Smoking and Vaping Cessation -

The Impact of Tobacco and Vaping on Asthma and Rhinitis

William S. Silvers, M.D.
Clinical Professor of Medicine
Faculty Affiliate, Center for Bioethics & Humanities
University of Colorado- Anschutz Medical Campus

ACAAI New Orleans, November 2021

Disclosures

WSS-

CSO- Canna Research Foundation

Chair, International Cannabis KAP
(knowledge/attitudes/practice) Allergists Collaboration
ACAAI, EAACI, CSACI
Do you ask your patients about:

- Cigarette/tobacco use?
- Naimi- tobacco
- E-cig/JUUL/vape use?
  - What motivated you to start?
  - What device/devices to you like?
- Cannabis/marijuana use?
  - Inhaled? Edible? Other (tinctures, dab, etc)?
  - Allergy Asthma Network Cannabis survey


The emergence of electronic cigarettes (e-cigs) has given cannabis smokers a new method of inhaling cannabinoids. E-cigs differ from traditional marijuana cigarettes in several respects. First, it is assumed that vaporizing cannabinoids at lower temperatures is safer because it produces smaller amounts of toxic substances than the hot combustion of a marijuana cigarette. Recreational cannabis users can discretely “vape” deodorized cannabis extracts with minimal annoyance to the people around them and less chance of detection. There are nevertheless several drawbacks worth mentioning; although manufacturing commercial (or homemade) cannabinoid-enriched electronic liquids (e-liquids) requires lengthy, complex processing, some are readily on the Internet despite their lack of quality control, expiry date, and conditions of preservation and, above all, any toxicological and clinical assessment. Besides these safety problems, the regulatory situation surrounding e-liquids is often unclear. More simply ground cannabis flowering heads or concentrated, oily THC extracts (such as butane honey oil or BHO) can be vaped in specially designed, pen-sized marijuana vaporizers. Analysis of a commercial e-liquid rich in cannabidiol showed that it contained a smaller dose of active ingredient than advertised; testing our laboratory-made, purified BHO, however, confirmed that it could be vaped in an e-cig to deliver a psychoactive dose of THC. The health consequences specific to vaping these cannabis preparations remain largely unknown and speculative due to the absence of comprehensive, robust scientific studies. The most significant health concerns involve the vaping of cannabinoids by children and teenagers. E-cigs could provide an alternative gateway to cannabis use for young people. Furthermore, vaping cannabinoids could lead to environmental and passive contamination.
What You Need to Know About E-Cigarettes

Below are answers to common questions about e-cigarettes, including health consequences, risks of secondhand emissions, kids and e-cigarettes and FDA oversight.

What Are E-Cigarettes?

Electronic cigarettes, or e-cigarettes, include e-pens, e-pipes, e-hookah, and e-cigarettes are known collectively as ENDS—electronic nicotine delivery systems. According to the FDA, e-cigarettes are devices that allow users to inhale an aerosol containing nicotine or other substances.

Unlike traditional cigarettes, e-cigarettes are generally battery-operated and use a heating element to heat e-liquid from a cartridge (usually refillable), releasing a chemical-filled aerosol.

What’s in E-Cigarettes?

The main component of e-cigarettes is the e-liquid contained in cartridges or tanks. To create an e-liquid, nicotine is extracted from tobacco and mixed with a base (usually propylene glycol), and may also include flavorings, colorings and other chemicals (such as formaldehyde and acrolein, which can cause irreversible lung damage).

Learn more about what’s in e-cigarettes.

Statistics about E-cigarette Use among U.S. Youth

- Among middle and high school students, 3.6 million were current users of e-cigarettes in 2020.¹
- More than 8 out of 10 current youth users of e-cigarettes use flavored e-cigarettes, with fruit, mint, candy, and menthol flavors among the most commonly used.²
- According to a 2013–2014 survey, 81 percent of current youth e-cigarette users cited the availability of appealing flavors as the primary reason for use.²
The Inhalation of Harmful Chemicals Can Cause Irreversible Lung Damage and Lung Disease

In January 2018, the National Academies of Science, Engineering and Medicine released a consensus study report that reviewed over 800 different studies.

That report made clear: using e-cigarettes causes health risks. It concluded that e-cigarettes both contain and emit a number of potentially toxic substances. The Academies’ report also states there is moderate evidence that youth who use e-cigarettes are at increased risk for cough and wheezing and an increase in asthma exacerbations.
E-cigarettes, aka JUULs and vape pens, use a battery to heat up a special liquid into an aerosol that users inhale. It’s not just harmless water vapor. The “e-juice” that fills the cartridges usually contains nicotine (which is extracted from tobacco), propylene glycol, flavorings and other chemicals. Studies have found that even e-cigarettes claiming to be nicotine-free contain trace amounts of nicotine. Additionally, when the e-liquid heats up, more toxic chemicals are formed.

Because the Food and Drug Administration (FDA) has not begun its review of any e-cigarette or its ingredients, nor has FDA issued any standards on the products, e-cigarette composition and effects vary. What researchers do know is that these toxic chemicals and metals have all been found in e-cigarettes:

- **Nicotine** – a highly addictive substance that negatively affects adolescent brain development
- **Propylene glycol** – a common additive in food; also used to make things like antifreeze, paint solvent, and artificial smoke in fog machines
- **Carcinogens** – chemicals known to cause cancer, including acetaldehyde and formaldehyde
- **Acrolein** – a herbicide primarily used to kill weeds, can cause irreversible lung damage
- **Diacetyl** – a chemical linked to a lung disease called bronchiolitis obliterans aka *popcorn lung*
- **Diethylene glycol** – a toxic chemical used in antifreeze that is linked to lung disease
- **Heavy metals** such as nickel, tin, lead
- **Cadmium** – a toxic metal found in traditional cigarettes that causes breathing problems and disease
- **Benzene** – a volatile organic compound (VOC) found in car exhaust
- **Ultrafine particles** that can be inhaled deep into the lungs

---

**The Inhalation of Harmful Chemicals Can Cause Irreversible Lung Damage and Lung Disease**

In January 2018, the National Academies of Science, Engineering and Medicine released a consensus study report that reviewed over 800 different studies.

That report made clear: using e-cigarettes causes health risks. It concluded that e-cigarettes both contain and emit a number of potentially toxic substances. The Academies’ report also states there is moderate evidence that youth who use e-cigarettes are at increased risk for cough and wheezing and an increase in asthma exacerbations.

- A study from the University of North Carolina found that the two primary ingredients found in e-cigarettes—propylene glycol and vegetable glycerin—are toxic to cells and that the more ingredients in an e-liquid, the greater the toxicity.
- E-cigarettes produce a number of dangerous chemicals including acetaldehyde, acrolein, and formaldehyde. These aldehydes can cause lung disease, as well as cardiovascular (heart) disease.
- E-cigarettes also contain acrolein, a herbicide primarily used to kill weeds. It can cause acute lung injury and COPD and may cause asthma and lung cancer.
- Both the U.S. Surgeon General and the National Academies of Science, Engineering and Medicine have warned about the risks of inhaling secondhand e-cigarette emissions, which are created when an e-cigarette user exhales the chemical cocktail created by e-cigarettes.
- In 2016, the Surgeon General concluded that secondhand emissions contain, “nicotine; ultrafine particles; flavorings such as diacetyl, a chemical linked to serious lung disease; volatile organic compounds such as benzene, which is found in car exhaust; and heavy metals, such as nickel, tin, etc.”
Detrimental Health Effects of E-Cigs

- Similar adverse effects as traditional cigs
- Plus features unique to e-cigs
  - Mediated by e-cig liquid, e.g. propylene glycol, vegetable glycerin, flavoring additives, or nicotine?

Altered epithelial cell and sputum proteomes, airway gene expression, mucus composition

Upregulated mechanisms e.g. aldehyde-detoxification and oxidative stress, suppressed host-defense genes, elevated concentrations pathologic mucins MUC5AC and elastases

MUC5AC important in pathology of asthma/COPD,
- increased airway obstruction, hyperreactivity, remodeling, tissue damage
Effects of vehicle compounds
PG/VG

- Propylene Glycol (PG) and vegetable glycerin (VG) advertised inert, but induce in vitro and invivo changes
  - Airway remodeling, increases MUC5AC, reduced membrane fluidity, impaired protein diffusion
  - Bronchoscopies in never smokers re PG/VG in absence of nicotine or flavorings, show BAL changes in inflammatory cell counts and proinflammatory cytokines, and cell viability in airway epithelial cells

Effects of Nicotine/Flavoring Additives

- Nicotine:
  - Nicotine content e-cigs 3-36 mg/mL (up to 80)
  - Macrophage activation, disrupted airway mucociliary clearance (MCC), altered mucus properties - concentration & viscosity -
    - Increasing likelihood of persistent infections/inflammation
- Flavorings
  - Diacetyl- respirator toxin
  - Cinnamaldehyde impaired ciliary beat frequency, impair neutrophil function
Health effects of e-cig use and 2nd hand exposure in Asthma

- Ongoing debate re e-cigs as effective cessation tool- “safer alternative”??
- Dual use e-cigs/smokers more dx asthma or COPD, greater breathing difficulty
- Asthmatics may be more susceptible to sensitizers/respiratory irritants
- Among never smokers, increased use/asthma sx’s/dx.

- 2nd hand exposure e-cigs to asthma being evaluated.
  - May be similar to tobacco smoke exposure.

Both the U.S. Surgeon General and the National Academies of Science, Engineering and Medicine have warned about the risks of inhaling secondhand e-cigarette emissions, which are created when an e-cigarette user exhales the chemical cocktail created by e-cigarettes.

In 2016, the Surgeon General concluded that secondhand emissions contain, "nicotine; ultrafine particles; flavorings such as diacetyl, a chemical linked to serious lung disease; volatile organic compounds such as benzene, which is found in car exhaust; and heavy metals, such as nickel, tin, and lead."

The Food and Drug Administration has not found any e-cigarette to be safe and effective in helping smokers quit. If smokers are ready to quit smoking for good, they should call 1-800-QUIT NOW or talk with their doctor about finding the best way to quit using proven methods and FDA-approved treatments and counseling.
Health effects of vaping THC products

- Prefilled cartridges of cannabinoid concentrate loaded into e-cig devices. Combo's w/ flavors, scents
  - 30-70% vapers use THC cartridges - legal +/-
    - immediately psychoactive
  - THC, BHO (Butane Hash Oil) inhaled assoc / organizing pneumonia, pneumonitis respectively
  - Additives e.g. diacetyl pentanediol, acetoin assoc w/ bronchiolitis obliterans
  - Short and long term effects incompletely understood.
  - Pesticides- mostly illegal production, may be carcinogenic
STUDY FINDS PERILOUS MOLD IN COLORADO POT-GROWING OPERATIONS
DENVER POST, 2012

• Police and other first responders may be exposed during busts of illegal marijuana-growing operations to dangerous levels of mold that could lead to potentially deadly respiratory diseases, researchers said Monday.

• A team working with National Jewish Health researcher Dr. John Martyny reviewed conditions in 30 marijuana-growing operations in Denver, Littleton and Larimer County and found mold levels at times 100 times higher than considered safe and in a few cases so high that their instruments could not read the levels.

EVALI- E-cig and vaping associated lung injury

• EVALI-
  • By Feb 2020, 2800 cases, 68 deaths, all 50 states
  • Lipoid pneumonia/ chemical pneumonitis

• Vitamin E Acetate, thickening agent
  • Used in “black market” THC vapes, not commercially sold

• Emphasizes increased need for regulations for devices/flavorings
Active smoking effect in allergic rhinitis

Background: Tobacco smoke has been described as causing increased prevalence of rhinitis symptoms and decreased atopy. Furthermore, these nasal symptoms and quality of life in smokers with Allergic Rhinitis (AR) were not significantly different to non-smokers. As a result of this duality, a comparison study between the quality of life and inflammatory markers of atopy among active smokers and non-smokers having AR was put forward.

Material and methods: Cross-sectional study in adult smokers and non-smokers, with a clinical diagnosis of AR and positive Skin Prick Test (SPT). Smoking status was confirmed by olfactory culture measurements. Functional respiratory evaluation was performed, and quality of life between groups was compared using the SNOT-20 questionnaire. Immunological markers in serum and nasal washes (IL-4, IL-5, IL-10, IL-13, IL-17, and IFN-γ) were evaluated. Data from a third group of passive smokers were also evaluated. The statistical analysis included Student’s t-test, Mann-Whitney U (ANOVA 2-way), and Kruskal-Wallis for 3 groups analysis. Values of P < 0.05 were considered significant.

Results: Twenty-two patients per group with similar demographics and allergen sensitivity were studied. Regarding inflammatory markers, a reduction in IL-33 in the serum of smokers (P = 0.0236) was the only statistically significant different parameter revealed, showing a remarkable trend in nasal IL-33 levels in smoker and non-smoker allergic rhinitis vs controls

Anova Kruskal Wallis p = 0.0006
Effect of smoking on symptoms of allergic rhinitis

Philippe J Bousquet 1, Claire Copet, Jean Michel Klossek, Bachar Alhal, Françoise Neukirch, Jean Bousquet

Affiliations + expand
PMID: 19768015  DOI: 10.1016/S1081-1206(10)60181-0

Abstract

Background: Tobacco smoking is common in patients with allergic rhinitis.

Objective: To examine the impact of smoking on allergic rhinitis.

Methods: Two cross-sectional studies (performed between March 1, 2002, and February 28, 2003) assessed the impact of tobacco smoking on the symptoms and quality of life of untreated patients with diagnosed allergic rhinitis who had consulted with primary care physicians (472 patients) and specialists (672 patients). Both studies used the same methods and were combined. Rhinitis was classified according to the Allergic Rhinitis and its Impact on Asthma initiative. The European Community Respiratory Health Survey questionnaire on smoking and the disease-specific Rhinconjunctivitis Quality of Life Questionnaire (RQLQ) were used.

Results: A total of 20.8% of the patients were smokers and 10.9% were ex-smokers. More than 79% of the patients had moderate to severe symptoms of rhinitis. Fewer patients had moderate to severe nasal pruritus or loss of smell. There appeared to be no significant difference in the severity of nasal symptoms, depending on the smoking status. Moderate to severe nasal obstruction was observed in 78.8% of the nonsmokers, 79.0% of the smokers, and 77.4% of the ex-smokers. Overall and individual

Influence of cigarette smoking on allergic rhinitis: a comparative study on smokers and non-smokers

Calogero Grillo 1, Ignazio La Marzia, Caterina M Grillo, Giorgio Ciprandi, Marina Ragusa, Claudio Andaloro

Affiliations + expand
PMID: 31292427  PMCID: PMC6776172  DOI: 10.23750/abm.v007.s.8658

Free PMC article

Abstract

It has been described that exposure to tobacco smoke causes worsening of allergic rhinitis symptoms. Otherwise, some studies have demonstrated a negative association between cigarette smoke and allergic rhinitis (AR). Given this inconsistency, this study evaluated the quality of life and immuno-inflammatory parameters in current smokers and nonsmokers suffering from AR. A comparative cross-sectional study was conducted in patients who presented symptoms of AR. Patients were categorized into two groups: current smokers and non-smokers based on salivary cotinine measurements. Primary outcomes were the levels of immuno-inflammatory biomarkers (IFN-γ, IL-4, IL-5, IL-13, IL-17, and IL-33) in serum and nasal lavage and the quality of life assessed by the Mini Rhinconjunctivitis Quality of Life Questionnaire (MiniRQLQ). Secondary outcomes included salivary cotinine levels, and pulmonary function parameters, such as forced vital capacity (FVC), forced expiratory volume in 1 s (FEV1), and FEV1/FVC ratio. Twenty-two patients per group were included in the analysis, with no significant difference regarding demographic characteristics. Statistically significant higher values in salivary cotinine levels (p<0.001) and lower lung function FEV1 (p=0.044) and FEV1/FVC (p=0.047) were found in smokers than in nonsmokers. Only serum IL-33 was significantly different in the 2 groups (p=0.001); smokers had higher values compared to non-smokers. There were no significant differences in
Hypothesis: may e-cigarette smoking boost the allergic epidemic?

Jean Bouzouit, Tim Bachtold, Derek Bachtold, Laura Croby, Alexandre, and Frank T. Leona

Background

IgE-associated allergic diseases represent a global health problem increasing in prevalence and severity. An epidemic of IgE-associated allergic diseases has occurred over the past decades globally [1, 2] and many factors driving this epidemic are not clear. The most common diseases (asthma, rhinitis and eczema) are linked, at least partly, to IgE immune response. These diseases are complex multifactorial disorders, with both genetic and environmental components. Reasons explaining the allergy epidemic are not clear. Many inhabitants such as air pollution and diesel exhaust particulates are associated with a modulation of the IgE response [1]. On the other hand, tobacco smoking has a minimal effect on the increased prevalence or severity of allergic rhinitis [1].

Any new inhaled compound should be considered a potential adjuvant of the IgE immune response or non-allergic mechanisms leading to a boost in the allergy epidemic. E-cigarettes are largely used to replace smoking, but their effects on the development of allergy are not well understood. A better understanding of their potential effects on the allergic immune system is needed.

The Rise of E-Cigarette Use in Youth: How the Vaping Industry has Hooked the Youngest Customers

January 20, 2021

Ashley Brooks-Russell, PhD, MPH and Adam Leventhal, PhD
...another step toward marijuana becoming a normal part of the drug cabinet...

...Teva inks trailblazing cannabis pact with Israel's Syqe Medical...
Smoking and Vaping Cessation
The Role of the Allergist

Kevin R. Murphy, M.D.
Boys Town National Research Hospital
Director of Clinical Research

Clinical Professor
Department of Pediatrics
University of Nebraska Medical Center

Conflict of Interest

Kevin Murphy, M.D. has listed the following financial interest/arrangement or affiliations:

<table>
<thead>
<tr>
<th>Commercial Interest</th>
<th>Consultant/Advisory Board</th>
<th>Speaker</th>
<th>Honorarium</th>
<th>Research Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td>AstraZeneca</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sanofi</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Genentech</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Novartis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>TEVA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>GlaxoSmithKline</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Smoking and Vaping Cessation
The Role of the Allergist

Objectives
• Recognize the alarming increased e-cigarette use
• Understand that combustible and electronic cigarettes deliver other harmful chemicals
• Review what cessation methods are available
• Discussion as a shared decision-making conversation

Question
Over the past two years, do you think e-cigarette use among teens has grown by:

A. 50%
B. 75%
C. 100%
D. 135%
E-cigarette Use in Teens

- **135% increase** in the use of e-cigarettes in the last 2 years
- 8,000 kids start vaping every day

- Teens using e-cigarettes:  
  - 4X more likely to use combustible cigarettes  
  - 3X more likely to become frequent smokers

---

Current Tobacco Use Among U.S. High School Students

Dashed lines represent change in the mode of survey administration
E-Cigarette History

- The modern e-cigarette came to the U.S. in 2006. Since then, the range of products has grown to:
  - Almost 470 brands
  - Over 500 different types of devices
  - More than 15,500 different flavors of e-cigarette juice

- In 2009 President Obama signed into law the Family Smoking Prevention and Tobacco Control Act, giving the FDA the power to regulate the tobacco industry

- September 2021, the FDA has ruled on whether some electronic cigarette products can remain on the market, however delayed action on products made by JULL

How Did E-Cigarette Use Become so Widespread?

- Delay in government oversight

- Invention of the discreet and easy to hide pod model e-cigarettes

- The most popular product (JUUL) with 49% of the market, is easy to hide as it resembles a flash drive

- The JUUL company and marking strategies have resulted in the spike in e-cigarette use among youth
How an E-cigarette Works

• E-cigarette invented by Chinese pharmacist Hon Lik in 2003

• A battery powered device that heats a metal coil.

• The heated metal coil converts liquid nicotine into a mist or vapor

• The “vapor” is inhaled by the user

E-Cigarette Devices

• FIRST GENERATION devices looked like cigarettes and had only three ingredients: propylene glycol, nicotine, and water

• SECOND GENERATION devices looked more like pens, held larger amounts of liquid, introduced flavors

• THIRD GENERATION systems were more diverse, using square and rectangular shapes and were more customizable. That's why they're often referred to as “mods”
E-Cigarette Devices

FOURTH GENERATION

• Pod systems are the most popular among teens

• Smaller, easy-to-hide devices that often don’t look like e-cigarettes

• Some devices use single use pods while others can be refilled

• Newest devices are disposable and come in a variety of flavors

POD SYSTEM

• Use nicotine salts rather than the freebase nicotine

• Nicotine salts, have a lower pH than free base nicotine:
  – Allowing particularly high levels of nicotine to be inhaled
  – With less irritation to the throat than freebase nicotine
  – Contributes to more frequent use, increasing potential for addiction.
Do You See a Vaping Device

Answer: All Vaping Devices
What is in E-Cigarette Aerosol

E-Cigarette Chemicals

- Propylene glycol → Antifreeze
- Acetone → Nail Polish Remover
- Ethylbenzene → Paints, Pesticides
- Formaldehyde → Embalming
- Nicotine → Cigarettes
- Rubidium → Fireworks
Smoking and Vaping Cessation
A Shared Decision-Making Conversation

Asking the Right Questions
• The Public Health Service “5As” model provides a model for screening and counseling patients

The 5 A’s Model
• Ask
• Advise
• Assess
• Assist
• Arrange Follow up

Steps to Intervention: Ask
Measuring Nicotine Dependence

• When assessing a patient’s readiness to quit, it can be helpful to show the patient that they are addicted to nicotine
• Allergists have available tools to assess the level of dependence on nicotine
• Options:
  – Hooked on Nicotine Checklist (tailored for e-cigarettes or traditional tobacco products )
  – E-Cigarette Dependence Scale
  – CAGE Questionnaire
  – Fagerstrom Test for Nicotine Dependence
CAGE Questionnaire

- A simple accurate tool to screen patients for addictive disorders
- The CAGE questions have been revised to apply to smoking behavior
- Scoring:
  - Two “yes” responses, constitute a positive screening test
    1. Have you ever felt a need to Cut down or control your smoking, but had difficulty doing so?
    2. Do you ever get Annoyed or angry with people who criticize your smoking or tell you that you ought to quit smoking?
    3. Have you ever felt Guilty about your smoking or about something you did while smoking?
    4. Do you ever smoke within half an hour of waking up (Eye-opener)?


HONC Questions

- A measure to determine a patient’s level of dependence on nicotine
- Scoring:
  - Total number of “yes” responses, from 10 questions
  - Any score greater than zero indicates the user has lost some degree of autonomy over the use of e-cigarettes, and nicotine addiction has begun
    1. Have you ever tried to quit, but couldn’t?
    2. Do you smoke/vape now because it is really hard to quit?
    3. Have you ever felt like you were addicted to tobacco?
    4. Do you have strong cravings to smoke/vape?
    5. Have you ever felt like you really needed to smoke/vape?
    6. Is it hard to keep from smoking/vaping in places where you are not supposed to?
    When you tried to stop smoking/vaping:
      1. Did you find it hard to concentrate because you couldn’t smoke/vape?
      2. Did you feel more irritable because you couldn’t smoke/vape?
      3. Did you feel a strong need or urge to smoke/vape?
      4. Did you feel nervous or anxious because you couldn’t smoke/vape?

E-Cigarette Dependence Scale

Instructions: Please respond to each question marking one box per row.

<table>
<thead>
<tr>
<th>Question</th>
<th>Never (0)</th>
<th>Rarely (1)</th>
<th>Sometimes (2)</th>
<th>Often (3)</th>
<th>Almost Always (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find myself reaching for my e-cigarette without thinking about it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I drop everything to go out and get e-cigarettes or e-juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I vape more before going into a situation where vaping is not allowed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I haven't been able to vape for a few hours, the craving gets intolerable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scoring: Higher score indicates more dependence on nicotine


Steps to Intervention: Advise

- Allergists should counsel adolescents about smoking/e-cigarette use
- Provide clear, personalized guidance about the negative health impacts of smoking/e-cigarette use
- Messages that may resonate include:
  - Impact of smoking/vaping on breathing and athletic performance
  - Expense of cigarette products
  - Tobacco Industry’s history, of deceitful marketing practices to attract teen users
  - Reasons for not using combustible cigarettes and linking that to e-cigarette use
Advise: What to Say

- **Be Clear**: Tell your patient that you're worried about them
  - “I’m really concerned about you, and I strongly advise you to quit.”

- **Be Specific**: Emphasize the health effects
  - "Your brain is still developing, which means you can get addicted to nicotine faster and more easily than an adult would. I don't want you to become dependent."
  - "Scientists are still learning about the long-term health impacts of e-cigarettes. But we already know that some of the ingredients in e-cigarettes can be harmful to your lungs."

Steps to Intervention: Assess

- Assess patient's loss of autonomy to nicotine addiction

- Talk with your patient to determine whether they are interested in quitting

- Strategies for a productive discussion
  - Ask for permission:
    - May I make a suggestion?“
    - Offer help, not “rules”
  - Elicit ideas from the patient
  - Offer alternatives or preparatory steps
  - Help set patients own goals for behavior change
When a Patient is Not Ready to Quit

- Users may not always be ready to make a quit attempt

- For patients that are not ready, discuss the Rs":
  - Relevance of quitting
  - Risks of not quitting
  - Rewards related to quitting
  - Roadblocks that may arise
  - Repetition: it may take several attempts to succeed

Offer encouragement, and assure the patient that you are here to help when they decide they're ready to quit

Steps to Intervention: Assist & Follow Up

- Allergists can help prepare their patients for a successful quit attempt

- Allergists should assist with a multi-layer approach:
  1. Setting a Quit Date
  2. Planning for Success
  3. Anticipating Challenges
  4. Utilizing Behavioral/Pharmacological Support
  5. Arrange follow up
Develop a Plan for Success

• Prepare to quit completely:
  – Stop use of all vaping and tobacco products
  – Throw away vaping devices and e-liquid

• Support strategies:
  – Identify friends and family that can help your patients stay on track
  – Consider support strategies such as healthy eating, exercise, mindfulness, or meditation
  – Arranging follow up

• Pharmaceuticals for cessation:
  – OTC nicotine replacement therapy (patch, gum, lozenge)
  – Prescription medications (inhaler, nasal spray, Varenicline, Bupropion)

Summary

• One in four adolescents use e-cigarettes, with 8,000 kids start vaping every day

• E-cigarettes are addictive and adolescents using e-cigarettes are four times more likely to use combustible cigarettes

• Combustible and electronic cigarettes deliver harmful chemicals

• Allergists should address smoking/e-cigarettes use in clinical practice and offer cessation
  – Ask the right questions using the Public Health Service “5As” model
  – Counseling + Medications together gives a better chance of quitting for good
  – Develop a shared decision-making conversation
Outline

• Important clinical history
• Pharmaceutical options
  – Nicotine Replacement Therapy
  – Varenicline
  – Bupropion
• Electronic Cigarettes considerations
• Billing and Coding
Important Patient History

- Age of onset
- Types of products used
- Patterns of use
  - Amount of use
  - Timing
- Previous quit attempts
- Comorbid conditions
- Desire to quit smoking/Plan to quit

Addictive Effects of Nicotine

Clinical Pharmacology of Nicotine: Implications for Understanding, Preventing, and Treating Tobacco Addiction

- Dopamine → Pleasure, appetite suppression
- Norepinephrine → Arousal, appetite suppression
- Acetylcholine → Arousal, cognitive enhancement
- Glutamate → Learning, memory enhancement
- Serotonin → Mood modulation, appetite suppression
- β-endorphin → Reduction of anxiety and tension
- GABA → Reduction of anxiety and tension
Nicotine Replacement Therapy

- Relieve nicotine withdrawal symptoms
- Appropriate dosing important
- Double the quit rates
- Transdermal Patch
- Gum
- Lozenge
- Nasal Spray (Rx only)
- Inhaler (Rx only)

Nicotine Transdermal Patch

- Dosing:
  - Three strengths (7 mg, 14 mg, 21 mg).
  - >10 cigarettes per day - 21 mg
  - <9 cigarettes a day - 14 mg
- Taper dose over time
- Put the patch on clean, dry, hair-free skin on the upper body.
- Rotate placement to decrease irritation.

How to use Nicotine Patch, CDC: https://www.cdc.gov/tobacco/campaign/tips/quit-smoking/quit-smoking-medications/how-to-use-quit-smoking-medicines/how-to-use-a-nicotine-patch.html
Nicotine Gum

- Ad lib use
- Dosing: 2 mg, 4 mg
  - ≥25 Cigarettes per day - 4 mg dose of gum
  - <25 Cigarettes per day - 2 mg dose of gum
  - Up to 24 pieces of gum per day for six weeks
  - Gradually reduce over the next six weeks
- Chew and Park
- Difficult to use with poor dentition/TMJ

Nicotine Lozenge

- Ad lib use
- Dosing: 2 mg, 4 mg
  - If smoke initiation w/in 30 mins of awakening, 4 mg
  - If smoke initiation after 30 mins of awakening, 2 mg
- Taper dosing
  - Weeks 1 to 6 - every 1 to 2 hours (>9 per day)
  - Weeks 7 to 9 - every 2 to 4 hours
  - Weeks 10 to 12 - every 4 to 8 hours
- Do not chew or swallow
- Move side to side
- Better for poor dentition/TMJ
Nicotine Inhalers (Rx only)

- Ad lib use
- Produces 1/3rd plasma nicotine levels compared to smoking
- Mouth and throat irritation
- May cause bronchospasm; use with caution in patients with reactive airway disease
- Use 6 to 16 cartridges per day for the first 6 to 12 weeks
- Gradually reduce dose over the next 6 to 12 weeks

Nicotine Nasal Spray (Rx only)

- One to Two sprays per hour
- Use for ~3 months
- Max dosing: 10 sprays per hour;
- 80 sprays per day
- Peak nicotine level within 10 mins (faster than oral absorption)
- ADE- nasal irritation, rhinitis, sneezing, tearing
Nicotine replacement kinetics

Cipolla D, Gonda I. Inhaled Nicotine Replacement. AJPS. 2015 10(6) 472-480.

Clinical Pharmacology of Nicotine: Implications for Understanding, Preventing, and Treating Tobacco Addiction

Varenicline

• Partial agonist $\alpha_4\beta_2$ nicotinic acetylcholine receptor
  – Mediates addictive effects/Withdrawal symptoms
  – Competitive antagonist (block effect of nicotine)
• Most effective single agent
• ADEs- Nausea (titrate up; with food/water), sleep disorders (abnormal dreams, insomnia; reduce/skip evening dose)
• No increased risks of neuropsychiatric effects (previously reported/FDA warning); pts should contact provider with any new symptoms
• Dose reduction in renal insufficiency

Varenicline

• Initiate 1 week prior to quit attempt
• Titrate up:
  – 0.5 mg daily for 3 days
  – 0.5 mg BID for 4 days
  – 1 mg daily for 12 weeks
• Extend for upto 24 weeks to prevent relapse
Bupropion

- Enhances CNS noradrenergic and dopaminergic release
- Less effective than Varenicline or combo NRT
- ADEs: insomnia, agitation, dry mouth, and headache
- Contraindicated in pts with seizure disorder or predisposition of seizures
- No increased risks of neuropsychiatric effects (previously reported/FDA warning)
- Can temporarily help avoid post cessation weight gain

Bupropion

- Initiate 1 week prior to quit attempt
- Titrate up:
  - 150 mg daily for 3 days
  - 150 mg BID for 12 weeks
- Extend for up to 24 weeks to prevent relapse
Billing for smoking cessation

- Cessation Services are billable*
- Considered preventative service
- Medicare requirements
  - 2 cessation attempts are covered in 12 month period
  - Each attempt - max of 4 counseling sessions (total of 8 per year)
- Qualifying criteria
  - Competent and alert patient
  - Provided by MD or other Medicare recognized HCP


Billing for smoking cessation

- Coding/Documentation Requirements
  - Diagnosis (ICD-10)
    - F17 codes- Dependent on tobacco
    - Z codes- NOT Dependent on tobacco
    - T65 codes- Toxic effects (not used with F17 codes)
  - Services Provided (CPT)
    - 99406- Intermediate counseling (>3 mins- 10 mins)
    - 99407- Intensive counseling (>10 mins)

Billing for smoking cessation

• Documentation
  – Include treatment plan for each diagnosis
  – Use linking terms (“due to” or “secondary to”)
  – Key components
    • Current and historical consideration
    • Document “counseling” activities (not E/M)
    • Time

Summary

• Ask about smoking status and engage
• Cessation is not one size fits all
  – Tailor based on preference, history, etc.
• Knowledge about stop smoking medication will empower provider and patient
• You can bill for cessation efforts