OBJECTIVES

• Learn about the health effects of vaping and the extent of the JUUL and eCigarette epidemic among adolescents
• Hold vaping devices and smell the e-juice to better identify existing products that are being used by patients and students
• Learn what steps to take to treat and address the vaping epidemic at the clinic, school, community, and state level.
• Ask their questions and learn from each other to help brainstorm solutions to the vaping epidemic

HEADLINES
TOBACCO USE IS A PEDIATRIC DISEASE

“Nicotine addiction begins when most tobacco users are teenagers, so let’s call this what it really is: a pediatric disease.”

David A. Kessler MD
Commissioner of FDA, 1995

NICOTINE AND THE DEVELOPING ADOLESCENT BRAIN

Prefrontal cortex still developing through age 25
- Decision making, impulse control, executive functioning

Adolescent brain uniquely vulnerable to nicotine addiction
- Become addicted more quickly, at lower levels of use

Early use of nicotine associated with:
- Earlier addiction
- Greater risk of progressing to daily smoking
- Harder to quit

95% of U.S. adult users start before age 21.

Many Different Vape Systems: Some are Meant to Deceive
WHAT DOES E-JUICE LOOK LIKE? WHO ARE THEY TRYING TO HOOK... YOUNG KIDS

Pod System, Different Form of Vaping

WHAT ARE THE INGREDIENTS FOUND IN E-CIGARETTE SOLUTIONS (E JUICE)?

- Humectant (propylene glycol and glycerin)
- Flavoring
- Nicotine (can be present even when listed as 0 mg/ml)
- Toxicants
- Carcinogens
- Cytotoxic metallic nanoparticles (from the coil/heating element)
- Silicates
- Other psychoactive ingredients (added by users)

Williams M, Talbot P. Nicotine Tob Res. 2011 Dec; 13(12):1276-83
TWO MAJOR REPORTS ON ECIGS: KEY CONCLUSIONS FOR YOUTH

- Nicotine exposure during adolescence can cause addiction, structurally alter the developing adolescent brain, cause mood disorders and attention problems.
- Most eCigarette products contain and emit numerous toxic substances in addition to nicotine.
- Biologic plausibility that long-term exposure to eCigarettes could increase risk of cancer and adversely affect reproductive outcomes.

1. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General 2016

KEY CONCLUSIONS FOR YOUTH (CONTINUED)

- E-Cigarette use increases asthma attacks.
- E-Cigarette use greatly increases the odds of subsequent combusted tobacco cigarette use.

1. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General 2016

2018 DATA SHOW E-CIG SURGE

- Data from the National Youth Tobacco Survey show an increase in e-cigarette use among youth and young adults.
- The percentage of high school students who report using e-cigarettes has significantly increased in recent years.

1. National Youth Tobacco Survey 2018
SURFACE CONTAMINATION WITH NICOTINE

Nicotine, which combines with indoor substances such as ozone and nitrous oxide to make irritants and carcinogens (TSNAs), collects on surfaces from eCigarette use.

WHAT ARE THE HAZARDS TO LUNGS?

Alveolar growth is impaired in healthy newborn mice exposed to nicotine-containing e-cigarette emissions.

ATHLETIC PERFORMANCE?

Vaping causes Asthma and affects cardiovascular health: Ultrafine particles in the lung may affect athletic performance.
BEHAVIORAL EFFECTS
• Mice exposed to e-cigarette aerosol neonatally:
  • More head dips (anxiety)
  • Higher levels of rearing and locomotor activity (ADHD)

Smith, et al. PLOS One 2015

THE NEW LOOK OF NICOTINE ADDICTION

THE AMOUNT OF NICOTINE IN
1 JUUL POD = 1 PACK OF CIGARETTES

1 pack contains 20 cigarettes.
2009 FDA BANS FLAVORED CIGARETTES

The New York Times
Flavors Banned From Cigarettes to Deter Youths

The ban was intended to end the sale of tobacco products with chocolate, vanilla, clove, and other flavorings that lure children and teenagers into smoking.

JUUL

The 2009 Federal Ban on flavors does not include e-cigs. The majority of e-cigarette users now use JUUL.

FLAVORS ARE MARKETED TO TEENS

There are over 8,000 vaping flavors! 85.1% of current youth eCig users said they used e-cigarettes "because they come in flavors I like."
SEX AND RISK TAKING: EXPLOITING GOOD BOY/ BAD BOY IMAGERY

FAVORITE JUUL POD FLAVORS
Coincidence... who's using these...

STOMACH FUNCTION VS LUNG FUNCTION
Eating Mango: Natural!
Inhaling Mango: Not Natural.
STOMACH VS LUNGS

STOMACH
MEANT FOR FOOD

LUNGS
MEANT FOR AIR

INHALING FLAVORS CAN CAUSE EOSINOPHILIC PNEUMONITIS

EPIDEMIC OF E-CIG/VAPE-ASSOCIATED LUNG INJURY (EVALI)

- As of October 29, 2019, 1,888 cases of lung injury in 48 states and 37 associated with the use of e-cigarette or vaping products.
- All have reported e-cigarette or vaping product use within the past 90 days.
- 37 deaths (More deaths are under investigation.)
- 34% reported exclusive using THC-vape products & 11% reported exclusive use of nicotine-vape products.
- 79% of cases are under 35 years old; with 14% under 18 years old.
- 70% of cases are male.

"No one compound or ingredient has emerged as the cause of these illnesses to date; and it may be that there is more than one cause of this outbreak. Many different substances and product sources are still under investigation."

1. US Centers for Disease Control and Prevention, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion. October 31, 2019.
IMAGING OF VAPING-ASSOCIATED LUNG DISEASE

4 imaging patterns correlated with pathological findings attributable to vaping:
1. **Acute eosinophilic pneumonia** - a rapidly developing acute lung injury
2. **Diffuse alveolar damage** - a rapidly developing acute lung injury
3. **Organizing pneumonia** - develops subacutely over days to weeks. A rare giant-cell interstitial pneumonia was observed and correlated with hard metals in ENDS that developed over a period of 6 months.
4. **Lipoid pneumonia** - an inflammatory response to the presence of lipids within the alveolar space and typically results from aspiration of hydrocarbons or oil-based products.

He n ry  T S , K a n n e JP , K lig e rm a n SJ. Im a g in g  o f Va p in g - A sso cia te d  Lu n g  Dise a se . N E n g l J M e d . S e p te m b e r 2019

PULMONARY LIPID-LADEN MACROPHAGES

“A notable and consistent feature... is the presence of lipid-laden macrophages seen with oil red O staining in bronchoalveolar lavage samples that are not attributable to aspiration of exogenous lipid material.”

Symptoms that may be attributable to oil and/or white blood cells in lungs:
- Rapid onset of coughing
- Difficulty breathing
- Weight loss
- Nausea and vomiting
- Diarrhea


SMOKE AND MIRRORS

• The Juul is the heroin of e-cigarettes.
• Nicotine causes the release of dopamine in the nucleus accumbens, creating a positive feedback loop.
TEEN NICOTINE ADDICTION

- Dependence is more severe if use begins in adolescence.
- Those who begin as teens are more likely to become dependent, use for more years, and use more heavily.
- Increased vulnerability may be due to still-developing brain.
- Teens in Massachusetts are 9 times more likely to use e-cigarettes than adults.
- Among never tobacco users, rates of teens use are over 20 times higher than adults.

YOUTH ADDICTION IS THEIR GOAL

Like combustion tobacco of the 20th century reinforcement of JUUL electronic cigarette via earning probability among youth.

Big tobacco which developed an e-cigarette competitive how illicit under the name that maybe can more accurately described as teen nicotine addiction initiation device.

ADDITION PROGRESSES FAST: HALF A JUUL POD COULD DO IT

Nicotine dependence, as indicated by craving, starts BEFORE daily or regular use.

Interventions may be delivered at any stage.

DryFranzis, 2017
**Teenage Vaping Rises Sharply Again This Year**

2019 Monitoring the Future Survey
E-cigarette use in the past 30 days

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New England Journal of Medicine, 9/18/19

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**NATIONAL YOUTH TOBACCO SURVEY**: YOUTH USE OF E-CIGARETTES CONTINUES TO CLIMB

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**FLAVORS POPULAR AMONG HIGH SCHOOL USERS OF E-CIGARETTES**
WHAT WORKS FOR TEEN NICOTINE ADDICTION?

• Evidence reviews of smoking prevention and cessation show limited evidence for effectiveness of...
  anything...
• Primary Prevention is thus most critical... BUT

CLINICAL TREATMENT STRATEGIES

• Asking the right questions—Do any of your friends JUUL? Have you ever tried taking a hit?... Do you plan to try it?
• Experimenting with Vaping is NOT a right of passage. Experimentation should be treated as a clinical emergency...
• The recognition of addiction; prove you are not experiencing withdrawal by taking a one month holiday and see how you feel—concept of latency
• Counseling HAS been shown to be effective in adolescents
  • Almost doubles the chances of quitting
  • Free text messaging programs: TEXT QUIT to 202-804-9884
  • In my clinic, I've been using nicotine gum and patch to get teens off of JUUL with some success

SCHOOL-BASED STRATEGIES

• Tobacco and Vape Free zones
• Zero tolerance policies, combined with treatment options for nicotine addiction
• Brainstorm things to try: Amnesty day—help a friend clean out their JUUL. Refer a friend to help.
• Survey asking if you would love to help a friend clean out their JUUL. Refer a friend to help.
CONGESTIVE HEART FAILURE

You may even need open heart surgery for heart disease.

Emphysematous Lungs

Will you need to be on oxygen for the rest of your life when you develop this disease?

Probably
VAPING TONGUE

The tongues of some people that vape begin to look like this.

PARENTAL STRATEGIES

1. Talk about it early
2. Set clear expectations and consequences for breaking your rules
3. Kids should not keep a lot of cash at home—put it in the bank
4. Be careful with money—JUUL pod costs $4/day. “Dad, can I have money to buy food and drinks for my friends?” by handing them $20, you just bought them three JUUL pods and an $8 snack.
5. Get help early, at the first sign of any use. OR if friends are vaping.

E-CIG COMMUNITY AND STATE ADVOCACY STRATEGIES

- If you suspect any store is selling tobacco products to youth under 21, report them to the AG’s office 617-727-8400
- Encourage local Boards of Health to increase enforcement for selling to those under 21; revoke and retire license to sell
- Enact a tobacco and vape-free zone around all schools
- Urge local Boards of health to ban all flavored tobacco products including mint and menthol; State level...support H4089 (An Act Regulating Flavored Tobacco Products)
STUDENTS ARE ONLY AS SAFE AS THE COMMUNITIES WHERE THEY LIVE—WHITE SPACE WILL ALL FILL IN IF THE STATE BILL H4089 TO BAN FLAVORS PASSES

![Map of Massachusetts showing flavor regulations](image)

TAKE OUT YOUR PHONES: CALL YOUR LEGISLATORS

Find your legislators and their contact info here: [https://malegislature.gov/Search/FindMyLegislator](https://malegislature.gov/Search/FindMyLegislator)

FOR YOUR REP: I'm calling to ask that Representative ______ support House Bill 4089, Representative Danielle Gregoire's Act Regulating Flavored Tobacco Products as it stands now. To protect our kids, we must ban ALL flavored tobacco products, including menthol cigarettes, flavored cigars and chewing tobacco.

FOR YOUR SENATOR: I'm calling to ask that Senator ______ support Senate Bill 2357, Senator John Keenan's Act Regulating Flavored Tobacco Products as it stands now. To protect our kids, we must ban ALL flavored tobacco products, including menthol cigarettes, flavored cigars and chewing tobacco.

Speaker Deleo: 617-722-2500
Ways and Means Chair Michlewitz: 617-722-2990

ELECTRONIC CIGARETTES: SUMMARY

Youth should not be exposed to eCigs, eCig aerosol, eCig solution, or eCig advertising.

You can fight back against the tobacco industry.
Thank you!

Jonathan P. Winickoff MD, MPH
jwinickoff@mgh.harvard.edu

MOTIVATIONAL INTERVIEWING

• Promoting change by collaborating with students/families
• Guide them by helping them to find their own motivation, resolve ambivalence
• Guide them in setting goals and a plan
MOTIVATIONAL INTERVIEWING

- Patient-focused
- Ask open-ended questions
- Find common ground
- Non-judgmental
- Express empathy
- Define motivation, confidence and commitment for change

HISTORY IS REPEATING ITSELF
SMOKING TO VAPING TO JUULING
JUUL sells products with nicotine contents of 3-5%. Five percent content of nicotine is equivalent to smoking a pack of cigarettes.

Why is this dangerous?

Hazardous carcinogens and toxic chemicals found in cigarettes:
- Formaldehyde (carcinogenic)
- Benzene (carcinogenic)
- Acrolein (can damage DNA)

Nicotine in cigarettes is associated with damage to lung endothelial cells, which can lead to inflammation.

JUUL uses “nicotine salts” that more closely resemble the natural structure of nicotine found in tobacco leaves. The nicotine is more readily absorbed into the bloodstream.

Nicotine and these toxic chemicals may harm adolescent brain development.

Nicotine is highly addictive – vaping may serve as a “gateway” to regular cigarette use.
- Younger age of initiation increases the likelihood of becoming a lifetime vaper.


