

Vaping:

What Physicians Need to Know to Protect Their Patients

BY THEOPHANIS PAVLOU, MD



LEARNING OBJECTIVES

At the conclusion of this activity, participants will be able to:

- 1 Understand the health risks associated with e-cigarettes and vaping.
- 2 Discuss how to communicate the risks and uncertainties associated with vaping use to patients.
- 3 Describe the reporting recommendations for possible cases of vaping-associated pulmonary disease.

CME

Vaping and electronic cigarettes have been a hot topic in the press lately. This is due in large part to a multistate outbreak of lung disease associated with e-cigarette product use, including a confirmed 26 deaths in 21 states across the nation.¹ The Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), state and local health departments and other clinical and public health partners are working together to investigate this outbreak.

KEY FACTS ABOUT E-CIGARETTE USE

E-cigarettes are nicotine delivery devices that have a battery, a heating element and a container for liquid. When the liquid is heated, users inhale the aerosol. The liquids are usually flavored and contain nicotine, so users experience a taste sensation as well as a hit of the same addictive stimulant found in cigarettes. The liquid can contain nicotine, tetrahydrocannabinol (THC) and cannabinoid (CBD) oils and other substances and

additives. Vaping is the word used to describe inhaling the aerosol produced by e-cigarettes or similar devices, such as vaporizers or vapor pens.

Nearly 11 million adults in the U.S. use electronic cigarettes, and only 15 percent of e-cigarette users are not former cigarette smokers.² Some have celebrated the arrival of these smokeless nicotine tools as a safe alternative to cigarettes, cigars and other tobacco products. The devices do not emit the same cancer-causing tar and toxins that burning tobacco leaves produce. Additionally, a study published in *The New England Journal of Medicine* found vaping was more effective for helping tobacco users quit than nicotine replacement therapy, when both products were accompanied by behavioral support.³

On the other hand, many e-cigarettes are loaded with addictive nicotine, and even those without nicotine may contain toxic chemicals. The reality is that there is still much unknown about the health effects of vaping. A major issue is that no one knows exactly what goes into all of the flavorings. Vaping is still fairly new compared to smoking, and the science on its effects is far from conclusive. Experts say it could take 20 years to know the long-term health effects of vaping.⁴

There are some clear dangers to e-cigarettes, particularly when it comes to nicotine. Nicotine is addictive and is harmful, particularly to young, developing brains. Nicotine use can stunt an adolescent's ability to learn and affect their behavior. Nicotine also worsens conditions such as depression and anxiety. For smokers, vaping can actually support their habit, not break it. Instead of transitioning from cigarettes to e-cigarettes, some smokers end up using both.⁴

ADOLESCENTS AND VAPING

The 2018 National Youth Tobacco Survey found that e-cigarette use among high schoolers increased by 78 percent in one year.⁵ Recent data showed that more than a quarter of high school students had used e-cigarettes in the previous 30 days, compared to 21 percent in 2018. Two-thirds of adolescents who vape believe they are inhaling only the flavors—not nicotine or anything potentially dangerous.⁶

In response, the Trump administration announced a plan to ban flavored e-cigarettes to address youth vaping.⁶ After the FDA releases its final plan for banning the products, there will be a 30-day delay until the new policy goes into effect. At that point, all flavored e-cigarettes, other than tobacco flavor, would have to be removed from the market. Retailers would have to get rid of products with flavors such as cotton candy, bubble gum, crème brulee, fruit, menthol and mint. Companies can apply to the FDA to bring their flavored e-cigarettes back on the market, but the request will have to be approved by the regulator.

Influential public health advocates, including Mike Bloomberg, have come out in favor of banning flavors as a way to curb the youth vaping epidemic. Bans of sales of flavored vaping products are in place in New York and Michigan, and a temporary ban has been passed in Washington. Massachusetts recently announced a four-month ban on all sales of vaping products. Other states, including New Jersey, are also signaling interest in taking a tougher stance on e-cigarettes.⁷

On September 25, 2019, Juul announced that CEO Kevin Burns stepped down and will be replaced by K.C. Crosthwaite, who had been Chief Growth Officer at tobacco company Altria. Juul also states that it will suspend all TV, print and digital ads, will stop some of its lobbying efforts and will support and comply with any new federal policy related to vaping products.⁸

WHAT IS KNOWN ABOUT THE LUNG INJURY OUTBREAK

According to the Centers for Disease Control and Prevention (CDC), there are 1,299 cases of lung injury reported from 49 states, the District of Columbia and one U.S. territory, as of October 8, 2019, and the number continues to climb. All these patients have a reported history of e-cigarette product use, and no consistent evidence of an infectious cause has been discovered.¹ Therefore, the suspected cause is a chemical exposure.

"According to the CDC, there are 1,299 cases of lung injury reported"

The CDC and the U.S. Food and Drug Administration (FDA) have not found a specific cause of the illness. The latest findings from the investigation into lung injuries associated with e-cigarette use or vaping suggest products

containing THC play a role in the outbreak.

Many of the samples tested by the states or by the FDA as part of their ongoing investigation have been identified as vaping products containing THC, the psychoactive component of the marijuana plant. Vitamin E became a key focus of New York state health officials' investigation after cannabis-containing vaping cartridges submitted by those who had fallen ill tested positive for Vitamin E acetate. Vitamin E acetate is used to dilute cannabis oil and is a substance present in topical consumer products or dietary supplements, but data are limited about its effects after inhalation.

While the FDA does not have enough data presently to conclude that Vitamin E acetate is the cause of the lung injury in these cases, the agency believes it is prudent to avoid inhaling this substance. Because consumers cannot

be sure whether any THC vaping products may contain Vitamin E acetate, consumers are urged to avoid buying vaping products on the street and to refrain from using THC oil or modifying/adding any substances to products purchased in stores.⁸

DIAGNOSING LUNG INJURIES ASSOCIATED WITH VAPING

Patients with cases of e-cigarette or vaping-associated lung injury have reported experiencing a rapid onset of coughing, weight loss and significant breathing difficulties. Other symptoms may include fatigue, fever, nausea, vomiting, abdominal pain and diarrhea. Symptoms generally appear over the course of a few days but can take as long as a few weeks to arise. The majority of patients are hospitalized, and while many of their symptoms overlap, their diagnoses have included lipid pneumonia, acute eosinophilic pneumonia and acute respiratory distress syndrome.⁹

Physicians need to be aware that there is an overlap between the early symptoms of vaping injury and common respiratory infections. Physicians should be asking patients about their vaping history as part of their standard protocol during routine visits. Gathering that information is especially important as doctors evaluate patients with respiratory symptoms from infectious causes. When evaluating patients for lung injury and illness, physicians should also be careful not to discriminate based on age and smoking status, as there are a large number of older Americans who vape (before and after quitting tobacco) and vapers who have never before smoked.

Physicians should consider all possible causes of illness in patients reporting respiratory and gastrointestinal symptoms. Patients should be evaluated and treated for other possible causes of illness (e.g., infectious, rheumatologic, neoplastic) as clinically indicated. When there is any question of a vaping-related lung injury, a referral to a lung specialist should be made immediately.

As we enter flu season, some U.S. doctors have raised concerns that vaping injury cases will be missed in the rush of patients seeking treatment for seasonal flu and other respiratory ailments. Influenza can be deadly in people who have other underlying illnesses. The fact that a patient could present at a physician's office with flu, a lung injury due to vaping, or both, makes diagnosis even more complicated for physicians. Other respiratory infections, including fungal infections, can also cause similar symptoms and could result in a delay of diagnosing a vaping injury.

It is particularly important this year that anyone, but especially people who have underlying pulmonary infections of any kind, receive the flu vaccination. The CDC recommends that all healthcare providers strongly

consider respiratory infections as well as lung injury associated with the use of e-cigarettes or vaping products in all patients presenting with respiratory symptoms and a history of using these products.¹⁰

WHAT PHYSICIANS SHOULD BE COMMUNICATING TO PATIENTS ABOUT VAPING

Healthcare providers have a vital role to play in raising public awareness about the potential dangers of vaping. While the specific cause of these lung illnesses remains unknown, the CDC has released the following interim recommendations for healthcare providers, health departments and the public.¹¹

Until more is known about the cause of these illnesses, physicians should be counseling patients to refrain from the use of all e-cigarette or vaping products. Adults who do not currently use tobacco products should be advised not to start using any cigarette products. Adults who used e-cigarettes containing nicotine to quit cigarette smoking should not be advised to return to smoking cigarettes. Physicians who examine patients who report e-cigarette or vaping product use within the last 90 days should ask them about any signs and symptoms of pulmonary illness.


In addition to these recommendations from the CDC, in a recent statement, American Medical Association President Dr. Patrice A. Harris wrote: "The AMA calls on physicians to make sure their patients are aware of the dangers of e-cigarettes, including toxins and carcinogens, and swiftly report any suspected cases of lung illness associated with e-cigarette use to their state or local health department. . . . We urge the U.S. Food and Drug Administration (FDA) to speed up the regulation of e-cigarettes and remove all unregulated products from the market. We also call on the FDA to immediately ban flavors, as well as marketing practices, that enhance the appeal of e-cigarette products to youth."¹²

REPORTING RECOMMENDATIONS FOR CLINICIANS

If an e-cigarette or vaping product is suspected as a possible cause for a patient's pulmonary disease, the CDC recommends collecting data that is not usually part of the medical history, such as information about the vaping substances, devices and sources used. To identify other potential cases, it is advisable to determine if the e-cigarette products were shared with another person. Also, efforts should be made to determine if any remaining product, devices and liquids are available for testing. These types of records can be helpful in determining the cause or causes of these pulmonary illnesses, and may also be helpful in anticipation of future civil litigation for wrongful injury and death. As the investigation into the lung illness outbreak continues, the CDC encourages physicians to report possible cases of e-cigarette or vaping-associated pulmonary disease that occurred within

the last 90 days to their local or state health department for further investigation.¹¹

FOR MORE INFORMATION

At this time, the recommendations and guidance for diagnosing, treating and monitoring known or suspected vaping or e-cigarette related lung injury continues to evolve on a quick and regular basis. Physicians should keep current on the changing recommendations for the treatment of these patients, including the appropriate use of antibiotics and high-dose steroids, as well as aggressive diagnostic testing, such as lung biopsy and special staining. The CDC continues to publish updated information and resources for healthcare providers on its website. The investigation is ongoing, and the CDC will continue to work in collaboration with the FDA and state and local partners to investigate cases and to update guidance, as appropriate, as new data emerge from this complex outbreak.¹³ 

Theophanis Pavlou, MD, FCCP, FAASM, is board certified in pulmonary medicine, sleep medicine, critical care and internal medicine and practices at Pulmonary Specialists of North Jersey in Englewood, New Jersey.

- 1 Centers for Disease Control and Prevention. (2019, October 10). *Outbreak of lung disease associated with e-cigarette use, or vaping*. www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html.
- 2 Mirbolouk, M., Charkhchi, P., Kianoush, S., Uddin, I., Orimoloye, O. A., Jaber, R., . . . Blaha, M. J. (2018, October 2). Prevalence and distribution of e-cigarette use among U.S. adults: Behavioral risk factor surveillance system, 2016. *Annals of Internal Medicine*, 169(7), 429–438.
- 3 Hajek, P., Phillips-Waller, A., Przulj, D., Pesola, F., Smith, K. M., Bisal, N., . . . McRobbie, H. J. (2019, February 14). A randomized trial of e-cigarettes versus nicotine-replacement therapy. *The New England Journal of Medicine*, 380, 629–637.
- 4 Alexander, H. (2018, October). Is vaping safe? *The University of Texas, MD Anderson Cancer Center*. www.mdanderson.org/publications/focused-on-health/is-vaping-safe-.h19-1592202.html.
- 5 U.S. Food and Drug Administration. (2018, November 15). *Results from 2018 National Youth Tobacco Survey show dramatic increase in e-cigarette use among youth over past year* [press release]. www.fda.gov/news-events/press-announcements/results-2018-national-youth-tobacco-survey-show-dramatic-increase-e-cigarette-use-among-youth-over.
- 6 U.S. Food and Drug Administration. (2019, September 11). *Trump administration combating epidemic of youth e-cigarette use with plan to clear market of unauthorized, non-tobacco-flavored e-cigarette products* [press release]. www.fda.gov/news-events/press-announcements/trump-administration-combating-epidemic-youth-e-cigarette-use-plan-clear-market-unauthorized-non.
- 7 Knowles, H. (2019, September 24). Massachusetts to ban sale of all vaping products for 4 months in toughest state crackdown. *The Washington Post*. www.washingtonpost.com/health/2019/09/24/massachusetts-ban-all-vaping-product-sales-months-toughest-state-crackdown.
- 8 U.S. Food and Drug Administration. (2019, September 6). *Vaping illnesses: Consumers can help protect themselves by avoiding tetrahydrocannabinol (THC)-containing vaping products*. www.fda.gov/consumers/consumer-updates/vaping-illnesses-consumers-can-help-protect-themselves-avoiding-tetrahydrocannabinol-thc-containing.
- 9 Vaughn, E. (2019, September 18). The vaping illness outbreak: What we know so far. *NPR*. www.npr.org/sections/health-shots/2019/09/18/760635457/the-vaping-illness-outbreak-what-we-know-so-far.
- 10 Steenhuisen, J. (2019, October 10). Amid vaping crisis, U.S. to issue new advice for doctors focused on lung infections. *Reuters*. www.reuters.com/article/us-health-vaping-cdc-guidance/amid-vaping-crisis-u-s-to-issue-new-advice-for-doctors-focused-on-lung-infections-idUSKBN1WP2P1.
- 11 Centers for Disease Control and Prevention. (2019, October 11). *Outbreak of lung disease associated with e-cigarette use, or vaping*. www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/healthcare-providers/index.html.
- 12 Harris, P. A. (2019, September 9). AMA urges public to avoid e-cigarette use amid lung disease outbreak. *American Medical Association*. www.ama-assn.org/press-center/ama-statements/ama-urges-public-avoid-e-cigarette-use-amid-lung-illness-outbreak.
- 13 Siegel, D. A., Jatlaoui, T.C., Koumans, E. H., Kiernan, E. A., Layer, M., Cates, J. E. . . . Koppaka, R. (2019, October 11). Update: Interim guidance for health care providers evaluating and caring for patients with suspected e-cigarette, or vaping, product use associated lung injury – United States, October 2019. *Morbidity & Mortality Weekly Report*. [http://dx.doi.org/10.15585/mmwr.mm6841e3external icon](http://dx.doi.org/10.15585/mmwr.mm6841e3external%20icon).



TO OBTAIN AMA PRA CATEGORY 1 CREDIT™, PARTICIPANTS ARE REQUIRED TO ADHERE TO THE FOLLOWING:

- 1** Review the CME information along with the learning objectives at the beginning of the CME article. Determine if these objectives match your individual learning needs. If so, read the article carefully.
- 2** Complete the post-test questions. These have been designed to provide a useful link between the CME article and your everyday practice. Read each question, choose the correct answer and record your answers on the Registration Form.
- 3** Complete the evaluation portion of the Registration and Evaluation Form. Forms and tests cannot be processed if the evaluation section is incomplete.
- 4** Complete the Registration and Evaluation Form online at: www.surveymonkey.com/r/CMEFall2019

If you cannot complete the form online, you may mail it to:
MDAdvisor CME Dept
c/o MDAdvantage Insurance Company
100 Franklin Corner Rd
Lawrenceville, NJ 08648

Or fax to: 978-244-5112
- 5** Retain a copy of your test answers. Your answer sheet will be graded, and if a passing score of **80%** or more is achieved, a CME certificate awarding *AMA PRA Category 1 Credit™* and the test answer key will be mailed to you within 4 weeks. Individuals who fail to attain a passing score will be notified and offered the opportunity to reread the article and take the test again.
- 6** Mail the Registration and Evaluation Form on or before **November 1, 2020**. Forms received after that date will not be processed.

Author: Theophanis Pavlou, MD, FCCP, FAASM, Pulmonary Specialists of North Jersey, Englewood, NJ, and Holy Name Medical Center

Accreditation Statement: HRET is accredited by the Medical Society of New Jersey to provide continuing medical education for physicians. This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Medical Society of New Jersey (MSNJ) and through the Joint Providership of **Health Research Education and Trust of New Jersey (HRET)** and MDAdvantage. HRET is accredited by the Medical Society of New Jersey to provide continuing medical education for physicians.

AMA Credit Designation Statement: HRET designates this enduring activity for 1.0 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Disclosure: The content of this activity does not relate to any product of a commercial interest as defined by the ACCME; therefore, there are no relevant financial relationships to disclose. No commercial funding has been accepted for the activity.

Deadline for Response: **November 1, 2020**
This post-test may be completed online at www.surveymonkey.com/r/CMEFall2019.

- 1** The FDA has definitively proven that the outbreak of lung disease associated with e-cigarette product use is caused by Vitamin E acetate.
 - a. True
 - b. False
- 2** Recent surveys have revealed that e-cigarette use among high schoolers has been increasing over the last year.
 - a. True
 - b. False
- 3** The CDC recommends that physicians advise adult patients who used e-cigarettes containing nicotine to quit cigarette smoking to return to smoking cigarettes instead of vaping.
 - a. True
 - b. False
- 4** The flavored e-cigarette products often used by adolescents do not contain nicotine or other potentially dangerous chemicals.
 - a. True
 - b. False
- 5** The CDC suspects that the cause of the lung disease outbreak is most likely chemical exposure.
 - a. True
 - b. False

REGISTRATION FORM

First Name	Middle Initial	Last Name	Degree
------------	----------------	-----------	--------

Address _____

City	State	ZIP	
------	-------	-----	--

Phone	Email Address	Specialty	
-------	---------------	-----------	--

ANSWER SHEET CIRCLE THE CORRECT ANSWER.

- 1) A B 2) A B 3) A B 4) A B 5) A B

Number of hours spent on this activity _____ (reading article and completing quiz)

I attest that I have read the article "Vaping: What Physicians Need to Know to Protect Their Patients" and am claiming 1 AMA PRA Category 1 Credit.™

Signature _____	Date _____
-----------------	------------

EVALUATION

- | | | | |
|--|------------------------------------|--|---------------|
| Completed by: | <input type="checkbox"/> Physician | <input type="checkbox"/> Non-Physician | |
| 1. The content of the article was: | Excellent__ | Fair__ | Good__ Poor__ |
| 2. The author's writing style was: | Excellent__ | Fair__ | Good__ Poor__ |
| 3. The graphics included in the article were: | Excellent__ | Fair__ | Good__ Poor__ |
| 4. The stated objectives of this program were: | Excellent__ | Met__ | Not met__ |

Was this article free of commercial bias? Yes No

If not, why not _____

Please share your name and contact information so that we may investigate further.

Participant Name _____ Telephone/Email: _____

5. Will the knowledge learned today affect your practice? Very Much__ Moderately__ Minimally__ None__
6. Based on your participation in the CME activity, describe ways in which you will change the way you practice medicine.
- Yes Describe _____
- No Why Not _____
- N/A Were you the wrong audience for this activity? _____
7. Did this CME Activity change what you know about:
- The health risks associated with e-cigarettes and vaping. Yes No
 - Communicating the risks and uncertainties associated with vaping use to patients. Yes No
 - The reporting recommendations for possible cases of vaping-associated pulmonary disease. Yes No
8. Based on your participation today, what barriers to the implementation of the strategies or skills taught today have you identified?

Suggested topics for future programs: _____

