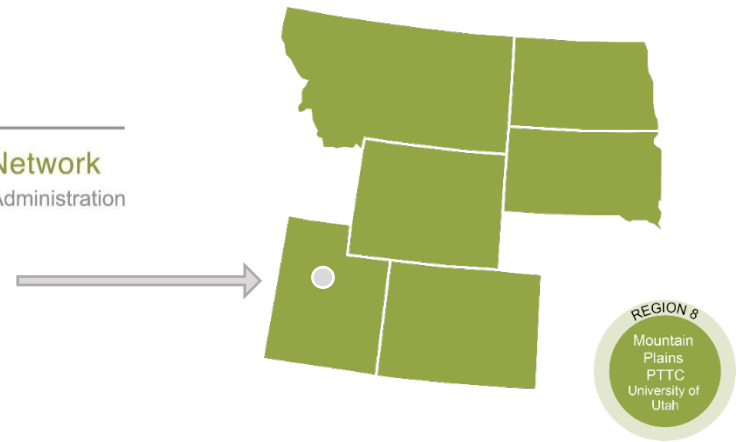




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## 3-Part Series – An Update on Adolescent Vaping Prevention: Prevalence, Adverse Behavioral Health Effects, and Prevention Practices

### Part 1: Adolescent Vaping: Prevalence, Why, and What? February 13, 2024



**Jason Burrow Sanchez, Ph.D.**

Professor, Educational Psychology, University of Utah  
Director, Mountain Plains PTTC

***SAMHSA***  
Substance Abuse and Mental Health  
Services Administration

# Disclaimer

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Funding for this presentation was made possible by SAMSHA grant no.H79SP080971 (Mountain Plains PTTC). The views expressed by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services (HHS), SAMHSA.

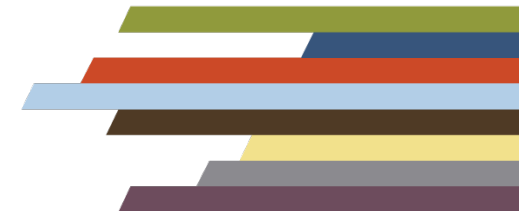


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# Three-Part Webinar Series

## An Update on Adolescent Vaping Prevention: Prevalence, Adverse Behavioral Health Effects, and Prevention Practices

### **Part 1: Adolescent Vaping: Prevalence, Why, and What?**

Today!!

### **Part 2: Vaping and Adolescent Behavioral Health: Understanding the Relationship Between the Two**

February 27, 2024 @ 10:30 - 11:45 a.m. MST (11:30 a.m. -  
12:45 p.m. CST)

### **Part 3: Vaping Prevention and Interventions in Schools**

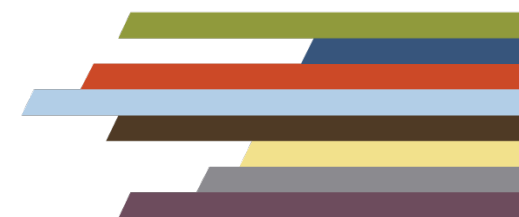
March 5, 2024 @ 10:30 - 11:45 a.m. MST (11:30 a.m. -  
12:45 p.m. CST)



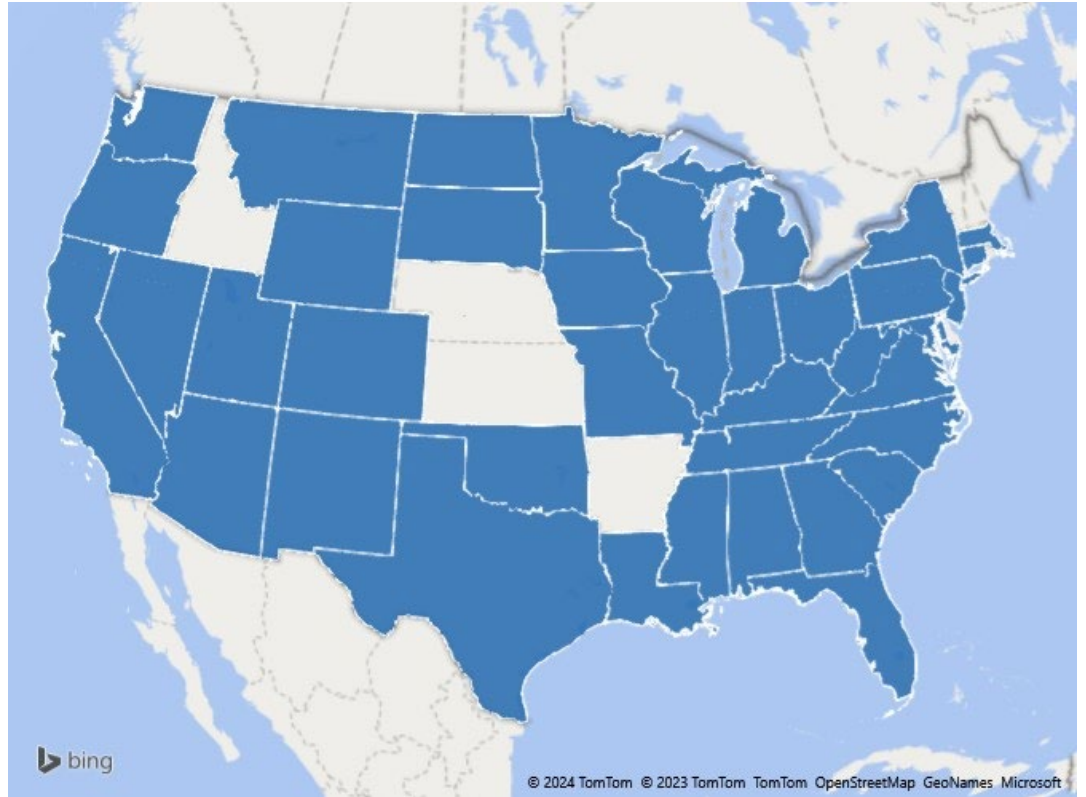
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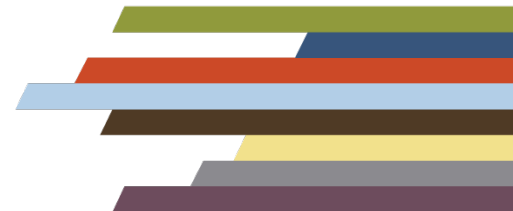
# Map of Participants



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## PRODUCTS



### Informing Prevention: Understanding Adolescent Development

This webinar will provide you with information in order for you to be able to describe the prevention model (primary, secondary, tertiary)...

MP PM PP PPS AC

View All



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# A Brief E- Cigarette History

- **2007:** E-cigarettes introduced in U.S.
- **2014:** E-cigarettes is most used tobacco product for youth
- **2016:** FDA Deeming Rule
- **2017:** JUUL brand becomes most popular on the market
- **2018:** JUUL has over 70% of market share
- **2019:** EVALI cases
- **2022:**
  - June/July: FDA Denies Authorization to Market Juul Products
    - Soon after administrative hold until review application
  - Sept: Juul to Pay 440M to settle 33 states vaping cases

---

# Three Questions for Today!

---

1) How many adolescents are vaping?

---

2) What are adolescents vaping?  
(2a and 2b)

---

3) Why are adolescents vaping?



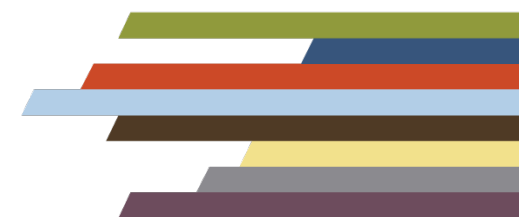
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# Q1: Prevalence of Adolescent Vaping

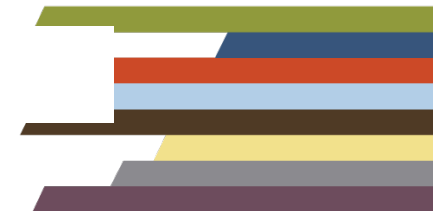
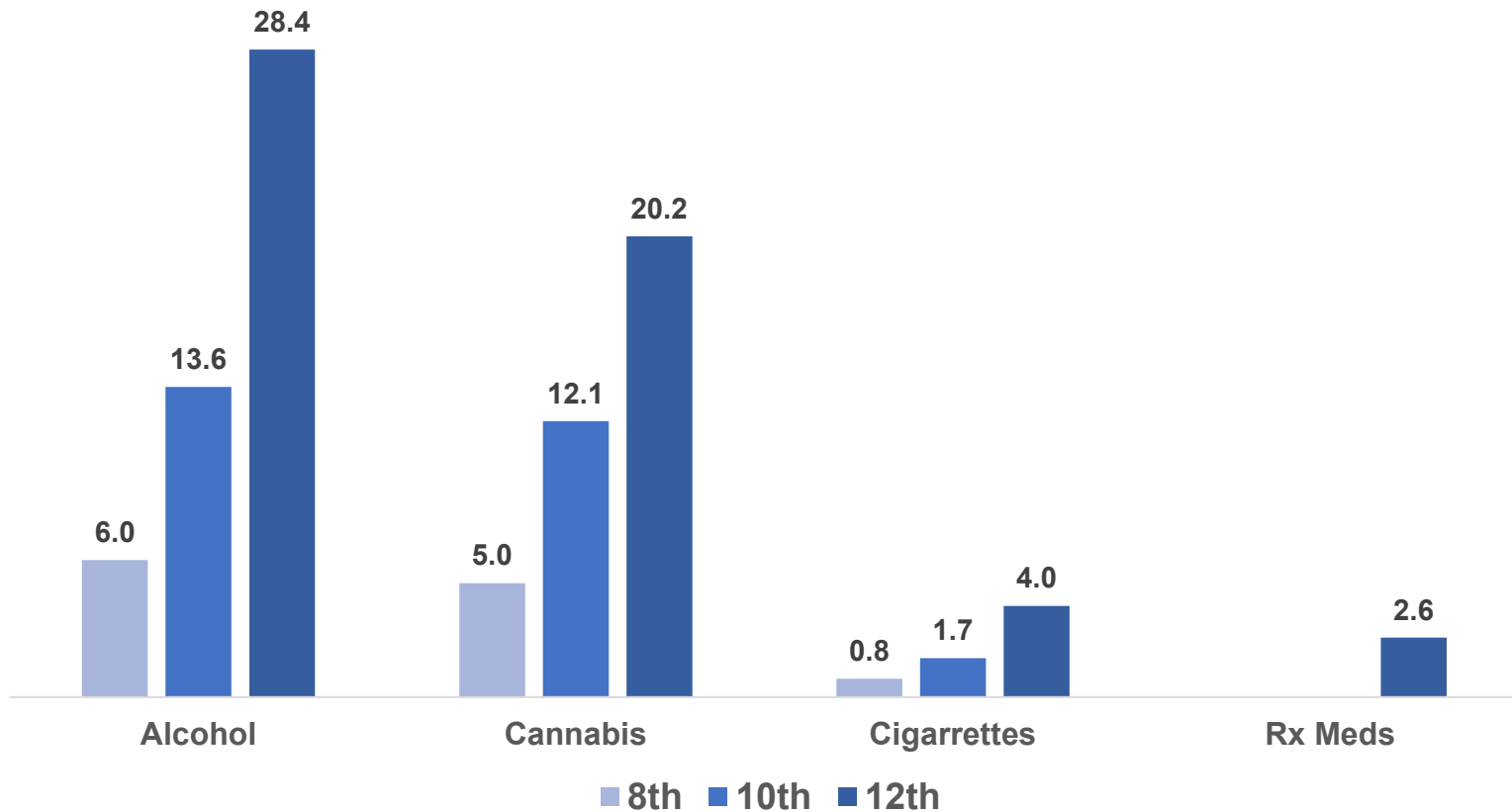
- Data Sources
  - National:
    - Monitoring the Future (MTF)
    - National Survey on Drug Use and Health (NSDUH)
    - National Youth Tobacco Survey (NYTS)
    - Youth Risk Behavior Survey (YRBS)
    - Others...
  - State-Based
    - Student Health and Risk Prevention (SHARP)
    - Youth Risk Behavior Survey (YRBS)
    - Others....





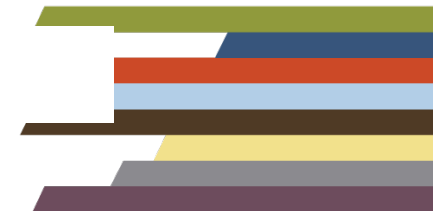
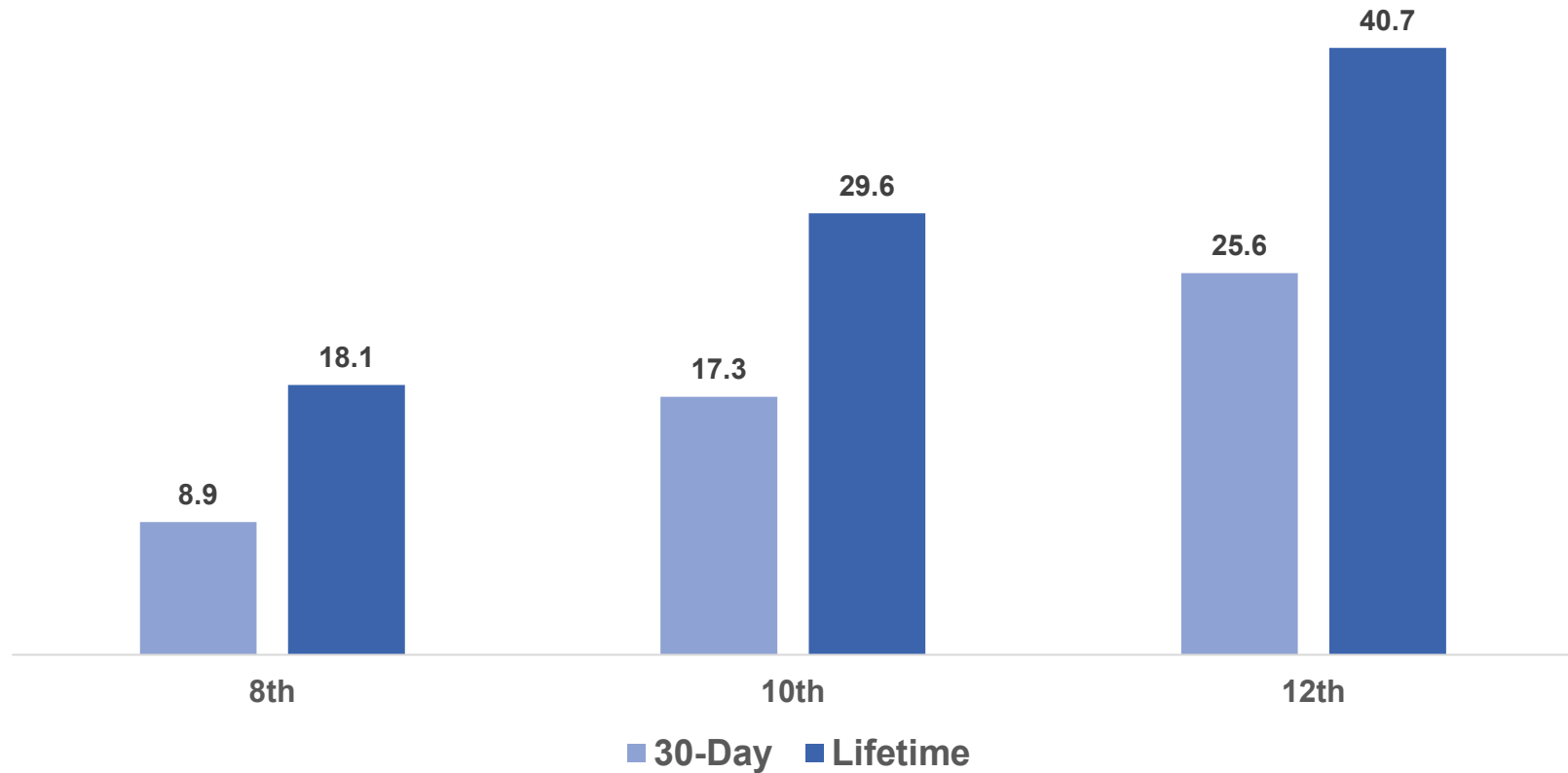
# Grades 8, 10, 12 – U.S.

Substance Use By Grade in Past 30 Days



# Grades 8, 10, 12 – U.S.

Vaping Use By Grade: 30-Day Versus Lifetime



# 12<sup>th</sup> Grade Vaping

Use in Past 30 Days

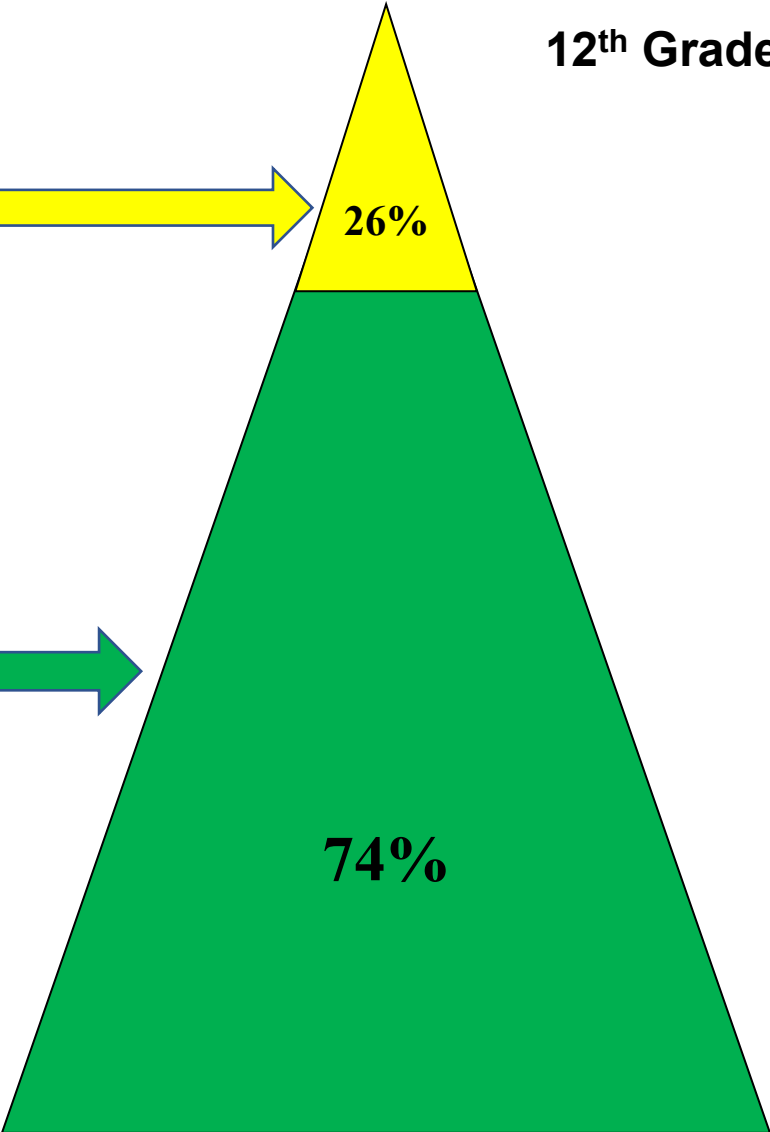


26%

No Use in Past 30 Days



74%



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**Source:** Data for the graphic based on MTF 2022 National Survey Key Results Report  
<https://monitoringthefuture.org/wp-content/uploads/2023/01/mtfoverview2022.pdf>



# Q2a: What is Vaping?

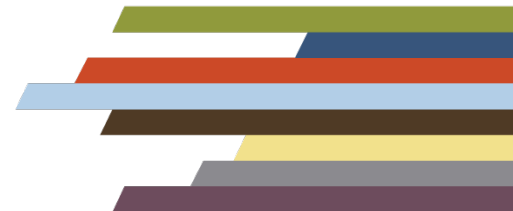
- Involves a **Device**
  - Different types
- Involves a **Substance**
  - Different types
- Involves an **Interaction** between the two
  - Devices X Substances = Many Combinations



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# Vaping Basics

**Electronic Device** + **Liquid** = **Vaping**

Tanks & Mods



Rechargeable e-cigarette



Disposable e-cigarette



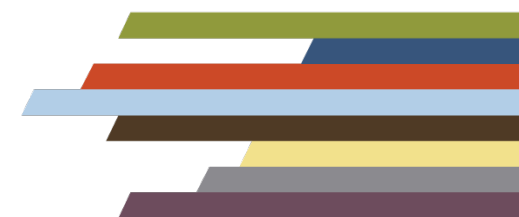
Picture Source: CDC Infographic



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# Q2b: What are Adolescents Vaping?

Nicotine

THC

Cannabis

Vaping Liquid

Flavors

Dried Flower

Vaping Oil

Dabs

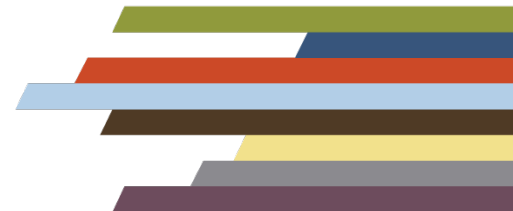
Concentrates



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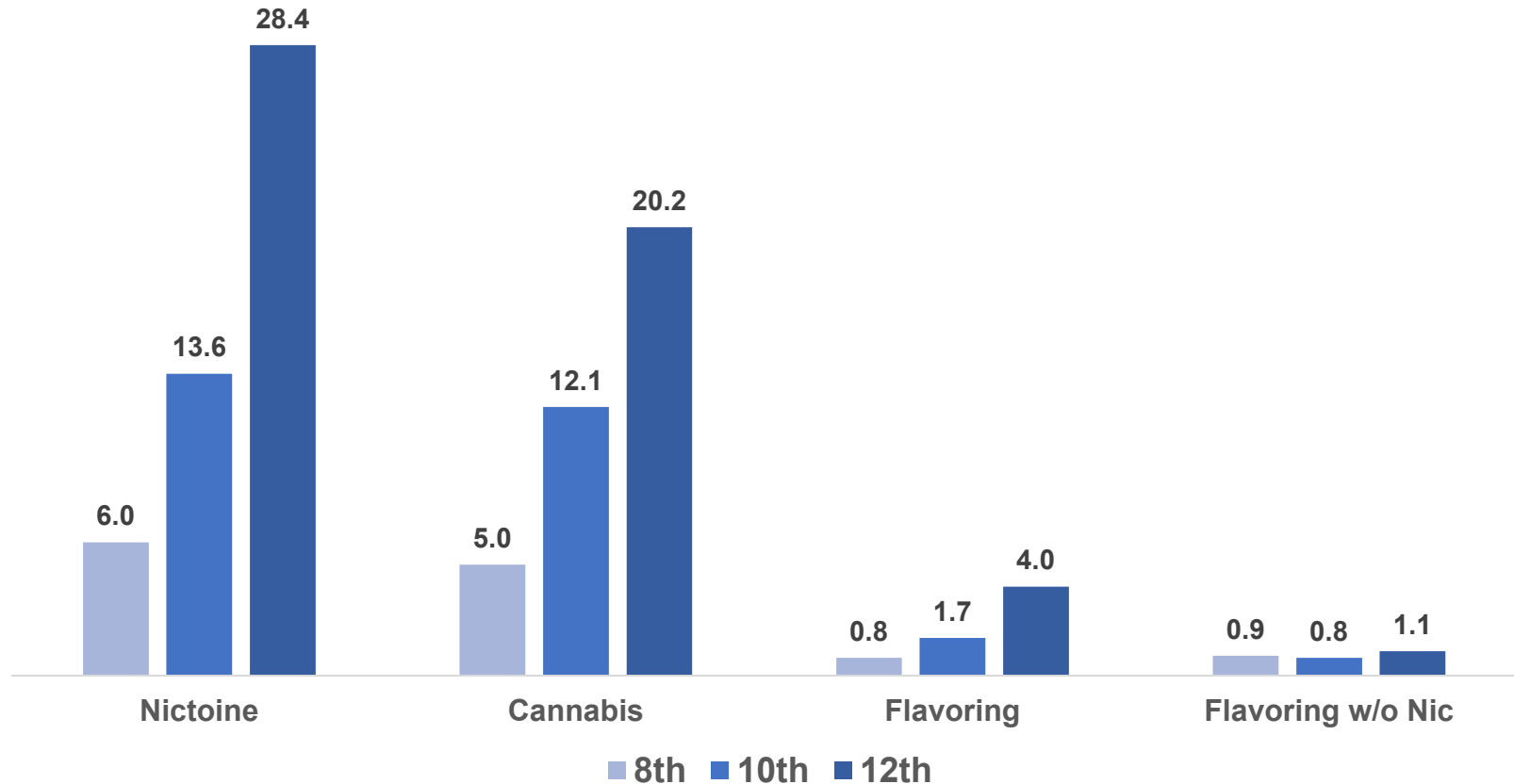
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# Grades 8, 10, 12 – U.S.

Vaping Substance by Grade: 30 Day Use



Source: MTF 2022 National Survey Key Results Report

<https://monitoringthefuture.org/wp-content/uploads/2023/01/mtfoverview2022.pdf>

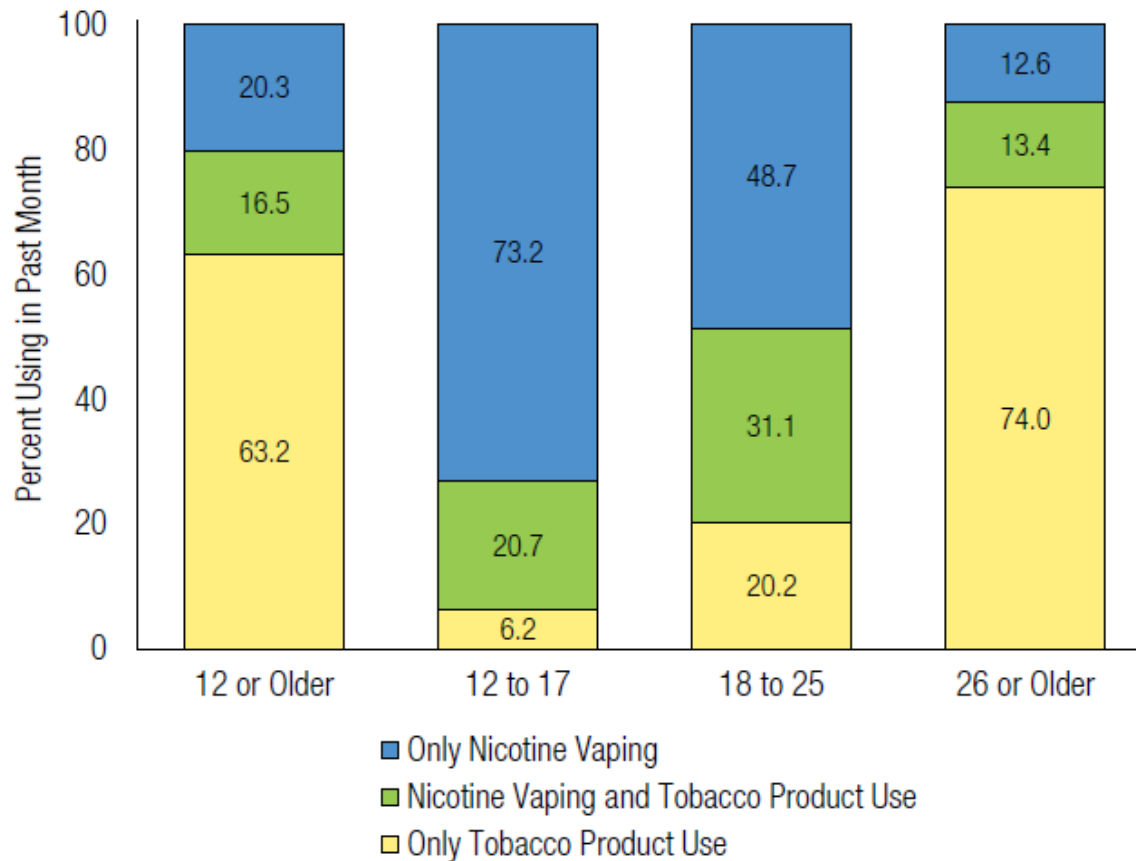


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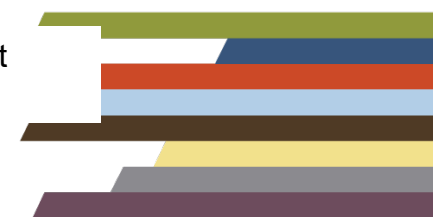


**Figure 3. Type of Past Month Tobacco Product Use or Nicotine Vaping: Among Past Month Nicotine Product Users Aged 12 or Older; 2022**



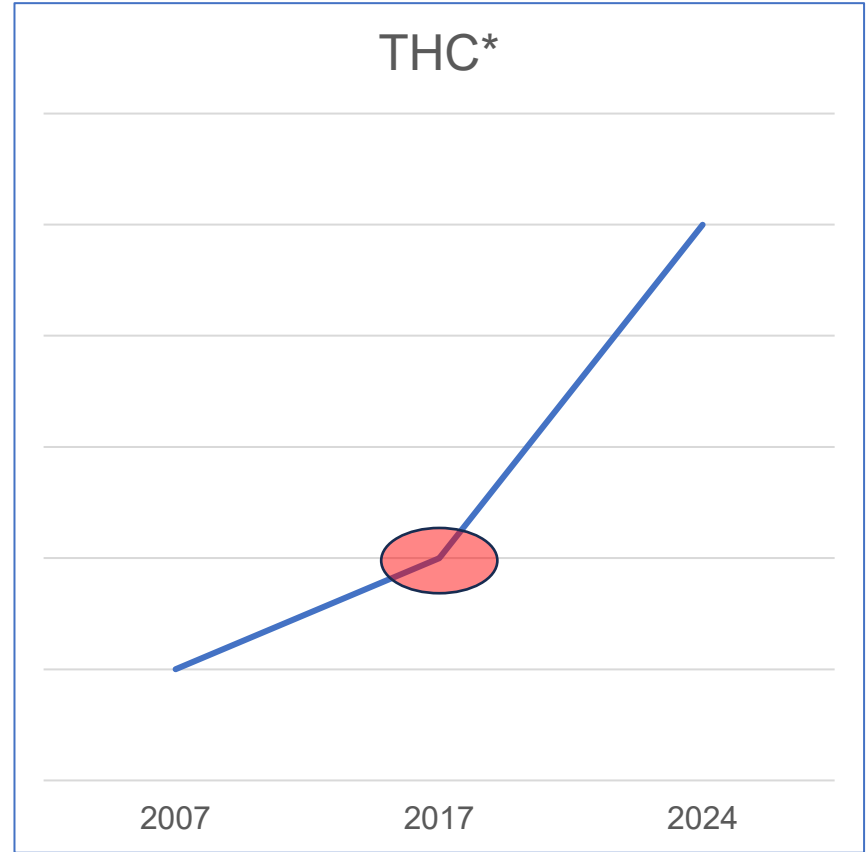
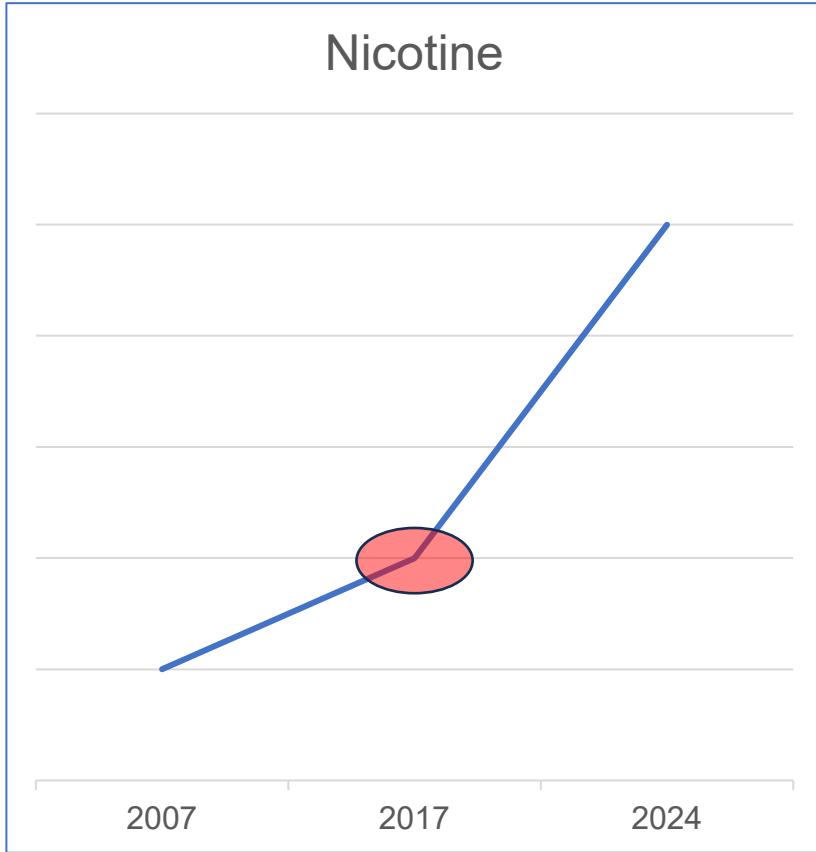
Note: The percentages may not add to 100 percent due to rounding.

Source: NSDUH 2023 - Results from the 2022 NSDUH Report. National Survey Key Results Report <https://www.samhsa.gov/data/report/2022-nsduh-annual-national-report>





# Concentrations of Nicotine and THC in Vaping Products



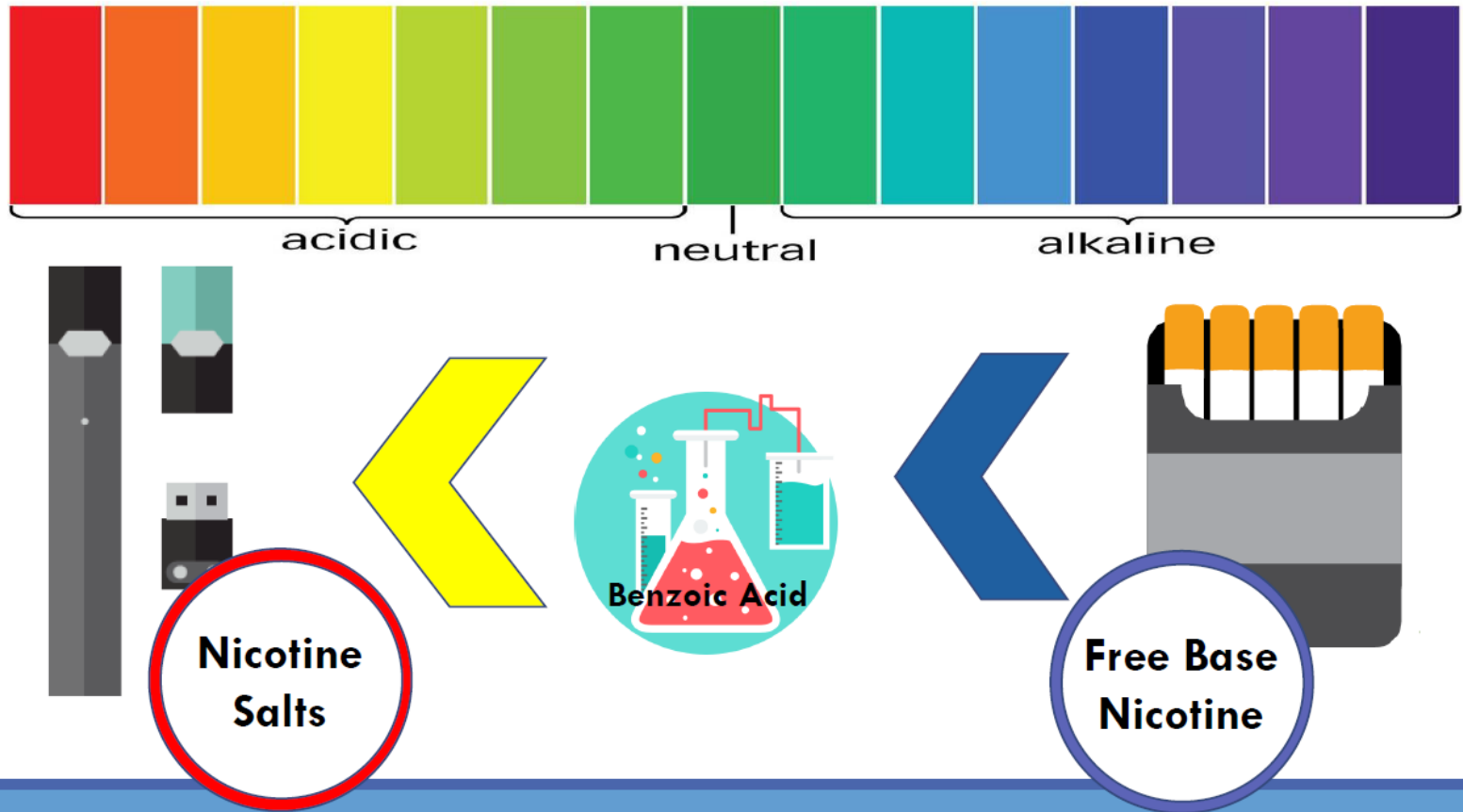
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\*THC = tetra-hydro-cannab-inol

Nicotine salts allow particularly high levels of nicotine to be inhaled more easily and with less irritation than free base nicotine.



Slide Source: King, B. (2019). Webinar slides on e-cigarette use among youth and young adults – 2/26/19



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# Q3: Why Are Adolescents Vaping?

## Environment

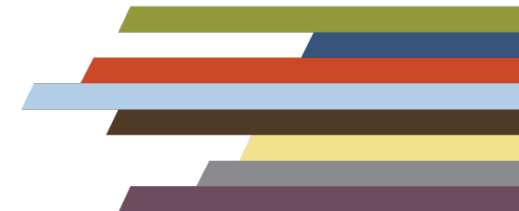


## Biology



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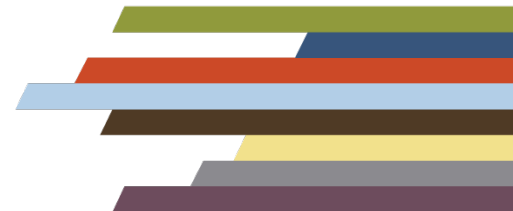
# Environmental Factors



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# Asking Adolescents

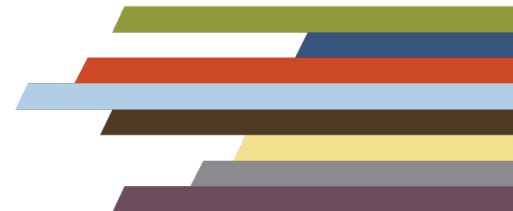
- Study from Patrick et al., 2016
  - Experimentation
  - Taste
  - Boredom
  - Having a good time
  - Relaxation
- Study from Tsai et al., 2018
  - Use by a friend or family member
  - Availability of flavors
  - Belief they are less harmful than other tobacco products



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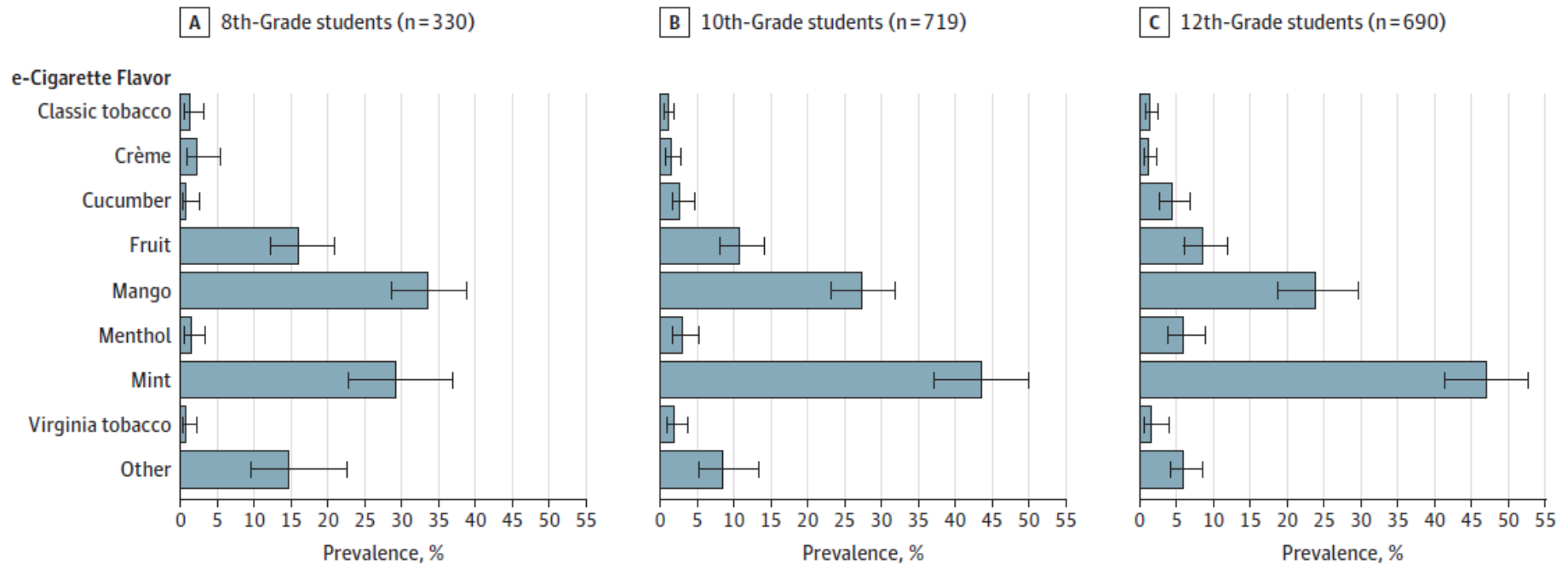
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# Vaping Flavors

Figure. Flavor Used Most Often Among US Youths, Past 30-Day JUUL e-Cigarette Users



Weighted prevalence estimates of forced-choice responses to “Which JUUL flavor do you use most often?” The “other” category did not specify any flavor and could represent various flavors compatible with the JUUL device made by manufacturers other than JUUL Labs. Error bars indicate 95% CIs.

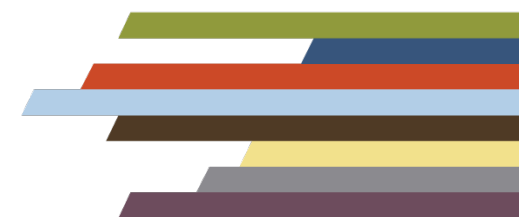
Source: Leventhal et al., 2019, JAMA



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**NYT Article: Jan 31, 2020**

## *Teens Find a Big Loophole in the New Flavored Vaping Ban*

The policy allows mint, dessert and fruit flavors to continue to be sold in disposable e-cigarettes, prompting many teens to switch from Juul to those devices.

**Source:** <https://www.nytimes.com/2020/01/31/health/vaping-flavors-disposable.html>



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# “They are less harmful than regular cigarettes, right?”

## ARE E-CIGARETTES LESS HARMFUL THAN REGULAR CIGARETTES?



VS



**YES**, but that doesn't mean e-cigarettes are safe.

E-cigarette aerosol generally contains fewer toxic chemicals than the deadly mix of 7,000 chemicals in smoke from regular cigarettes. However, e-cigarette aerosol is not harmless. It can contain harmful and potentially harmful substances, including nicotine, heavy metals like lead, volatile organic compounds, and cancer-causing agents.

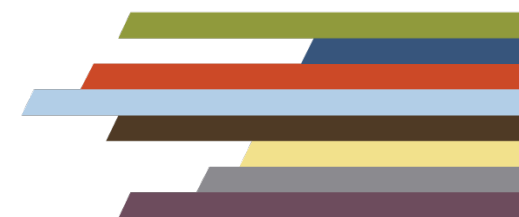
Source: CDC Infographic, Electronic-Cigarettes-Infographic-508c



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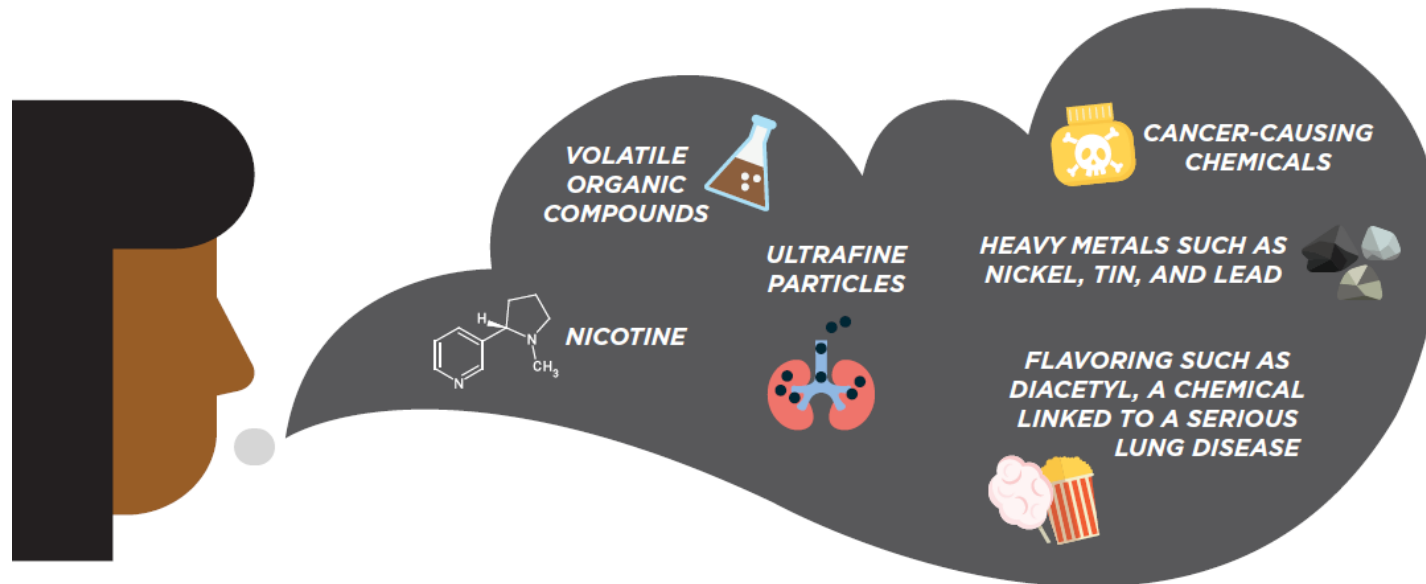




# “It’s just water vapor, right?”

## WHAT IS IN E-CIGARETTE AEROSOL?

THE E-CIGARETTE AEROSOL THAT USERS BREATHE FROM THE DEVICE AND EXHALE CAN CONTAIN HARMFUL AND POTENTIALLY HARMFUL SUBSTANCES:



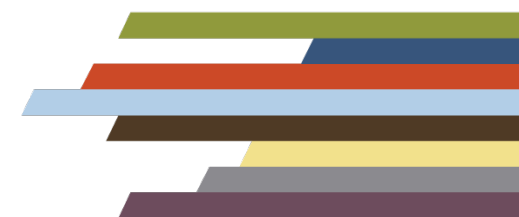
It is difficult for consumers to know what e-cigarette products contain. For example, some e-cigarettes marketed as containing zero percent nicotine have been found to contain nicotine.

**Source:** CDC Infographic, Electronic-Cigarettes-Infographic-508c  
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## Frequent E-Cig Compared to No E-Cig Use (Past 30 Days)

### INDIVIDUAL

Perceived Risk - E-Cig

-1.12 (-1.10, -1.08)

Perceived Risk - Cannabis

-1.15 (-1.18, -1.07)

Favorable Att - Substances

1.89 (1.84, 1.98)

### PEER

Peer Use

2.21 (2.02, 2.39)

Peer Fav Att - Substances

1.67 (1.59, 1.76)

### FAMILY

Parental Fav Att - Substances

0.95 (0.85, 1.06)

Family Management

-0.76 (-0.82, -0.69)

### SCHOOL

Low Commitment

0.82 (0.77, 0.86)

Academic Failure

0.67 (0.62, 0.71)

### COMMUNITY

Perceived Availability - Substances

1.22 (1.15, 1.30)

Laws/Norms Favorable - Substance Use

0.63 (0.56, 0.70)

LESS LIKELY

MORE LIKELY

-3.5

-2.5

-1.5

-0.5

0.5

1.5

2.5

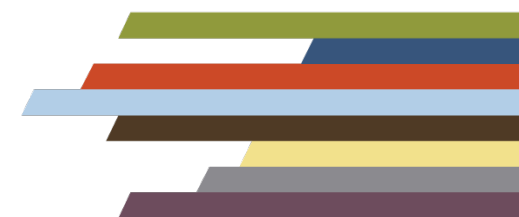
3.5

# Commonalities and Differences: Risk and Protective Factors

Factors	Alcohol	Cannabis	E-Cigs
<b>RISK</b>			
Favorable Attitudes	↑	↑	↑
Peer Use	↑	↑	↑
Parental Favorable	↑	×	×
Perceived Availability	↑	↑	↑
<b>PROTECTION</b>			
Perceived Risk	×	↓	↓
Prosocial Peers	×	↓	↓
Positive Family Mgt.	↓	↓	×
Prosocial Rewards	↓	×	↓



Source: Burrow-Sanchez et al., 2022





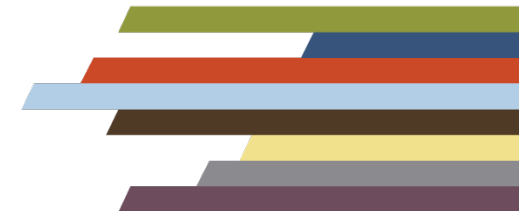
# Biological Factors



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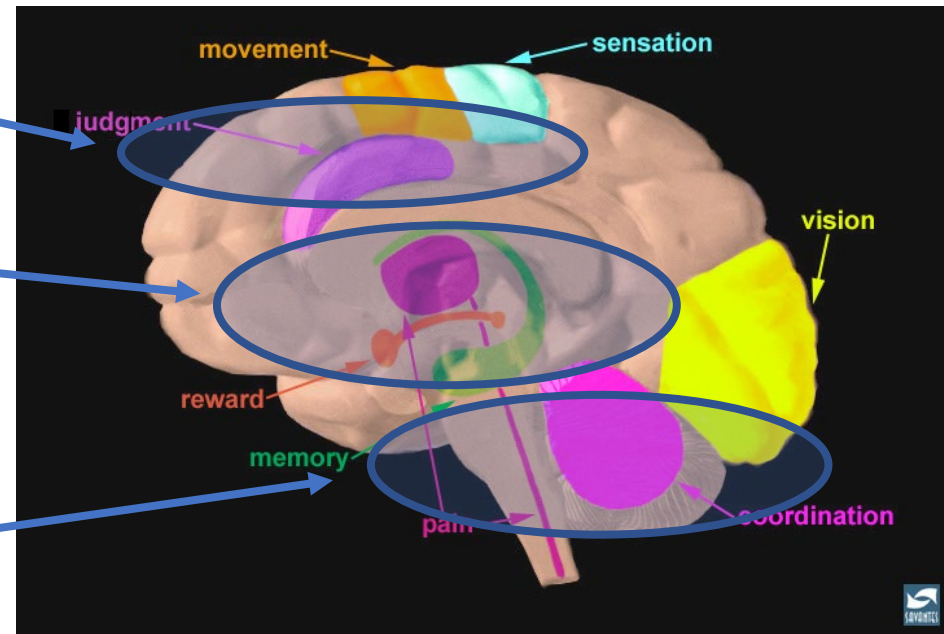
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# Major Parts of the Adolescent Brain

- **Cortex Area**
  - Prefrontal Cortex
- **Limbic Area**
  - Emotion
    - Amygdala (fear, anger)
    - Hippocampus (new memories)
    - Hypothalamus (hormones)
- **Brain Stem**
  - Keeps us alive



Content Source: Walsh, 2013

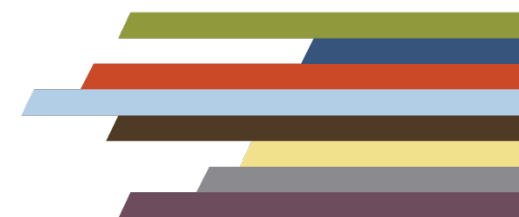
Image Source: NIDA, [www.drugabuse.gov](http://www.drugabuse.gov)



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# Adolescent Risk Taking, Impulsivity, and Cognitive Control



## Risk taking

Engage in sensation-seeking behaviors

Adolescents engage in more risk-taking than younger or older age groups



## Impulsivity

Correlates with risk-taking

Emotional rather than cognitive process



## Cognitive Control

Consequential thinking, decision making, problem solving



# Effects of Nicotine

- Adolescent Compared to Adult Brains (preclinical studies):
  - More sensitive to rewarding effects of nicotine
  - Withdrawal from nicotine is more blunted
  - Higher doses of nicotine tolerated better
    - Lowers aversion to higher doses later in life
  - Enhances effects (use) of other substances (e.g., alcohol, cocaine, methamphetamine)
    - Higher susceptibility to other substances

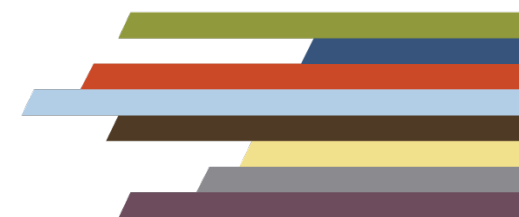
Source: Yuan et al., 2015



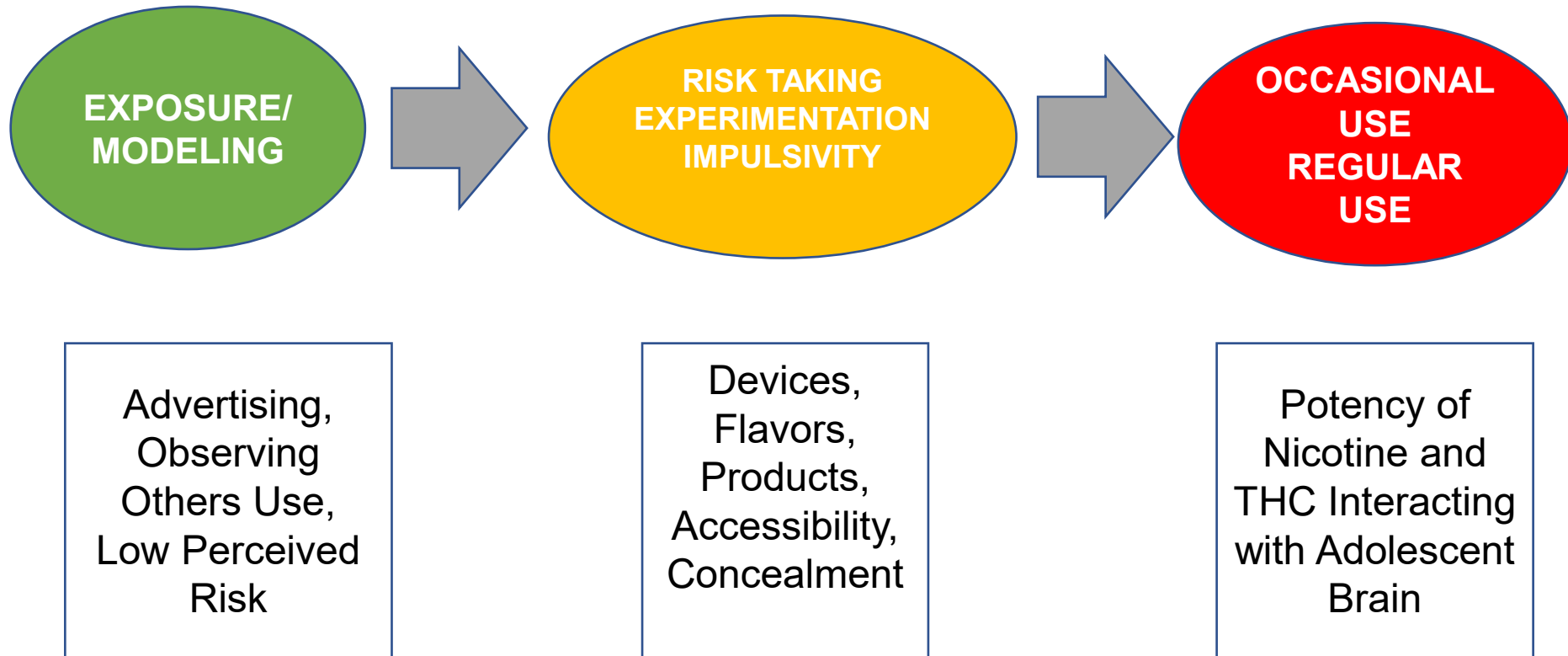
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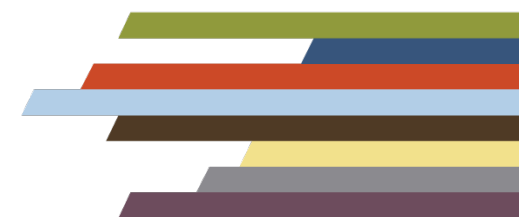
# Potential Pathway to Vaping



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# Review: Three Questions for Today!

---

1) How many adolescents  
are vaping?

---

2a) What is vaping?

2b) What are adolescents  
vaping?

---

3) Reasons why  
adolescents vape?



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# Effects of Substances on the Teen Brain & Body (Video Resources)

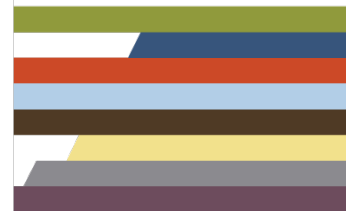


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# Thank You!!

**Jason Burrow-Sánchez, PhD**

Email: [jason.burrow-sanchez@utah.edu](mailto:jason.burrow-sanchez@utah.edu)



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