Dartmouth Health

Project ECHO

MCD Global Health

WELCOME to

Hooked on a Cloud: Youth Vaping Products, Risks, and Intervention Opportunities ECHO

Session 1, Vaping 101: What vapes are today, what they look like, and what's inside
September 24, 2025

Funding Statement

This program is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $474,667 annually with 100% funded by HRSA/HHS under award number UU7TH54328-01-00. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA/HHS, or the U.S. Government.

Series Learning Objectives

1. Explain the prevalence, basic physiology, pharmacology and health effects of nicotine vaping, including evidence-based interventions for vaping cessation and harm reduction.
2. Communicate comfortably and effectively with youth about vaping in order to engage them in reflection on use and movement towards elimination.
3. Advocate for policies at Federal, State and local levels aimed at reducing youth engagement in vaping.

Series Sessions

Date	Session Title
9/24/2025	Vaping 101: What vapes are today, what they look like, and what's inside
10/8/2025	Vaping 101: Physiology and health effects
10/22/2025	Interventions for vaping: Behavioral health strategies and medications
11/5/2025	Interventions for vaping: Apps, websites, and other self-guided strategies
11/19/2025	Strategies to engage youth and young adults in conversations about vaping
12/3/2025	Vaping influences: Industry, peers and policy

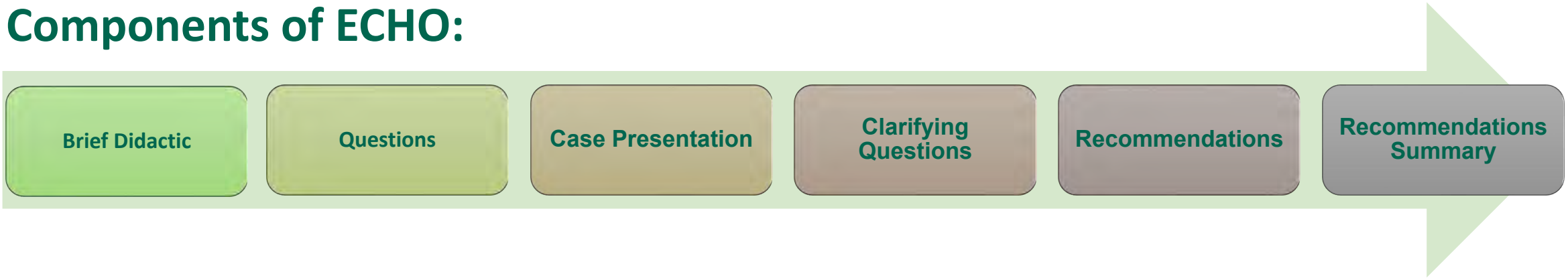
Today's Program

- Brief housekeeping
- Didactic: Vaping 101: What vapes are today, what they look like, and what's inside
  - Hilary Schuler, Maggie Coleman
- Case Presentation:
- Discussion
- Summary
- Up Next

Project ECHO (Extension for Community Healthcare Outcomes)

- All teach, all learn.
- ECHO is a telementoring model that uses virtual technology to support case-based learning and to engage the wisdom and experience of all attending.
- Highly Interactive.

Components of ECHO:



Notes

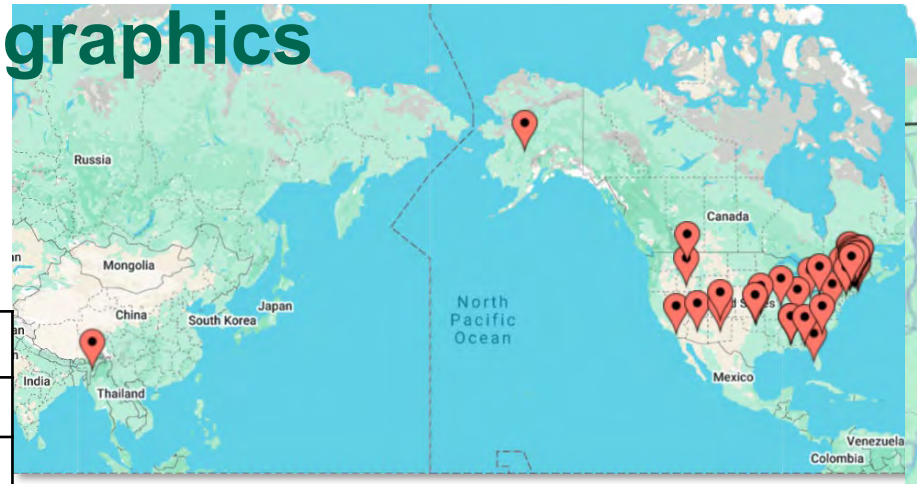
- Raise virtual hand or enter comments in chat at any time. We will call on you when it works. Please mute otherwise.
- To protect individual privacy, please use non-identifying information when discussing cases.
- We will be recording the didactic part of these sessions. *Participating in these session is understood as consent to be recorded. Thank you!*
- Closed Captioning will be enabled during sessions
- Questions to ECHO Tech Support thru personal CHAT or ECHO@hitchcock.org

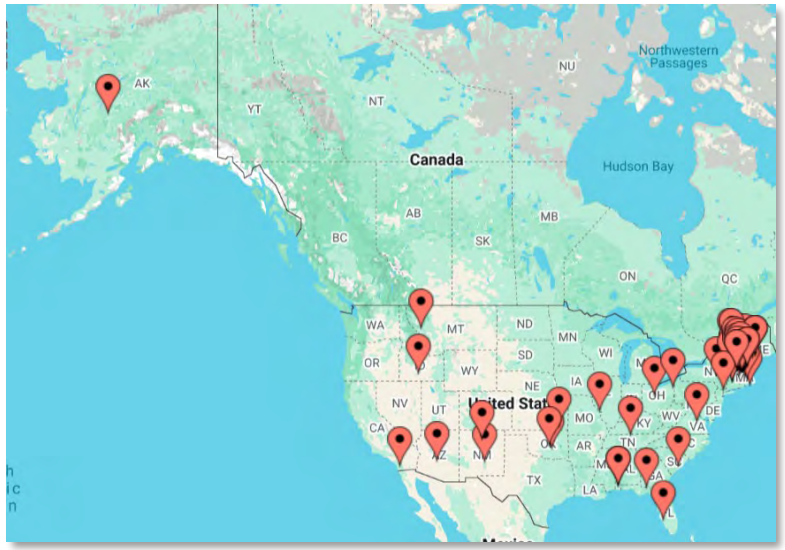
CME/CNE

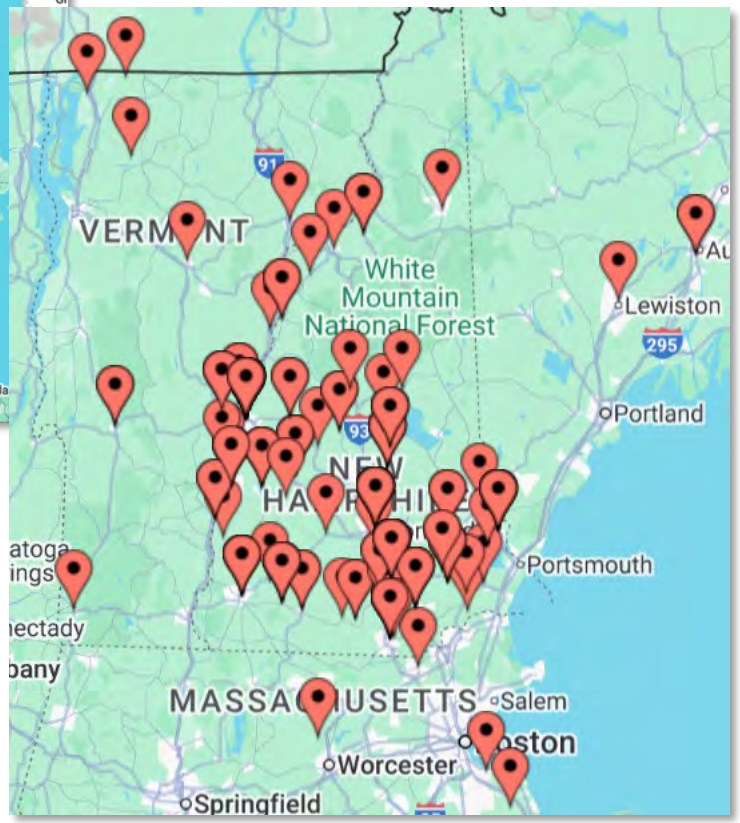
- One hour of free CME/CNE is available for every session attended, up to 6 sessions.
- Track participation via DH iECHO site
- A link will be provided at the end of the course to submit your attendance and claim your CME/CNE
- No relationships to disclose among planners, panel, speakers

ECHO Participant Demographics
Total Registrants: 235

Professional Identities	
Nurses	90
School Administration and Teachers	46
Behavioral Health Professionals	32
Administration	27
Other Healthcare	13
Physicians	6
Other	27







Core Panel

Alex Fannin, MS, APRN	Tobacco Treatment Specialist, Dartmouth Health
Brenna Morgan	Youth Voice and ECHO Facilitator
Caroline Christie, LICSW	Clinical Social Worker, Dartmouth Health
Hilary Schuler	Population Health Coordinator, Dartmouth Health
Maggie Coleman	Population Health Coordinator, Dartmouth Health
Sue Tanski, MD, MPH	Pediatrician, Dartmouth Health

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Vaping 101: What vapes are today, what they look like, and what's inside

Hilary Schuler
Senior Population Health Coordinator, DHMC

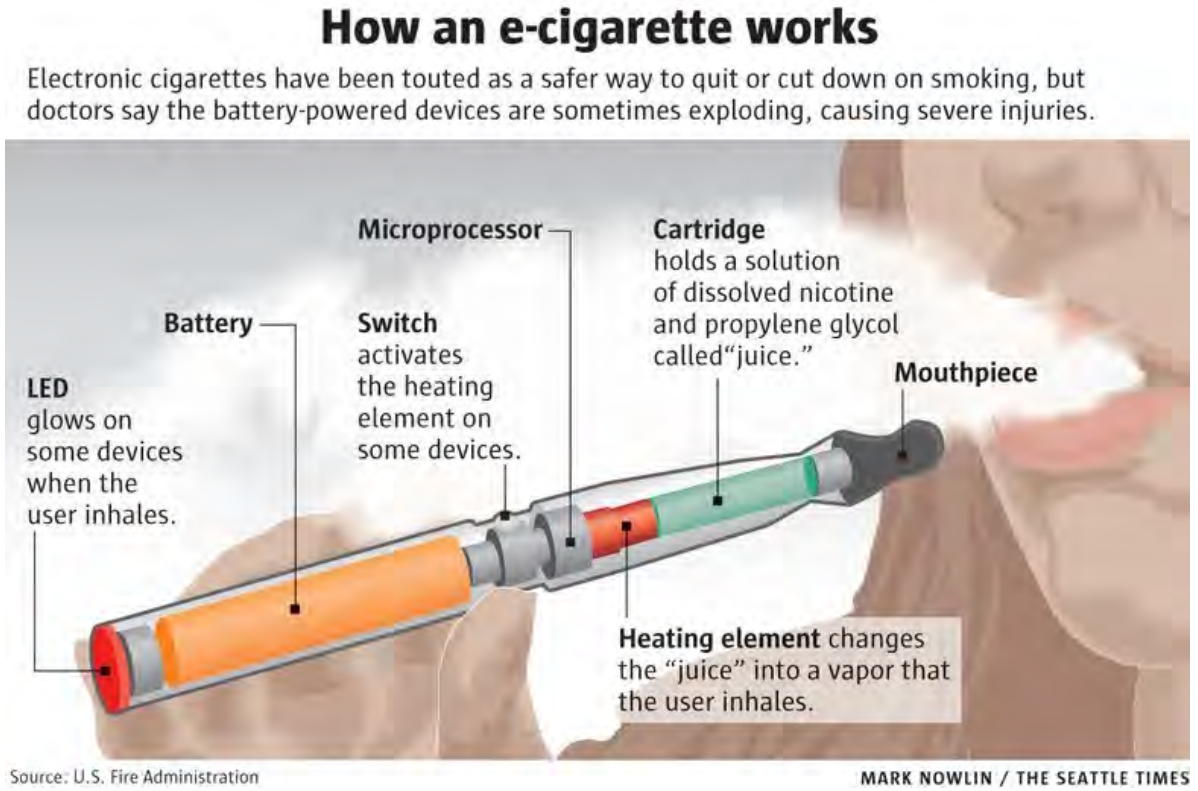
Maggie Coleman, MPH
Senior Population Health Coordinator, DHMC

Agenda

- Vaping 101
  - What is a vape?
  - What do vapes look like in 2025?
  - What's inside?
- Case discussion

What is a vape?

- “Vapes” or “e-cigs,” are electronic devices that heat liquid and produce an aerosol that is inhaled into the lungs.
- They contain a battery, a heating element, and a place to hold a liquid.
- The liquid or “e-juice” in vapes often contains nicotine, chemicals that help produce the aerosol, and artificial flavorings.
- People who use vapes breathe and exhale the aerosol produced when the vape heats this liquid.



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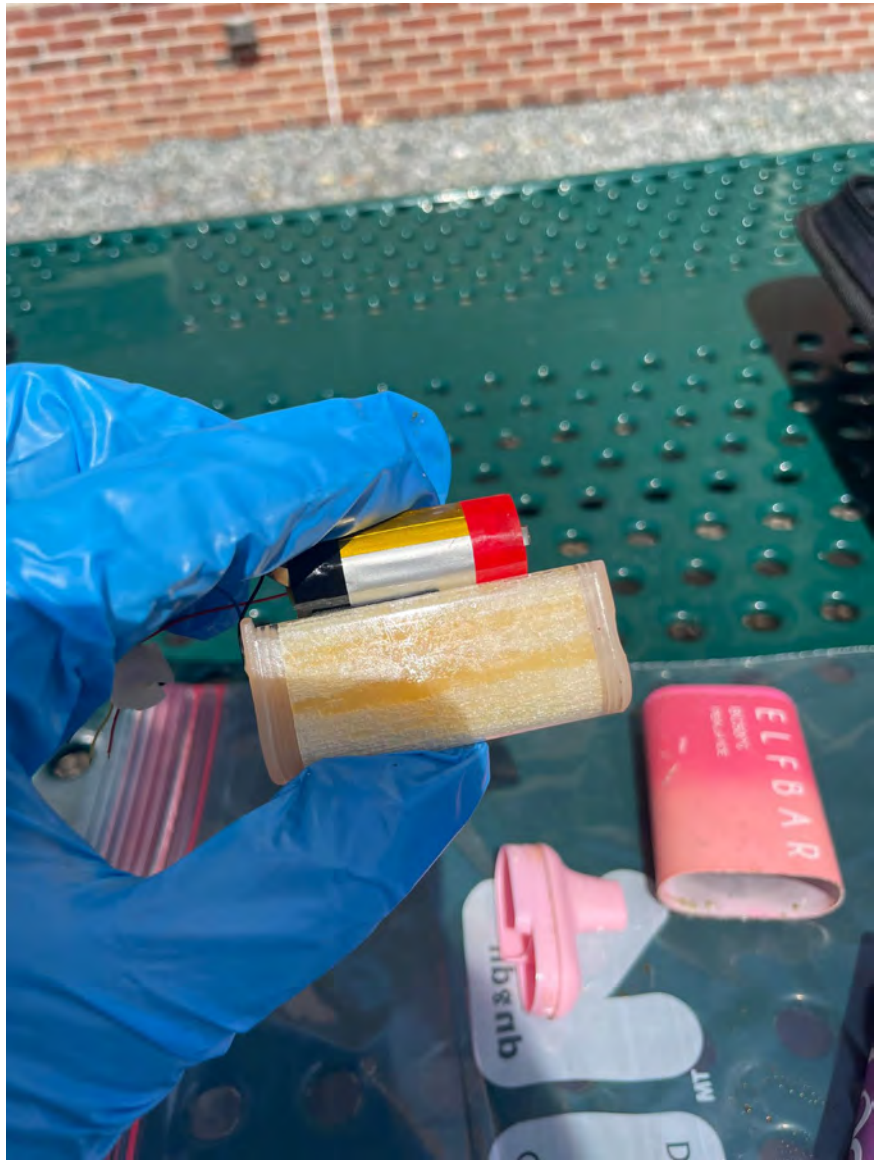


What do vapes look like nowadays?

ELF BAR
(36.1%)

BREEZE
(19.9%)

MR. FOG
(15.8%)

VUSE
(13.7%)

JUUL
(12.6%)

Source: [Dartmouth Health Vaping Education and Resources Toolkit]

Using a vape

- Vapes are small, easily tucked away, and both subtle and quick to use: the aerosol they produce disappears rapidly after being exhaled into the air.
- Vaping devices can also be modified to look like everyday objects, making them easy to disguise.
- We're now also seeing gamification of vape use through Bluetooth enabled digital "pet" vapes.

source

source

source

Stanford MEDICINE
REACH Lab

CIGS IN AN E-CIG

TOBACCO PREVENTION TOOLKIT

1 Pack of Cigarettes
= ~22mg of Nicotine

~20
CIGARETTES

1 JUUL Pod
= ~41.3mg of Nicotine

~37
CIGARETTES

1 Flum Float
= ~400mg of Nicotine

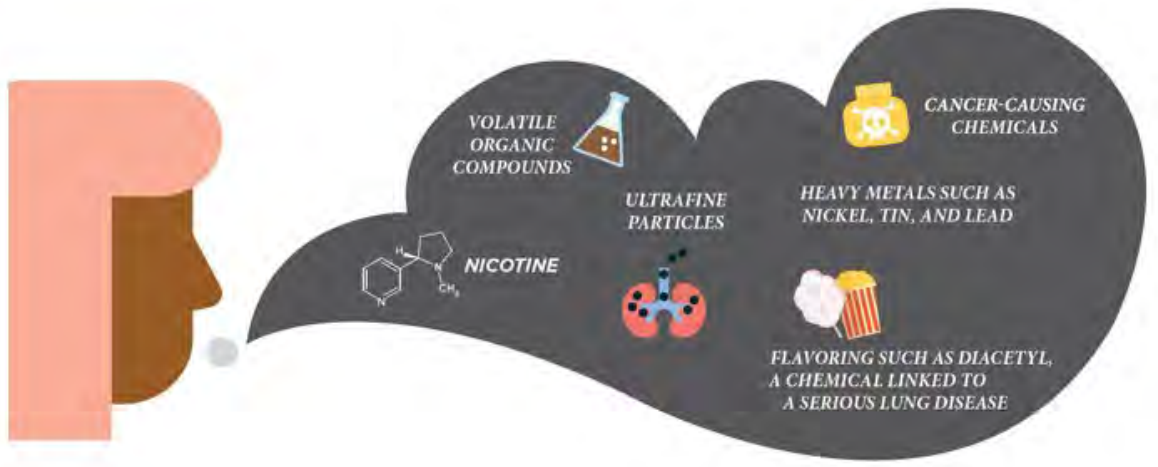
~363
CIGARETTES

1 Elf Bar
= ~650mg of Nicotine

~590
CIGARETTES

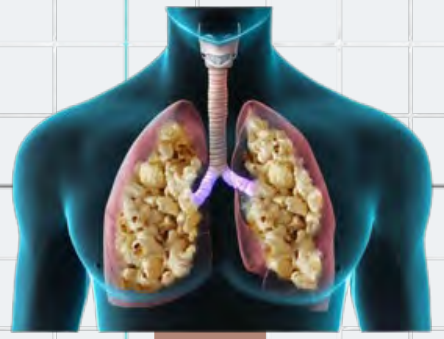
What else is inside?

- E-cigarette aerosol is ***NOT*** harmless “water vapor.”
- The e-cigarette aerosol that users breathe from the device and exhale can contain harmful and potentially harmful substances, including:
  - Nicotine
  - Ultrafine particles that can be inhaled deep into the lungs
  - Flavorings such as diacetyl, a chemical linked to a serious lung disease
  - Volatile organic compounds
  - Cancer-causing chemicals
  - Heavy metals such as nickel, tin, and lead1
- The aerosol that users inhale and exhale from e-cigarettes themselves and bystanders to harmful substances.
- Disposal/battery concerns



Source: CDC’s Quick Facts on the Risks of E-Cigarettes for Kids, Teens, and Young Adults

What's in that E-cig?



Diacetyl
(butter flavor)

Benzene
(gasoline)

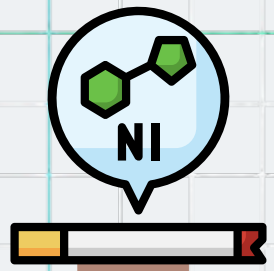
Cadmium
(batteries)

28
Ni
Nickel
58.693

Nickel
(cheap jewelry)

Lead
(car batteries)

Toluene
(paint thinner)



Nicotine
(tobacco)

N-Nitrosonornicotine
(pesticides)

Formaldehyde
(dead tissue preservative)

Key Resources

- DH Vaping Resource Folder and Youth Vaping Education and Resources Toolkit
- Stanford Medicine's Tobacco Prevention Toolkit
- My Life, My Quit (free and confidential cessation support for youth)

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Session 2, Vaping 101: Physiology and health effects

October 8, 2025

Vaping 101: Physiology and Health Effects

Susanne Tanski, MD MPH

Why do we care about vaping?

Nicotine Addiction,

initiation of combustible tobacco use/dual use

Unknown Health Risks (too soon to know)

Lung harms

(EVALI)

Exposes children, pregnant women, and non-users to secondhand aerosol

Diminishes the chances that a smoker will quit/

Discourages proven quit methods

Leads to relapse among former smokers

Environmental Waste

Results in poisonings among users or non-users

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"In a sense, the tobacco industry may be thought of as being a specialized, highly ritualized and stylized segment of the pharmaceutical industry. Tobacco products uniquely contain and deliver nicotine, a potent drug with a variety of physiological effects."

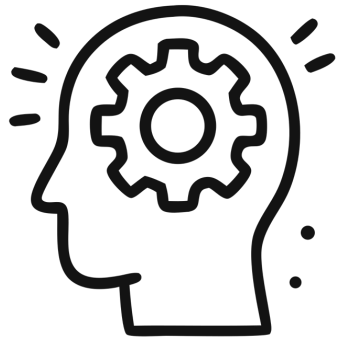
~Claude Teague Jr., Philip Morris, 1972

Similarly, vapes are providing a potent drug from an unregulated, unlicensed source that is only interested in profit…

Why Do People Use Tobacco? Nicotine is a psychotropic (drug that affects mental state) & makes users feel good.

Nicotine has complex impacts on the brain and body :

- Stimulant at low doses and a depressant at high doses



Stimulates memory and alertness.

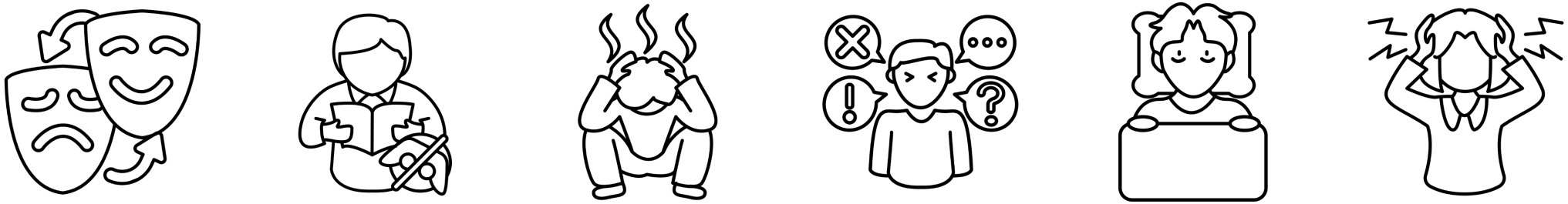
Many people feel a **sense of well-being.**

Decreases appetite.

Re-dosing prevents **withdrawal symptoms…**

Nicotine:
HIGHLY addictive, and abstinence leads to WITHDRAWAL:

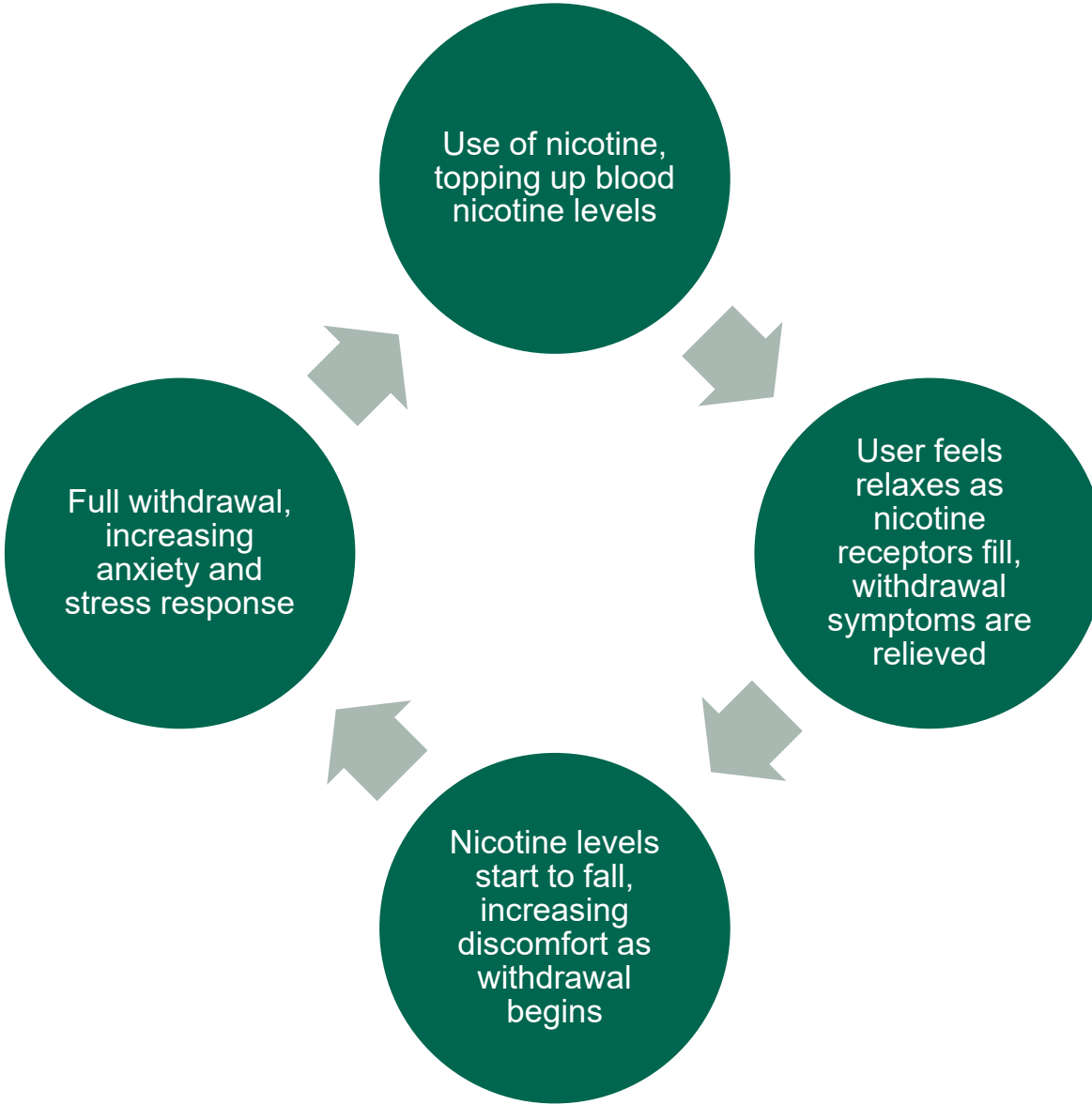
Irritability, frustration, anger, increased appetite, tremors, depression, insomnia, anxiety, difficulty concentrating



Business Insider Infographic, October 6, 2016

Stress and Nicotine: a behavioral reinforcer

- **STRESS** is the leading reason for relapse for all drugs.
- Nicotine users feel that use **REDUCES STRESS** because abstinence from nicotine **CAUSES** stress:
  - Nicotine + stress (cortisol) changes the the absorption of the drug (decreased bioavailability so need to use more) and the way it works (so it is more rewarding in times of stress).



Nicotine is *especially* addictive to youth, due to developmental stage, stress, social influence, etc.

Adolescents are developmentally primed for *drug use* and developmentally susceptible to *addiction*

- Why? Vulnerable time period due to brain development
  - Myelination, speeding up the highway
  - Synaptic pruning, trimming what isn't being used
  - Prefrontal cortex is not working (yet!)

Prefrontal cortex= "brakes"

Psychoactive Drugs

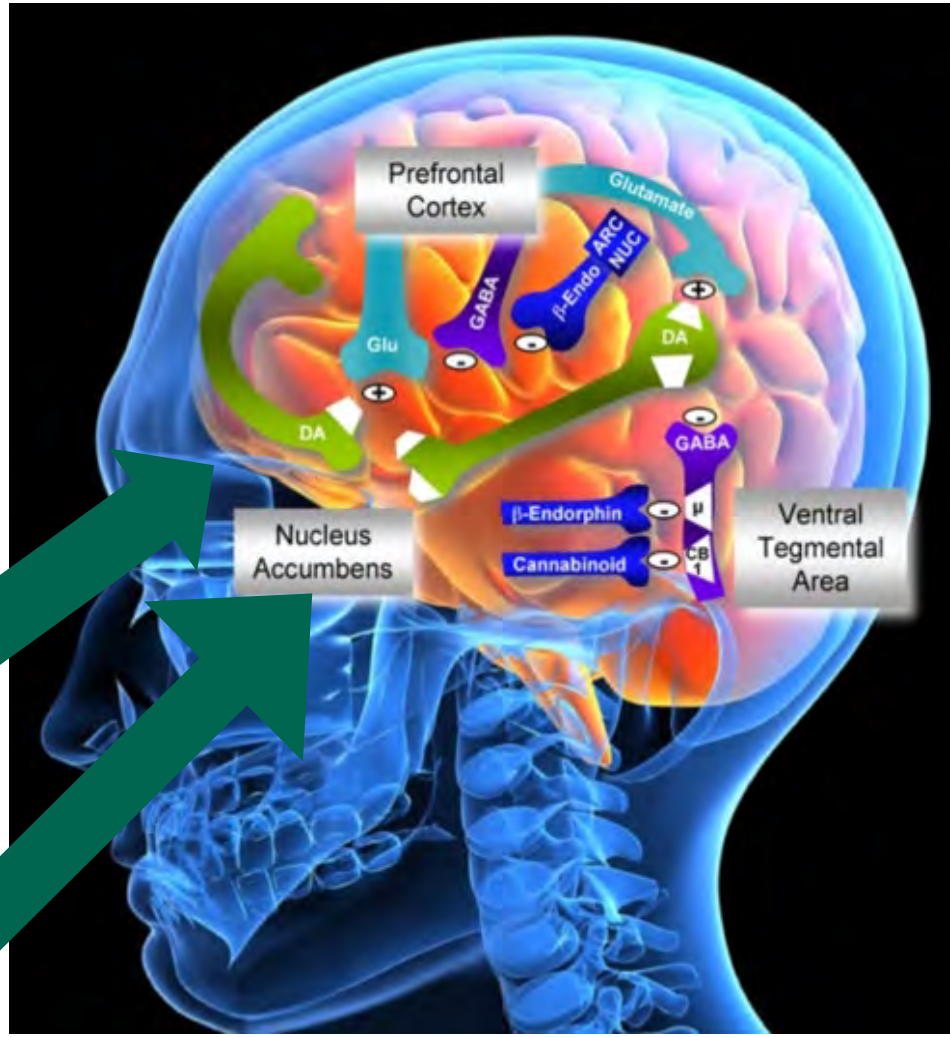
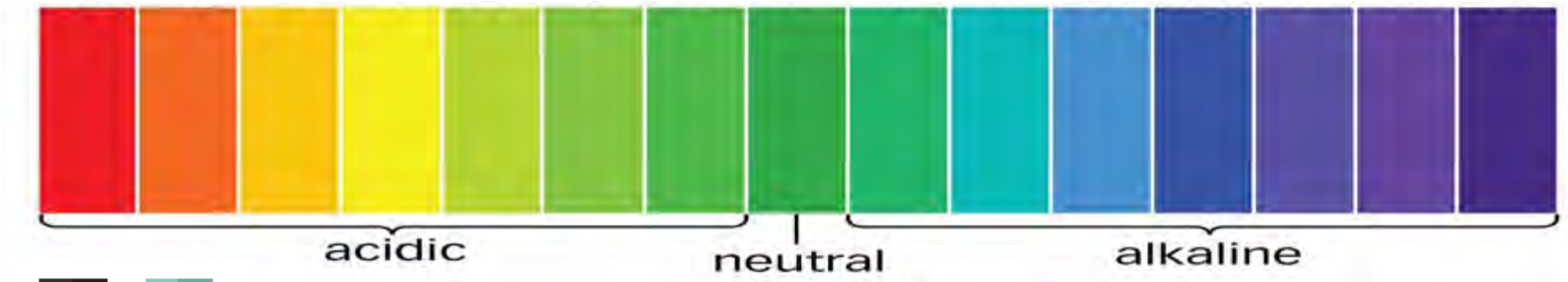


Image credit Professor Billy O'Connor, inside-the-brain.com

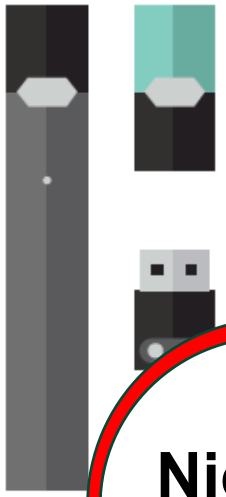
Delivery mode matters: lung is better than stomach, nose, mouth or skin

- The SPEED of drug delivery influences how rewarding it feels, and addiction potential
  - Blood delivers nicotine to the targets in brain and body
    - Nicotine can reach the blood through any surface
  - Lung surface area is about the size of a tennis court
  - Ultrafine particles can deliver nicotine deeper into the lung and cross from the lung to blood circulation faster

Chemistry matters too: JUUL figured out higher levels of nicotine to be inhaled more easily (without vomiting)



Nicotine delivered per pod/fill?? 20-90mg+++



Nicotine Salts

Benzoic Acid

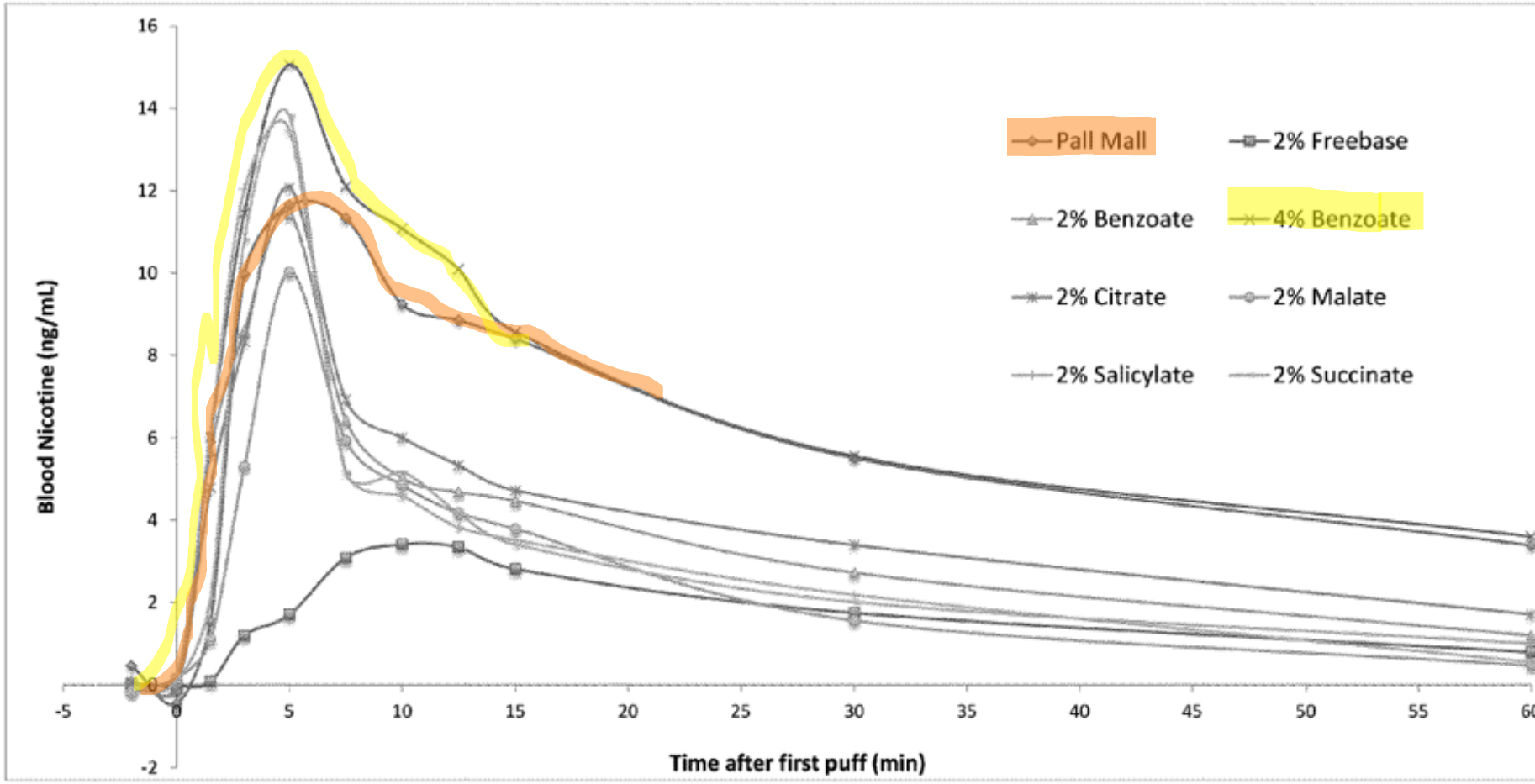
Free Base Nicotine

Nicotine *delivered* per cigarette ~0.7-1mg

Mimics Nicotine Delivery of a Combusted Cigarette

- Using the nicotine salt 4% benzoic acid enables much higher concentrations of nicotine – 5%

  – (56mg/mL)
- Improves the absorption to better simulate a cigarette



Bowen and Xing, US Patent 9,215,895
Juul Website, 2016

Nicotine Delivery of Cigarettes vs. Vaping Devices

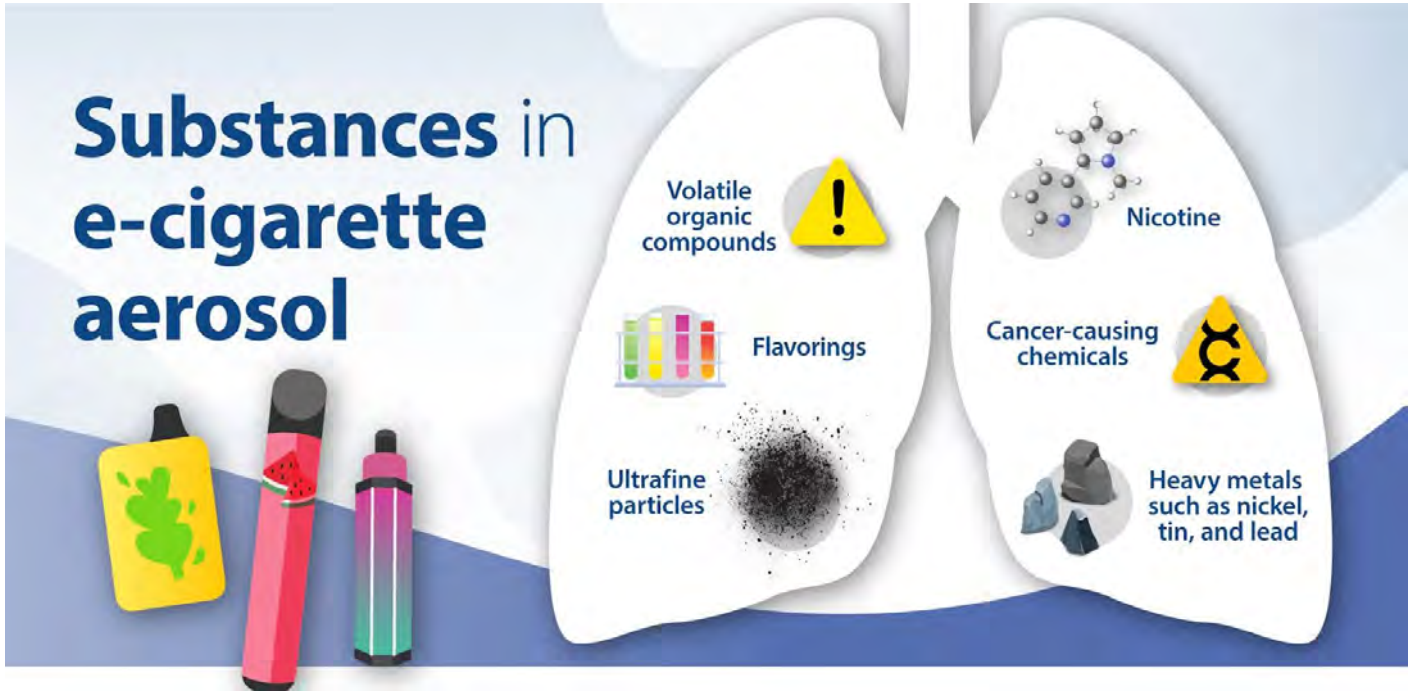
tobaccopreventiontoolkit.stanford.edu

TOBACCO PREVENTION TOOLKIT

1 Pack of Cigarettes ≈20 mg of nicotine	1 JUUL pod, 6% 0.7mL ≈42 mg of nicotine ? 20mg delivered	1 Suorin Air Plus pod, 3.5 mL 5x more than Juul	1 Hyde Rechargeable disposable, 7 mL 10x more than Juul	1 Mega Crave Rechargeable disposable “5500”, 12 mL 17x more than Juul	1 Elfbar Ice King Rechargeable disposable “30000”, 30 mL 28x more than Juul
					
20 CIGARETTES	**≈20?** CIGARETTES	**≈100?** CIGARETTES	**≈200?** CIGARETTES (that’s a carton…)	**≈340?** CIGARETTES (17 packs)	**≈560?** CIGARETTES (that’s a LOT…)
					

There are additional chemicals DELIVERED by e-cigarettes/vapes, many from the delivery system itself

- Humectant
- Flavoring
- +/- Nicotine
- Toxicants
- Carcinogens
- Metallic nano-particles (from the coil/heating element)
  - Other psychoactive ingredients (can also added by users)
  - Other medications: Melatonin? Essential oils?

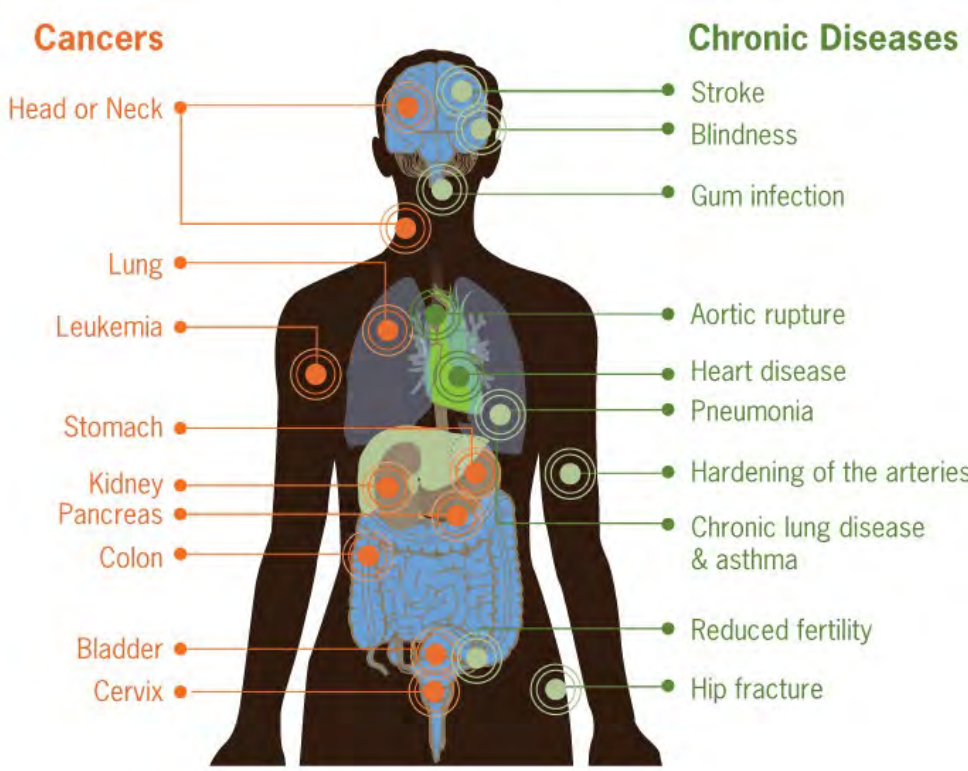


Unknown Health Risks

Toxic exposures of E-cigarettes to the user?

Puff for puff relative to combusted tobacco: MUCH LOWER RISK

- No tar, so far fewer carcinogens, but….
- Nicotine: cardiovascular consequences
- Ultrafine particles: cardiovascular, pulmonary and inflammatory effects
- VOCs/acrolein/formaldehyde/other aldehydes / flavoring chemicals: inflammatory effects, growing concerns for decreased lung function



Above: COMBUSTED tobacco risks

Relative to NO tobacco or medical NRT: MUCH CONCERN

Significant Concerns about Flavors: many at 1-2% of solution, with inflammatory, irritant or cytotoxic effects

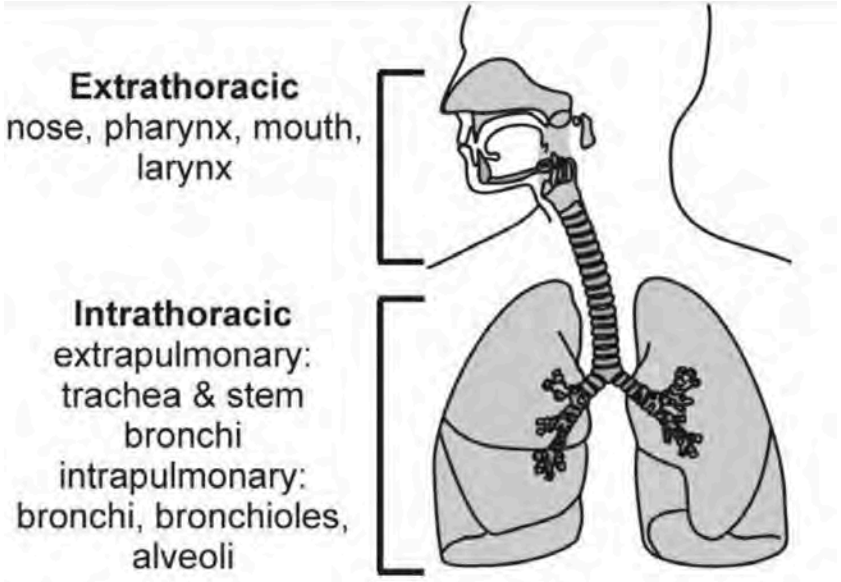
FLAVORS HAVE NOT BEEN TESTED FOR INHALATION SAFETY

100's of different toxicant profiles (combinations), most yet to be determined

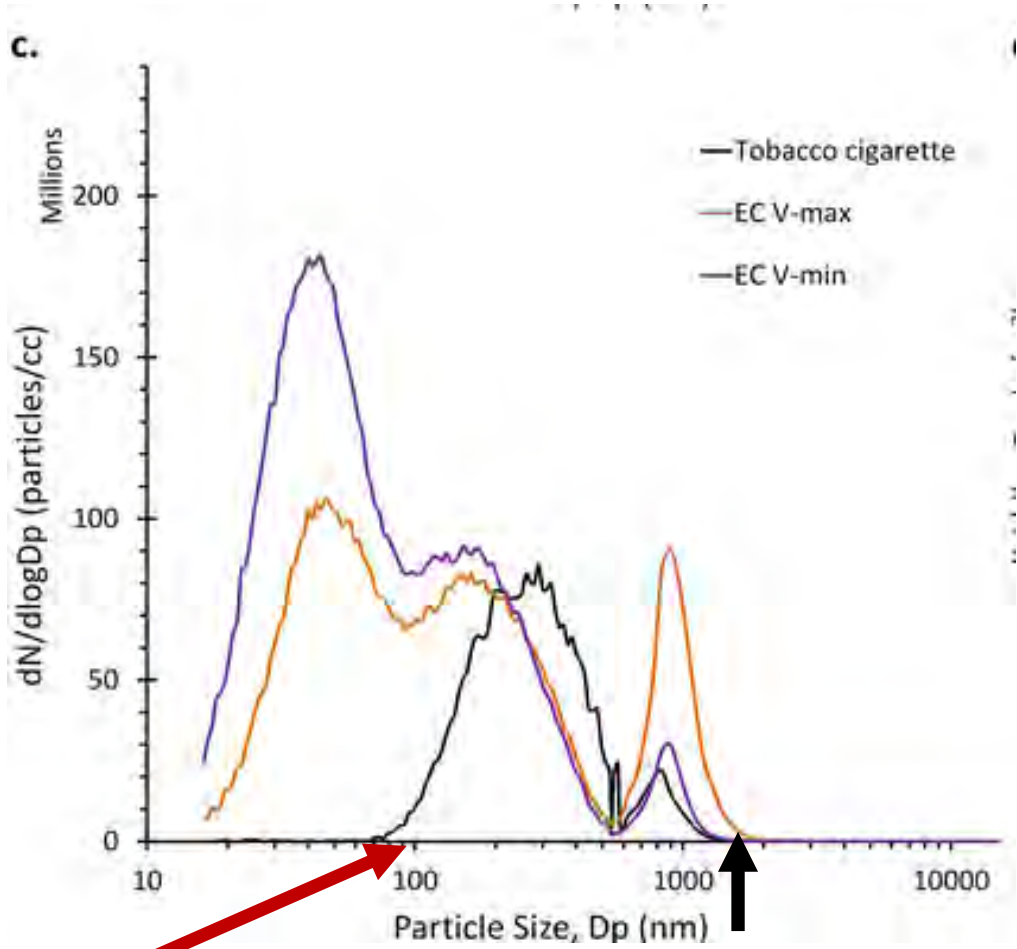
- Menthol (mint) – lots of studies - anesthestic
- Diacetyl (butter) – lung tissue destruction
- Cinnamaldehyde (Cinnamon) – cell death
- Benzaldehyde (fruit flavors) - irritant
- Furfural (sweet, sugar, caramel) – irritant, tumors on mice

Kaur et al, *Toxicology Letters*, 2018

Particle size affects respiratory tract deposition dose to tissues, potential toxicity and environmental behavior

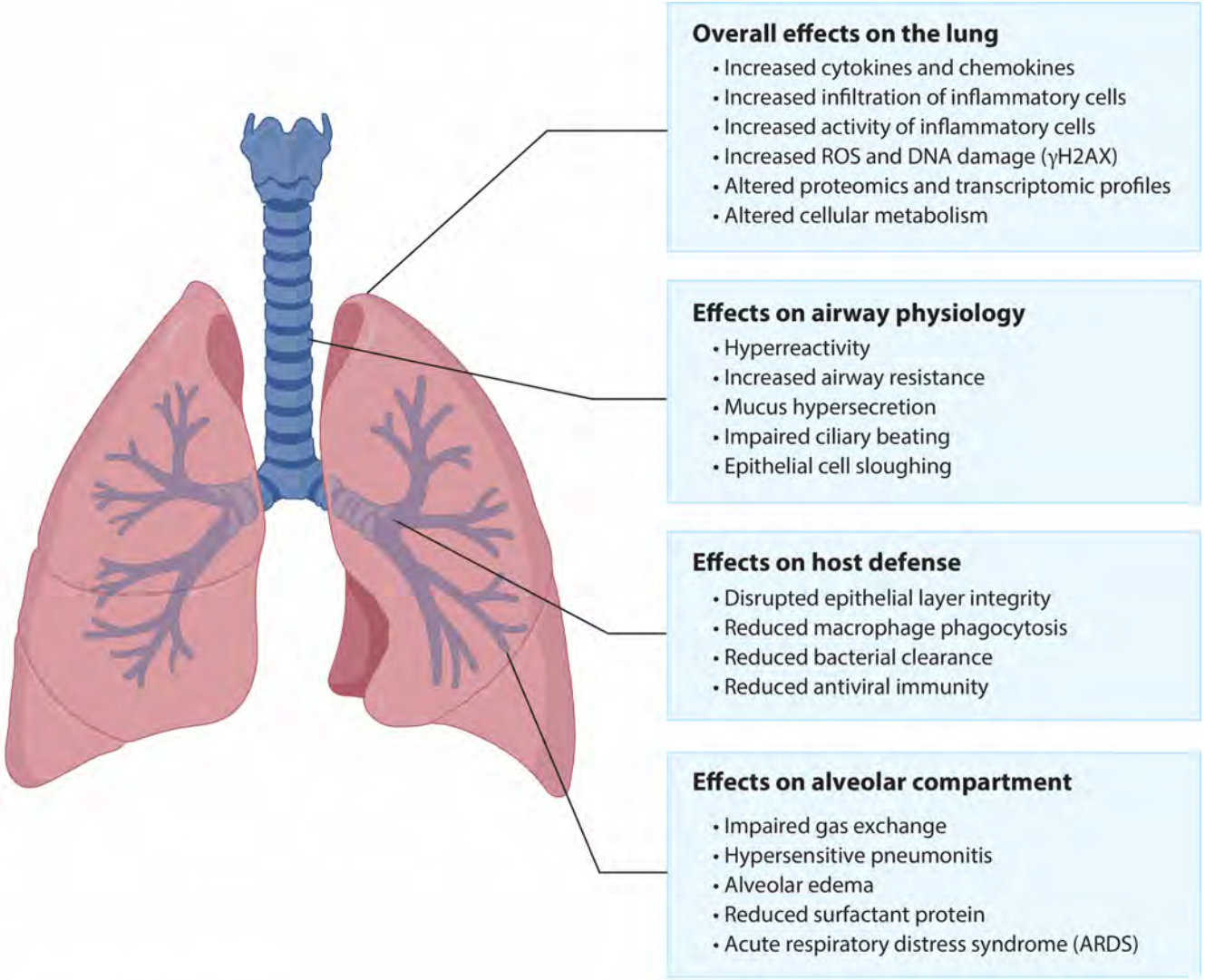


- **PM_{10}** : inhalable particles, with diameters that are generally 10 micrometers and smaller
- **$PM_{2.5}$** : fine inhalable particles, with diameters that are generally smaller than 2.5 micrometers. Can enter circulation through lung inhalation
- **Ultrafine particles** – 0.1 micrometer – greatest health effects, trigger inflammation, heart disease, stroke



Floyd et al. PLOS One 2018

Vape-induced inflammation effects lung function



Overall effects on the lung
- Increased cytokines and chemokines
- Increased infiltration of inflammatory cells
- Increased activity of inflammatory cells
- Increased ROS and DNA damage (γH2AX)
- Altered proteomics and transcriptomic profiles
- Altered cellular metabolism

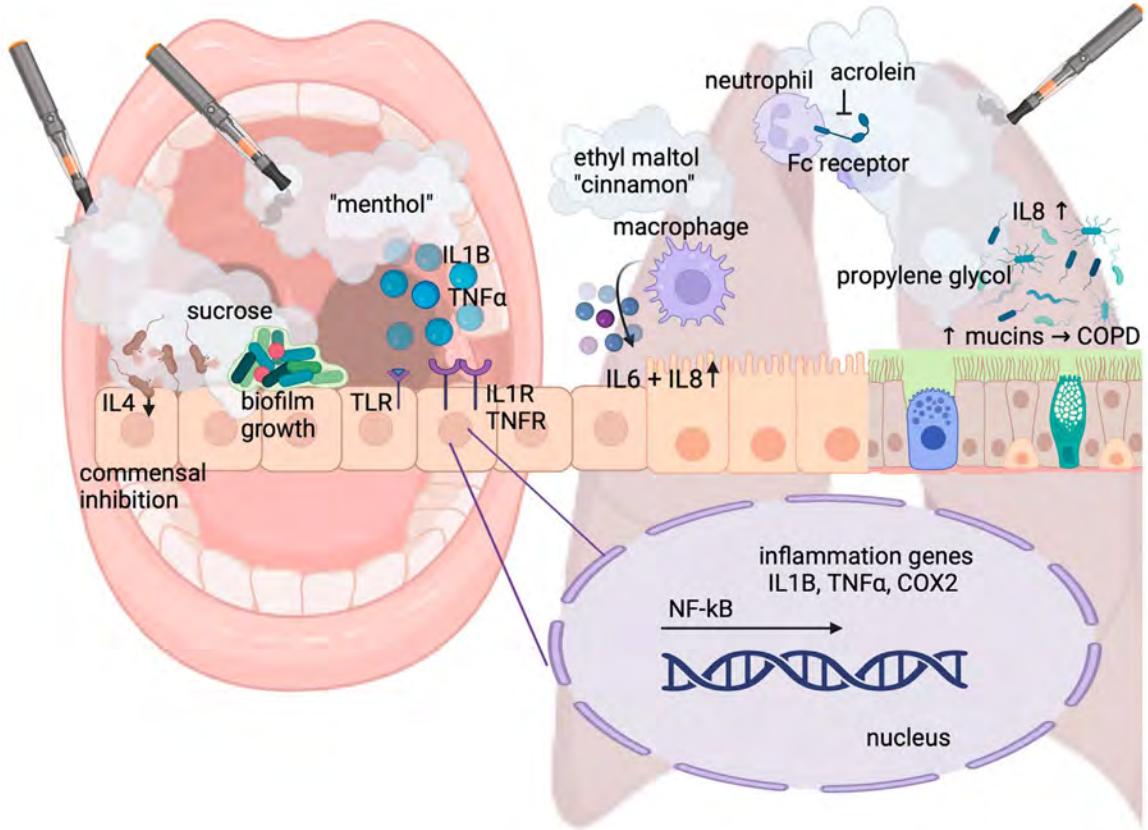
Effects on airway physiology
- Hyperreactivity
- Increased airway resistance
- Mucus hypersecretion
- Impaired ciliary beating
- Epithelial cell sloughing

Effects on host defense
- Disrupted epithelial layer integrity
- Reduced macrophage phagocytosis
- Reduced bacterial clearance
- Reduced antiviral immunity

Effects on alveolar compartment
- Impaired gas exchange
- Hypersensitive pneumonitis
- Alveolar edema
- Reduced surfactant protein
- Acute respiratory distress syndrome (ARDS)

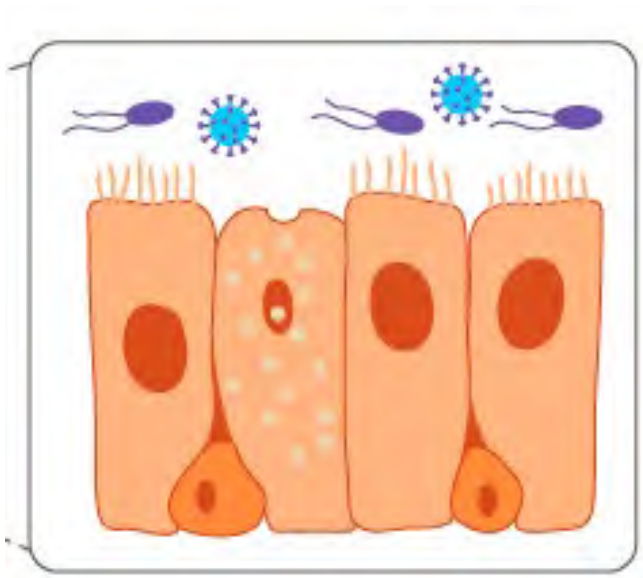
Park J-A, et al. 2022

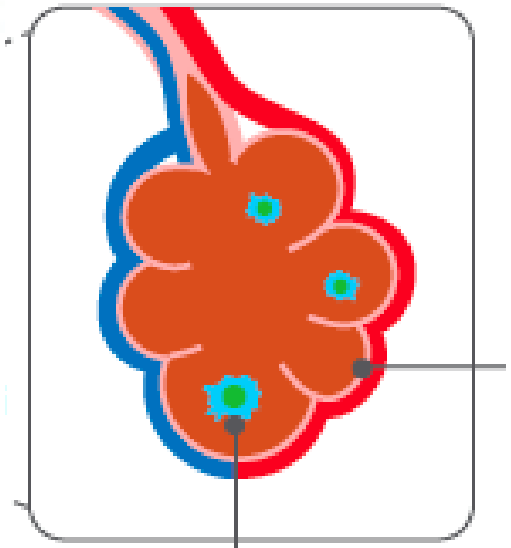
[Park et al, Annual Review of Physiology https://doi.org/10.1146/annurev-physiol-061121-040014]



Cells **2023**, *12*(21), 2552; [https://doi.org/10.3390/cells12212552]

Health Risks: Evidence for changes in lung function





PG/VG alone

- may dehydrate airway surface liquid, making it harder to clear small particles
- Can induce stress due to imbalance of hydration, causing inflammation which can disrupt mucous/surfactant balance

Nicotine

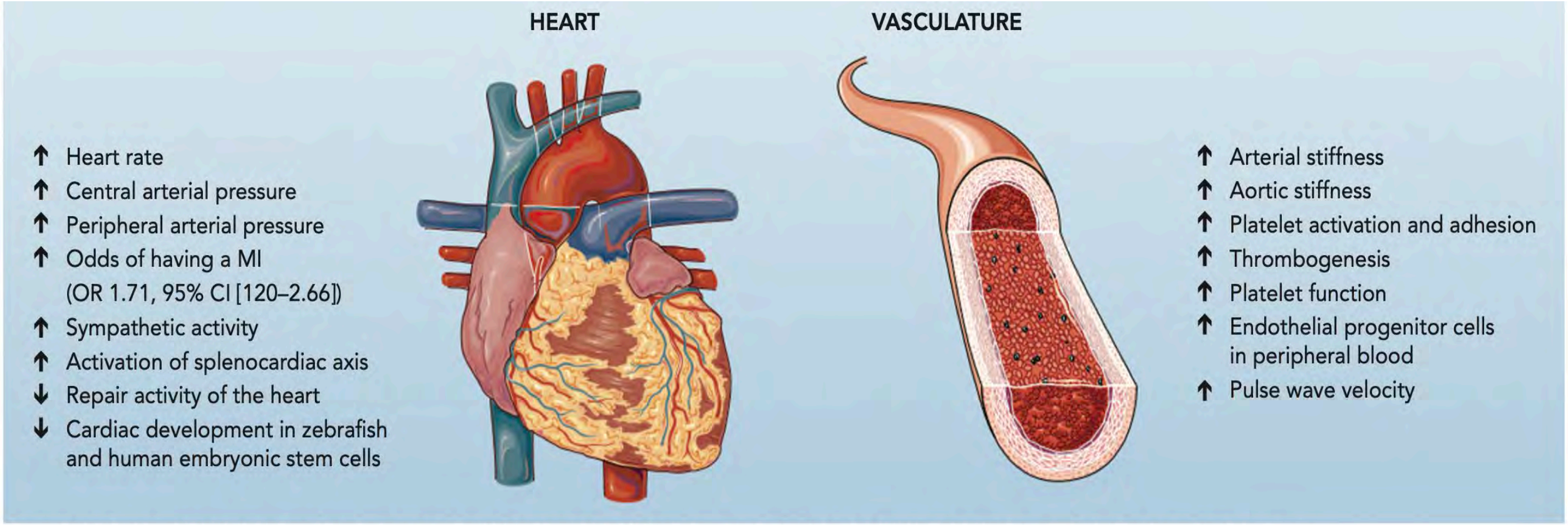
- Can make airways “twitchy” leading to wheeze and difficulty breathig

Flavorings

- Poison to cells in lung, inflammation

Gotts et al, *BMJ* 2019

Vape impacts on cardiovascular function – many related to nicotine alone



OR = odds ratio; Source: Central images kindly provided by Servier. Servier Medical Art is licensed under a Creative Commons Attribution 3.0 Unported License.

So what ARE we sure of?

- Nicotine is highly addictive and has powerful full-body effects
- The vaping industry seeks profit, and tunes their products to make customers
- Vaping carries much less risk than smoking, but long term risks are unknown
- We should support adolescents to NOT vape
- Quitting nicotine is hard

- That's what is coming up in the next ECHO sessions….

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Session 3 - Interventions for vaping: Behavioral health strategies and medications
October 22, 2025

Hooked on a Cloud: Youth Vaping Products, Risks, and Intervention Opportunities ECHO

Interventions for vaping: Behavioral health strategies and medications

Alex Fannin, APRN, TTS

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Brief Interventions

- A-C-T
  - Ask – about vape use
  - Counsel – talk about cessation
  - Treat – make a plan
- 5 As
  - Ask – about tobacco use
  - Advise – encourage cessation
  - Assess – what are their thoughts about quitting smoking
  - Assist – develop a quit plan
  - Arrange – follow up

Vaping Cessation Strategies

- Dual approach
  - Pharmacologic support
  - Behavior change

OTC Nicotine Replacement Therapy (NRT)

- Nicotine Patches
  - Provides 24 hour dosing
  - Available in 7 mg, 14 mg, and 21 mg
  - Most common side effects – skin irritation, vivid dreams/difficulty sleeping

- Nicotine Gum/Lozenges
  - Short acting, as needed dosing for cravings, Faster delivery than patches
  - Available in 2 mg and 4 mg
  - Most common side effects – nausea, hiccups, heartburn

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Prescription Nicotine Replacement Therapy

- Nicotine Inhaler
  - Short acting, as needed dosing, mimic hand to mouth behavior of smoking
  - Requires 80 puffs/20 minutes for full dosing
  - Most common side effects – coughing, mouth and throat irritation
- Nicotine Nasal Spray
  - Short acting, as needed dosing, fastest NRT delivery system
  - 0.5 mg per spray – 2 sprays (one in each nostril equals one dose)
  - Most common side effects – sneezing, nose and throat irritation

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Prescription Nicotine Replacement Therapy

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Prescription Nicotine Replacement Therapy

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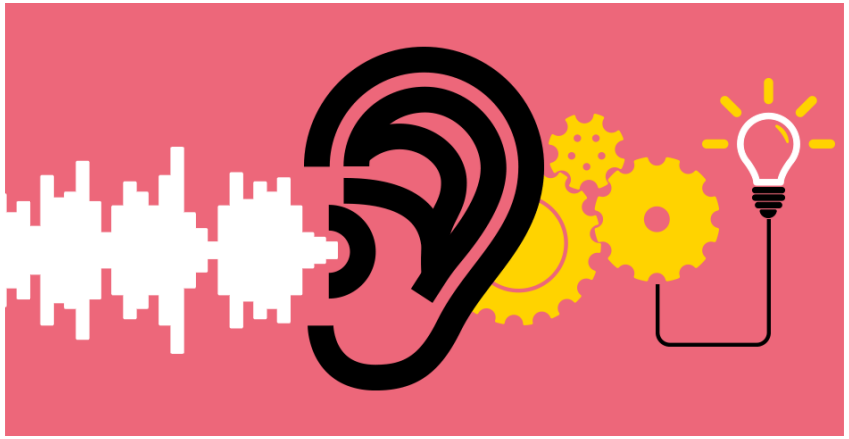
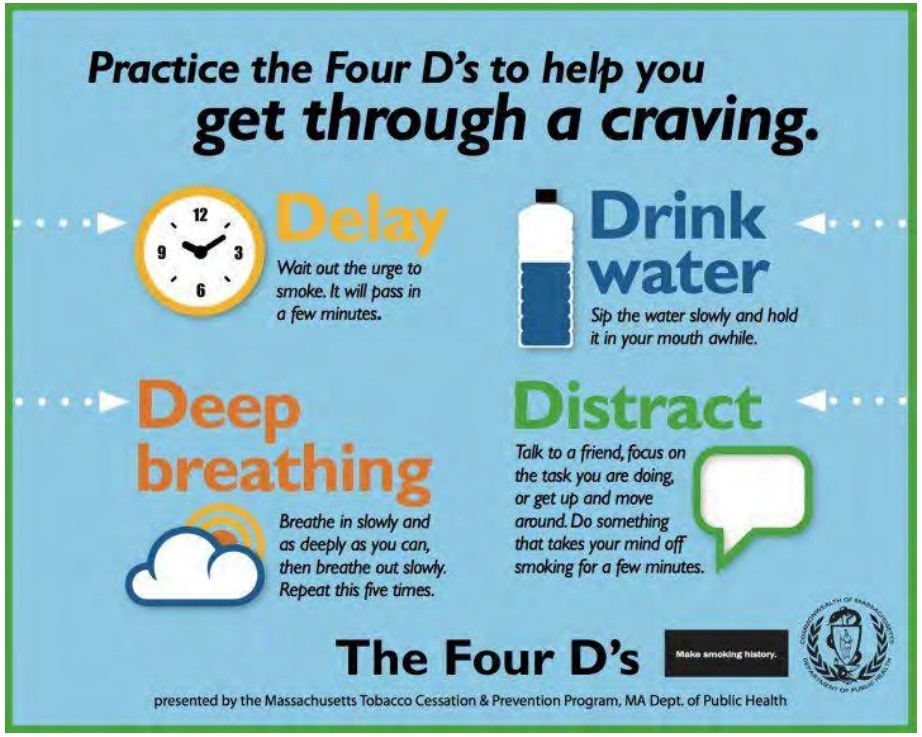
Behavior Change Interventions

- Motivational Interviewing – promoting change talk
  - Engagement – relationship establishment
  - Focusing – what is important to the youth
  - Evoking – youth's own motivation
  - Planning – developing a youth driven plan to quit
- Active Listening
  - Open ended questions
  - Affirmations
  - Reflections
  - Summaries



Behavior Change Interventions

- Be practical
  - Setting a quit date
  - Removing vapes, pods
  - Discussing coping strategies for withdrawal symptoms or cravings
  - Talking with support systems about quitting



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Behavior Change Interventions

- Adjusting daily routines or associated triggers:
  - First thing in the morning
  - Being at school
  - Spending time with friends

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Project ECHO

Behavior Change Interventions

- 5Rs – Not ready to quit
  - Relevance: why is quitting important for them
  - Risks: consequences
  - Rewards: benefits
  - Roadblocks: barriers/fears and ways to overcome them
  - Repetition: discuss at each follow up

Dartmouth Health

Project ECHO

MCD Global Health

WELCOME to

Hooked on a Cloud: Youth Vaping Products, Risks, and Intervention Opportunities ECHO

Session 4 - Interventions for vaping: Apps, websites, and other self-guided strategies

November 05, 2025

SMARTPHONE APPS FOR VAPING CESSATION

- Dartmouth Hitchcock medical center
- Vaping ECHO Series
- Mary.f.brunette@Hitchcock.org
- November, 2025

*Thanks to **Minda Gowarty** for some of these slides*

Presentation outline

- Why consider using apps for smoking cessation?
- Assessment of vaping cessation apps- content, engagability, access
- How can I incorporate an app into my vaping cessation practice with patients?

Why Apps?

- Scalable – improve access to treatment at low cost
- More intensive (potentially)
  - Available on-demand – any time, anywhere
  - Feedback and notifications for daily reminders and reinforcement in quitting efforts
- Culturally relevant for many
  - Ubiquity of smartphone usage
  - Popularity of apps
- Person-centered
  - Interactive and personalized content

Can apps really lead to behavioral change?

Yes! (if they have the right ingredients)

- Apps improved targeted outcomes across a variety of health-related behaviors (physical activity, medication management, etc.) (Zhao et al, JMIR, 2016)
- Most effective when:
  - Uses a behavioral change theory framework (e.g. Theory of Planned Behavior, Social Cognitive Theory)
  - Includes specific behavioral change techniques (e.g. self-regulation, prompting commitment, social reward, non-smoker/vaper identity)
  - Less time burden, user-friendly, real-time feedback, personalized, and ***involvement of health professional***

Theory of planned behavior

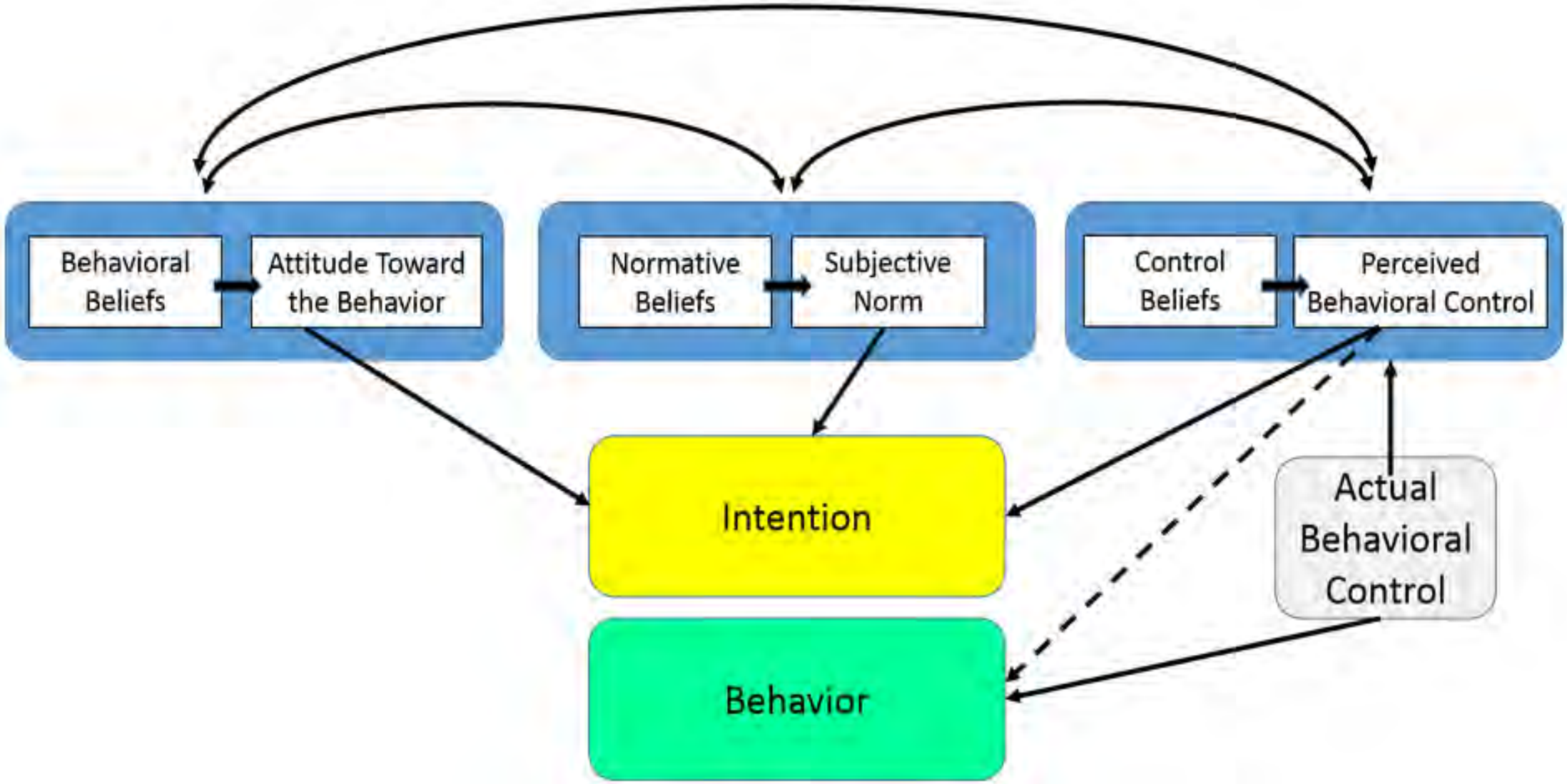


image from: Behavioral Change Models website BUSM

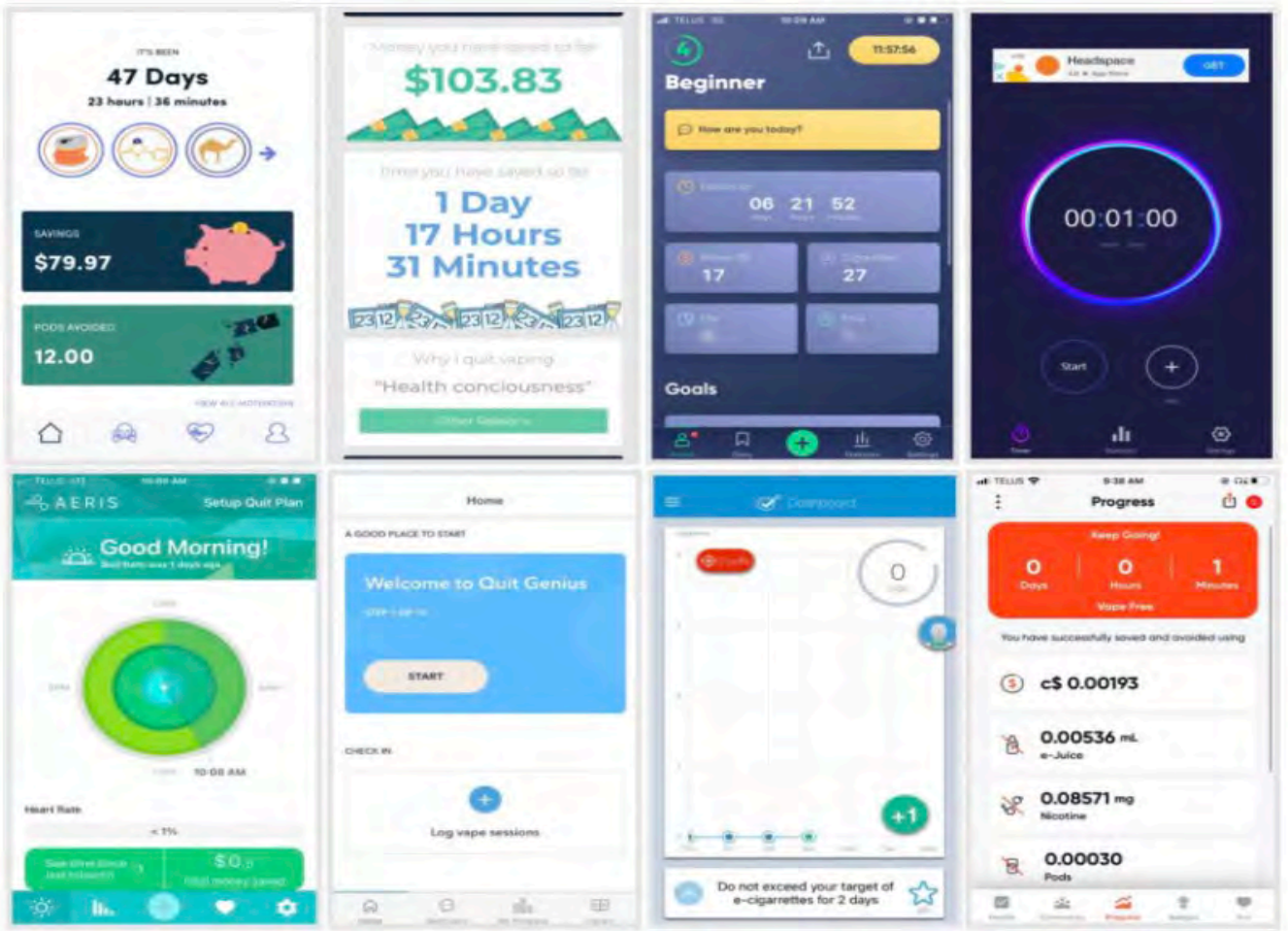
Vaping cessation app content and quality

- Evaluate quality, content, features of free vaping cessation apps
- Assess popularity and evidence-based adherence
- Systematic search in Dec 2020
- Inclusion: free, English-language apps targeting vaping cessation

- Eight publicly available apps
  - 3 vaping-specific,
  - 5 smoking cessation apps including vaping

Tested for one week and rated by experts

Figure 2.



Open in a new tab

Visual overview of the 8 apps included in the analysis.

How the apps were assessed

- **Features Examined**
  - Trackers, motivational tools common
  - Few features unique to vaping cessation (applicable to behavior change in general)
- **Adherence Index**
  - 14 items based on Canadian Smoking Cessation Guidelines
  - Items cover advising quitting, assessing readiness, offering quit tools
- **Behavior Change Techniques**
  - Apps include goal setting, tracking, encouragement
  - Similar approaches as smoking cessation apps

Evidence based content of vaping cessation apps

	KWIT	Quit Vaping for Good	Quit Vaping Addiction Calendar	Escape the Vape	Quit Genius	Smoke Watchers	Aeris
Assess willingness to quit	x	x	x		x		x
Assess nicotine dep		x		x	x		
Discuss benefits of quit	x	x	x	x	x		x
Offers tools and resources to quit	x	x	x	x	x	x	x
Enhance motivation	x	x	x	x	x	x	
Explore doubts /barriers	x				x		x
Form quit plan							x
Arrange f/u	x		x		x		
Index score	**12**	**8**	**9**	**7**	**10**	**7**	**10**

App rating scale scores

	KWIT	Quit Vaping for Good	Quit Vaping Addiction Calendar	Escape the Vape	Quit Genius	Smoke Watchers	Aeris
MARS[b] scores							
Engagement	4.1	3.8	3.4	3.53	3.1	2.9	2.6
Functionality	4.9	4.67	4.75	4.67	4.12	3.89	4.5
Aesthetics	4.83	4	4.5	4	3.83	4.17	3.67
Information	3.14	3.1	2.86	3.1	3.21	2.64	2.36
MARS total mean scores	4.24	3.89	3.88	3.82	3.57	3.4	3.28

Popularity

	KWIT	Quit Vaping for Good	Quit Vaping Addiction Calendar	Escape the Vape	Quit Genius	Smoke Watchers	Aeris
	Tracker	Tracker	Tracker	Tracker	Tracker	Other	Tracker
Ratings on Apple App Store	4.5 (1100)	4 (4)	0 (0)	3.4 (5)	4.3 (472)	0	2.3 (3)
Ratings on Google Play	4.5 (3000)	3.7 (248)	0 (0)	3.8 (6)	4.3 (2000)	3.7 (39)	3.9 (84)
# downloads google	100,000+	10,000+	100+	100+	100,000+	5000+	5000+

Some are still available, some require fees…

- For example:
  - KWIT - basic version is free, premium version for a charge
  - Escape the Vape - $7/month

National Cancer Institute Apps– Free

smokefree.gov/quit-vaping-dip/quit-vaping-resources

Website includes quit vaping content

QuitGuide

QuitGuide is a free app that helps you understand your smoking patterns and build the skills needed to become and stay smokefree.

quitSTART

The quitSTART app takes the information you provide about your smoking history and gives you tailored tips, inspiration, and challenges to help you become smokefree.

https://smokefree.gov/tools-tips/apps

APPS & WEBSITES FOR BEHAVIOR CHANGE ARE MORE EFFECTIVE WITH HUMAN SUPPORT

Although the interventions in each study were unique, they offer a window into the role of human support in facilitating engagement and outcomes with digital health. Authors of both studies noted that their digital approach offers scalability through reduced reliance on human support, yet humans still remained a critical factor "in the loop" for both.

quote from: Torous May 5, 2021 JAMA

Coaching someone to use an app for cessation

- Pick an app, try it for a week, make sure you like it, know the content and can coach some one to use it
- Help your patient download the app
- Open it and have them try several features with you
  - Strategies for coping with craving a vape
- Ask them to interact with it at least daily for a week and then check in with you
- At the check in, ask them about any barriers to using the app, help them overcome those barriers with hands on help.

Effectiveness depends on engagement

Figure 1. Average weekly log-in trajectory for each cluster from the (left) WebQuit (n=1240) arm and (right) Smokefree (n=1309) arm for first 16 weeks of use.

WebQuit

Smokefree.gov

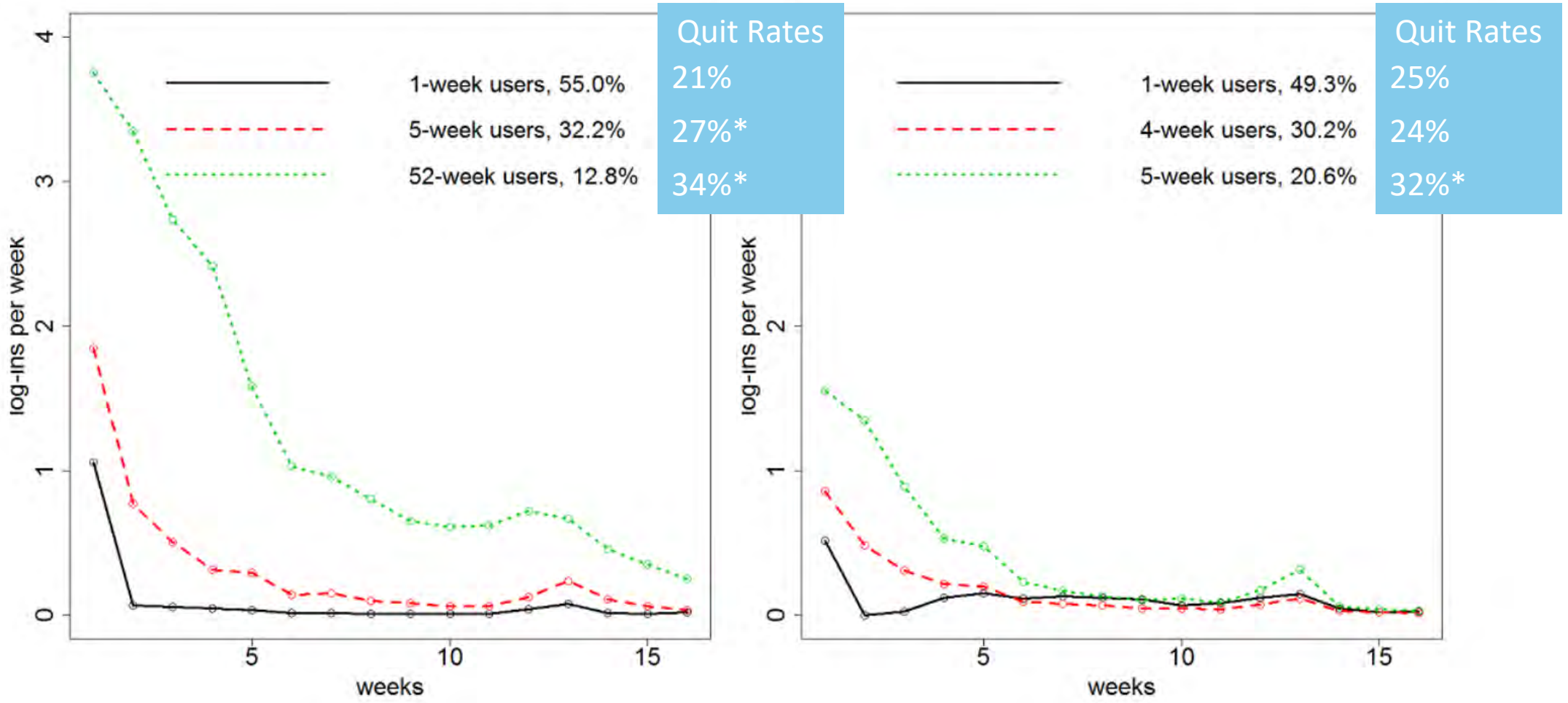


image from: Bricker et al 2018 *JMIR*

Cochrane Library

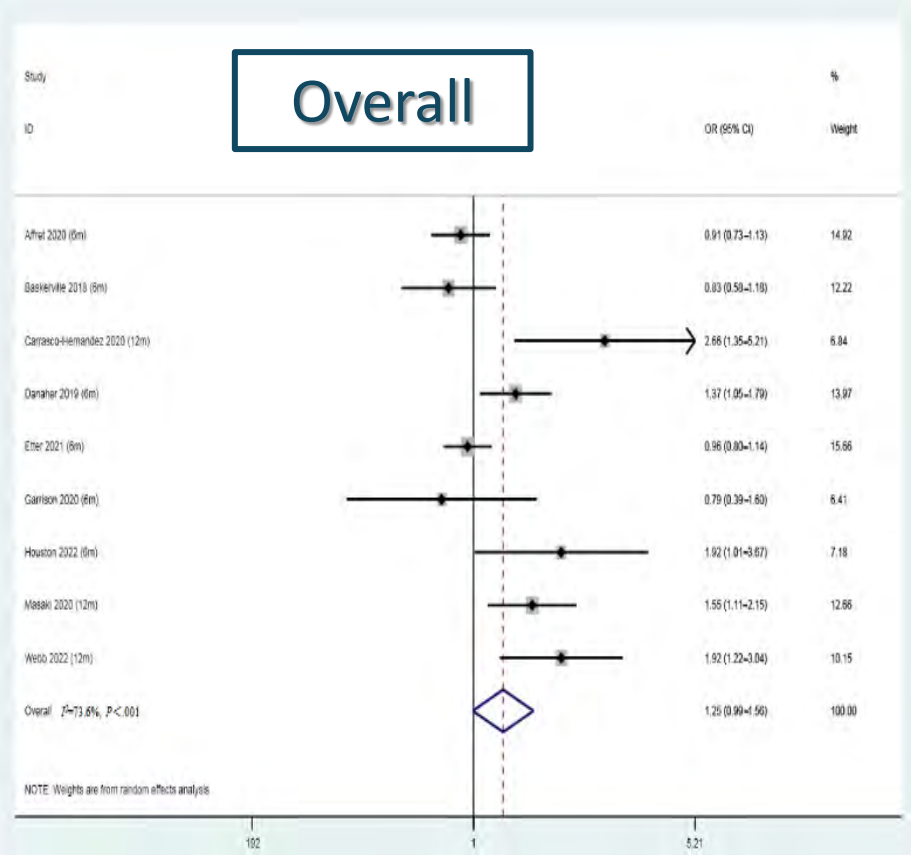
Trusted evidence.
Informed decisions.
Better health.

Cochrane Database of Systematic Reviews

[Intervention Review]

Mobile phone text messaging and app-based interventions for smoking cessation

Robyn Whittaker[1], Hayden McRobbie[2], Chris Bullen[1], Anthony Rodgers[3], Yulong Gu[4], Rosie Dobson[1]



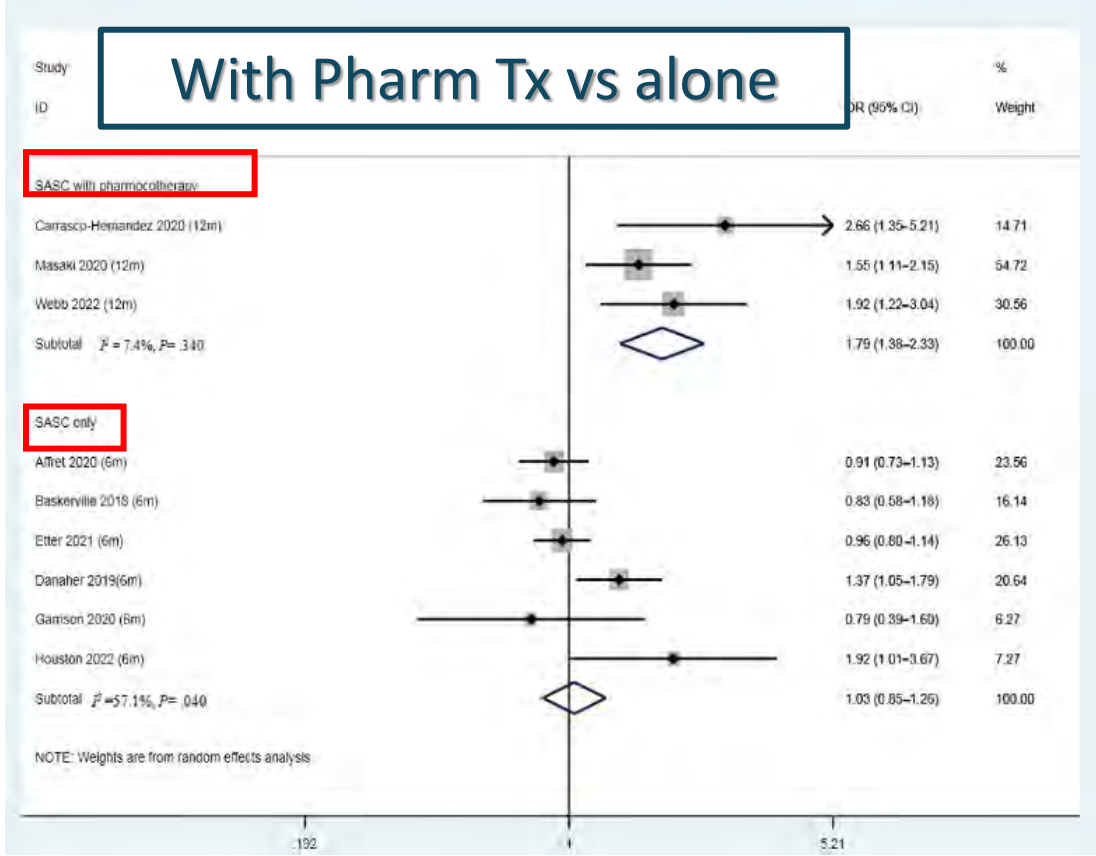


image from: Guo et al 2023 *JMIR*

APP ADVISOR

An American Psychiatric Association Initiative

The App Evaluation Model

Evaluation Model Screener

The below Model is comprehensive. This brief version of the Model extracts a sample of the most fundamental questions that should be asked before considering using an app, and can serve as a good "jumping off" point to get you started:

1. On which platforms/operating systems does the app work? Does it also work on a desktop computer?
2. Has the app been updated in the last 180 days?
3. Is there a transparent privacy policy that is clear and accessible before use?
4. Does the app collect, us, and/or transmit sensitive data? If yes, does it claim to do so securely?
5. Is there evidence of specific benefit from academic institutions, end user feedback, or research studies?
6. Does the app have a clinical/recovery foundation relevant to your intended use?
7. Does the app seem easy to use?
8. Can data be easily shared and interpreted in a way that's consistent with the stated purpose of the app?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps/the-app-evaluation-model

Questions/clarifications?

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WELCOME to

Hooked on a Cloud: Strategies to Engage Youth and Young Adults in Conversations About Vaping

Session 5 - Using Therapeutic Interventions and Connections to Begin the Conversation

November 19, 2025

Dartmouth Health

Project ECHO

Hooked on a Cloud: Youth Vaping Products, Risks, and Intervention Opportunities ECHO

Strategies to Engage Youth and Young Adults in Conversations About Vaping

Caroline Christie, LICSW Dartmouth Health, Child and Adolescent Psychiatry

Objectives

Understand how youth prefer to be approached about vaping

Use Motivational Interviewing (MI) to open conversations

Apply Stages of Change to tailor interventions

Practice nonjudgmental, connection-first approaches

Dartmouth Health

Project ECHO

What our teenagers and young adults wish we knew…

Don't freak out

Don't assume…anything

Getting in trouble doesn't help me quit

If you yell, I don't want to talk anymore

If you smoke or vape, I don't want to hear it

Maybe try and help me instead of being angry

Ask me before you think you know everything

Dartmouth Health

Project ECHO

Key Message:

Youth Want:
Relationship first communication
Respect
Curiosity
And Real Information

DARE is OVER

WHY HAVE THESE CONVERSATIONS???

Silence doesn't protect them—connection does.

Teens are in a stage of rapid brain development.

Tough conversations build trust—not conflict—when done with curiosity.

Teens are already encountering high-risk situations.

Talking about hard stuff reduces shame and secrecy.

Conversations improve long-term outcomes.

Tough conversations are an act of love—and teens feel that.

Why our tough conversations fail….

- **Lecture mode**
- **Assuming risk = motivation to quit**
- **Leading with consequences**
- **Jumping ahead of the young person's readiness**
- **Judging behavior before you know their perspective**

Reframe: Conversations fail because adults jump into *expert mode*, not because kids don't care.

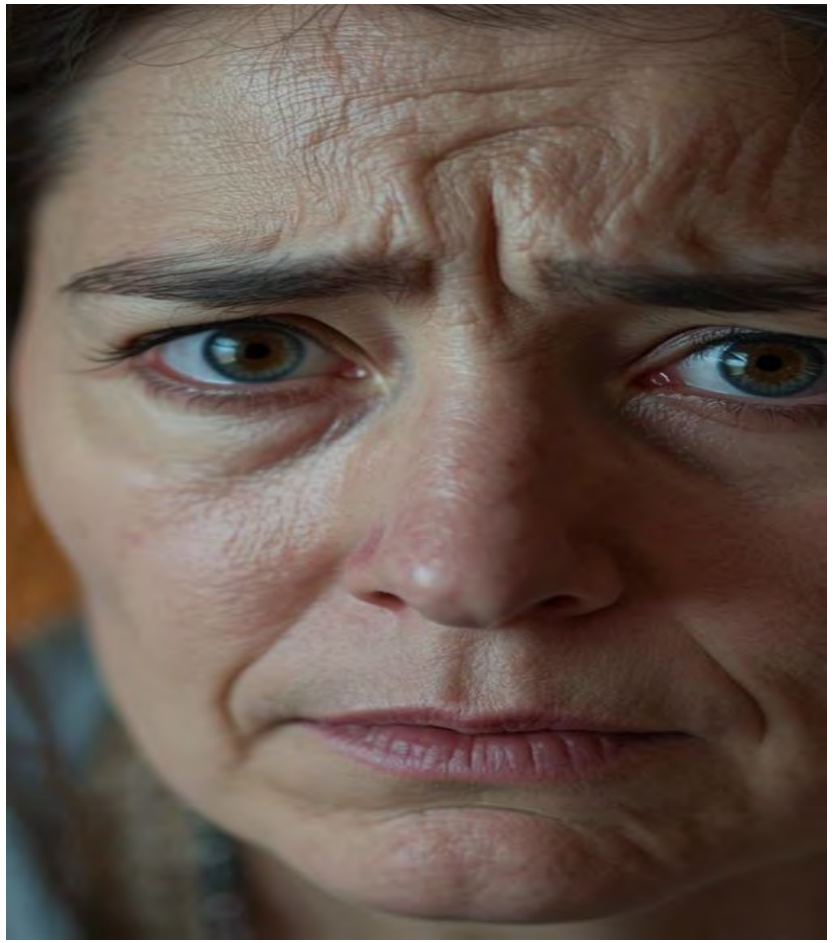
Motivational Interviewing: What it is and what it isn't

MI is:

- **Curiosity**
- **Collaboration**
- **Autonomy**

MI isn't:

- **Convincing**
- **Scaring**
- **Pushing someone to quit**



OARS

Open questions

Affirmations

Reflections

Summaries

Dartmouth Health

Project ECHO

Oars

Openers that work:

- **“What do you like about vaping?”**
- **“When do you notice yourself wanting to vape most?”**
- **“What do you wish adults understood about it?”**
- **“On a scale of 1–10, how important is it for you to cut back or quit?”**

oArs

Affirmations:

- **“You’ve clearly thought through your reasons.”**
- **“I appreciate you being honest—most people wouldn’t be.”**
- **“You know your body and routines really well.”**

oaRs

Reflections:

- **“Vaping helps you calm down between classes.”**
- **“You feel like the adults don’t get it.”**
- **“Part of you is curious about stopping, and part of you isn’t sure yet.”**

oarS

Summary:

- **“What I’m hearing is that you like the stress-relief, you don’t want to get in trouble, and you’re thinking about cutting back but aren’t ready to quit. Did I get that right?”**

RULE

R – Resist the Righting Reflex

Avoid the urge to correct, fix, or persuade.
People naturally push back when they feel pressured.

U – Understand Your Client's Motivations

Explore *their* reasons for using, cutting back, or quitting—not yours.
This is where open questions and reflections shine.

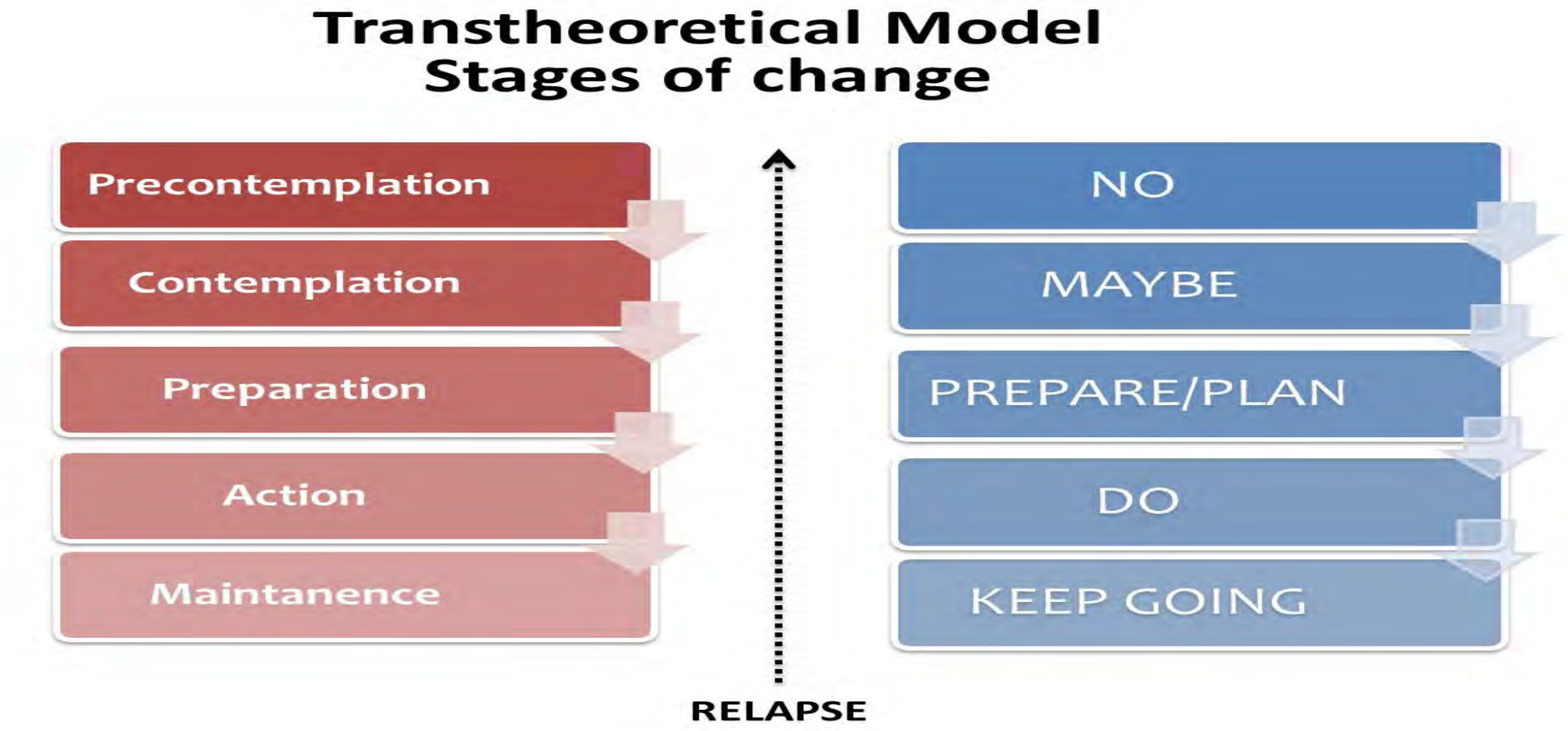
L – Listen With Empathy

Use reflective listening to show you truly get them.
This builds trust and reduces defensiveness.

E – Empower the Client

Support autonomy. Build confidence.
Affirm strengths and emphasize that change is their choice.

STAGES OF CHANGE



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Behavior Change Interventions

- 5Rs – Not ready to quit
  - Relevance: why is quitting important for them
  - Risks: consequences
  - Rewards: benefits
  - Roadblocks: barriers/fears and ways to overcome them
  - Repetition: discuss at each follow up

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Precontemplation:

- **No interest in changing**
- **Doesn’t see vaping as a problem**
  MI strategy:
- **Validate and ask permission**
- **Reflect values**
  Script:
- **“You’re not thinking about stopping, and vaping feels helpful right now. Would it be OK if I share something I hear from a lot of kids?”**

Contemplation:

- Knows there are downsides, still ambivalent

  MI strategy:

- Explore pros/cons

- Strengthen change talk

  Script:

- “What are some things you like about it? What’s something that bugs you about it?”

Preparation:

- Thinking about cutting back or trying a quit attempt
  MI strategy:

- Help identify triggers

- Build confidence
  Script:

- “What would make it feel doable to cut back for a school day?”

Action & Maintenance:

- Behavior change underway
  MI strategy:

- Resources

- Celebrate small wins

- Troubleshoot slips
  Script:

- “If you had a tough moment, how do you want adults to respond?”

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Project ECHO

Silence doesn’t protect them—connection does.

Teens are in a stage of rapid brain development.

Tough conversations build trust—not conflict—when done with curiosity.

Teens are already encountering high-risk situations.

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WELCOME to

Hooked on a Cloud: Strategies to Engage Youth and Young Adults in Conversations About Vaping

Session 6 – Vaping influences: Industry, peers and policy

December 3, 2025

Vape and Regulation

James Sargent, MD

The C. EVERETT KOOP INSTITUTE at DARTMOUTH

Talk Outline

- Why regulate?
- FDA role in regulating harm reduction products
  - Anatomy of a PMTA
- How industry evades regulation
  - Illegal vapes
  - Court cases
  - New formulations
  - Appeal to politicians and their constituents.

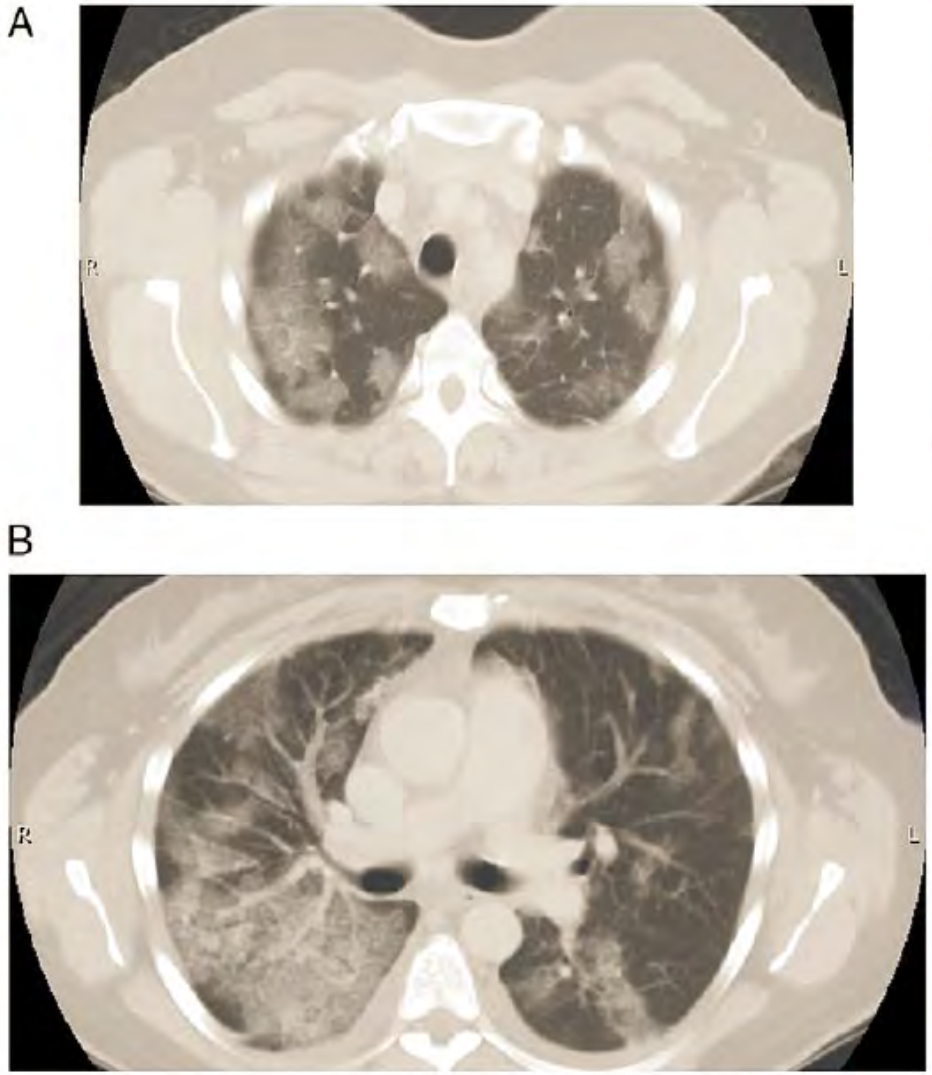
Why Regulation?

- Historically unregulated marketplace for tobacco products
  - Companies denied addiction and causality for decades
    - B&W “Project Truth”
      - “Doubt is our product.”
      - “Objective No. 1: To set aside in the minds of millions the false conviction that cigarette smoking causes lung cancer and other diseases; a conviction based on fanatical assumptions, fallacious rumors, unsupported claims and the unscientific statements and conjectures of publicity-seeking opportunists.” (Brown and Williamson, 1969)

Why Regulation?

- Consequences from the historically unregulated marketplace
  - Industry-controlled product modification to respond to health concerns
    - Filtered cigarettes
    - “Light” and “Low tar” cigarettes
    - In the absence of a science-based regulatory agency, government and health authorities assumed a public health benefit

E-cigarette Toxicity—Case Reports



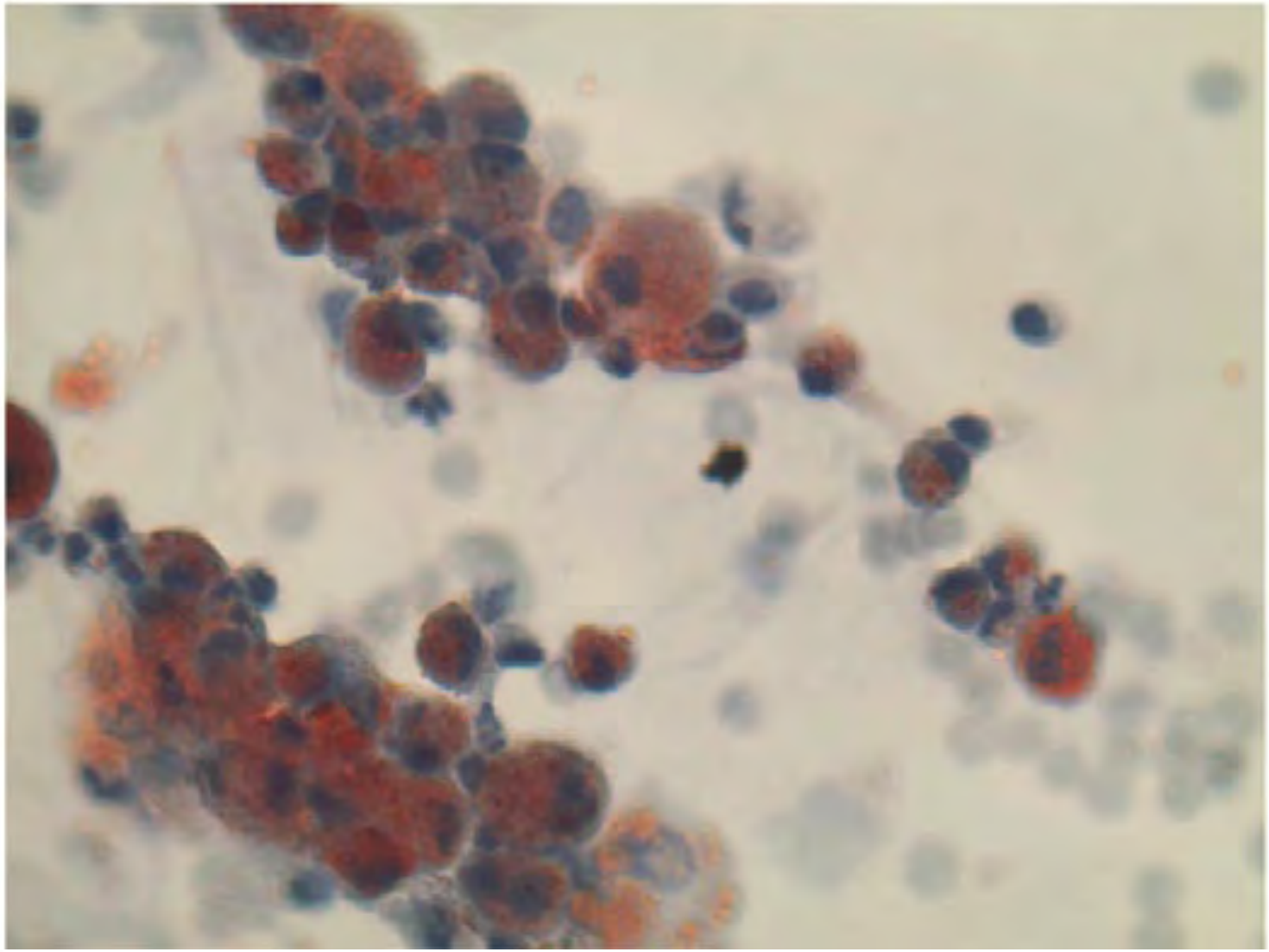


FIGURE 1. Representative CT images show the "crazy paving" pattern of patchy ground glass superimposed on interlobular septal

Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products

Español (Spanish)

CDC, the U.S. Food and Drug Administration (FDA), state and local health departments, and other clinical and public health partners are investigating a national outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI).

For Healthcare Providers

For Health Departments

Frequently Asked Questions

Resources

Digital Press Kit

By the end of the epidemic:

- As of February 18, 2020, a total of 2,807 hospitalized e-cigarette, or vaping, product use-associated lung injury (EVALI) cases or deaths have been reported to CDC from 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
- Sixty-eight deaths have been confirmed in 29 states and the District of Columbia (as of February 18, 2020).
- The median age of deceased patients was 49.5 years and ranged from 15-75 years (as of February 18, 2020).
- Laboratory data show that vitamin E acetate, an additive in some THC-containing e-cigarette, or vaping, products, is strongly linked to the EVALI outbreak.

The 2009 Family Smoking Prevention and Tobacco Control Act gave FDA authority to regulate the manufacture, distribution, and marketing of tobacco products.

- Key provisions include premarket review of new tobacco products and any health claims
  - Legal standard for marketing e-cigarettes and other Electronic Nicotine Delivery Systems: “appropriate for the protection of the public health” (APPH)
  - Case-by-case decisions based upon evidence submitted in each application
  - Benefits to adults need to be demonstrated to outweigh risks to kids, especially for flavored products
  - Legal and evidentiary burden squarely on each company

Why Regulation?

- But with product regulation
  - FDA serves as the gatekeeper standing between tobacco companies and the public
  - All of the decisions about new products and claims coming to market are science-based and made by a regulatory agency, not a tobacco company
  - Companies need to specify ingredients and assure manufacturing consistency
  - Only products that balance the public health benefit to smokers with threats to youth and nonsmokers are allowed on the market
  - Legal burden on the companies to demonstrate marketing is appropriate
    - Marketing standards under current law are high

Benefits to regulation, An example

- Let’s examine a “PMTA”--the Premarket Tobacco Application
- It's the application a company needs to submit to get a marketing authorization for a new tobacco product.
- NJOY tobacco flavored e-cigarette
- Allowed on market by FDA in Feb 2022

U.S. FOOD & DRUG ADMINISTRATION

Technical Project Lead (TPL) Review of PMTAs

New Products Subject to this Review[1]	
STNs	PM0000630-PM0000631
Common Attributes	
Submission date	March 30, 2020
Receipt date	March 30, 2020
Applicant	NJOY, LLC
Product manufacturer	NJOY, LLC
Application type	Standard
Product category	ENDS (VAPES)
Product subcategory	Closed E-Cigarette
Cross-Referenced Submissions	
All new products	(b)(4)
Supporting FDA Memoranda Relied Upon in this Review	
All STNs	• Statistical Consultation finalized on May 6, 2021 • Tobacco Product Surveillance Team Consultations finalized on September 30, 2020 and on February 2, 2022 • OHCE Consultation finalized on February 24, 2022
Recommendation	
Issue marketing granted orders for the new products subject of this review.	

Technical Project Lead (TPL):

Digitally signed by Luis G. Valerio -S
Date: 2022.06.09 17:27:29 -04'00'

Luis G. Valerio, Jr., Ph.D., ATS
Associate Director
Division of Nonclinical Science

Signatory Decision: Concur with TPL recommendation and basis of recommendation

Digitally signed by Matthew R. Holman -S
Date: 2022.06.10 06:31:28 -04'00'

Matthew R. Holman, Ph.D.
Director
Office of Science

[1] Product details, amendments, and dates provided in the Appendix. PMTA means premarket tobacco application(s).

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3.2.1.1. Product design and composition

- Engineering:
  - Each new tobacco product is a closed non-rechargeable ENDS. The new products are not serviceable by the user for any purpose, including, but not limited to, customizing the atomizer, or modifying or refilling the e-liquid. For a 3-second puff, the new products heat an e-liquid to produce 3 to 5 mg of inhalable aerosol.
  - The design minimizes the risk of poisoning by containing the e-liquid in a manner that results in the e-liquid being inaccessible through customary or reasonably foreseeable handling or use, consistent with the Child Nicotine Poisoning Prevention Act of 2015. In addition, the e-liquid quantity is only 0.94 mL and it is contained in a sponge and is not free-flowing. Poisoning presents a minimal risk from an engineering perspective. Although the
  - The 4.5% nicotine e-liquids contain 2.1% lactic acid, 40-44% (w/w) propylene glycol (PG), and 42-44% (w/w) vegetable glycerin (VG). The 6.0% nicotine e-liquids contain 3.2% lactic acid, 37-42% (w/w) PG, and 42-46% (w/w) VG. With regard to nicotine salts in the new products, the applicant used lactic acid to reduce e-liquid pH and protonate the nicotine to create a nicotine salt. The applicant indicated the main purpose is to partition more

3.3. ABUSE LIABILITY

3.3.1.1. Current tobacco users

- Behavioral and Clinical Pharmacology:
  - 'Abuse liability' refers to the ability of the product to promote continued use, and the development of addiction and dependence. This can be relevant to determining the likelihood that addicted users of one nicotine product would switch to another. For example, if a new tobacco product has a low abuse liability, current addicted tobacco users may find it to be an inadequate substitute for the product they are currently using. On the other hand, low abuse liability makes it less likely that new users will become addicted.

3.3.2 Synthesis

Clinical studies measured nicotine pharmacokinetics for the new product, Extra Rich Tobacco 6%, which was appropriately selected by the applicant to bridge to the lower nicotine containing product, Rich Tobacco 4.5%. The data from these studies demonstrated an abuse liability that approaches that of combusted cigarettes. A study was submitted by the applicant demonstrating use of the new products by combusted cigarette smokers who had past month experience using ENDS suggesting that abuse liability would be lower than or comparable to combusted cigarettes for experienced users. Results from the applicant's clinical study provided evidence that the new

3.4.1.3. Tobacco Non-users (including youth)

- Social Science:
  - For the new products, the proportion of youth reporting both curiosity about and intention to try the new products is higher than the proportion of adult current smokers ($p < 0.05$). However, the interest in tobacco flavor is low among youth according to the literature. The available evidence (NYTS 2021) indicates that a higher percentage of middle and high school current users reported using flavored ENDS than tobacco-flavored ENDS (Park-Lee et al., 2021).

Summary Weighing the Risks & Benefits

In terms of the risks to non-users, youth are considered a vulnerable population for various reasons, including that the majority of tobacco use begins before adulthood and thus youth are at particular risk of tobacco initiation. Existing evidence consistently indicates that use of tobacco-flavored ENDS is less common compared to flavored ENDS among youth. In addition, the applicant's study findings demonstrated low intention to try and curiosity about using the new products among adult former smokers and never smokers. Nonetheless, given the strong evidence regarding the impact of youth exposure to marketing on youth appeal and initiation of tobacco use, any marketing authorization should include marketing restrictions and post-market requirements to help ensure that youth exposure to tobacco marketing is limited. Together, based on the information provided in the PMTAs and the available evidence, the potential to benefit smokers who switch completely or significantly reduce their cigarette use would outweigh the risk to youth, provided the applicant follows postmarket requirements aimed at reducing youth exposure and access to the products.

Fact

- FDA has not approved any vape flavor besides tobacco and menthol
- Any vape with another flavor is from the illegal market

Harm reducti oved vapes

Independent

Japan Tobacco
American Spirit

Altria
Marlboro

R.J. Reynolds
Camel, Lucky Strike

E-Cigarettes Authorized by the FDA

Below is an up-to-date list of all e-cigarettes authorized by the FDA. These are the only e-cigarettes that may be lawfully sold in the United States.

Manufacturer	Product	
JUUL Labs Inc.	JUULpods (Menthol 3.0%)	JUULpods (Menthol 5.0%)
	JUULpods (Virginia Tobacco 3.0%)	JUULpods (Virginia Tobacco 5.0%)
	JUUL Device	
Logic Technology Development LLC	Logic Regular Cartridge/Capsule Package	Logic Pro Capsule Tank System (1)
	Logic Vapeleaf Cartridge/Capsule Package	Logic Pro Capsule Tank System (2)
	Logic Vapeleaf Tobacco Vapor System	Logic Power Tobacco e-Liquid Package
	Logic Pro Tobacco e-Liquid Package	Logic Power Rechargeable Kit
NJOY LLC	NJOY DAILY Rich Tobacco 4.5%	NJOY ACE POD Classic Tobacco 2.4%
	NJOY DAILY EXTRA Rich Tobacco 6%	NJOY ACE POD Classic Tobacco 5%
	NJOY DAILY EXTRA Menthol 6%	NJOY ACE POD Rich Tobacco 5%
	NJOY DAILY Menthol 4.5%	NJOY ACE POD Menthol 2.4%
	NJOY ACE Device	NJOY ACE POD Menthol 5%
R.J. Reynolds Vapor Company	Vuse Vibe Power Unit (1)	Vuse Replacement Cartridge Original 4.8% G2
	Vuse Vibe Tank Original 3.0%	Vuse Alto Power Unit
	Vuse Vibe Power Unit (2)	Vuse Alto Pod Golden Tobacco 5%
	Vuse Ciro Power Unit (1)	Vuse Alto Pod Rich Tobacco 5%
	Vuse Ciro Cartridge Original 1.5%	Vuse Alto Pod Golden Tobacco 2.4%
	Vuse Ciro Power Unit (2)	Vuse Alto Pod Rich Tobacco 2.4%
	Vuse Solo Power Unit	Vuse Alto Pod Golden Tobacco 1.8%
	Vuse Replacement Cartridge Original 4.8% G1	Vuse Alto Pod Rich Tobacco 1.8%

Threats to Regulation

- Industry moves fast
- Illegal products
- Court challenges
- New formulations
- Appeal to politicians and their constituents

Juul happened on FDA watch

2020 NYTS:
3.55 MILLION ADOLESCENTS
(Middle+High School)

2015
Juul comes to market

2006
E-cigarettes come to US

COVID PANDEMIC

YRBS: 27.5, 30.5, 34.8, 36.4, 34.8, 28.5, 21.9, 23, 20, 19.5, 18.1, 15.7, 10.8, 8.8

NYTS: 28, 21.7, 19.7, 17.2, 15.8, 14, 12.7, 9.2, 9.3, 8, 7.6, 8.1, 5.8

NYTS E-cig: 1.5, 2.8, 4.5, 13.4, 16, 11.3, 11.7, 20.8, 27.5, 19.6

YRBS NYTS NYTS E-cig

0 5 10 15 20 25 30 35 40

1990 1995 2000 2005 2010 2015 2020

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Illegal Vapes

- Illegal vapes, like fentanyl, cross into the US unnoticed
- The source of these products, like fentanyl precursors, is mainly China

ELEMENT VAPE

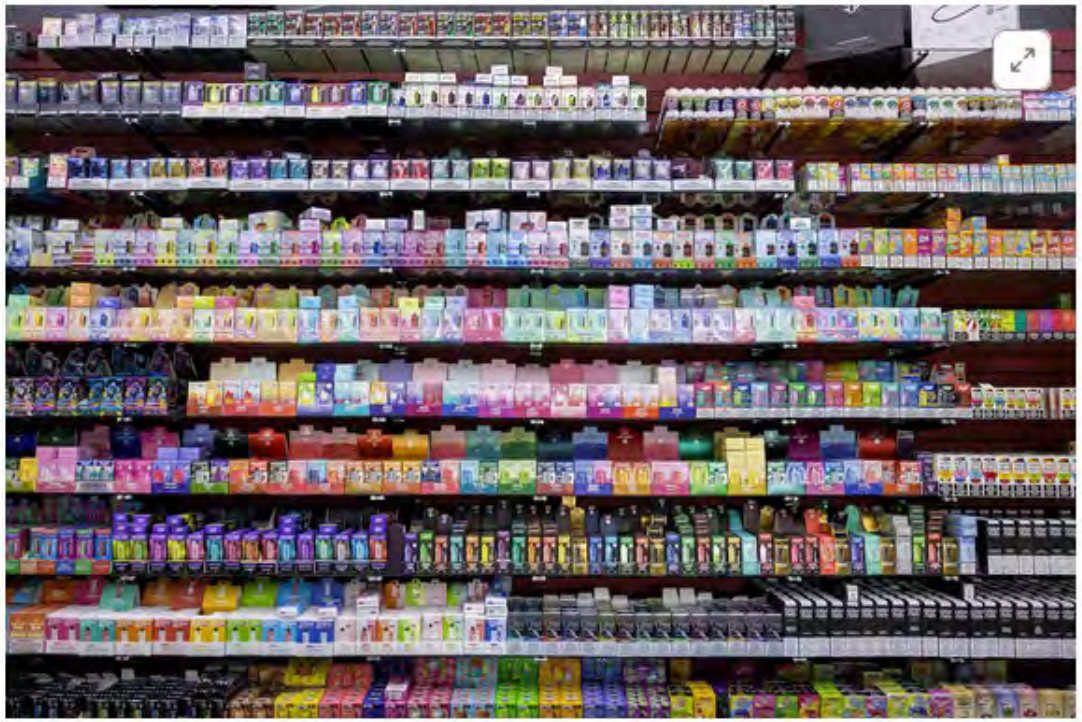
NEW BRANDS VAPE KITS DISPOSABLES E-LIQUIDS HEMP VAPORIZERS NIC POUCHES GLASS CIGARS ACCESSORIES




Illegal U.S. vape sales worth at least $2.4 billion in 2024, data shows

By **Emma Rumney**

February 24, 2025 9:50 AM EST · Updated February 24, 2025



[1/2] Various vapes, nicotine products and the new Spree Bar, which contains a chemical that mimics nicotine, line the shelves at Sultans' Smoke in Arvada, Colorado, U.S., May 21, 2024. REUTERS/Kevin Mohatt/File Photo Purchase Licensing Rights

Summary Companies

- Unauthorised vapes make up 35% of tracked US e-cigarette market
- FDA authorised only 34 tobacco or menthol vape products
- FDA crackdown on imports hits sales of some brands

Tracked sales of flavoured disposable vapes vs the total market ($ billions)

Note: The data on the total tracked market was provided directly by Circana. The data on tracked flavoured disposable sales is private Circana data supplied by an industry source outside of the market research firm. The source indicated that 2024 numbers are preliminary. The data does not capture vape sales made in independent stores, specialty vape shops or online.

By Emma Rumney • Source: Circana/industry source

A bar chart where sales of flavoured disposable vapes rise as a portion of all vape sales tracked by Circana over time to reach $3.24 billion in 2023, before dropping back according to preliminary numbers for 2024

The top 10 disposable vapes in the United States in 2024 ($ millions)

Geek Bar Pulse is estimated to have racked up over $580 million in sales

Note: Data do not capture vape sales made online, in independent stores or in speciality vape outlets.

By Emma Rumney • Source: Circana

A bar chart showing the estimated 2024 retail sales of the top ten disposable vape devices in the United States, where the Geek Bar Pulse is by far the most popular with $582.8 million in sales

FDA NEWS RELEASE

HHS, CBP Seize $86.5 Million Worth of Illegal E-Cigarettes in Largest-Ever Operation

For Immediate Release: September 10, 2025

The U.S. Department of Health and Human Services (HHS), through the U.S. Food and Drug Administration (FDA), and U.S. Customs and Border Protection (CBP) today announced the seizure of 4.7 million units of unauthorized e-cigarette products with an estimated retail value of $86.5 million – the largest-ever seizure of this kind. The seizures were part of a joint federal operation in Chicago to examine incoming shipments and prevent illegal e-cigarettes from entering the country.

Almost all the illegal shipments uncovered by the operation originated in China. FDA and CBP personnel determined that many of these shipments contained vague and misleading product descriptions with incorrect values, in an apparent attempt to evade duties and the review of products for import safety concerns.

“We will never allow foreign actors to threaten the health of America’s children,” **said HHS Secretary Robert F. Kennedy, Jr.** “Today we took decisive action to protect kids from illegal vape products. Thank you to President Trump and Attorney General Bondi for their leadership in helping us shut down this black market.”

HEALTH

Well, That's One Way to Address America's Vaping Problem

Millions of Americans are inhaling e-cigarettes illegally imported from China. Because of tariffs, they're about to get a lot more expensive.

By Nicholas Florko

OK McCausland / The New York Times / Redux

- Tariff on vapes from China currently at 100%
- How we can apply a tariff to an illegal product is beyond me
- Another issue facing illegal vapes is the elimination of de-minimis shipping
- Before elimination, any package worth less than $800 avoided inspection and tariff application
- Now everything is inspected

Threats to Regulation

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- Court challenges
- New formulations
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The 2009 Family Smoking Prevention and Tobacco Control Act gave FDA authority to regulate the manufacture, distribution, and marketing of tobacco products.

- Requires larger, more visible and informative health warnings on advertisements

“Final agency action” and potential litigation

- Litigation challenging a rulemaking can only be brought after an agency has taken “final agency action”
  - A proposed rule is not final action, and litigation generally cannot be brought at this stage in the rulemaking process
- Publication of a final rule is considered “final agency action”
- Lawsuits typically commence in federal district court
  - “Forum shopping”
  - Would likely include a request for a “stay” of the effective date pending the outcome of the lawsuit
  - The losing party in district court could appeal to a circuit court
  - The Supreme Court could also, in its discretion, hear an appeal from a circuit court ruling

LAWSUIT: Graphic Warning Labels have STILL not been implemented due to lawsuits.

and the court struck down the images as "compelled government speech"

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Loophole? SYNTHETIC NICOTINE

- Puff Bar did not file any PMTA paperwork, and did not stop selling products, with the assertion that their products are NOT TOBACCO, but SYNTHETIC nicotine
- FDA didn't buy it…
- FDA sent a letter in July, 2020

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Critical elements for game-changing policy

- The right “ingredients” (compelling science and evidentiary case)
- Key relationships
- Political will
- *Historical examples – assertion of jurisdiction in the 1990s; earlier work on menthol and nicotine reduction in the Obama Administration; failure of Biden Administration to finalize banning menthol*

Thank You!

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- Recordings will be posted on the D-H ECHO website https://www.dartmouth-hitchcock.org/project-echo/enduring-echo-materials