A New Wave of Addiction: ENDS
Introductions

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Session Outline

1. Terms & Products
2. A short history of vapes and laws
3. Who’s using vapes?
4. It’s all about business
5. What are the risks?
6. Risk Reduction
7. Prevention Strategies and Discussion
2014

INTERNATIONAL WORD OF THE YEAR

REFLECTING THE ETHOS OF THE YEAR AND THE WORD'S LASTING POTENTIAL AS A WORD/PHRASE OF CULTURAL SIGNIFICANCE

Oxford Dictionaries

WORD OF THE YEAR

VAPE

Pronunciation: /vɛɪp

VERB
to inhale and exhale the vapor produced by an electronic cigarette or similar device

NOUN
an electronic cigarette or similar device; an act of inhaling and exhaling the vapor produced by an electronic cigarette or similar device
Definitions: The Basics

E-cigarette (electronic cigarette, or e-cig): a battery-operated device that is used to inhale a (usually) nicotine-containing vapor

Vaping: to inhale vapor through the mouth from a usually battery-operated electronic device (such as an e-cigarette) that heats up and vaporizes a liquid or solid

ENDS: Electronic Nicotine Delivery Systems

E-juice or E-liquid: the solution that is vaporized within the e-cigarette cartridge

Sources: Merriam-Webster; The Best e-cigarette guide: the language of vaping
Definitions

**Mod:** any vape that has been improved over the original e-cig model; also any modification a user has made to their device

**Dripping:** the process of directly inhaling heated e-cig liquid at a higher temperature in order to produce a more concentrated vapor. A user “drips” the juice directly onto a heater coil/atomizer to create vapor.

**PG (Propylene Glycol):** one of two main ingredients used in the making of e-cigarette liquids. PG is thinner, produces less residue, has no impact on flavor, and produces a better “throat hit”.

**VG (Vegetable Glycerine):** the other common base ingredient found in e-liquid. VG is thicker, produces more residue, has a sweet taste, and produces a smoother “hit”. It also has produces a larger, thicker vape cloud.

Sources: Merriam-Webster; The Best e-cigarette guide: the language of vaping
How do vapes work?

3 Main Parts:
- rechargeable lithium battery
- vaporization chamber
- cartridge

The battery activates the heating element. A small amount of nicotine is heated into a vapor, and then inhaled.

Source: Maryland Department of Health
What’s a JUUL?

- A specific brand of closed-system vape
- The shape is similar to that of a thumb drive
- Charges using a USB port
- E-juice is contained in a replaceable “pod” and comes in many flavors
  - Most pods are 5% nicotine
  - Tobacco & mint pods also come in 3%
Juul Suspends Sales of Most Flavored Products, Stops Social Media to Address Underage Vaping
All About “Juice”

- E-liquid or “juice” is the fluid used in an e-cigarette to create the vapor
- Typically contains:
  - PG or VG (the base)
  - Glycerin
  - Water
  - Flavorings
  - Nicotine (non-nicotine versions available)
- May contain THC
Nicotine Delivery: Freebase vs. Salts

- Most ENDS use freebase nicotine
  - Nicotine is a base and is not very potent until protons are removed
  - Liquid ammonia strips away the protons and allows nicotine to become more bioavailable to the lungs, brain, and CNS
  - It then can bind to the nicotine receptors in the brain and body

- JUUL uses nicotine salts
  - Salt is more stable but require more heat to allow it to be inhaled
  - Create a much smoother throat “hit” so users can increase the level of nicotine used
  - Simulates smoking much better

Source: vapepassion.com
Sources: PAX Labs; vapepassion.com
A Brief History
Lesson
Herbert A. Gilbert invented and patented a "smokeless nontobacco cigarette". The device was never commercialized.

A variety of patents for nicotine inhaler devices are filed in the U.S. by both tobacco companies and by individuals.

Modern e-cigarettes are patented by Chinese inventor Hon Lik.

E-cigarettes are introduced to the European market.

E-cigarettes are introduced to the American market.

The WHO proclaims that e-cigarettes are not approved smoking cessation devices.

Source: Consumer Advocates for Smoke-Free Alternatives Association
2009

The FDA classifies e-cigarettes as drug-delivery devices, and prohibits imports. The FDA also gets the power to regulate the tobacco industry.

Australia, Jordan, Canada, Brazil, Panama, Saudi Arabia & Hong Kong enact various bans on e-cigarettes.

Suffolk County, NY passes the first legislation banning e-cigarette use indoors where smoking is prohibited. NJ includes e-cigarettes in the state indoor smoking ban.

2010

Legal ruling of Smoking Everywhere vs. FDA case (US Court of Appeals for DC) is that the FDA can only regulate e-cigarettes under tobacco laws, unless therapeutic claims are made.

Under the ruling, e-cigarettes start to be prohibited in places along with other tobacco products.

Thailand & Singapore enact various bans on e-cigarettes.

Source: Consumer Advocates for Smoke-Free Alternatives Association

2011

FDA begins regulating e-cigarettes under tobacco laws.

The Department of Transportation announces it will adopt a rule prohibiting e-cigarette use on airplanes.

The first clinical trial suggests that e-cigarettes may be effective in helping smokers quit traditional cigarettes.
Where are we now?

- Under FDA rules, any company who manufactures or sells vapes must register as a tobacco company - with all of the regulations this entails.
- A variety of state laws exist regulating the sale of ENDS and where they can be used.
- **Connecticut:**
  - E-cigarettes are not included in the state’s definition of tobacco products
  - Manufacturers must register with the state
  - Purchase and possession are prohibited by those under age 18/sale to those under 18 prohibited
  - Significant smoke-free restrictions exist
- **Massachusetts:**
  - E-cigarettes are not included in the state’s definition of tobacco products
  - Sale is prohibited to those under age 18
  - Very limited smoke-free restrictions exist for ENDS (statewide)

*Source: Public Health Law Center at Mitchell Hamline School of Law*
Source: National Conference of State Legislatures - 2017
What do we know about who is vaping?
Current trends in vaping: college students

Any use of e-cigarettes in the last 30 days

Source: ACHA-NCHA survey of undergraduate students
Fall 2015 - Spring 2018
Current trends in vaping: college students

Self-reported use of e-cigarettes in the last 30 days

Source: ACHA-NCHA survey of undergraduate students, Spring 2018

140 institutions representing almost 74,000 undergraduate students
But the perception is different...

Perceived use of e-cigarettes in the last 30 days

Source: ACHA-NCHA survey of undergraduate students, Spring 2018

140 institutions representing almost 74,000 undergraduate students
And the perception hasn’t changed...much

Any perceived use of e-cigarettes in the last 30 days

Source: ACHA-NCHA survey of undergraduate students, Fall 2015-Spring 2018
Current trends in vaping: high school

- In the US, youth are more likely than adults to use ENDS.
- ENDS are now the most popular form of tobacco product among youth.
- Among youth, use increases with age and is more common among Hispanics and whites. Males use more often than females.
- The vast majority prefer flavored products.

Sources: Centers for Disease Control and Prevention; E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
Percent of Students Reporting Daily Cigarette Use, by Grade

Denotes significant difference between 2016 and 2017.

Source: University of Michigan, 2017 Monitoring the Future Study

Source: Monitoring the Future (2017)
Current trends in vaping: middle & high school

Trends in ever e-cigarette use among U.S. middle and high school students

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
Current trends in vaping: middle & high school

Trends in past 30-day e-cigarette use among U.S. middle and high school students

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
Adult users, Dual users, and New users

- Among the adult (18+) US population, the current prevalence of use is 4.5%
- More than half of ENDS users are under age 35
- Among ENDS users age 18–24, 40% have never been regular cigarette smokers
- 31% of teenage ENDS users started smoking traditional combustible cigarettes within 6 months, compared to 8% of non-users
- Young people who had *ever* tried vaping were 3.6 times more likely to start smoking traditional cigarettes, and those who had vaped in the last 30 days were 4 times more likely than non-vapers to use cigarettes.

It’s All About Business
Lessons from Big Tobacco

- In 2009, the FDA banned tobacco companies from selling flavored cigarettes (exception: menthol) after research showed that these flavors were targeted towards teens.

- Even though the FDA regulates ENDS as tobacco products, these flavoring laws do not pertain to them.

- Fun flavors are one of the things that attracts youth to use ENDS.

Sources: Soneji et al. (2017) Association Between Initial Use of e-Cigarettes and Subsequent Cigarette Smoking Among Adolescents and Young Adults: A Systematic Review and Meta-analysis. JAMA Pediatrics; National Institute on Drug Abuse.
E-liquid or food product?

FDA, FTC warn companies to stop misleading kids
E-cigarette use among youth is rising as e-cigarette advertising grows

Dollars spent on e-cigarette advertising
Past 30-day e-cigarette use among youth

Juul sales are booming

Dollar share percentage of the e-cigarette traditional retail market, as of March 2018

*As of August 11, 2018, JUUL’s market share was 72.1%*

Source: Nielsen Total US xAOC/Convenience Database and Wells Fargo Securities, LLC

Source: Winston-Salem Journal, August 25, 2018
What are the Health Risks?
Let’s start with some challenges in the research

- There are more than 460 ENDS on the market and over 7500 different flavoring components, which makes it hard to truly assess their health effects.
- Because ENDS are relatively new, there is very limited evidence on long-term health effects.
- Some ENDS that are marketed as containing 0% nicotine have been found to contain nicotine.

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
What’s actually in the vapor?

- Nicotine
- Ultrafine particles that can be inhaled deep into the lungs
- Flavorings
- Volatile organic compounds
- Known carcinogens
- Heavy metals (chromium, nickel, zinc, and lead)
- Potential for other pharmacologically-active substances

Sources: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016); Centers for Disease Control & Prevention
The aerosol from e-cigarettes may include other components... such as tobacco-specific nitrosamines, acrolein, and formaldehyde. Aerosols generated with vaporizers contain up to 31 compounds, including nicotine, nicotyrine, formaldehyde, acetaldehyde glycidol, acrolein, acetol, and diacetyl. Glycidol is a probable carcinogen not previously identified in the vapor, and acrolein is a powerful irritant. Although these constituents have been identified in e-cigarette aerosol, current evidence is unclear on whether typical user dosages achieve levels as high as conventional cigarettes, or at harmful or potentially harmful levels.”

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
What are the risks of some of these chemicals?

Diacetyl

▪ Occurs naturally as a product of fermentation
▪ Used in manufacturing artificial butter flavoring
▪ May be hazardous when heated and inhaled over a long period
▪ Is approved for food use but associated with respiratory disease when inhaled
▪ “Popcorn worker’s lung”

Glycidol

▪ Used as a stabilizer for oils, polymers and as a demulsifier
▪ A known irritant of the skin, eyes, mucous membranes, and respiratory tract
▪ Classified as a probable carcinogen

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)
We thought it was bad, now there’s cannabis

- Approximately 9% of high school students have used cannabis in an e-cigarette
- Most common among ever-ENDS users, ever-cannabis users, and dual (ENDS & cannabis) users
  - 18.0% of lifetime ENDS users
  - 18.4% of lifetime cannabis users
  - 26.5% of lifetime dual-users

ENDS: Better than cigarettes?

Sources: Expert Vaping
The official position of the CDC is that ENDS have potential to benefit adult smokers if used as a complete substitute for cigarettes and other smoked tobacco products.

They are not considered safe for youth, pregnant individuals, or adults who do not currently use tobacco products.

If someone does not use tobacco products, they should not start using ENDS.

*There is still a lot to learn about whether they can help people quit smoking. They are not currently approved as a smoking cessation device.

Source: Centers for Disease Control and Prevention
Risk Reduction
Battery Safety

Batteries have exploded!

- Use a brand with UL-approved batteries and chargers
- Never put batteries in the user’s pocket
- Only use the charging devices that come with the ENDS
- Only charge when awake
- Replace the batteries if they get wet
Overall Recommendations

- Keep juices away from children
- Use the lowest voltage possible (or avoid mods/tanks with a manual voltage control)
- Do not use inside, particularly where children are present
- Skip dripping
- Avoid the JUUL because of the addictive potential

Source: E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General (2016)

[Graph showing human exposures to e-cigarettes and liquid nicotine reported to poison centers as of July 31, 2016.]
Prevention Strategies
What might we do?

- Educate, educate, educate!
- Include ENDS in our tobacco-free policies
- Offer cessation resources which include cessation from ENDS
Too Juul for School

Juul’s and Vapes: Everything you need to know about them and more

Juuls

Juuls are a particular type and brand of vape. They have a body and shape similar to that of a thumb drive and even charge by using a USB port.

Juuls utilize “pods”, which contain the nicotine equivalent to one full pack of cigarettes. The pods come in a variety of flavors such as mango, mint, and creme brulee.

Because of the high dose of nicotine (5% nicotine) contained in a single Juul pod, there is the potential for addiction, psychiatric mood disorders, and memory deficits later in life. There is also a risk that one can inhale formaldehyde, nitrosamines, and lead.

Sources


Vapes

A vaporizer - or “vape” - is an electric device that turns e-liquid, concentrate, or dry herb into vapor.

A vape consists of:
- The tank (if refillable) or cartridge (if intended for single-use) - holds the e-juice
- The atomizer - contacts the vaping material and transforms it into vapor for inhalation
- The sensors and software
- The battery - generates the power for the heating element in the atomizer

Conduction vs. Convection

Vaping

Conduction
- Heat is transferred from the heating chamber, coil, or heating plate to the material via direct contact
- Because of this, the vaporizer is ready to use in a matter of seconds (can result in an uneven energy transfer, and can cause burning of the material)
- Conduction is more popular

Convection
- Works by heating up the material by blowing hot air through it
- The material is transformed into vapor without direct contact
- They take longer to reach optimal temperature
- Convection vapors are usually more expensive and result is a “smoother” taste

What’s the big deal?

While Juul ing may be safer than smoking cigarettes, it’s not risk-free.

People who Juul are definitely getting addicted to nicotine. While the head rush and fun flavors might be fun at first, it doesn’t take long to need to Juul to feel normal. That’s the same as any other nicotine addiction.

Exposure to nicotine in adolescence has been shown to have long term effects on brain development, affecting behavior, concentration, and memory. Adolescents who use any vape are twice as likely to develop coughs and bronchitis as well.
Smoke-free, Tobacco-free Policy

I. PURPOSE:

This Smoke-Free, Tobacco-Free Policy (“Policy”) addresses the presence and use of tobacco products on Springfield College (“College”) property. The College is committed to promoting the health and wellness of our students, faculty, and staff by providing a living, working, and learning environment free of the negative effects of tobacco products and smoke. The College recognizes that smoking and the use of other forms of tobacco are a major cause of preventable disease, and, accordingly, in 2015 convened a Study Circle to explore whether and how the College might implement a smoke-free, tobacco-free policy. Having received the Study Circle’s report, the College has concluded that a tobacco-free campus is consistent with the mission and purpose of the College by promoting individual and community health.

II. SCOPE:

This Policy applies to all members of the College community, including employees, students, volunteers, vendors and visitors, and to all property, both indoors and outdoors, owned by, or under the control of, the College.

Yes. The policy applies to electronic cigarettes. Electronic cigarettes contain nicotine or other unhealthy or unsafe products and pose health risks to users and to the public. In the best interest of the health and well-being of all members of the Springfield College community, electronic cigarettes are prohibited.
Thank You!

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