

# Darth Vader

The Vaping Health Crisis and the Future of Vaping

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## Disclaimer

No financial disclosures.



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## Objectives

- Review basics of vaping
- Epidemiology and background of vaping
- Review the rise of vaping and evolution into the vaping epidemic
- E-Cigarette or Vaping Product use Associated Lung Injury (EVALI)
- Implications of vaping in the times of COVID-19
- Review current recommendations for vaping



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## Terminology

- Combustible Cigarettes: traditional cigarettes
- Electronic-cigarettes: handheld devices that produce an aerosol from a solution typically containing nicotine, flavoring chemicals and other additives for inhalation through a mouthpiece
  - E-cigarettes, e-cigs, vapes, vape pens, mods, tanks, pod systems
  - For the purposes of this presentation, these terms will be used interchangeably but generally referred to as "vaping"
- E-Cigarette or Vaping Product use Associated Lung Injury (EVALI)<sup>1</sup>



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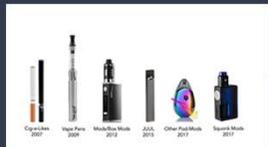
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## Vaping

The process of inhaling an aerosol that is created by heating a liquid or wax containing various substances, such as nicotine, cannabinoids, flavoring and additives.<sup>1</sup>





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Nicotine content is unregulated and unreliable based on packaging

- Range from 0 to 36mg/ml
- For comparison, conventional cigarettes range from 7.5mg to 13.5mg per cigarette.
- Release is further dependent upon concentration, experience of user, length of puff, frequency of puffs, device characteristics.<sup>2</sup>



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### The Epidemiology of Vaping

- First came to US/European markets around 2006 as disposable e-cigarettes
- Predominantly used by youth.
  - In 2019, more than 5 million middle and high school students vaped in past 30 days. This included 10.5% of middle school students and 27.5% of high school students.
  - highest rates among boys, non-hispanic white youth and hispanic youth. <sup>2</sup>
- In a 2019 national survey, 36.9% of adults were current regular cigarette smokers, 39.5% were former regular cigarette smokers and 23.6% have never regularly smoked. In contrast, in those 18-24 years old, 56% have never regularly smoked. <sup>3</sup>



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### Youth Use

In 2019, for the 6th year in a row, e-cigarettes were the most commonly used tobacco product among youth

- Decreasing combustible tobacco use in youth
- Increasing e-cigarette use in youth
- Odds of subsequent cigarette smoking **quadrupled** among e-cigarette users. <sup>4</sup>
  - E-cigarette use may be perpetuating and worsening tobacco use epidemic
    - Attracting low-risk youth who otherwise would not have started smoking



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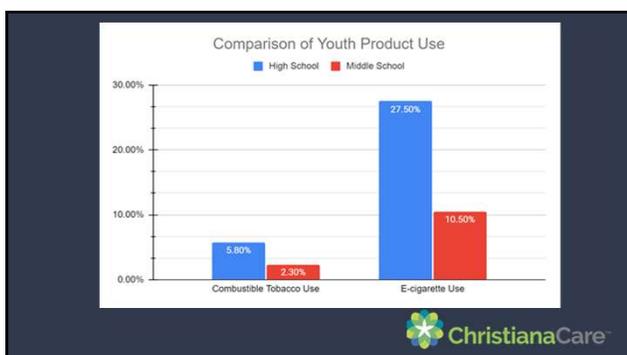
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**Youth**

2019 Youth Tobacco Survey

- E-cigarettes perceived to be less harmful than combustible cigarettes
- Reasons for use:
  - + Friends/family
  - Flavors
    - 68.8% of youth e-cigarette users reported using flavored products in 2019. <sup>4</sup>

2019 Monitoring the Future Survey

- Past-month use of marijuana-based products among 12th graders nearly doubled
  - 14% from 7.5% - second largest one-year jump ever tracked. <sup>4</sup>
- THC-containing products associated with EVALI



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**Role of E-Cigarettes in Smoking Cessation**

Currently 7 FDA-approved medications for addiction involving nicotine

- E-cigarettes are not one of them

Some public health experts have promoted e-cigarettes as harm-reduction or smoking cessation tool. <sup>4</sup>

Public officials in the UK have taken unequivocal positive stance on e-cigarettes

- National Health Service has authorized retail vape stores on hospital premises
- Some e-cigarette devices licensed as medicine



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**E-cigarette or Vaping Associated Lung Injury (EVALI) Outbreak**

E-cigarette or Vaping Associated Lung Injury (EVALI)

- First case recognized was in summer of 2019
  - Sharp rise in ED cases in August 2019
  - Peak in September 2019
  - Gradual, persistent decline since then. <sup>5</sup>
- Findings:
  - THC-containing products linked to most EVALI cases
  - Vitamin E acetate strongly linked to EVALI outbreak
  - Lung and heart disease also linked to EVALI deaths



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# EVALI

- As of November 26, 2019, CDC asked hospitals to only report hospitalized EVALI cases
- 2807 cases of EVALI reported to CDC as of February 18, 2020
  - 68 deaths confirmed
  - 68% male
  - 76% <35 years old
  - Approximately 30% underlying asthma
- Multifactorial cause of decline
  - Increased public awareness of risk
  - Removal of Vitamin E acetate from products
- Incidence has not decreased to rates prior to June 2019. <sup>5</sup>



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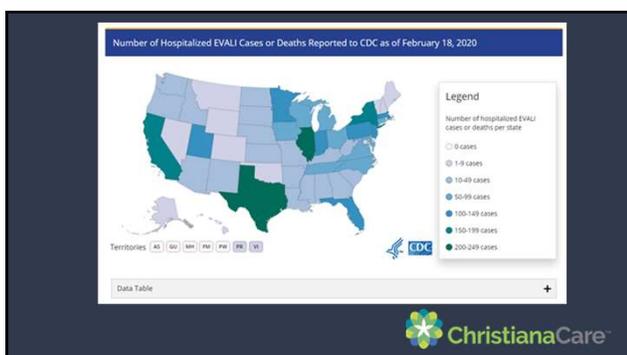
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**EVALI during COVID-19**

Cases fell after September 2019 peak but did not disappear

- By mid-December 2019, EVALI had hospitalized 2500 people and killed 54.<sup>5</sup>
- Then the first case of novel coronavirus was reported in Wuhan a few weeks later
- When first deaths from COVID-19 were being reported in the US, 68 people had died from EVALI.<sup>6</sup>
- More than half of patients hospitalized for EVALI were <25 years old
- Morbidity and mortality for COVID-19 is higher for older adults



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**EVALI during COVID-19**

Overlap of symptoms

- EVALI: fever, vomiting, chills, respiratory symptoms, SOB, cough, chest pain, hypoxia
- Radiologic features also similar
  - Nonspecific ground glass opacities, interstitial prominence
- EVALI is diagnosis of exclusion
- BAL to test for vitamin E to distinguish between the two has been proposed



17

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**EVALI during COVID-19**

Identification of MIS-C has also made diagnosis more challenging

- At least 18% of MIS-C cases present with SOB and respiratory sx's also seen in EVALI
  - Overlap in vape use, exposure to COVID-19 exposure makes distinguishing between diagnoses even more difficult
  - MIS-C seen more often in younger children but has been reported in older children and adolescents.<sup>7</sup>



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**EVALI during COVID-19**

Impact of vaping on COVID-19 has not been widely studied

- Online survey involving 4351 teens and young adults suggested strong link
  - Compared to never-users, ever-users of e-cigarettes were 5 times more likely to be diagnosed with COVID-19
  - Dual e-cigarette and combustible cigarette users were 7 times more likely to be diagnosed with COVID-19. <sup>7</sup>

Why?

- E-cigarettes can damage lung tissue
- Possible compromise of immune system
- Increased exposure risk - smoking without mask on, sharing products, aerosol from vaping transporting virus



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**American Society of Addiction Medicine**

Background

- Over 480,000 people die each year from cigarette smoking
- Smoking cigarettes kills over time 50% of the people who use them
- Over 7,000 chemicals in smoke from tobacco
  - Over 70 are carcinogenic to humans
- \$300 billion per year in healthcare costs and lost productivity due to illness and death. <sup>4</sup>



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**E-cigarette Role in Addiction Medicine**

- E-cigarette aerosol contains fewer carcinogens in lower levels than combustible tobacco
  - Users are still exposed to ultrafine particles and other toxicants that increase risk of CV and lung disease
- Exposure to nicotine and toxicants depends on the delivery system and user
- Potential for harm/benefit on public health depends on:
  - Effect of e-cigarette use on later initiation of combustible cigarettes
  - Continued e-cigarette use by youth
  - Potential to facilitate cessation of combustible tobacco use by adults
  - Long-term harm of e-cigarette use



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Public Policy Statement on E-Cigarettes

1. That all substances and behaviors involved with addiction, including nicotine, be included in the medical care plan of treatment in all treatment settings.
2. That the FDA accelerate and intensify the regulation of e-cigarettes and e-fluids as tobacco products including ingredients and delivery systems to include specified nicotine concentration and standardized manufacturing techniques.
3. That the FDA's enforcement of the 21-year-old minimum age for purchase of e-cigarettes be closely monitored to ensure compliance. Advertising campaigns discouraging e-cigarette use by youth should be disseminated to complement the FDA's efforts to enforce this age requirement.
4. That taxes be applied to e-cigarettes comparable to other tobacco products. Tax revenue obtained from these sources should be earmarked for public health prevention and treatment efforts.
5. That e-cigarette flavors be prohibited unless a flavor has been demonstrated to help current tobacco users to stop smoking, will not lead non-tobacco users to start, and does not increase risk of harm from using the product.
6. That the FDA create specific rules to continuously monitor and limit marketing tactics, particularly those that target children and young people, including flavors and cartoon themes, etc.
7. That the use of e-cigarettes be prohibited in places defined by statute or regulation as tobacco-free environments.
8. That there be continued and increased research into the long-term potential for harms from the use of e-cigarettes and the component parts of their delivery system.
9. That research be expanded and accelerated on the potential for e-cigarettes, in particular for those who have not been able to quit or not interested in quitting, to be used as a potential tool in the treatment for nicotine/tobacco use and especially addiction involving nicotine, or as a component of a comprehensive harm reduction strategy.<sup>4</sup>



22

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### AAP Public Policy Statement (2019)

Public Policy Recommendations

- I. Reduce youth access to e-cigarettes.
  - a. The FDA should act immediately to regulate e-cigarettes similar to how traditional cigarettes are regulated to protect public health.
  - b. Ban the sale of e-cigarettes to children and youth younger than 21 years.
  - c. Ban internet sales of e-cigarettes and e-cigarette solution.
- II. Reduce youth demand for e-cigarettes.
  - a. Ban all characterizing flavors, including menthol, in e-cigarettes.
  - b. Ban all e-cigarette product advertising and promotion in forms that are accessible to children and youth.
  - c. Tax e-cigarettes at comparable rates to those of conventional cigarettes.
- III. Incorporate e-cigarettes into current tobacco-free laws and ordinances where children and adolescents live, learn, play, work, and visit.<sup>4</sup>



23

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### USPSTF Recommendations (updated 2021)

- Primary care clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use among school-age children and adolescents (Grade: B).<sup>9</sup>
- Insufficient evidence to recommend vaping as tobacco cessation method (Grade: I).<sup>10</sup>



24

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### Evolving US Regulatory Landscape

**2009**: Tobacco Control Act gives the FDA immediate authority to regulate the manufacturing, marketing and sale of cigarettes, cigarette tobacco, smokeless tobacco and roll-your-own tobacco.

**2016**: FDA issued a final "deeming rule" extending its authority to all tobacco products, including e-cigarettes, cigars and hookah.

**2017**: FDA postponed the PMTA deadline until August 2022 in a new Compliance Policy, challenged in court by public health organizations and physician groups, and eventually vacated by a U.S. District Court in May 2019.

**2019**: Congress raised the federal minimum age to purchase any tobacco products including e-cigarettes to 21. This is now federal law enforced by the FDA.

**2020**: January 2020 FDA issues policy prioritizing enforcement action against unauthorized flavored cartridge-based e-cigarettes.

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### Looking to the Future - Public Health Concerns

- Renormalization of Smoking Behavior
- Health Effects of Vaping
  - Limited data on human health effects
  - Thought to be safer than conventional cigarettes, but still not safe
  - Known harmful effects of nicotine
  - Unknown health effects with additional COVID risk (EVALI)
- Injury/Harm
  - Fires/Explosions from batteries
  - Nicotine poisoning, <sup>8</sup>
- Role in Smoking Cessation

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26

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