Vaping: What You Need to Know Before Trying

Presented by the Ferris State University College of Pharmacy, Class of 2022 - Public Health Elective Course
In December 2018, the Surgeon General issued an advisory on e-cigarette use among youth, declaring the growing problem an epidemic.
What is Vaping?
Vaping is the act of **inhaling and exhaling aerosol**, often referred to as vapor. This vapor is **produced by electronic cigarettes (e-cigarettes) or a similar device.**

- The term vaping is used because e-cigarettes **do not produce** tobacco smoke.
Why Do People Vape?

- "To boost social image"
- "Easier to get than other tobacco products"
- The belief that "e-cigs are less harmful than other forms of tobacco"
- "To help people quit smoking"
- "Cost less than other tobacco products"
Difference Between E-Cigarettes and Cigarettes

Electronic Cigarettes consist of:
- Mouthpiece
- A battery
- A cartridge (contains e-liquid)
- A heating component
- NO tobacco

Cigarettes consist of:
- Cigarette paper
- Filter
- Tobacco
- Nicotine
Myth or Truth?

E-cigarettes and vapes are the same thing.
E-cigarettes and vapes are functionally the same, but they differ in structure. Other common names for e-cigarettes include: vape pens, mods and tank systems.
Recognizable Differences Between Vapes and E-Cigarettes
Myth or Truth?

Vaping is safer than Cigarettes.
MYTH

- Vaping is just as addictive as cigarettes, because they both can contain nicotine and other harmful ingredients.

- The results of a vaping study in 2018 showed an increase in dangerous chemicals, such as formaldehyde and acrolein, which damage DNA and lead to cancer.
Myth or Truth?

E-Cigarettes do not necessarily contain nicotine.
The nicotine content of e-cigarettes varies and is dependent on the “e-juice” or oil blend.
What is Nicotine?

The addictive drug component found in all tobacco products.

- It stimulates the release of adrenaline in the body
- Adrenaline then stimulates the central nervous system, which increases:
  - Heart rate
  - Blood pressure
  - Respiratory rate
  - Lung tissue damage
Tobacco Use Among High School Students

2018 - Survey of tobacco product use among high school students (within the previous 30 days):

- Any tobacco product: 27.1%
  ➢ Increase from 19.6% in 2017
- Two or more tobacco products: 11.3%
- E-cigarettes: 20.8%
- Cigarettes: 8.1%
Can You Smoke and Vape at the Same Time?

❖ Some may think that cutting down on cigarettes by adding another nicotine-containing product would improve their health (Potential smoking cessation tactic).

❖ However, it is **not** an effective way to fully safeguard your health.
  ➢ Nicotine exposure is noticeably increased among dual users in comparison to single source tobacco users.
What Types of Devices Are There?

**First Generation**
- Resembles a cigarette
- Disposable Cartridge

**Second Generation**
- Pen shaped device
- Rechargeable, Refillable

**Third Generation**
- Large batteries
- Rechargeable, Refillable
First Generation

❖ “Cigalikes”
❖ Because e-cigarettes were originally designed as a replacement product for smoking real cigarettes, they look just like them.
❖ It is ready to use right out of the package and the cartridge is disposable after 200-300 puffs.
❖ An average smoker will “puff” ~15 times/day.
Second Generation - JUUL

- As of June 2018, JUUL has taken 68% of the e-cigarette market.
- Every JUUL has a high level of nicotine.
  - Manufacturer: “a single JUUL pod contains as much nicotine as a pack of regular cigarettes.” (~200 cigarette puffs)
- 63% of all JUUL users do not know that this product ALWAYS contains nicotine.
- For smokers looking to switch from smoking cigarettes without the ash or odor.
Third Generation

- Has absolutely no resemblance to the original cigarette.
- Batteries, also known as “Mods” come in many different shapes and sizes.
- “Mods” that have higher wattage provide more vapor.
- Tanks vs. drippers
  - Ease of use, frequency of refilling, messiness
Dangers of Battery Explosions

❖ A combination of an e-cigarette and a lithium ion battery is a new and unique hazard.

❖ Between January 2009 and December 2016, 195 separate incidents of explosions and fires involving e-cigarettes were reported to the US media.
Myth or Truth?

“Vaping is just inhaling water vapor.”
MYTH

Many of the particles in vapor contain toxic chemicals, which have been linked to cancer, as well as respiratory and heart disease.
What Exactly is in the E-liquid?

Propylene Glycol (PG)
- Base ingredient
- Solvent
- Food preservative

Vegetable Glycerin (VG)
- Base ingredient
- Used in food and cosmetics

[Diagram showing the comparison between PG and VG in terms of popularity, viscosity, gunk build up, allergy risk, flavor intensity, throat hit, vapor density, and vapor temperature.]
Other Components of E-liquid

Flavoring additives

Nicotine/Nicotine salts (optional)

FREEBASE NICOTINE

NICOTINE SALT
Other Components of E-liquid: **Diacetyl**

- Flavoring agent used to create butter-flavor
- Inhaling Diacetyl can cause a condition called “popcorn lung” (Bronchiolitis Obliterans)
  - Damage to lungs’ smallest airways → cough, shortness of breath
Other Components of E-liquid: \(2,3\)-Pentanedione

- Alternative to Diacetyl (similar structure)
- Changes gene expression \(\rightarrow\) affects production/function of cilia
- May cause airway fibrosis
  - Lung tissue becomes damaged and scarred \(\rightarrow\) leads to shortness of breath

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{CO} \quad \text{CH}_3 \\
& \quad \text{O} \\
\end{align*}
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Byproducts of Vaping: **Formaldehyde & Benzene**

**Formaldehyde**
- Toxic byproduct found in the aerosol emitted by vaping.
- Colorless, flammable, strong-smelling chemical.
- The National Toxicology Program: “formaldehyde is a known human carcinogen.”

**Benzene**
- Toxic byproduct found in the aerosol emitted by vaping.
- Colorless, flammable, sweet-smelling chemical.
- The CDC reports that: “poison control should be contacted if you think you have been exposed.”
Effects on Pregnancy

❖ Vaping during pregnancy can be harmful to the baby both before and after birth.
❖ Increased risk of:
  ➢ Miscarriage
  ➢ Preterm delivery
  ➢ Stillbirth
  ➢ Low birth weight
  ➢ Sudden infant death syndrome (SIDS)
  ➢ Higher risk of birth defects
Myth or Truth?

Addiction poses a higher risk in adolescents than it does in adults.
Because addiction is an acquired habit, it has the greatest potential to influence the youth as their brain is still in development.
Effects on Youth

❖ Neurodevelopment
  ➢ Mood disorders
  ➢ Permanent decrease in impulse control
  ➢ Attention & learning deficits

❖ Behavioral
  ➢ Forming bad habits
  ➢ Risky behavior
    ■ Sex
    ■ Drugs
    ■ Alcohol
    ■ Tobacco products
    ■ Violence

❖ Addiction
Vaping, E-Cigs and Your Oral Health

❖ Researchers found vaping could lead to an increased risk of developing gum cancer.
❖ Using e-cigarettes decreases the mouth’s ability to fight off bacteria, leading to biofilms that can become cancerous.

❖ Teeth grinding
❖ Bad Breath
❖ Receding gums
Some Other Side Effects May Include:

- Dry mouth/skin/eyes
- Dizziness
- Coughing
- Itchiness
- Nose bleeds
- Seizures → mostly in youth and young adults
Cost

Average cost of smoking cigarettes:
❖ ~$6.28 per pack
❖ ~$188 per month

The cost vaping depends on:
❖ The type of vape you buy
❖ The price of your e-juice
❖ E-juice consumption
Financial Burden

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<td>Vaping</td>
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This information is based on: Half a pack of cigarettes a day, and (2) 10mL bottles of e-liquid a week.
How to Quit

Nicotine addiction may not be life-threatening in the short-term but can cut an individual’s life by 10+ years with long-term use.

Recovering from addiction can be managed with:

- Counseling from a health care provider
- A healthy support system
- Over the counter medications
- Prescriptions from your primary care provider
- Behavioral modifications
For more information:

❖ **CDC: Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults**

❖ **Truth Initiative: E-cigarettes: Facts, Stats and Regulations**

❖ **Johns Hopkins Medicine: 5 Truths You Need to Know About Vaping**
  ➢ [https://www.hopkinsmedicine.org/health/healthy_heart/ know_your_risks/5-truths-you-need-to-know-about-vaping](https://www.hopkinsmedicine.org/health/healthy_heart/ know_your_risks/5-truths-you-need-to-know-about-vaping)