single puff of cigarettes thereafter — using e-cigarettes whenever urges to smoke or cigarette-withdrawal symptoms occur. Non-nicotine e-cigarettes may be useful in this situation.

Choosing an e-cigarette from the variety available is not a straightforward decision. Cessation effectiveness may depend on the type of product used. If a patient decides to use e-cigarettes to quit smoking, a second- or third-generation product with nicotine delivery that is better than that of first-generation products should be recommended. Appropriate regulation would help to provide assurance to users regarding product performance, quality, and safety.

Smoking cessation is a complex and dynamic process. It is possible that the patient will reduce tobacco smoking but not quit completely. Although this is less than ideal, the combination of cigarette reduction and nicotine from non-combustible sources results in fewer tobacco cigarettes smoked and increases rates of tobacco-smoking cessation.⁵ Since patients are likely to gain weight after quitting tobacco use, encouragement and support to adopt a healthier lifestyle, including a healthier diet and regular physical activity, will be important. Together with quitting tobacco smoking with the aid of e-cigarettes, these steps could substantially increase Mr. O'Malley's chances of adding years of healthy life.

Disclosure forms provided by the author are available with the full text of this article at NEJM.org.

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OPTION 2

Do Not Recommend Trying E-Cigarettes for Smoking Cessation

Stanton A. Glantz, Ph.D.

Clinicians should encourage their patients to stop smoking and support their efforts. People who quit smoking before 30 years of age live nearly as long as people who have never smoked. Despite the fact that e-cigarettes have not been approved as a medication for smoking cessation by the Food and Drug Administration (FDA), they are widely promoted for smoking cessation, particularly to young adults, and smoking cessation is one of the main reasons that people try e-cigarettes.⁶ Indeed, as of May 2016, no e-cigarette company had even submitted an application to the FDA to market e-cigarettes for smoking cessation.

In 2015, the U.S. Preventive Services Task

Force concluded that evidence was insufficient to recommend e-cigarettes for smoking cessation in adults because of conflicting and limited evidence available at the time the recommendation was prepared.⁷ Since then, many more studies of the relationship between e-cigarette use and smoking cessation have been published. Unfortunately, the evidence to date indicates that smokers who also use e-cigarettes are actually less likely to quit smoking than smokers who do not use e-cigarettes. A meta-analysis of 20 studies that included control groups showed that e-cigarettes were associated with significantly lower odds of quitting cigarettes than either nicotine-replacement therapy or no cessation aid (odds ratio, 0.72, 95% confidence interval [CI], 0.57 to 0.91).⁸

A variety of FDA-approved prescription and nonprescription medications are available to help patients quit smoking, provided that the patients do not have contraindications to their use. These include nicotine-replacement therapy, varenicline, and bupropion. Since these are all first-line treatments for smoking cessation, the choice of agent should take into consideration patient preferences, coexisting medical conditions, and potential drug–drug interactions.

It is important to note that although clinical trials have consistently shown the efficacy of nicotine-replacement therapy for smoking cessation, population-based surveys showed that nicotine-replacement therapy was associated with long-term success in smoking cessation when it was available only by prescription and was combined with behavioral support, but this association was lost when nicotine-replacement therapy became available over the counter.⁹ In a prospective cohort study involving adult smokers in England, prescription medication combined with behavioral counseling was associated with increased cessation, whereas over-the-counter nicotine-replacement therapy was associated with less smoking cessation¹⁰: the odds ratio for cessation with over-the-counter nicotine-replacement therapy as compared with no cessation aid was 0.68 (95% CI, 0.49 to 0.94), similar to that with e-cigarette use.⁸ For the patient to receive the most effective care and have the highest chance of successful quitting, nicotine-replacement therapy and other FDA-approved smoking-cessation therapies should be accompanied by continued, active engagement between the patient and the health care provider.

Patients also need to understand that the quality control in e-cigarettes is highly variable and that even the labeled nicotine levels are often inaccurate. Heating the e-cigarette liquid exposes users to ultrafine particles, aldehydes, and other toxic chemicals. Most important, there is already evidence of immediate adverse health effects; long-term health effects are not yet known.

If a patient insists on trying e-cigarettes, the health care provider should emphasize that the evidence is that for most smokers, using e-cigarettes actually reduces the chances of quitting cigarettes and that it is very important that the patient stop using conventional cigarettes and set a quit date for the e-cigarettes. E-cigarettes should not be recommended as effective smoking-cessation aids until there is evidence that, as promoted and used, they assist in smoking cessation.⁸

Disclosure forms provided by the author are available with the full text of this article at NEJM.org

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