

Vaping: Yes, Your Kid Knows Someone Who's Doing it.

And Yes, Everyone is doing it.

Jade Tam-Williams, MD
Pediatric Pulmonary Medicine
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KAAP Progress in Pediatrics



1

Disclosures

• I have the following to disclose:

Speakers Bureau - None

Consultant - None

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Boehringer-Ingelheim

Stock - None



2

Objectives

- Review how we got here.
- Review Pulmonary complications with e-cigarettes/vapes
- Dealing E-cigarette/ Vaping in the clinic
- Discuss Nicotine Addiction & Options for treatment
- Review Resources available



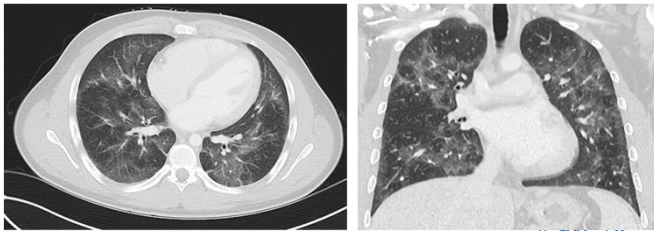
Case 1

15-year-old young man arrives in ER in respiratory distress. Mother reports no significant past medical history. Exam is concerning for SpO2 85% on room air, cough, retractions and wheezing. He is started on continuous albuterol through BiPAP in PICU and has some improvement. Due to persistent dyspnea, Pulmonology is consulted. A chest CT scan is recommended.



4

Case 1 Chest CT



5

Case 2

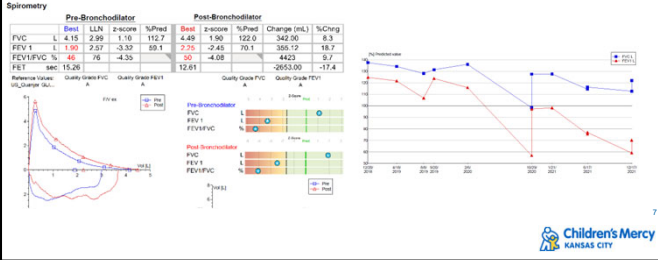
15-year-old young man with a history of multiple allergies, severe asthma, ADHD, ODD followed in severe asthma clinic. Med: Advair 230, Nucala monthly, Zyrtec, Flonase.

Over the past year, mother reports child has moving in & out her home to live with grandmother due to disagreements. He admits to poor adherence with medications including his ADHD medications. Denies any daily respiratory issues though mother disagrees reporting weight loss, decreased tolerance of activities of daily living, and increased cough. PFT trend is as shown.



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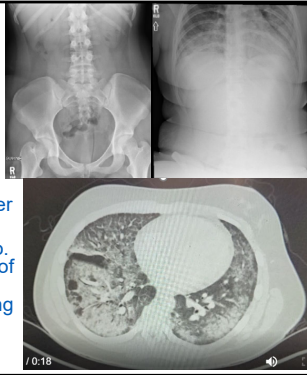
Case 2 Spirometry Trends



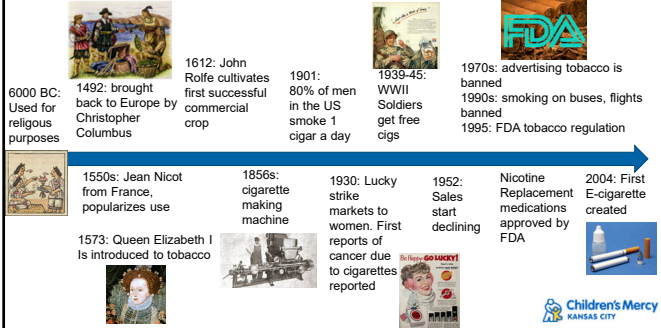
Case 3

15 year old girl presented to ER with abdominal pain, vomiting. Vital signs significant for T: 38.5, RR 32, HR 120, SpO₂ 94% on room air. Physical exam: clear on inspiration; slight crackles on exhalation. Diffusely tender abdomen.

Respiratory viral panel + Rhino/Entero. Abdominal film concerning for paucity of bowel gas and lead to a CT of abdomen. CT abdomen was concerning for bilateral ground glass opacities.



History of Tobacco: How did we get here?



Risks from Smoking

Smoking can damage every part of the body

As of 2018, World Health Organization:

- More than 7 million people die annually due to tobacco related diseases
- Smoking considered the 2nd most important risk factor
- Push to stop smoking from medical & cultural efforts

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Emergence of E-cigarette

- Attempting to quit is difficult
 - Relapse within 8 days with no assistance
 - 3-5% prolonged abstinence of 6-12 months
- Addiction driven by multitude of behavioral smoking cues
- E-cigarettes proposed as a form of smoking cessation

Dr. COLIN MENDELSON
"This book is a MUST for anyone who is considering quitting smoking. It provides a clear, concise, and evidence-based guide to the benefits of vaping and the risks of smoking. It is a must-read for anyone who is serious about quitting smoking." - Dr. Colin Mendelsohn

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WHAT'S THE MOST SUCCESSFUL WAY TO STOP SMOKING?

SUCCESS OF POPULAR METHODS COMPARED WITH GOING COLD TURKEY

Method	Success Rate	Notes
COLD TURKEY	0%	Quitting with no support. The study used going cold turkey as the baseline. No more successful than cold turkey – probably because people don't use enough.
NRT	60%	Using Nicotine Replacement Therapy without professional support. More successful.
E-CIGARETTES	225%	Using electronic cigarettes without professional support. Combined specialist support and prescription medication. *Available free from your local Stop Smoking Service: 0114 276 0000

WE WILL BEAT CANCER SOONER.
cancerresearchuk.org

https://news.cancerresearchuk.org/2017/02/06/new-study-comes-the-closest-yet-to-proving-that-e-cigarettes-arent-as-dangerous-as-smoking/

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Electronic Nicotine Delivery Systems (ENDS)

A rose by any other name?

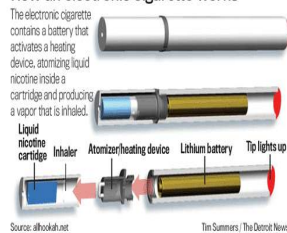
- Vapes
- Vaporizers
- Vape pens
- Hookah pens
- Electronic cigarettes (e-cigarette; or e-cigs),
- E-pipes
- Mods
- Pods
- Carts



E-Cigarette

- Contains:
 - Plastic tube, Electronic heating component
 - Cartridge with liquid propylene glycol - With or without nicotine
 - Battery
- Heater activated → cartridge heated → liquid vaporized → smoke like aerosol inhaled.
- Disposable battery system or rechargeable
- Various flavors, nicotine levels

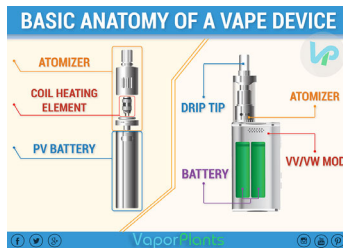
How an electronic cigarette works



E-cigs vs Vapes

Differences & Similarities

- Flavor – less with E-cigs
- Limited battery life with E-cigs, less risk of burn
- E-cigs need new cartridges when they run out, mouth to lung hit
- Open Vape Pod Mod can be customizable in flavor, nicotine, direct to lung hit
- Closed Vape Pod Mod systems: disposable
- Vape Pens: can modify temperature, voltages, can modify mouth to lung or direct to lung hit



<https://www.vaporplants.com/what-is-a-vape-pen>



JUUL

- 2 components
 - Bottom – Battery, temperature regulation system
 - Top – E-liquid cartridge- also the mouthpiece
- Rechargeable – USB – laptop!!
- Discrete
- Took over the market in late 2010s

Differences:

- Not user modifiable
- Temp. regulation – prevent overheating and combustion
 - Less likely to burn or explode



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What's in it?

Vape Juice

- Water – vapor
- Vegetable Glycerin – sugar alcohol
 - Texture enhancer, boosts thickness
 - Also found in moisturizers
- Propylene Glycol
 - Tasteless, odorless, colorless
- Flavoring
- Nicotine

Juul Pod Juice

- Glycerol
- Propylene Glycol
- Natural oils
- Flavoring
- Nicotine
 - 5% Nicotine, 59 mg/mL per pod ~ content of a pack of cigarettes
- Benzoic Acid
- Extract Flavoring



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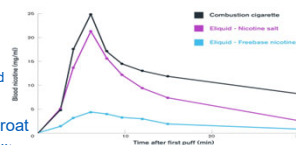
Liquid Nicotine Chemistry

E-cigs & Vape Pens

- Freebase Nicotine
- Basic pH
- Throat Irritation
- Limited tolerability
- Good stability

JUUL

- Nicotine salt
 - With Benzoic Acid
- Acidic/Neutral pH
- Smoother hit to throat
- Increased tolerability
- Improved stability



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Nicotine and Adolescents

- Adolescent brains are evolving, responds to the world differently
- Prefrontal cortex used less often compared to adults:
 - PFC: planning, memory, organization, mood, judgement
 - Emotional information can be responded with a "gut reaction"
 - Adults are able to identify fear emotions more adequately than teens
 - Difficulty considering present day decisions with regard to the future
- Neurotoxic effect: prenatal nicotine disturbs balance of cholinergic transmission, behavioral/developmental effects
- Increased risk of addictive behaviors
- Vapor affects lung growth/function
 - Increased respiratory symptoms, chronic bronchitic symptoms

NPR Stories: Lifelong addiction

- <https://www.npr.org/sections/health-shots/2018/06/07/615724991/he-started-vaping-as-a-teen-and-now-says-juul-is-impossible-to-let-go>
- Talked about vaping in high school
- "...even after an hour and a half or two, I'm chomping at the bit to find my JUUL"
- JUUL Labs – "alternative to adult smokers, not anyone else, not minors"
- Flavors such as cotton candy, Frutti Tutti, cookies and cream, caramel, cherry, crème brûlée

E-Cigarettes for Smoking Cessation

- NEJM: N = 886, E-cig or traditional nicotine replacement of their choice + Weekly behavioral support for at least 4 weeks
- Primary Outcome:
 - Sustained abstinence for one year
 - E-cig group: 18% 1 year abstinence rate; NRT group: 9.9%
- E-cig group - Mouth or throat irritation, but did use their assigned product more
- Meta-analysis looking at 38 studies:
 - More likely to remain off tobacco by 28%
 - More likely to **stay addicted to E-cigs**

Insufficient evidence to recommend as a way to stop smoking.

Peter Hajek et al. A randomized trial of e-cigarettes versus nicotine replacement therapy. N Engl J Med 2019; 380:629-637



E-cigarettes: Gateway effect

- Studies showing gateway effect with e-cigs preceding conventional cigarette use
 - Soneji, et al: 17389 14-30 yo. Odds Ratio: 3.62 CC use in those with hx of e-cig use.
 - Probability of cigarette smoking initiation was 30.4% for baseline e-cig users, 7.4% of never e-cig users.
 - Probability of smoking in the past 30 days: 21.5% for e-cig users, 4.6% for non
 - Leventhal, et al: 9th graders in 10 LA schools. Followed over 12 mo.
 - Baseline e-cig users more likely to use cigarettes.

23

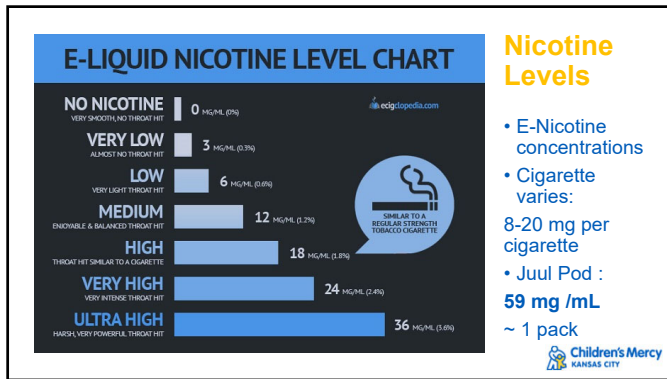


E-cigarettes: Gateway effect

- Using E-cigs and progressing to smoking:
 - Chaffee, et al: Looked at 12-17 yo, and followed up in 1 year.
 - If using E-cigarettes, 2 x more likely to become an established smoker (>100 cigs), more likely to be a current smoker (smoked in the last 30 days) or be both.
 - If using E-cigarettes, more likely to continue cigarette smoking.
- In those who modified nicotine levels in vapes:
 - Goldenson, et al: n = 181. Higher concentration of nicotine in e-cigarette, more likely to smoke more traditional cigarettes
 - More likely to use more cigs/ day.

2016





Abusing E-cigarettes

- E-cigarettes do not deliver carbon monoxide or other carcinogens
- Some really did use this as a way to reduce traditional cigarette use
- Users may "tamper" pods/juice
 - Increasing voltage deliver larger doses of nicotine
 - "Dripping": apply solution to heating element
 - Increases exposure to other chemicals
- Can also mix different liquid solutions
 - Mix Alcohol
 - Mix THC

Public Health: Many Vaping Illnesses Linked To Black Market 'Dank Vapes' Or Other THC Products

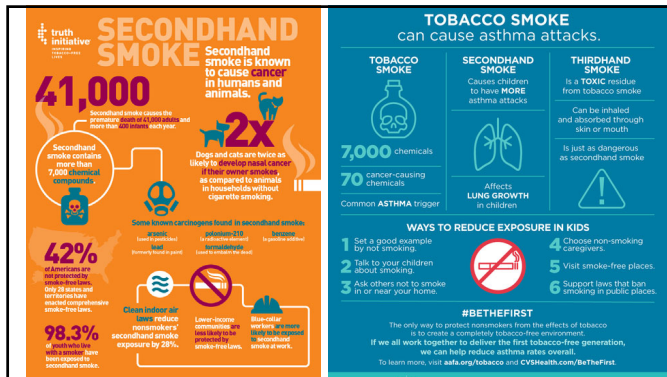
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Vaping Illness Update: FDA Warns Public to Stop Using Tetrahydrocannabinol (THC)-Containing Vaping Products and Any Vaping Products Obtained Off the Street

FDA strengthens warning to public to stop using THC-containing vaping products and any vaping products obtained off the street.

- Do not use vaping products that contain THC.
- Do not use vaping products—particularly those containing THC—obtained off the street or from other illicit or social sources.
- Do not modify or add any substances, such as THC or other oils, to vaping products, including those purchased through retail establishments.
- No vaping product has been approved by the FDA for therapeutic uses or authorized for marketing by the FDA.
- No youth or pregnant women should be using any vaping product, regardless of the substance.
- Adults who do not currently use tobacco products should not start using these products.
- If you are an adult who uses e-cigarettes instead of cigarette smoking, do not return to smoking cigarettes.

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Secondhand VAPE Exposure

- Not much out there; small studies.
 - Compare to background and cigarette smoke exposures
 - Articles from 1996 to 2015: Only 16/312 studies were relevant:
 - EC vapor compared to background levels - Increased **nicotine, formaldehyde, propylene glycol**
 - EC vapor compared to cigarette smoke - Lower levels of every compound except nickel, silver
 - One study looked at animal models (E Cig vs room air for 10 days) showed animals had decreased weight and lung growth
 - 7 studies looked at human volunteers: **more carbon monoxide, more volatile organic compounds, more nicotine**
 - 2 studies did not comment on possible exposure; then concluded that there was no risk to bystander, but these were *funded by national vapors club*

STOP SMOKING & START VAPING

▼ SMOKER ▼ VAPER

VS

Complications from ENDS
BUT ITS SAFER... RIGHT?

The infographic compares the health risks of smoking and vaping across several body systems:

- HEAD:** The risk of having a stroke is 10% higher for smokers. The risk of a stroke decreases significantly for vapers.
- MOUTH:** Increased risk of gum disease, tooth loss, and oral cancer for smokers. Improved health of mouth for vapers.
- LUNGS:** Risk of chronic disease is 10% higher for smokers. They will regain the ability to clear their lungs for vapers.
- HEART:** Increased risk of heart disease, stroke, and cardiovascular disease for smokers. Lower risk of heart disease for vapers.
- SKIN:** The amount of collagen that gets into your skin is reduced for smokers. Your skin will become clearer and healthier for vapers.
- STOMACH:** Increased risk of ulcers, stomach cancer, and colon cancer for smokers. Less prone to stomach issues for vapers.
- CIRCULATION:** Smoking causes your blood to clot, which increases the risk of blood clots. Blood circulation will be better for vapers.

Vapors: 10

www.vaporsource.com/blog/news/what-happens-when-you-stop-smoking-and-start-vaping

Vaping pen Explosions

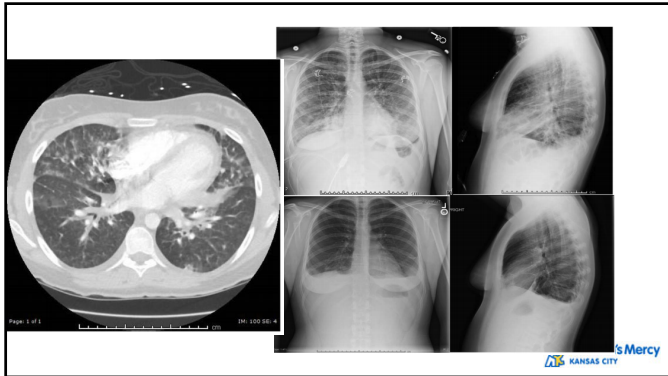
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Acute Eosinophilic pneumonia

- 18 yo female
- Presented with cough, shortness of breath, chest pain, low oxygen
- Started vaping 2 months prior
- Blood count showed elevated white blood cells, 0.5% eosinophils
- CXR – possible pneumonia – started on antibiotics
- Had worsening saturations, respiratory distress
- Chest CT – patchy airspace disease and nodules
- Bronchoscopy: 26% eosinophils
- Treatment: Hi dose IV Steroids

Arter et al. Acute eosinophilic pneumonia following electronic cigarette use. Respiratory Medicine Case Reports 27 (2019) 100825

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Bronchial Injury

- 35 year old female, non-smoker
- Came into ED with sudden onset chest pain and dyspnea
- Increased respiratory support despite normal Chest x-ray
- CT showed nodular infiltrates in the lower lobes, mediastinal adenopathy
- Admitted to e-cigarette use – equal to 2 packs/day cigarettes
- Mechanically ventilated with breathing tube, Extracorporeal Membrane Oxygenation
- Bronchoscopy: extensive airway trauma & thermal injury burns

Cartier, Thomas et al. Clin Pract Cases Emerg Med. 2017;10(4):217-219
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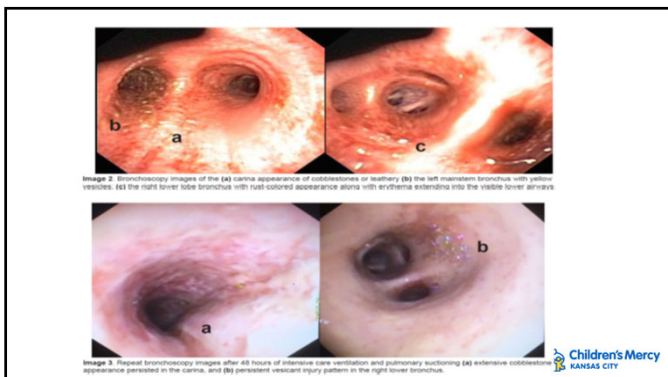


Image 2. Bronchoscopy images of the (a) carina appearance of cobblestones or healthy (b) the left mainstem bronchus with yellow vesicles. (c) the right lower lobe bronchus with red-colored appearance along with erythema extending into the visible lower airways.

Image 3. Repeat bronchoscopy images after 48 hours of intensive care ventilation and pulmonary suctioning (a) extensive cobblestone appearance persisted in the carina, and (b) persistent vesicular injury pattern in the right lower bronchus.

What does the liquid break down to?

- Capable of heating liquid solutions to temperature 350C
- Undergo conversion/breakdown from heating
 - Heating coils decompose to heavy metals (Manganese, Zinc)
 - Formaldehyde (5-15 times higher than in tobacco cigarettes)
 - Acetaldehyde, acetone, acrolein, propanal, butanal, glyoxal, methylglyoxal
 - Diacetyl – food flavoring (chemical that leads to popcorn lung)
 - Acrolein, formaldehyde, acetaldehyde – pulmonary irritants
 - Probable carcinogen, necrosis of living tissues
 - Propanal – pulmonary edema
 - Butanal – toxic pneumonitis
- Increased inflammation, Makes mucus more sticky, impairs immune system defense.

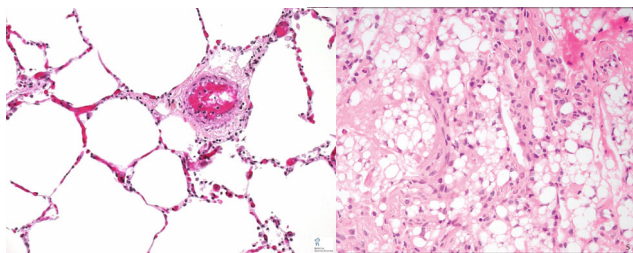


Lipoid Pneumonia Outbreak – North Carolina

- July – August 2019: 5 pts in N. Carolina, 18-35 yo
- Increased shortness of breath, nausea, vomiting, abdominal pain, fever
- Increased respiratory rate, difficulty breathing, low oxygen levels
- Abnormal Chest x-rays
- All were electronic vaping pen/ e-cigs that were refillable with THC or nicotine , some also did cigarettes
- All 5 in hospital, 3 in ICU, 1 needed ventilator



Lipoid Pneumonia



Normal

Lipoid Pneumonia



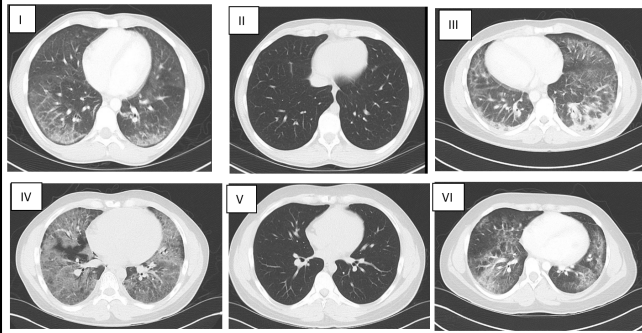
E-cigarette or Vaping Associated Lung Injury

- Inflammatory response triggered by inhaled substances in e-cig/vape products
- Increased risk in those with THC containing products, Vitamin E acetate (others: triglycerides, plant oils, petroleum, diluent terpenes also found in lungs)
- Sx: dyspnea, cough, chest pain, fever, chills, N/V/Abdominal pain, tachypnea, shallow breathing
- Dx: CT scan
- Trx: corticosteroids, supportive care



40

Singh A. Adolescent E-cigarette or Vaping Product Use-Associated Lung Injury: A Case Series and Review of the Literature. Pediatric Pulmonology. Accepted for Publication 01/02/22. DOI: 10.1002/ppul.25832



	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Treatment								
Antibiotics	Levofloxacin Rifampin, Isoniazid Ethambutol Pyrazinamide	Azithromycin Amoxicillin	Levofloxacin Azithromycin Ampicillin	Amoxicillin Azithromycin	Ceftriaxone Azithromycin	Azithromycin Ampicillin- Sulbactam	Azithromycin Ampicillin- Sulbactam	Azithromycin Ampicillin- Sulbactam
Treatment	Prednisone 8-week taper	Prednisone 60mg x 7 days	Prednisone 2-week taper	Prednisone 2-week taper	IV Methylpred, Prednisone 2-week taper	ICU for NIV IV Methylpred Prednisone 2-week taper	Prednisone 60mg x 5 days	IV Methylpred, Prednisone 60mg x 7 days
Follow Up								
PFTs	Yes	Yes	NP	NP	Yes	Yes	Yes	Yes + BD
Result	Reversible Obstruction				Mild obstruction	Normal	Mild restriction Normal at FU	response
Follow Up with Pulmonology	Yes	Yes	No	No	Yes & Adolescent Medicine	Yes	Yes & Adolescent Medicine	Yes & Adolescent Medicine
New Dx of Asthma	Yes	Yes	No	No	Yes	No	Yes - Exercise Induced	Yes
New Asthma Medication	ICS/LABA	ICS	NA	NA	LTRA		Albuterol	ICS/LABA

Singh A. Adolescent E-cigarette or Vaping Product Use-Associated Lung Injury: A Case Series and Review of the Literature. Pediatric Pulmonology. Accepted for Publication 01/02/22. DOI: 10.1002/ppul.25832



	Patient 1*	Patient 2*	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7*	Patient 8*
Age (y)	16	16	17	17	17	18	15	16
Gender	Male	Male	Male	Male	Male	Male	Male	Male
Ethnicity	Caucasian	Hispanic	Hispanic	Caucasian	Hispanic	Caucasian	Caucasian	Hispanic
Respiratory History	None	Yes Int. Asthma	None	None	Yes Int. Asthma	None	None	Yes Int. Asthma
Respiratory Symptoms	Cough, Wheeze	Cough Dyspnea	Cough	Cough Dyspnea	Cough	Cough Dyspnea	Cough Dyspnea Chest Pain	Dyspnea
GI Symptoms	Emesis Diarrhea Weight Loss	Emesis Diarrhea Weight Loss	Emesis Abdominal Pain	None	None	Emesis	Emesis Diarrhea	Emesis
Other Symptoms	None	Fever	Fever	Fever	Fever, Chills	Fever	Fever Headache	Chills Headache
Repeat Evaluation*	Yes	Yes	Yes	No	No	Yes	Yes	No
Hypoxemia	Yes	No	No	Yes	Yes	Yes	No	Yes
E-cig Use	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
THC Use	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Denied
Other Substance Use	"Joints"	No	No	Alcohol, Mushrooms, LSD, Rx Drugs	"Joints"	Alcohol, "Joints" "Dabbing" Edibles	"Joints"	Alcohol
Psycho-Social Stressors	None	None	None	Poly-Substances, School	Eating Disorder, Anxiety	No	Depression, Anxiety, Family	Poly-substances

Singh A. Adolescent E-cigarette or Vaping Product Use-Associated Lung Injury: A Case Series and Review of the Literature. Pediatric Pulmonology. Accepted for Publication 9/1/2022. DOI: 10.1002/ppul.23832



Survey finds higher risk of stroke among e-cig users

- <https://www.npr.org/sections/health-shots/2019/01/30/689905296/survey-finds-higher-risk-of-stroke-among-e-cigarette-users>
- Data collected by the 2016 Behavioral Risk Factor Surveillance System
 - Phone survey, sponsored by agencies like the CDC
 - All 50 states
 - Asks about risky behaviors; health issues
- Data collected by the 2016 Behavioral Risk Factor Surveillance System
- 400,000 respondents
 - 66,795 reported using e-cigs at least once
 - Compared to non-users, E-cig (only) users had:
 - 71% higher risk of stroke
 - 59% higher risk of heart attack
 - 40% higher risk of heart disease
 - Not submitted to a journal as of yet
- Problems:
 - Confounding variables – what other behaviors? Not prospective - More rigorous long term studies needed

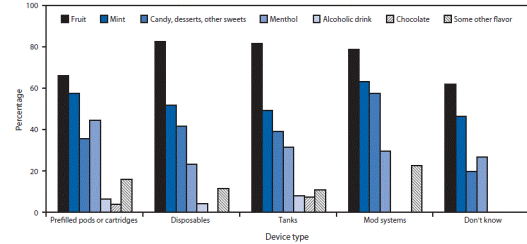


Federal Response

- 2016: FDA expanded authority to include manufacture, import, packaging, labeling, advertising, promotion, sale, distribution of all tobacco products
 - Need to have healthy warnings on all ENDS
 - Prohibit sales to those <18 yo
 - Bans free samples and sales through vending machine
 - ENDS require marketing authorization
 - Vape shops that mix liquids must comply with legal requirements
- 2016: Child Nicotine Poisoning Prevention Act signed into law
 - Packaging safety standards, childproof packaging
- January 2020 – Flavor Ban
 - Cartridge based; except tobacco and menthol
 - Does **not** apply to tanks, mods, pens
 - Widespread use; flavors still popular
- Menthol Ban proposal Summer 2022
- JUUL banned June 23, 2022 for sale in US. Repealed the next day.



National Youth Tobacco Survey: Flavor Types amongst middle/high school 2020

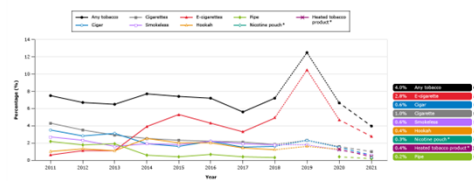


Wang TW, Neil LJ, Park-Lee E, Ruan C, Cullen KA, King BA. E-cigarette Use Among Middle and High School Students — United States, 2020. *MMWR Morbidity and Mortality Weekly Report* 2020;69:1310–1312. DOI: <http://dx.doi.org/10.15585/mmwr.mm6903a1>



Middle School Student Trends

Current tobacco product use among middle school students (NYTS, 2011–2021)



Dashed and dotted lines represent changes in survey methodology and may affect the comparability of results with prior years. In 2019, data collection included a new electronic mode of survey administration as well as presentation of tobacco images; in 2020, data collection was terminated early due to the COVID-19 pandemic; and in 2021, many students participated in distance learning as survey questionnaires were administered both remotely and in school settings.

NYTS: National Youth Tobacco Survey.

* These are new categories and do not have data for previous years.

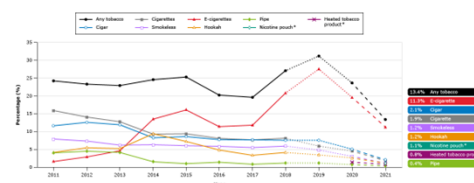
Data from:
1. Wang TW, Gentile AL, Chawan N, et al. Tobacco Product Use and Associated Factors Among Middle and High School Students — United States, 2019. *MMWR Surveill Summ* 2020; 69(2): 1–6.
2. Gentile AL, Wang TW, Gentile AL, et al. Tobacco product use among middle and high school students — United States, 2020. *MMWR Morbidity and Mortality Weekly Report* 2020; 69(48): 1480–1485.
3. Gentile AL, Wang TW, Gentile AL, et al. Tobacco product use and associated factors among middle and high school students — National Youth Tobacco Survey, United States, 2020. *MMWR Surveill Summ* 2020; 71(2): 1–6.
4. Centers for Disease Control and Prevention. Smoking and tobacco use: Youth data. Available at: https://www.cdc.gov/tobacco/data_statistics/youth_data/index.htm (Accessed on April 26, 2022).

47



High School Student Trends

Current tobacco product use among high school students (NYTS, 2011–2021)



Dashed and dotted lines represent changes in survey methodology and may affect the comparability of results with prior years. In 2019, data collection included a new electronic mode of survey administration as well as presentation of tobacco images; in 2020, data collection was terminated early due to the COVID-19 pandemic; and in 2021, many students participated in distance learning as survey questionnaires were administered both remotely and in school settings.

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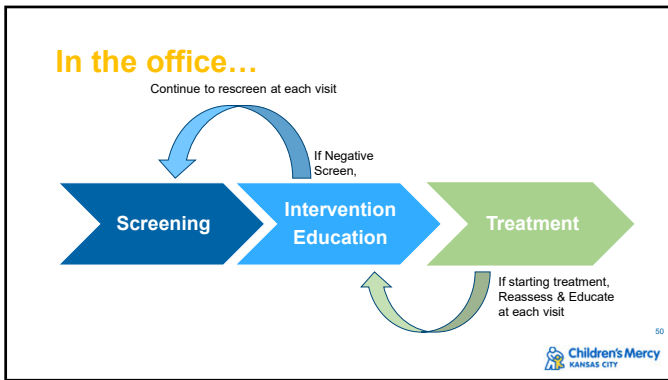
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3. Gentile AL, Wang TW, Gentile AL, et al. Tobacco product use and associated factors among middle and high school students — National Youth Tobacco Survey, United States, 2020. *MMWR Surveill Summ* 2020; 71(2): 1–6.
4. Centers for Disease Control and Prevention. Smoking and tobacco use: Youth data. Available at: https://www.cdc.gov/tobacco/data_statistics/youth_data/index.htm (Accessed on April 26, 2022).



Yah. Ok. I get it...

WHAT CAN I DO?

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Screening

Don't

- "Do you Smoke?"
 - Pts/families do not consider vaping use as smoking.
- "Do you vape?"
 - No time frame allows omission by answering only about the present day
- Ask in front of family

Do

- "In the past year, you have used a tobacco, nicotine product such cigarette, e-cigarette, vape?"
- Work on office flow to provide private time to screen
- Ask about friends & family smoking or vaping
- If acknowledged in the past, ask about frequency specifically

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Difficulties with Interventions in Teens

- Jennszen et al. Looked at a large institution 300,000 pts
- EHR prompts to ask youth about tobacco use
 - 25 practices throughout CHOP
 - If interested – then prompted by secure text – My Life, My Quit program
- May 2018 – August 2020 – 93,527 well visits for adolescents
 - 66,907 were screened for tobacco/e-cig use
 - 1603 (2.4%) reported use in the past year; 537 (0.8%) currently using
- Recruitment: 4382 emails sent
 - 52 referred: 15 enrolled, 18 unable to be contacted
 - 14 not interested, 5 ineligible
 - 6 enrolled in the program.

Inability to Recruit Adolescents for a Vaping Cessation Clinical Trial Within a Large Pediatric Health System
 Brian P. Jennszen, MD, MSHP, Chloe Hanson, MS, Mary Kate Kelly, MPH, Thomas Ylloja, PhD, Robert A. Schnoll, PhD, Alexander G. Fiks, MD, MSCE
 Nicotine & Tobacco Research, Volume 23, Issue 9, September 2021, Pages 1633–1644, <https://doi.org/10.1093/ntn/tlab034>
 Published: 25 February 2021 [Article history](#)

Intervention/ Patient Education

- Directly combat misinformation
- Establish rapport
- Less authoritative

Misconception	Educational Counter Argument
E-cigarettes are safer	"EVALI causing hospitalizations"
"It's like inhaling water"	"Water is never an ingredient..." "Inhaling aerosols, not vapor" "Contains bacteria, fungi"
"Less second-hand smoke..."	"...aerosol which contains many particles, including heavy metals, chemicals"
"...do not contain nicotine"	"Contain significant amounts of nicotine which can be mislabeled and cause harm other than addiction."

Singh A. A Commentary on the Past, Present and Future of Adolescent Electronic Cigarette, Use and Nicotine Addiction. Pediatric Pulmonology. Published 9/14/2021. <https://doi.org/10.1002/ppul.25676>



Misconception	Educational Counter Argument
"We don't know the long-term effects"	"If short-term effects include serious illness, then long-term effects may be worse."
"...will help you quit (traditional) cigarette smoking."	"You're switching, not quitting." "E-cigarette use associated with increased risk of addiction to traditional cigarettes in teens."
"But it's nicotine free."	"Unflavored e-cigarette products cause airway damage at the cellular level." "Nicotine-absent formulations are frequently mislabeled."
"We need to support small businesses."	"Most of the popular e-cigarettes and products are owned by the original big tobacco companies, not small business owners."

In Office Treatment

- Provide counseling
- Assess readiness to quit & likelihood of success
 - Readiness to quit surveys
 - Assess support systems
 - Frequency of use, amount of nicotine
 - Use of other substances: marijuana/ THC, conventional cigarettes, dabbing/waxing/huffing
 - Assess access to use
- Discuss Options for Quitting
 - Cold Turkey vs Nicotine Replacement Therapy



55

Nicotine Replacement Therapies

- Nicotine Gum (Nicorette®)
- Nicotine Lozenges (Nicorette®)
- Transdermal patches (NicoDerm®)
- Nasal Spray (Nicorette®, Nicotrol NS®)
- Oral Inhaler (Nicotrol Inhaler®)
- Bupropion (Wellbutrin®, Zyban®)
- Varenicline (Chantix®)



56

Nicotine Replacement Therapies

★ https://downloads.aap.org/AAP/PDF/NRT_and_Adolescents_Pediatrician_Guidance_factsheet.pdf?ga=2.203245009.1500815216.1661204910.1521923992.1641235907

- Resources for Nicotine Replacement therapies – Nice guide from AAP.

Nicotine Replacement Therapy and Adolescent Patients, Information for Pediatricians
Nicotine Replacement Therapy (NRT) can be an important tool for treating nicotine dependence in youth. Many pediatricians are uncertain about how to use this medication with adolescents, especially those who are under 18 years old. This document is intended to help pediatricians make informed decisions about using NRT with patients who wish to quit smoking or vaping.

What is Nicotine Replacement Therapy (NRT)?

- NRT is a medication that addresses nicotine withdrawal symptoms by providing a controlled amount of nicotine, thus helping reduce the urge to smoke or vape.¹
- NRT is safe and effective in helping adults quit tobacco use.²
- NRT works best when paired with behavioral counseling interventions.³
- NRT comes in four forms, including gum, patch, lozenge, nasal spray, and inhaler.
- Three forms of NRT (gum, patch, lozenge) are available over-the-counter for adults only.

Can Adolescents Use NRT?

- At present, the US Food and Drug Administration (FDA) has not approved NRT for youth under 18 years old.
- Research on the effectiveness of NRT for helping youth quit successfully is limited due to a lack of adequately powered studies. Overall efficacy findings have been mixed, with generally more modest outcomes than in comparable adult trials. There is no evidence of serious harm from using NRT in adolescents under 18 years old.⁴
- Given the effectiveness of NRT for adults and the severe harms of tobacco dependence, AAP policy recommends that pediatricians consider off-label NRT for youth who are moderately or severely addicted to nicotine and motivated to quit.⁵
- Youth under 18 years old need a prescription from a healthcare provider to access all forms of NRT.
- Non-adherence and relapse after cessation of therapy is common, and close follow-up is recommended.

Is NRT safe?

- NRT is safer than cigarettes, e-cigarettes, and other tobacco products because it delivers nicotine without the toxic chemicals and carcinogens in tobacco and e-cigarette products.
- NRT has low potential for misuse because the nicotine is absorbed slowly.

What are the contraindications to NRT use?

- The only contraindication to NRT use is hypersensitivity to nicotine or any component of the medication. In addition, patients who are allergic to saquin should not use the nicotine lozenge.⁶
- Pediatricians should be aware of chronic medical conditions when prescribing NRT, including cardiovascular disease, diabetes, and hyperthyroidism. However, it is important to note that these cautions are relative, not absolute. NRT is safer



Nicotine Replacement Therapies

- https://www.aafp.org/dam/AAFP/documents/patient_care/tobacco/pharmacologic-guide.pdf

PHARMACOLOGIC PRODUCT GUIDE: FDA-Approved Medications for Smoking Cessation[illegible]

Resources: Quitting

- N-O-T "Not On Tobacco": voluntary, small group tobacco cessation program through American Lung Association
 - <https://www.lung.org/quit-smoking/helping-teens-quit/not-on-tobacco>
 - Online version for teens: <https://notforme.org/>
- INDEPTH: Intervention for Nicotine Dependence: Education Prevention & health. Alternative to suspension, citation for schools/communities.
- North American QuitLine Consortium: **1800-QUIT NOW** or **1855 DEJELO-YA**
- Texting program for smokers who want to quit; has a line for teens. <https://smokefree.gov/tools-tips/text-programs>
 - SmokefreeTXT - QUIT to 47848 (Teens)



Resources: Institutional Resources

- **AAP:**
 - AAP Tobacco Control & Prevention: <https://www.aap.org/en/patient-care/tobacco-control-and-prevention/e-cigarettes-and-vaping/>
 - You can find a toolkit for presentations, review articles, Fact sheets for parents to provide in office and fact sheets for physicians.
- **CDC**
 - https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/healthcare-providers/index.html



Resources: Youth Specific

- <https://teen.smokefree.gov>
- <https://therealcost.betobaccofree.hhs.gov/>
- <https://www.lung.org/stop-smoking/helping-teens-quit/not-on-tobacco.html>
- <https://www.mdanderson.org/about-md-anderson/community-services/aspire.html>
- <https://mylifemyquit.com/>
- <https://truthinitiative.org/research-resources/topic/quitting-smoking-vaping>
- Truth initiative: Text DITCHVAPE to 88709. Parents can text QUIT to 202-899-7550



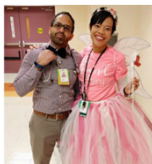
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