

Behavioral Health &
Wellness Program

Vaping, Juul, & Cessation: What Providers and Patients Needs to Know

Jim Pavlik, MA, CTTS

17 December 2019



The Clinical Edge Series Sponsors



School of Medicine

UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS



COLORADO

**Department of Public
Health & Environment**

"Funding for this event/project/program was provided in part by CU School of Medicine UPL and Amendment 35 Tobacco Education, Prevention and Cessation Grant Program funding. The views expressed do not necessarily reflect the official policies of, nor does the mention imply endorsement by, the CU School of Medicine or the Colorado Department of Public Health and Environment."



Behavioral Health & Wellness Program

Conflicts of Interest Disclosure

The presenter has no conflicts of interest, financial or otherwise, to disclose concerning the contents of the following presentation



Objectives

- Summarize vaping products (electronic nicotine delivery systems)
- Discuss whether vaping products are effective in helping people to quit smoking
- Outline what is known regarding the health concerns related to vaping
- Provide strategies for effective conversations with youth and adults who vape



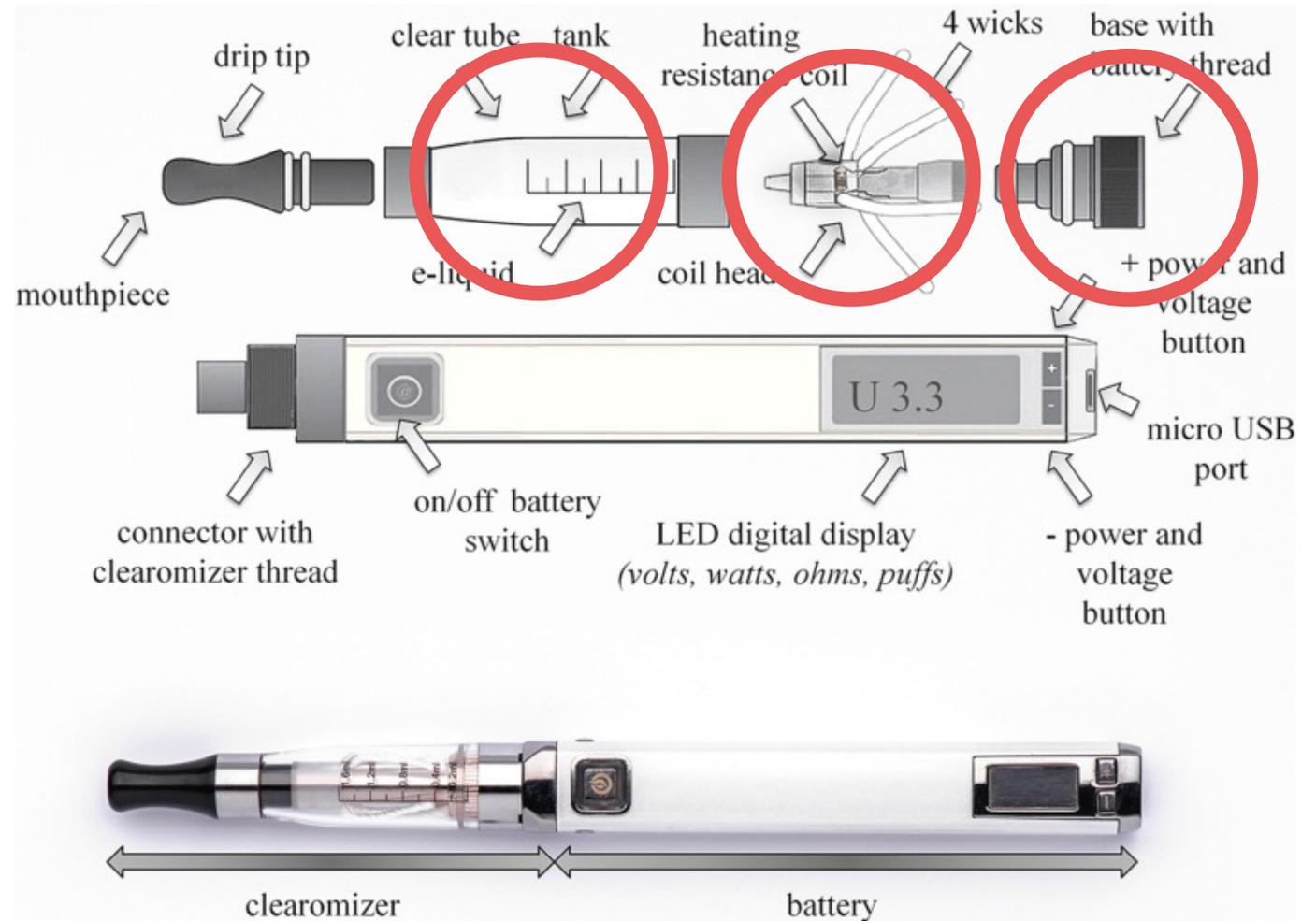


Introduction to ENDS

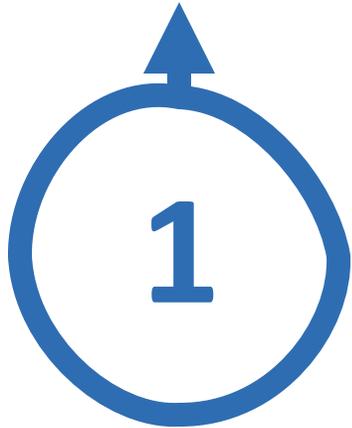
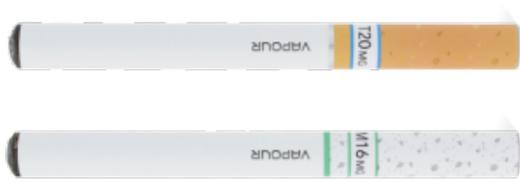
Electronic Nicotine Delivery Systems (ENDS)

Definition

A battery-powered device that provides inhaled doses of nicotine



The ENDS Family



What Is a Pod Mod?



Familiar Ideas

- A battery-powered device that provides inhaled doses of nicotine (ENDS)
- Battery is rechargeable (like 2nd and 3rd generation products)
- Not (designed to be) modifiable, except aesthetically
- Most popular products are flavors like Mango and Cool Mint

Innovations

- Marketed primarily via Twitter and Instagram
- Marketed heavily (by Juul Labs) as a permanent replacement for cigarettes
- Design: “The iPhone of e-cigarettes”
- Charges by plugging it into a computer USB port
- Initially had only one concentration of nicotine (40mg/pod)
- Nicotine salt formulation



ENDS Users: Attitudes, Knowledge and Behavior

Prevalence of Use

- 3.2% of adult Americans currently use ENDS
- 42.6% use ENDS daily
- Young adults have highest use among adult groups (7.6%)
- 20.8% of US high school students report use in the past 30 days
- 2% of callers to the Colorado QuitLine report daily use of ENDS



Reasons to Use—Youth

- Social approval
- Flavors/taste
- Alternative to smoking (health or aesthetic preference, e.g., smell)
- Curiosity
- Avoidance of smoking prohibitions
- Accessibility/convenience
- Affordability
- Cessation aid*



Reasons to Use—Adults

Cessation/Health

Consideration of others

Convenience

Curiosity

Flavors

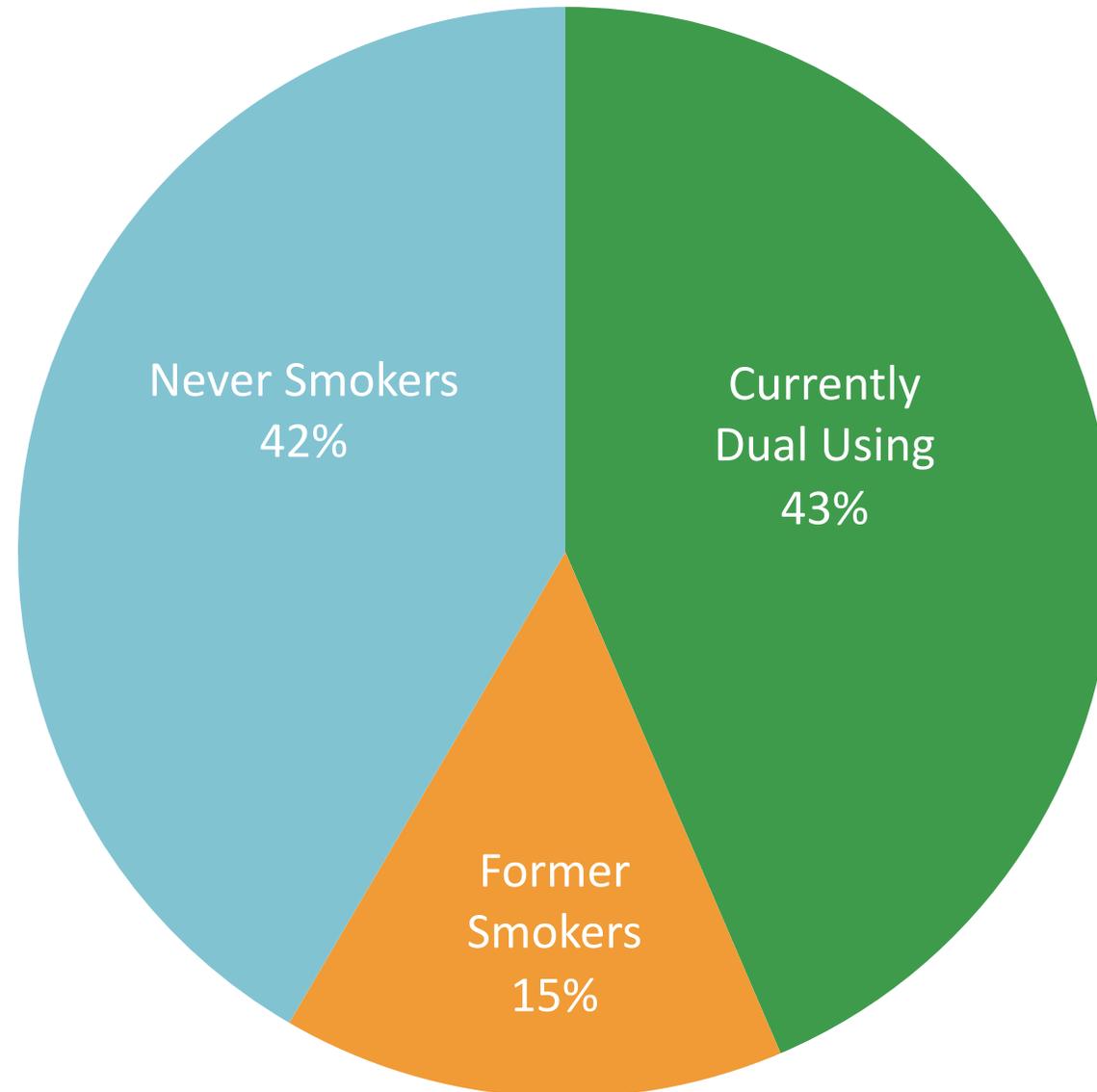
Cost

72% of callers to the Colorado QuitLine who used ENDS indicated they were doing so to quit or reduce their use of conventional tobacco products.

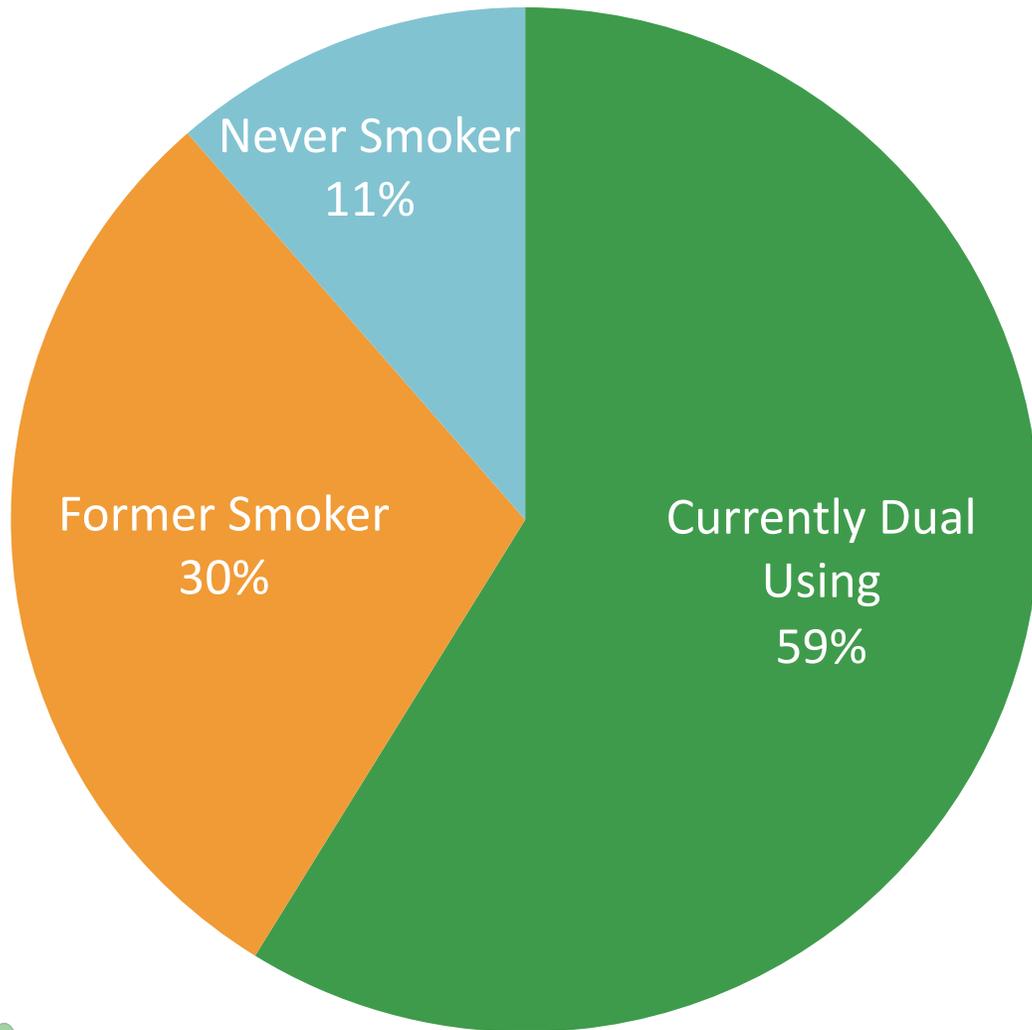
92% reported wanting to eventually quit ENDS as well.



Young Adult ENDS Users (18-24)



All Adult ENDS Users (Wave 1)



PATH Wave 2 Results

The Good

- About 15% of ENDS users had transitioned to total abstinence after 1 year.

The Bad

- Half of dual users were still dual using and had been joined by some former- and never-smokers.
- Half of dual users at Wave 1 had transitioned totally cigarettes as had 11% of former smokers and 13% of never smokers.

ENDS users were twice as likely to have transitioned to a cigarette-only habit as they were to have achieved nicotine abstinence.



ENDS as Cessation Devices

Research Findings

Studies have found mixed results for ENDS and tobacco cessation:

- 85% of users report using ENDS for cessation;
- 11% reported quitting
- One study found e-cigarette users had a higher quit rate (20%) than those using Nicotine Replacement Therapy (NRT) (10%)
- QuitLine using e-cigarettes were less likely to quit smoking than nonusers (16-21% vs. 31%)
- Still, many studies find no difference in quit rates between e-cigarettes and NRT



RESULTS

	Vape Pen		NRT	
	n = 438		n = 446	
Cessation from smoking	79	18.0%	44	9.9%
Abstinence from nicotine	16	3.7%	40	9.0%

"While ENDS may have the potential to benefit established adult smokers...[they] should not be used by youth and adult non-tobacco users because of the harmful effects of nicotine and other risk exposures."

*Tim McAfee, former director of the Office on Smoking and Health
Centers for Disease Control and Prevention*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy

Peter Hajek, Ph.D., Anna Phillips-Waller, B.Sc., Dunja Przulj, Ph.D., Francesca Pesola, Ph.D., Katie Myers Smith, D.Psych., Natalie Bisal, M.Sc., Jinshuo Li, M.Phil., Steve Parrott, M.Sc., Peter Sasieni, Ph.D., Lynne Dawkins, Ph.D., Louise Ross, Maciej Goniewicz, Ph.D., Pharm.D., Qi Wu, M.Sc., and Hayden J. McRobbie, Ph.D.

ABSTRACT

BACKGROUND

E-cigarettes are commonly used in attempts to stop smoking, but evidence is limited regarding their effectiveness as compared with that of nicotine products approved as smoking-cessation treatments.

METHODS

We randomly assigned adults attending U.K. National Health Service stop-smoking services to either nicotine-replacement products of their choice, including product combinations, provided for up to 3 months, or an e-cigarette starter pack (a second-generation refillable e-cigarette with one bottle of nicotine e-liquid [18 mg per milliliter]), with a recommendation to purchase further e-liquids of the flavor and strength of their choice. Treatment included weekly behavioral support for at least 4 weeks. The primary outcome was sustained abstinence for 1 year, which was validated biochemically at the final visit. Participants who were lost to follow-up or did not provide biochemical validation were considered to not be abstinent. Secondary outcomes included

From Queen Mary (P.H., A.P.-W., D.P., King's College London South Bank (S.P., Q.W.), and Leicester (L.R.) — dom; and Roswell Cancer Center, Bu dress reprint req Queen Mary Unive and Lifestyle Rese Rd., London E1 4A at d.przulj@qmul.

This article was pu 2019, at NEJM.org

N Engl J Med 2019

Qualities of Cigarettes Related Nicotine Addiction

- Dose controlled via “puff topography” modifications
- Absorption of nicotine through lungs is rapid
- Quick metabolization allows for resensitization
- Regular, small doses develops the *habit*

Pod mods' nicotine salt formulation performs almost as well or better than cigarettes as nicotine delivery systems, outperforming both NRT and ENDS that use freebase nicotine formulations.





Achieving Abstinence



The Key to Motivational Interviewing

Adopt the right “heart-set.” This includes:

Partnership

Active collaboration

Acceptance

Non-judgmental

Compassion

Focus on well-being

Evocation

Strengths and resources

Tips to address ENDS use

- Listen and acknowledge user's experience
- Congratulate success, no matter its form
- Ask permission to educate
- Educate and address misconceptions
- Assist patients in making an *abstinence* plan
- Refer to QuitLine or other resources



Clinical Recommendations

- Educate on the harms of use and benefits of quitting
- Correct misinformation when noticed
- Explore use patterns (regularity of use, cravings, social use)
- Design a quit plan including quit date, planning around triggers
 - Changing Behaviors
 - Social support
 - Encouraged technology (This is Quitting, other apps)
- **Pharmacotherapy**
 - Adults: Increases quit success 20%
 - Youth: Last line defense



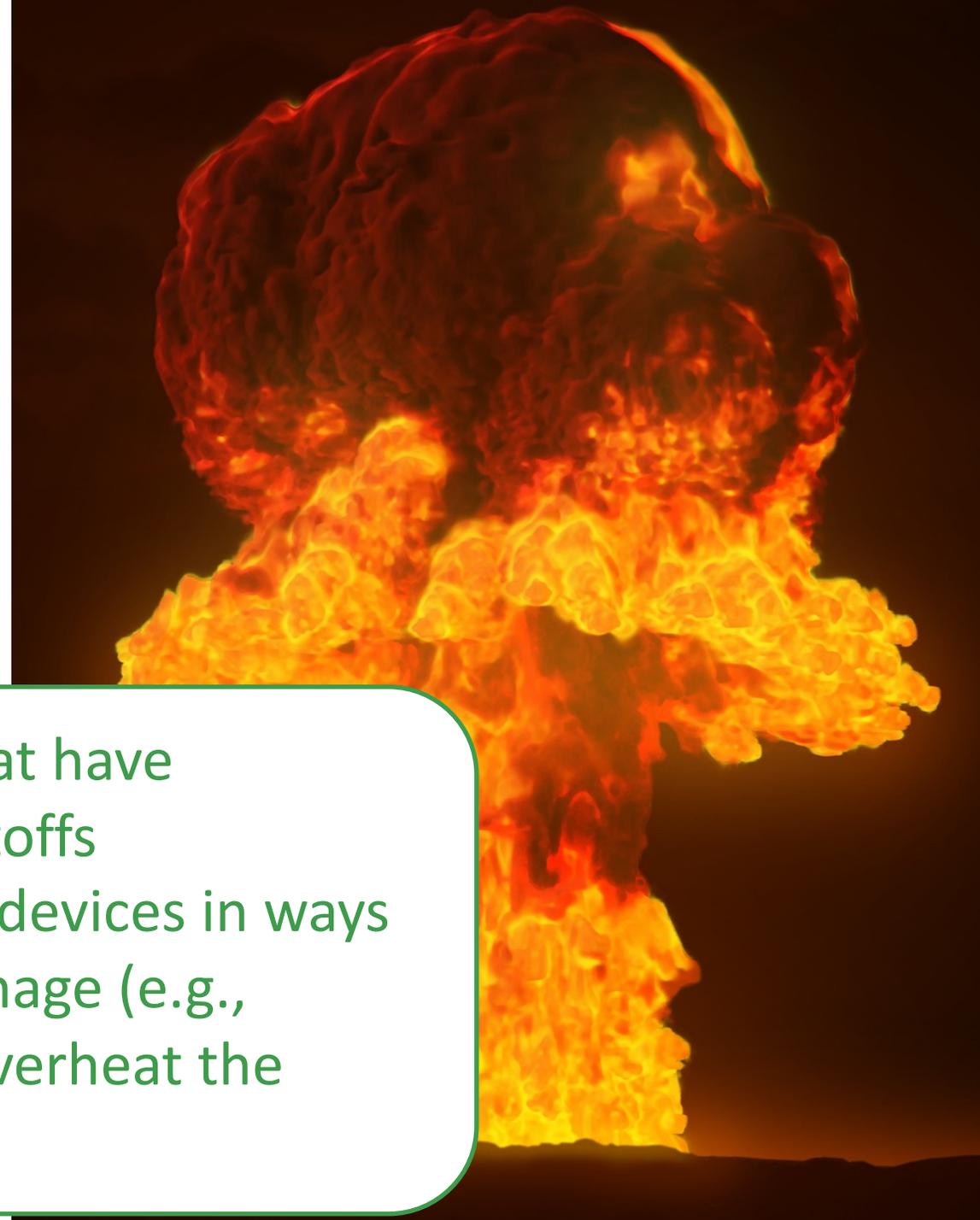


Key Messages

Exploding Batteries

Exploding batteries are a dramatic reality. However, the risk is small (and rarely fatal) and seems to be getting smaller as manufacturing improves over time.

- Use devices that have automatic shutoffs
- Avoid carrying devices in ways that might damage (e.g., puncture) or overheat the batteries



Popcorn Lung

Diacetyl, the primary suspect in an outbreak of bronchiolitis obliterans among workers at a microwave popcorn factory, is an organic compound used as an ingredient in some e-juice flavors.

It is also present in cigarette smoke. The *average* cigarette contains 8,000 times more diacetyl than the worst ENDS to be measured. The CDC does not recognize bronchiolitis obliterans as a tobacco-related illness.



Nicotine Overdose

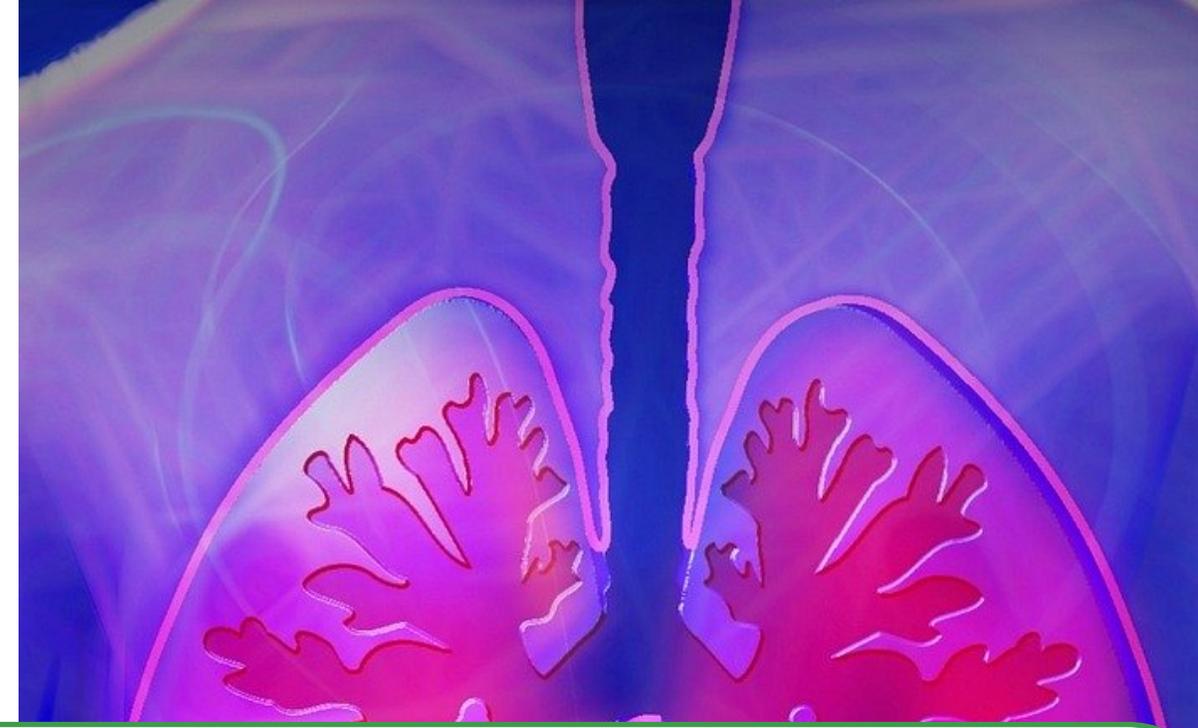
- Toxic alkaloid with an LD₅₀ of 6.5-13mg/kg
- A 4-year-old simultaneously smoking 90-180 cigarettes has a 50% chance of death
- At its highest point, about 220 children each month were poisoned by e-juice; 80% of them under the age of 3.



Users of ENDS refillable tanks, should be mindful that that flavors and packaging of the e-juice make them particularly attractive to children. Keep all such vials out of reach and have the number of poison control handy.

Lipoid Pneumonia

- Suspected cases of vape-related lipoid pneumonia date back to at least 2015
- Approximately 2,290 confirmed cases and 47 deaths
- inhalation of Vitamin E acetate, commonly in THC cartridges, appears the primary cause
- 83% of patients report using THC cartridges; 13% claim to exclusively use nicotine cartridges



- The CDC has advised that ENDS users avoid vaping if possible. If not, then to obtain their products from reputable sources
- BHWP further advises using devices as per the manufacturers' instructions

Formaldehyde Exposure

- A carcinogen occurring naturally as a result of the combustion of organic materials
- Formaldehyde is found in cigarettes and has been found in both mainstream and secondhand ENDS aerosol



Formaldehyde in ENDS seems to be the result of poor manufacturing or deliberate misuse (e.g., “dripping”-- where e-juice is applied directly to the heating coils)

FDA-Approved Ingredients

- Propylene glycol and glycerol
- Used as a preservative and flavoring agent
- The flavors themselves have an FDA status of “generally recognized as safe” (GRAS)



- Status granted as *food products*
- Not tested as aerosolized and inhaled products
- Propylene glycol is a lung and eye irritant
- Glycol has been suspected in cases of lipoid pneumonia
- Some flavorings are toxic to cells in in the lab

Vapor or Aerosol?

Many believe that what is inhaled from ENDS and exhaled from the lungs is “harmless water vapor.”

Emissions are an *aerosol* containing solid particulate matter at sizes associated with the development of several chronic lung ailments and heavy metals like lead, nickel, and cadmium



Cessation Device

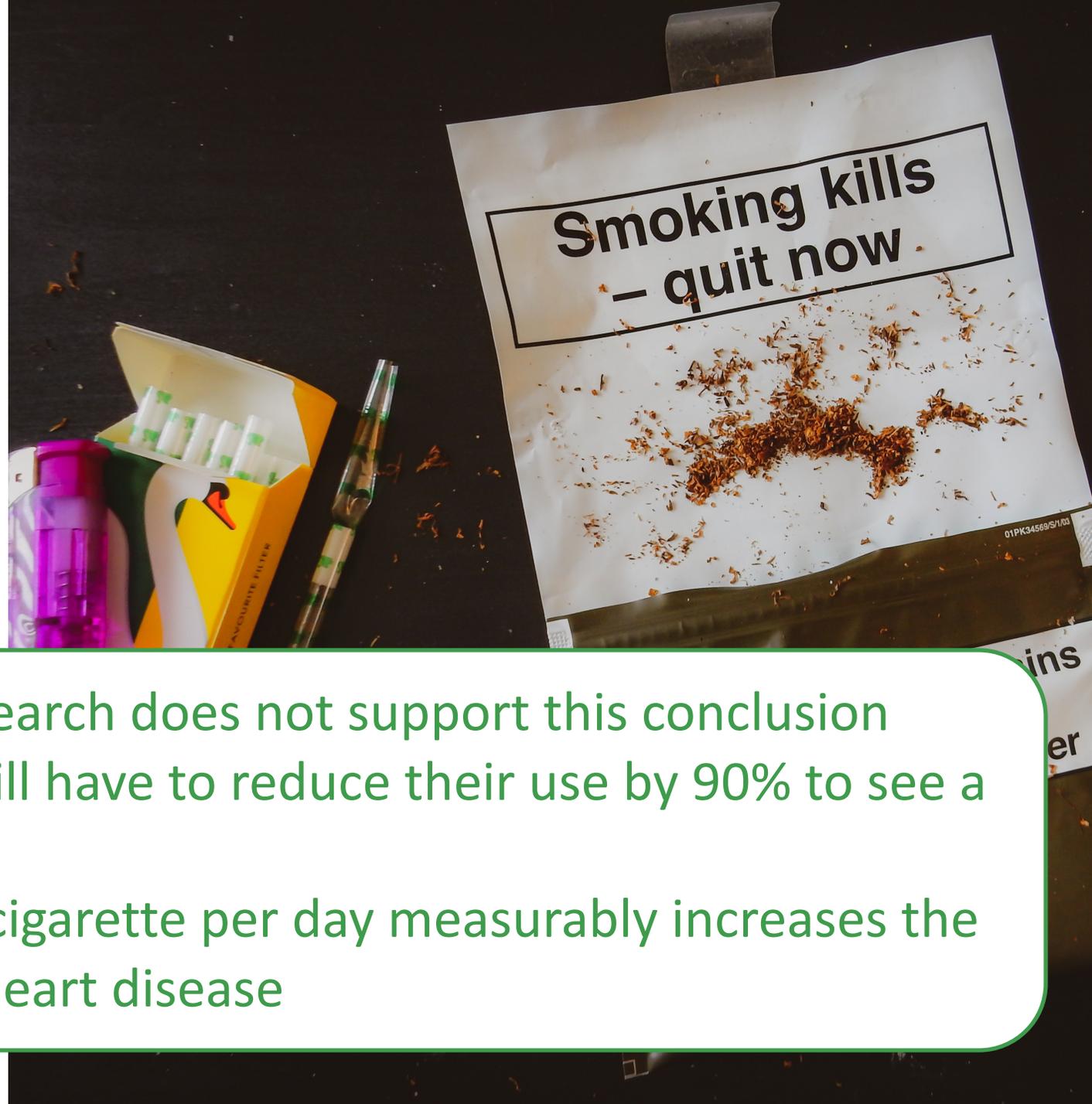
Many believe that ENDS will help them achieve abstinence from nicotine—or at least from cigarettes and other conventional tobacco products

- Most are unable to achieve abstinence and are twice as likely to relapse as they are to quit
- There are only 7 FDA-approved cessation therapies
 - 5 nicotine replacement medications, varenicline, and bupropion

Reducing Tobacco Use

Many use ENDS to reduce daily cigarette use under the impression that reduction in smoking will result in favorable health outcomes

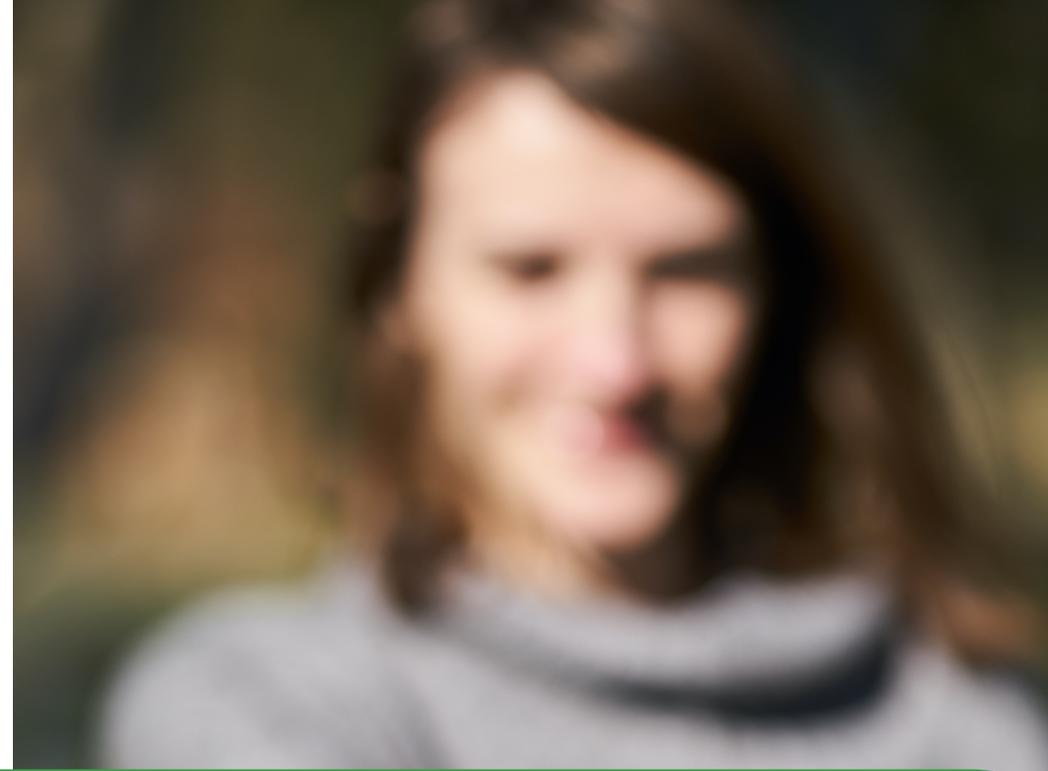
- The research does not support this conclusion
- Most will have to reduce their use by 90% to see a benefit
- Even 1 cigarette per day measurably increases the risk of heart disease



General Safety

Many see ENDS as a harm reduction strategy

- Nicotine itself is unsafe for pregnant or nursing mothers and those under age 25
- Nonsmokers should not pursue recreational nicotine use
- Safer than cigarettes does not imply absolute safety
- ENDS have many known risks and may have unknown risks
- “Safer” and “safe” are not necessarily equivalent



Nicotine Knowledge

- ENDS users may not know e-juice contains nicotine.
- They often do not know how much nicotine is in their e-juice
- May believe that the 5% Juul pod contains “low” levels of nicotine
- May believe the nicotine in ENDS is less dangerous or less addictive than other tobacco products

The nicotine in 1st – 3rd generation ENDS is “freebase” nicotine (extracted virtually unaltered) from plant material) and is chemically identical to the nicotine found in other tobacco products.

In addition to being extremely addictive, nicotine causes lung and brain deformities in fetuses and stunts brain development as late as age 25.

For every 10mg of nicotine a nursing mother consumes, 1mg is passed to the infant.

While nicotine alone is not yet causally linked to increased mortality, it is associated with cardiovascular conditions and to the development of cancers.

Researchers and watchdog groups have found nicotine even in e-juice vials labeled as “0mg nicotine” or “nicotine-free.”

Bottom Line

*Should I
recommend
ENDS to my
patients?*

Tobacco smoking is the leading cause of premature morbidity and mortality.



The safest alternative is nicotine abstinence.



For adults, using any of the seven FDA-approved pharmacotherapies is a good second-best option.



Many individuals using NRT will find them to be “unsatisfactory” replacements for smoking and will relapse.



ENDS may be a more attractive option for many. However, ENDS offer many known dangers (including a much higher chance of addiction than NRT) and the possibility for many more.

Users of all nicotine products (including ENDS & NRT) should be encouraged and assisted to become nicotine-free.





Behavioral Health & Wellness Program

303.724.3713

bh.wellness@ucdenver.edu

www.bhwellness.org



Behavioral Health and
Wellness Program



BHWP_UCD



Photo Credits

ENDS Family—images captured via online search and used here under general terms of fair use. Images used on this slide are for illustrative purposes only and not intended as endorsements.

What is a Pod Mod—image from Juul website and used here under fair use:

<https://www.juul.com/learn/device> Image is for illustrative purposes only and not intended as an endorsement.

Key to Motivational Interviewing: Photo by [Engin Akyurt](#) from [Pexels](#)

Battery: Image by [Alexander Antropov](#) from [Pixabay](#)

Popcorn: Image by [Teresa Wilde](#) from [Pixabay](#)

Poison: Image by [Arek Socha](#) from [Pixabay](#)

Lipoid Pneumonia: Image by [kalhh](#) from [Pixabay](#)

Formaldehyde: Image captured via online search and used here under general terms of fair use.

FDA-GRAS: image captured via online search

Vapor: Photo by [Ivandrei Pretorius](#) from [Pexels](#)

Cessation: Photo by [Aphiwat chuangchoem](#) from [Pexels](#)

Reduction: Photo by [David Gallie](#) from [Pexels](#)

Harm Reduction: Photo by [Engin Akyurt](#) from [Pexels](#)