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GENERAL HOSPITAL

PSYCHIATRY ACADEMY

# Nicotine

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# Disclosures



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I do not have a relevant financial relationship with a commercial interest to disclose.



# Learning objectives

Participants will be able to:

1. Identify at least 3 populations at elevated risk for tobacco use disorders.
2. Compare the effects of combustible cigarettes and electronic nicotine delivery systems (ENDS) products.
3. Recall at least 3 FDA-approved treatments for tobacco use disorder.



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# Scope of nicotine consumption

**Who still smokes anyway?**



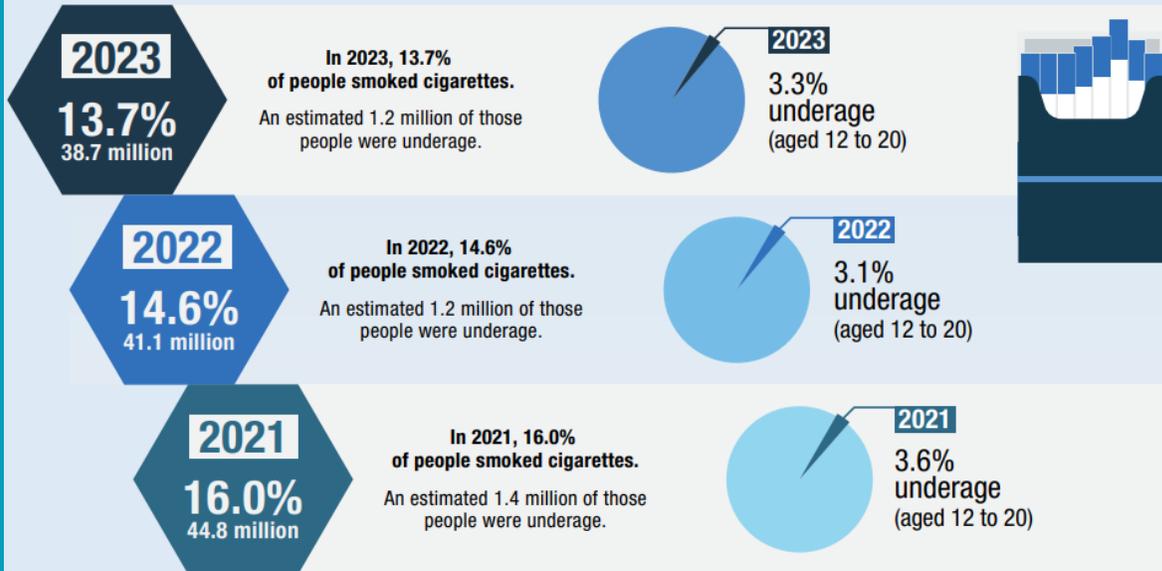
# How many people still smoke?

## Cigarette Use and Nicotine Vaping in the Past Month

NSDUH asked respondents aged 12 or older about their cigarette use and nicotine vaping in the 30 days before the interview.

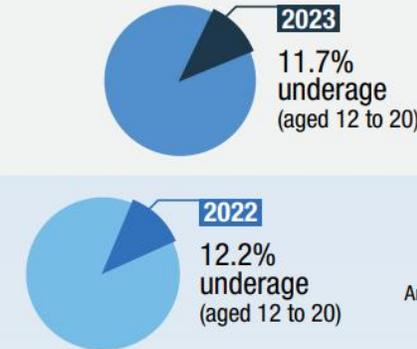
### Cigarette Use

Differences across Years: Cigarette Use  
2023 < 2022  
2023 < 2021  
2022 < 2021  
There were no significant differences across years for estimates of Underage Cigarette Use.



### Nicotine Vaping

Differences across Years: Nicotine Vaping  
2023 > 2022  
There were no significant differences across years for estimates of Underage Nicotine Vaping.

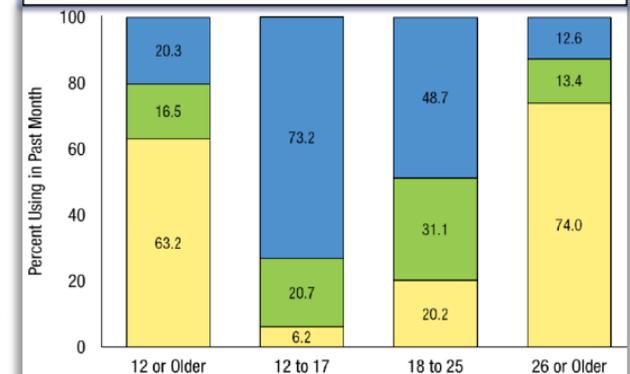


Nicotine vaping estimates from 2021 are not comparable with estimates from 2022 and 2023 and have been excluded.

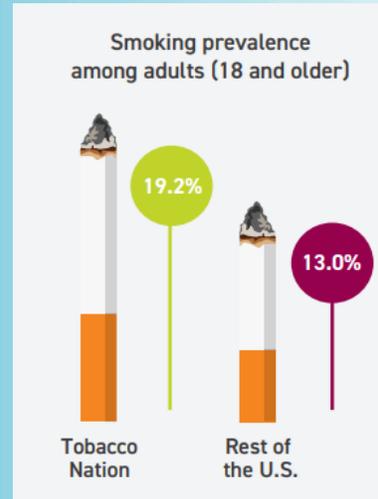
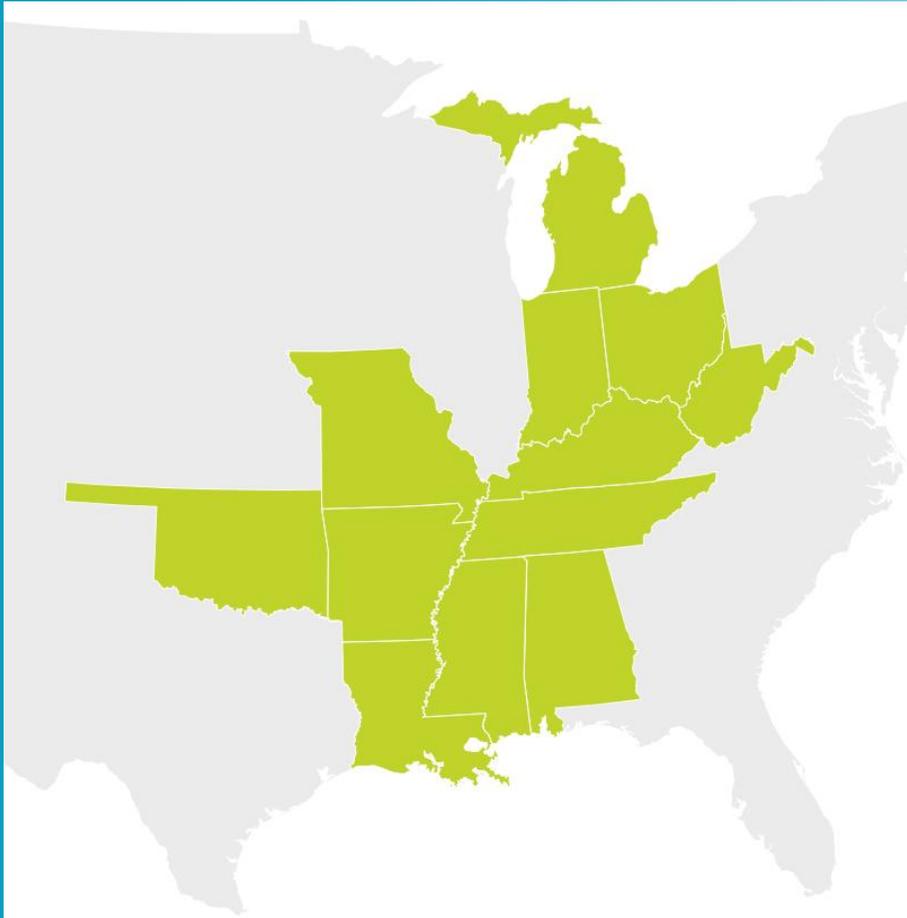
### Tobacco and Nicotine Use

- An estimated 63.9 million people reported current use of tobacco products and/or nicotine vaping, which is approximately 22.7% of people aged 12 and older.
- The type of nicotine products used varied by age group.

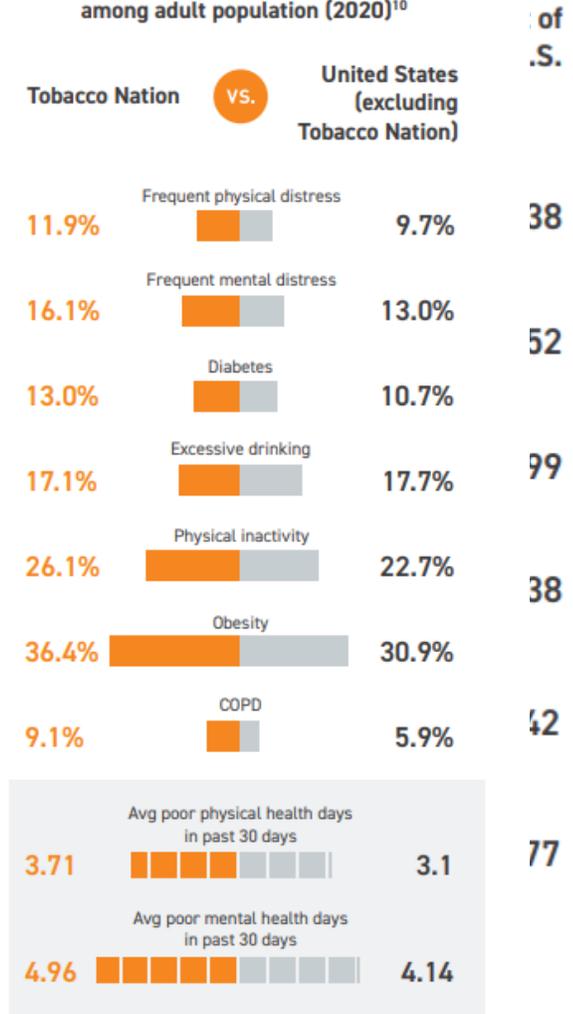
Type of Past Month Tobacco Use or Nicotine Vaping: Among Past Month Nicotine Product Users Aged 12 or Older; 2022



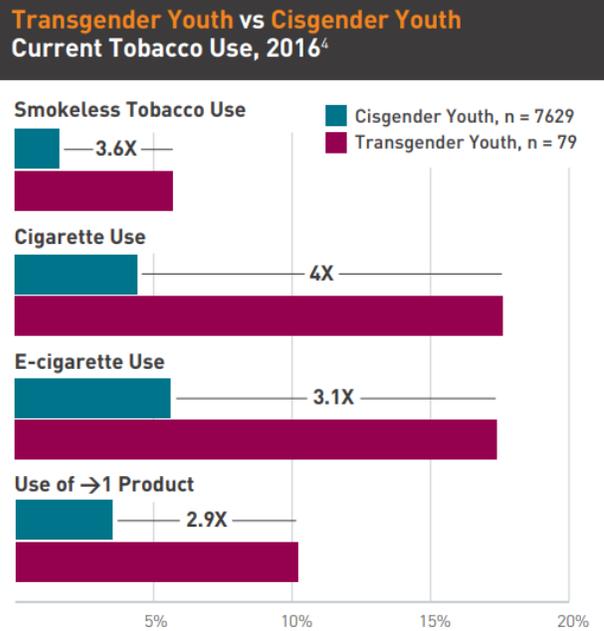
# Who still smokes?



Health and mental health indicators among adult population (2020)<sup>10</sup>

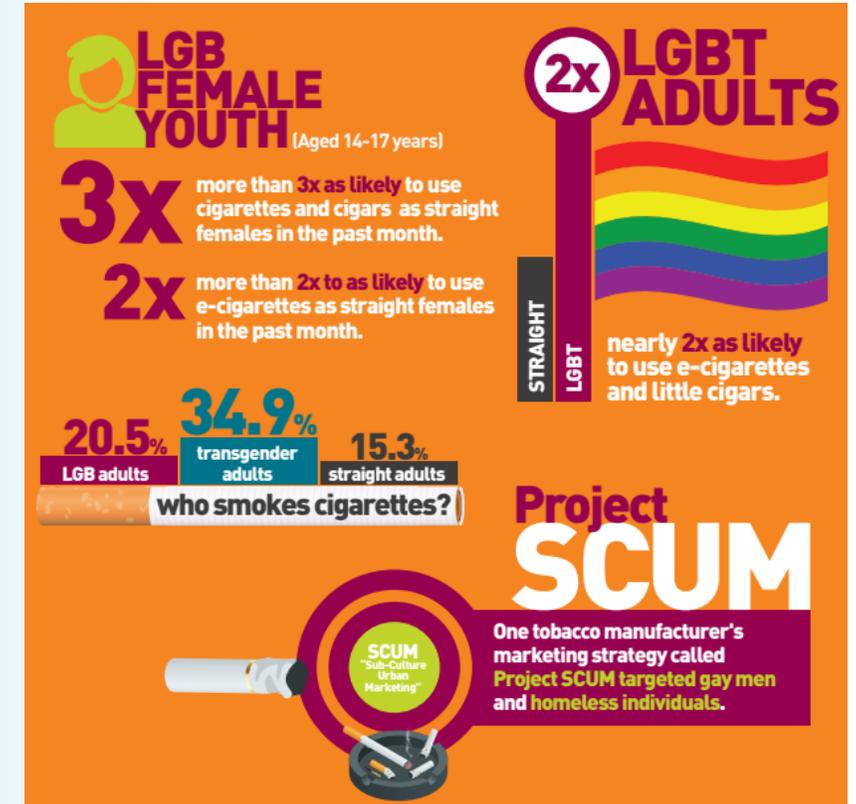
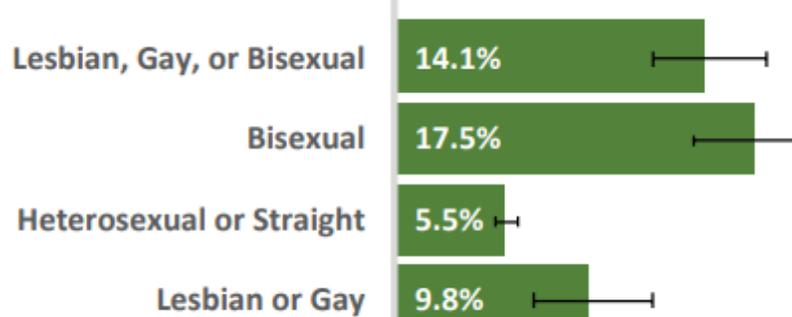


# Who still smokes?



## By Sexual Orientation:

Current e-cigarette use ranged from about 6 in 100 among heterosexual/straight adults to about 18 in 100 among bisexual adults.

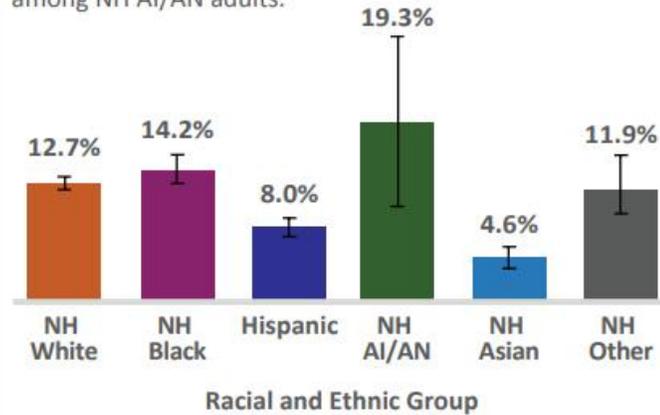


# Who still smokes?



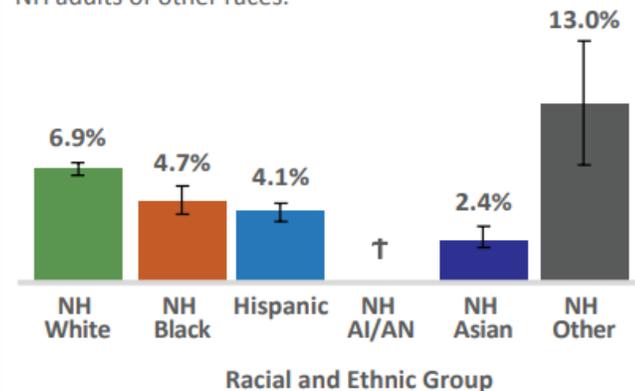
## By Race and Ethnicity<sup>d</sup>:

Current cigarette smoking ranged from about 5 in 100 among Non-Hispanic (NH) Asian adults to 19 in 100 among NH AI/AN adults.



## By Race and Ethnicity<sup>d</sup>:

Current e-cigarette use ranged from 2 in 100 among Non-Hispanic (NH) Asian adults to 13 in 100 among NH adults of other races.



## Tobacco Harms Some Population Groups More than Others

Smoking is the leading preventable cause of disease, disability, and death in the U.S.—including cancer, heart disease, and chronic obstructive pulmonary disease (COPD)—among all racial and ethnic groups.



Lung cancer incidence and death rates are highest among **Black men**. Among women, the incidence of lung cancer is highest among **American Indian** and **Alaska Native women**. Cigarette smoking is the primary cause of lung cancer.



The prevalence of heart disease is highest among **Black men** and among **White men**. Among women, the prevalence is highest among **Black women**. Cigarette smoking is a major cause of heart disease.



Chronic obstructive pulmonary disease (COPD) is highest among **American Indian** and **Alaska Native adults**. Cigarette smoking is a primary cause of COPD and the primary risk factor for the worsening of COPD.

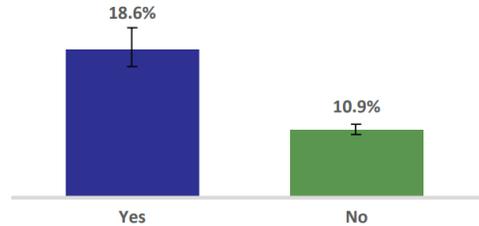
# Who still smokes?



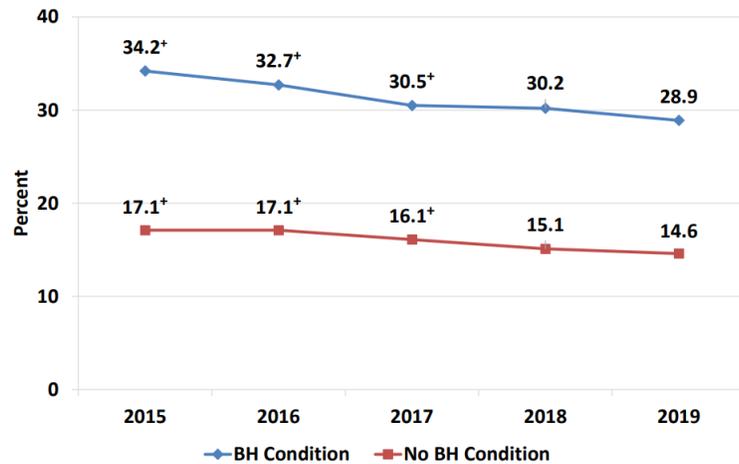
**By Disability Status\*:**

About 19 in 100 adults with a disability smoked cigarettes compared with 11 in 100 adults without a disability.

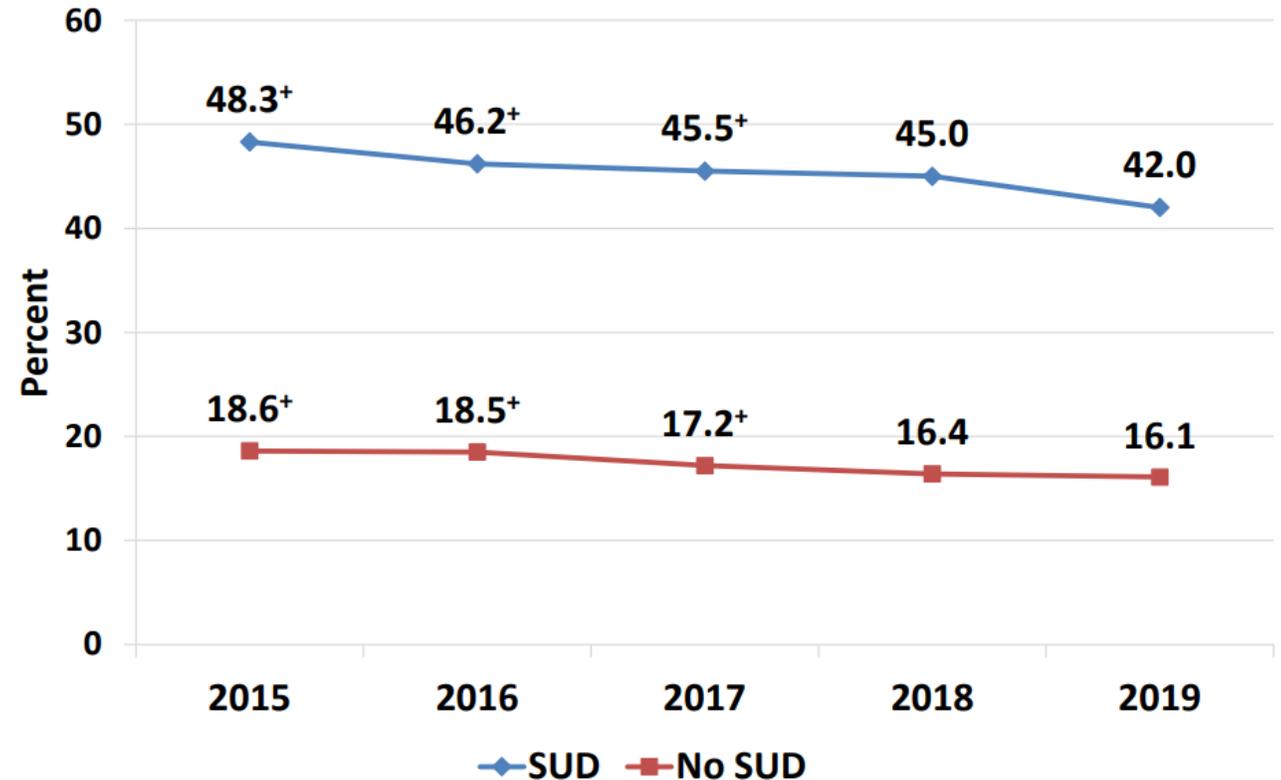
- Adults with a disability
- Adults without a disability



**Current Smoking among Adults (Age ≥ 18) with a Past Year Behavioral Health (BH) Condition: NSDUH, 2015-2019**



**Current Smoking among Adults (Age ≥ 18) with a Past Year Substance Use Disorder (SUD): NSDUH, 2015-2019**



# Just to review



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Disparities in commercial tobacco use exist by:



race and ethnicity



sexual orientation  
and gender identity



income and  
education level



occupation



geography



mental health condition

Each year in the U.S., more than

**470,000**

adults are estimated to die from  
cigarette smoking.

In the U.S., more than

**19,000**

people die from exposure to  
secondhand smoke each year.

In 2022, the tobacco industry spent

**\$8 Billion**

to market cigarettes and

**\$572.7 Million**

to market smokeless tobacco products

Exposure to tobacco advertising increases the chance that someone will try smoking for the first time or progress to the regular use of tobacco products.

The tobacco industry has a long history of targeting its advertising and promotions to certain population groups.

The targeted advertising of tobacco products, including menthol cigarettes and other flavored products, contributes to persistent disparities in their use. This is one example of a social injustice.



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# Route of nicotine consumption

Combustible cigarettes v. ENDS products

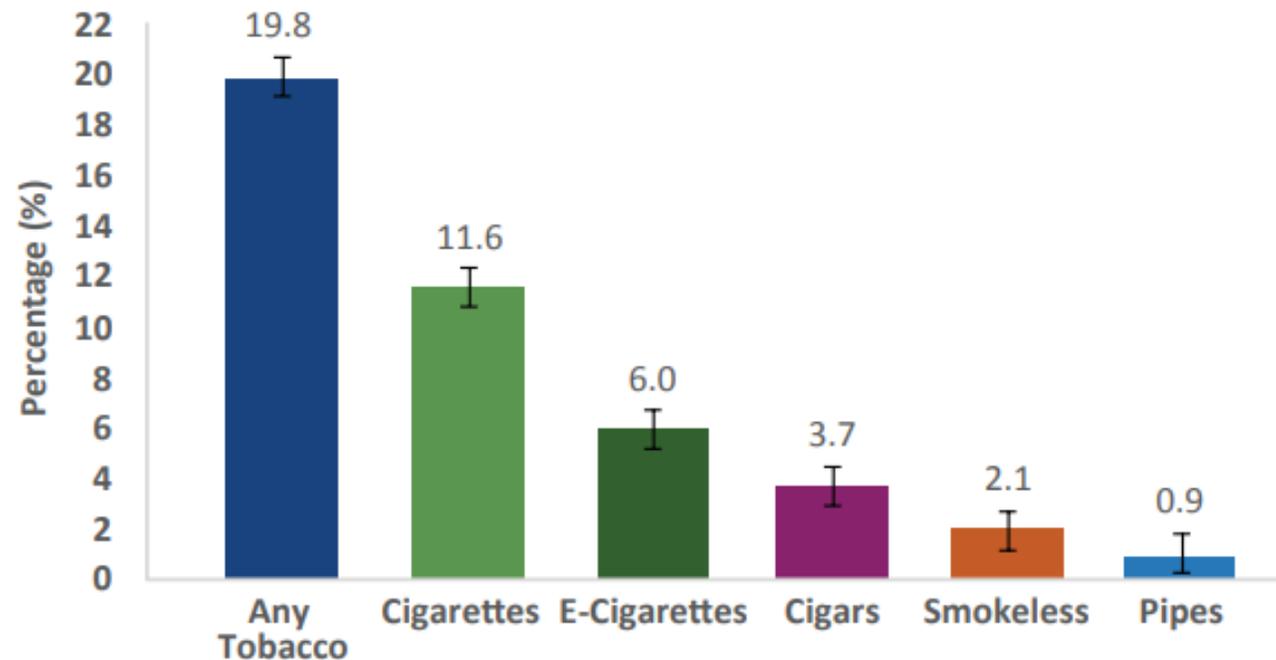


# What do people smoke?

In 2022, U.S. adults used a variety of different tobacco products. Among adults who reported current tobacco product use, about 3 in 4 (73.6%) used a combustible tobacco product.<sup>c</sup>



In 2022, **19.8%** of adults used a tobacco product. This is nearly **1 in 5** U.S. adults.



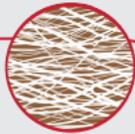


# How a Cigarette Is Engineered

The design and content of cigarettes continue to make them attractive, addictive, and deadly.<sup>1</sup> Every day, more than 1,300 people in the United States die because of cigarette use.<sup>2</sup>

## Filter<sup>3,4,5</sup>

- Typically made from bundles of thin, hair-like fibers.
- Designed to trap smoke, but only stops a small portion of the smoke from being inhaled.
- The filter (and ventilation holes) in most cigarettes may lead smokers to inhale more deeply, pulling dangerous chemicals farther into their lungs.



## Tipping paper<sup>6</sup>

- Wraps around the filter, connecting it to the rest of the cigarette.
- **Ventilation holes**, if unblocked, dilute inhaled smoke with air.
- Manufacturers have chosen to place the ventilation holes where they are. The holes are largely ineffective. Because of their location, most smokers unknowingly block them with their fingers or lips.



## Cigarette paper<sup>3</sup>

- Holds the tobacco filler.
- Manufacturers add chemicals to the paper to control how fast the cigarette burns.
- Smokers inhale everything that is burned—the tobacco filler, the paper... everything.

## Tobacco filler<sup>7,8,9</sup>

- Made up of chopped tobacco leaves, stems, reprocessed pieces, and scraps.
- Dangerous chemicals can form in and be deposited on tobacco during the processing of the tobacco leaves.
- Other dangerous chemicals are created when the tobacco filler is burned.



## Additives<sup>10,11,12</sup>

Manufacturers can **add hundreds of ingredients** to a cigarette to make smoking more appealing and to mask the harshness of smoke.

-  Certain **additives**, like sugars, can form cancer-causing chemicals when they are burned.
  - **Sugar and flavor\*** additives can change the taste of smoke and make it easier to inhale, but no less harmful.
  -  **Ammonia** and other **chemicals** added to tobacco may increase the absorption of nicotine, which is addictive.
- Some additives are **bronchodilators** that could increase the amount of dangerous chemicals absorbed by the lungs.

<sup>1</sup>In 2009, The Family Smoking Prevention and Tobacco Control Act banned characterizing flavors in cigarettes, except for tobacco and menthol flavors.

# Combustible Cigarettes

# Electronic Nicotine Delivery Systems



## How to Classify the User's E-Cigarette, or Vaping, Product

For an accessible explanation of schematic below on how to classify e-cigarettes, go to [Appendix, page 25](#).

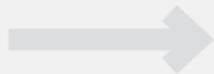
### Important notes:

1. E-liquids can contain nicotine, THC, CBD, flavors, or other solvents.
2. Marijuana herb, hash oil, dab wax are used with vaporizers.

#### QUESTION 1:

Is the e-liquid contained in a disposable e-cigarette, cartridge, tank, or pod?

**Disposable e-cigarette**  
(no cartridge, tank or pod)



**1st**  
**GENERATION**  
(Cigalike)



**QUESTION 2:**  
Is the cartridge also called a pod cartridge or contains nicotine salts?

NO

**2nd**  
**GENERATION**  
(Battery Pen)



YES

**Cartridge**  
(Prefilled or refillable)



**Tank/ Sub-Ohm**  
(Refillable)



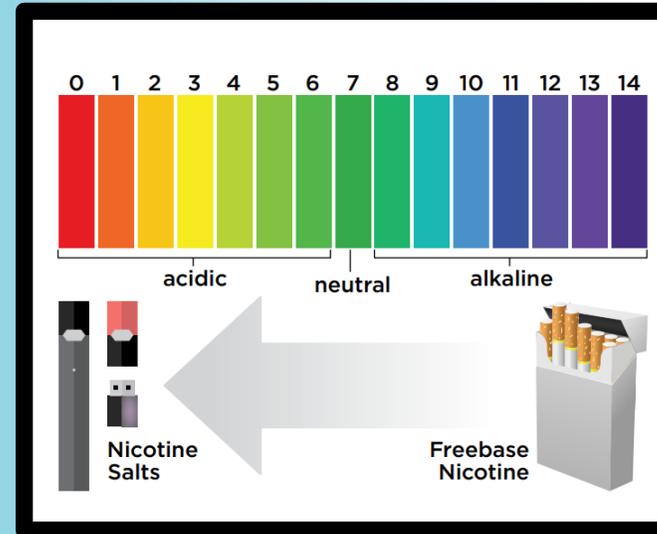
**3rd**  
**GENERATION**  
(Modifiable—allows variable voltage/watts)



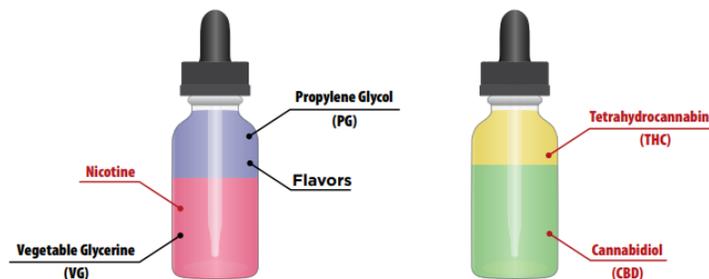
**Pod**  
(Prefilled or refillable)



**4th**  
**GENERATION**  
(Pod Mod)

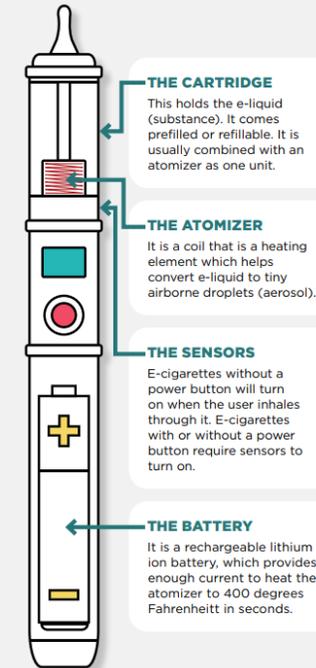


## REGULAR E-LIQUID VS. CANNABIS E-LIQUID



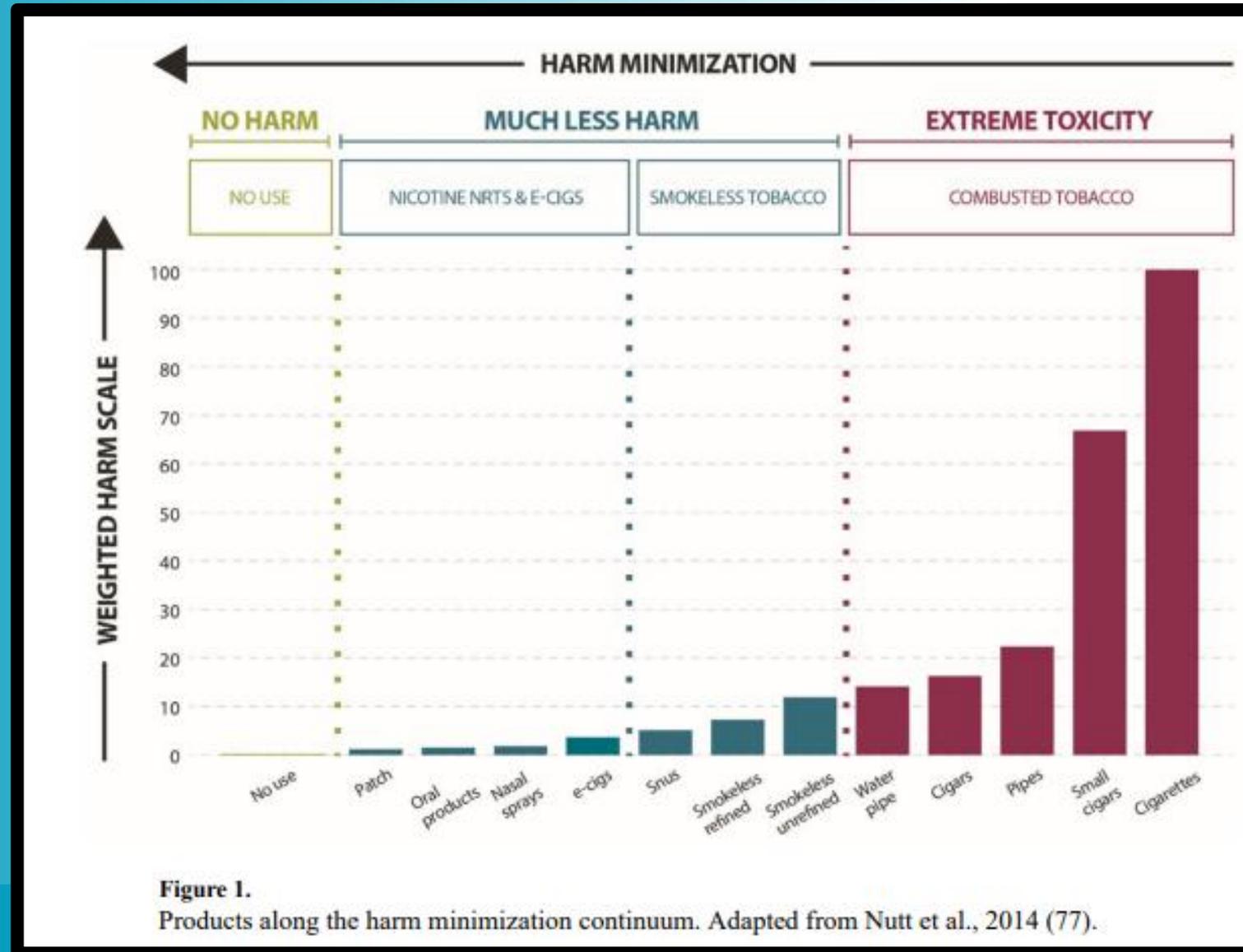
## Anatomy of an E-Cigarette

### THE E-CIGARETTE



- Mod Box**  
It is a 3rd generation device that is modifiable ("Mod") allowing users to change the voltage, coils and wicks.
- Sub-Ohm Tank**  
It is made of plastic or metal with transparent casing so liquid levels can be seen. It contains a lower resistance coil that allows the liquid to heat up faster.
- Cartridge**  
It is made of plastic or metal with transparent casing so liquid levels can be seen. It contains an atomizer that heats up the e-liquid.
- E-Liquid**  
E-liquid is contained in a pod, cartridge or tank. It is made up of a mixture of substances that includes nicotine, cannabis, and/or flavoring.

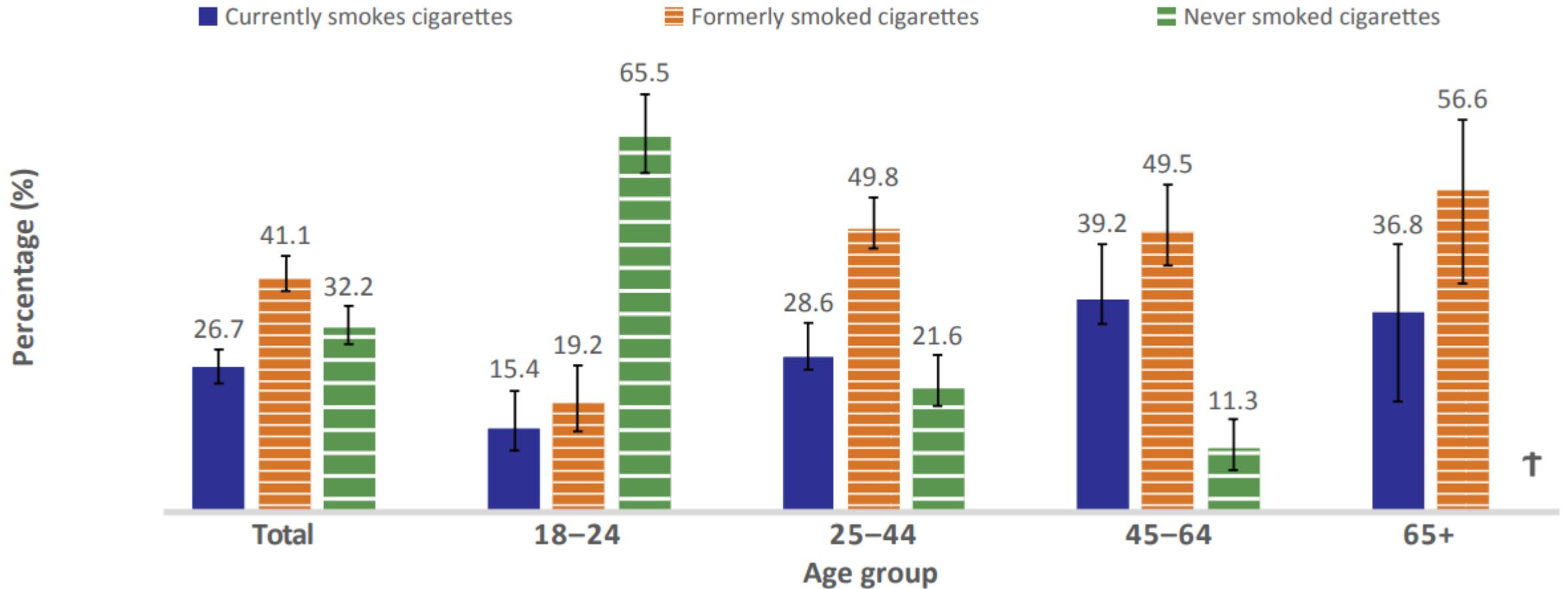
# Making the switch





# Making the switch?

Cigarette Smoking Status Among Current E-cigarette Users by Age Group in 2022.





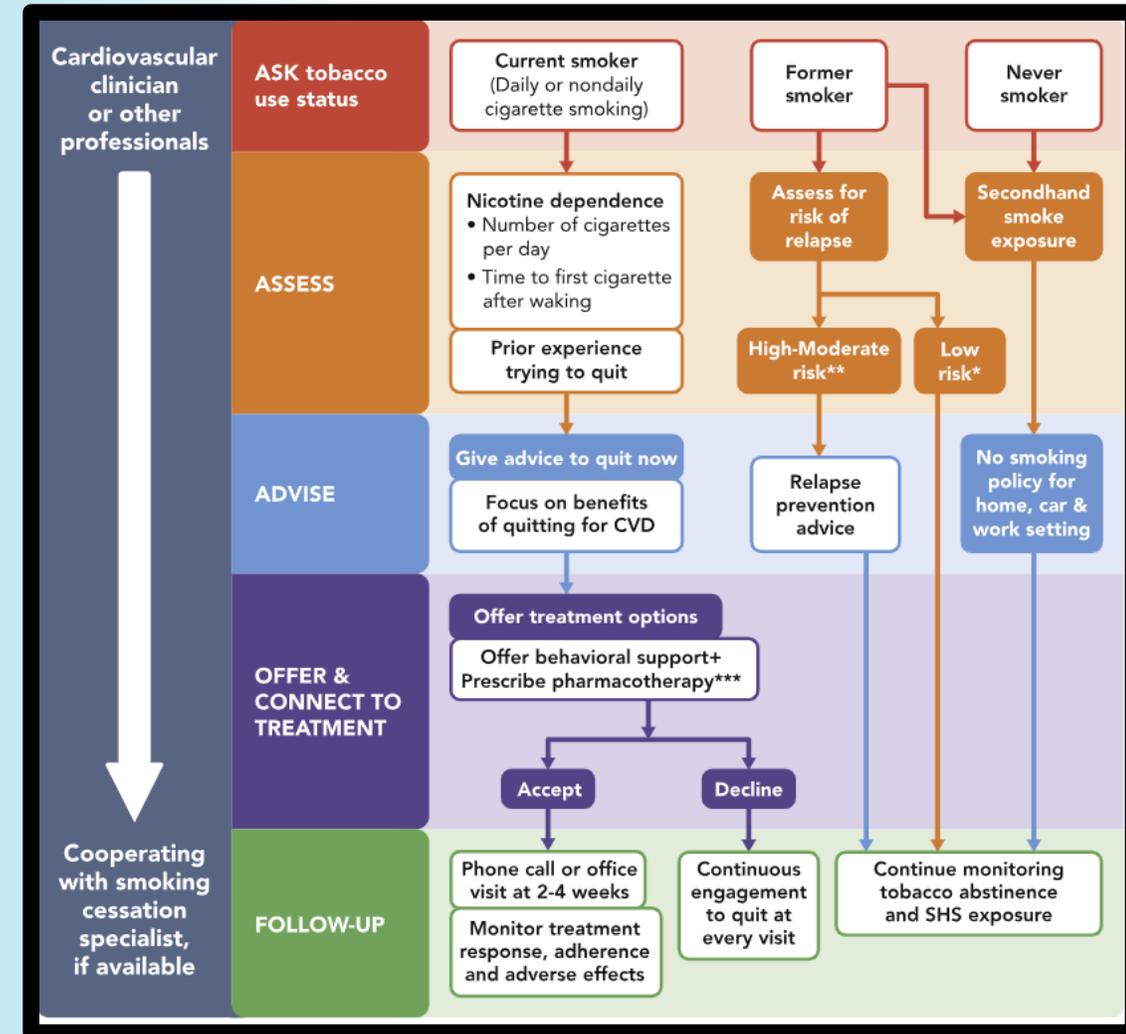
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# Treatment strategies for nicotine

Nicotine replacement therapy and other pharmacological options

# Creating a treatment plan



# Nicotine replacement therapy



**Table 1: Nicotine replacement therapy formulations** <sup>(11,14,24)</sup>

Nicotine products	Available doses	Cautions/ Warnings	Uses	Adverse events	Availability
Transdermal patches	5 mg, 10 mg, 15 mg doses worn over 16 hours 7 mg, 14 mg, 21 mg doses worn over 24 hours	For smokers with insomnia and other sleep-related adverse events, the patches should be removed before bedtime.	One daily on clean, unbroken skin; remove before bed (16 h patch) or next morning (24 h); new patch, fresh site	Local skin reaction  Insomnia	US FDA (OTC),  MHRA (OTC)
Chewing gum	2 mg and 4 mg doses	Temporomandibular joint disease Caution with dentures Do not eat or drink 15 min before or during use	Chew gum until taste is strong, then rest gum between gum and cheek; chew again when taste has faded. Try not to swallow excessively.	Mouth soreness, Hiccups, Dyspepsia and Jaw ache	US FDA (OTC)  MHRA (OTC)
Sublingual tablet	2 mg dose	Nicotine dependence, insomnia	Rest under tongue until dissolved	Mouth soreness	MHRA (Rx)
Lozenge	1mg, 2 mg and 4 mg doses	Do not eat or drink 15 minutes before or during use One lozenge at a time Limit 20 in 24 hours	Allow to dissolve in mouth (about 20–30 minutes), moving from side-to-side from time-to-time. Try not to swallow excessively. Do not chew or swallow whole	Nausea/ Heartburn	US FDA (OTC)  MHRA (OTC)
Nicotine inhalation cartridge plus mouthpiece	Cartridge containing 10mg	May irritate mouth/throat at first	Spray into the mouth, avoiding the lips. Do not inhale while spraying. Use when cigarettes would usually be smoked or if cravings emerge. Do not swallow for a few seconds after spraying	Local irritation of mouth and throat	US FDA (Rx)  MHRA (Rx)

Nicotine metered nasal spray	0.5mg dose/spray	Not for patients with asthma May cause dependence	Take shallow puffs approximately every 2 seconds or alternatively take four puffs every minute. Continue for up to 30 minutes.	Nasal irritation	US FDA (Rx)  MHRA (Rx)
Electronic cigarette	-	May cause dependence	E-Cigarette vapor is drawn very slowly in to mouth, then held there for a second or two. Then, it can be inhaled if desired. The vapor is then expelled through the mouth or nose.	Mouth and airway irritation, chest pain, and palpitation <sup>(26, 27)</sup>	Until now, it is not approved by any agency
High dose nicotine patches <sup>(28)</sup>	≥42 mg daily	Irritation at the patch application site. Sleep disturbances	One daily on clean, unbroken skin; remove before bed	Headache, cardiovascular events, asthenia, dyspepsia, myalgia, and	Until now, it is not approved by any agency
Combined Patch + acute forms (nicotine gum, spray, lozenge, & inhaler) <sup>(29, 30)</sup>	transdermal nicotine doses of 7, 14, and 21 mg + dosage of any one acute form	Nicotine dependence, insomnia	Both patch and acute nicotine forms should be used parallel.	Mouth and airway irritation, Nausea and vomiting	US FDA

US FDA: U.S. Food and Drug Administration; MHRA: Medicines and Healthcare products Regulatory  
Rx: Prescription; OTC: Over the counter



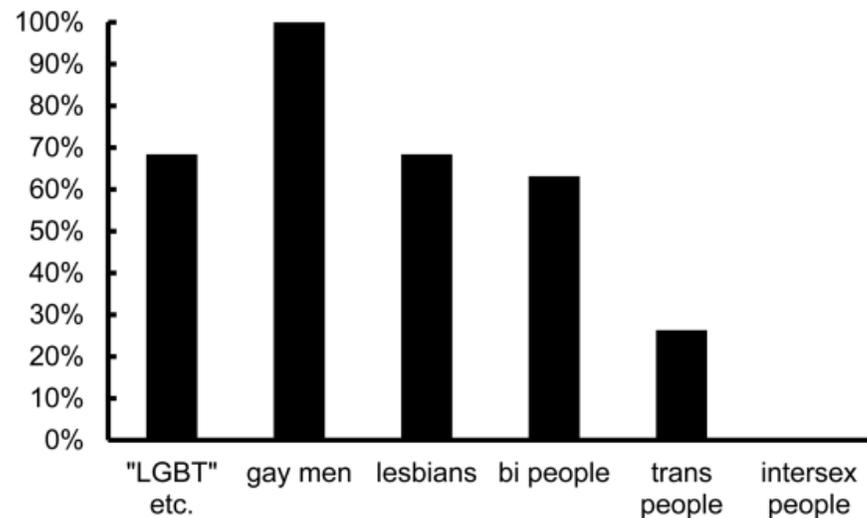


# Pharmacotherapy

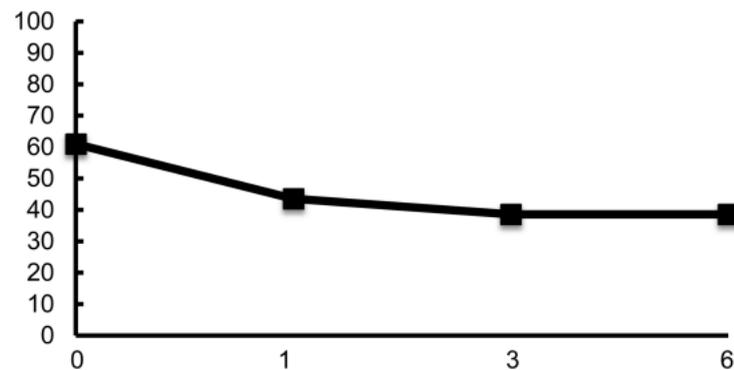
<b>Varenicline (tablet)</b> 0.5 mg 1.0 mg	Rx only	Days 1-3: 0.5 mg/day. Days 4-7: 0.5 mg twice a day. Day 8+: 1 mg twice a day. Use 3-6 months.	Start 1-4 weeks before quit date. Take with food and a tall glass of water to minimize nausea.	Nausea Insomnia Vivid dreams Headache	Quit date can be flexible, from 1 week to 3 months after starting drug. Dual action: relieves nicotine withdrawal and blocks reward of smoking. Oral agent (pill).	Because of previous FDA boxed warning (now removed), many patients fear psychiatric adverse events, even though they are no more common than with other cessation medications.
<b>Bupropion sustained release (SR) (tablet)</b> 150 mg	Rx only	150 mg/day for 3 days, then 150 mg twice a day. Use 3-6 months.	Start 1-2 weeks before quit date.	Insomnia Agitation Dry mouth Headache	May lessen post-cessation weight gain while drug is being taken. Oral agent (pill).	Increases seizure risk: not for use if seizure disorder or binge drinking.

(2018 ACC Expert Consensus Decision Pathway on Tobacco Cessation Treatment, 2018; Wadgave & Nagesh, 2016)

# Tailored interventions



**Figure 2.** Percent interventions targeting or reaching LGBTI populations. LGBTI = lesbian, gay, bisexual, transgender, and intersex.



**Figure 3.** Quit rates at 0, 1, 3, and 6 months.

**Table 2.** Interventions and Outcomes

Study	Indigenous personnel	Community or tribal	Group meetings	Individual Meetings	Cultural Activity	Pharmaceutical	Text Messages	Quit rate <sup>a</sup>	Primary Outcome(s) Significant <sup>b</sup>	Secondary Outcome(s) Significant <sup>b</sup>
Patten 2012 (N = 35)	x	x		x				0%	No	
Smith (N = 103)	x	x	x	x	x	x		20%	No	No
Choi (N = 463)	x	x	x	x	x	x		20.1%	No	Yes
Patten 2019 (N = 30)		x		x				20%	No	
Livingston (N = 1623)	x	x	x	x				1%	Yes <sup>c</sup>	
Dignan (N = 254)		x		x		x	x	6%	Yes	Yes
D'Silva (N = 141)		x	x	x	x	x		21.8%	Yes	Yes
Moore (N = 3373)		x		x				16%	Yes	Yes
Neri (N = N/A)							x	32%	N/A <sup>d</sup>	
Fu (N = 291)						x		14.1%	N/A <sup>d</sup>	

<sup>a</sup>Quit rate at conclusion of study as per each protocol.

<sup>b</sup>See Table 1 for outcomes defined for each study.

<sup>c</sup>Cigarette use, when assessed separately, was not a significant outcome.

<sup>d</sup>Primary outcome was smoking rate and not compared to other outcomes.

# Resources



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**TOBACCO EDUCATION RESOURCE LIBRARY**

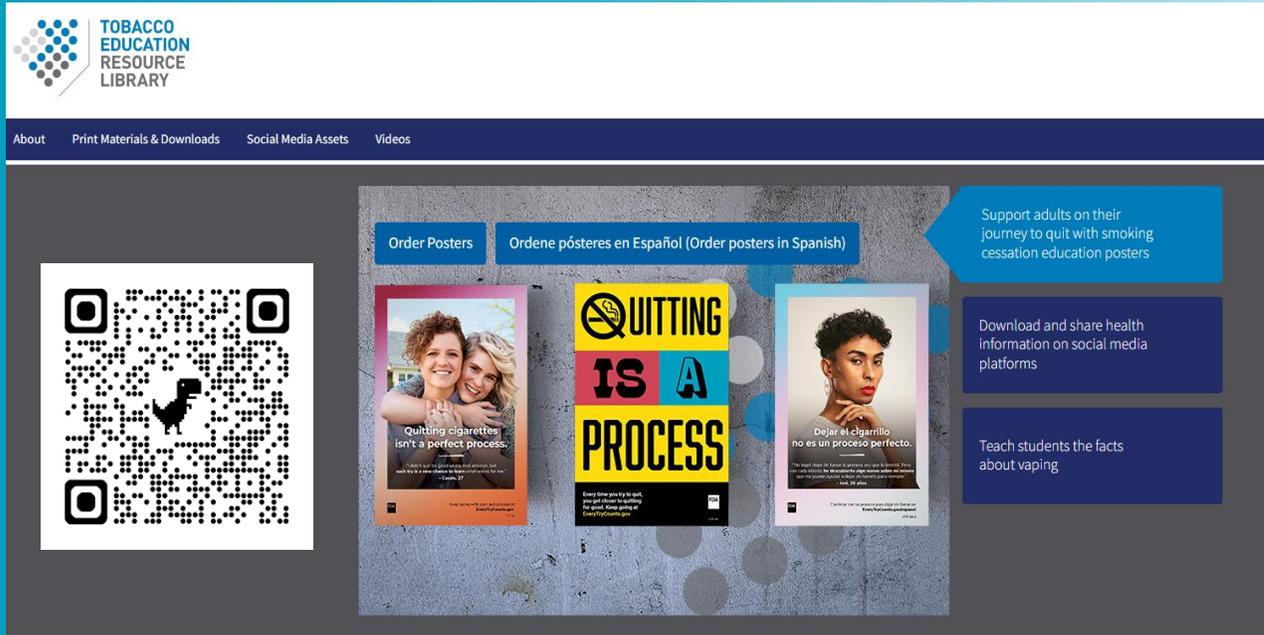
About | Print Materials & Downloads | Social Media Assets | Videos

Order Posters | Ordene pósters en Español (Order posters in Spanish)

Support adults on their journey to quit with smoking cessation education posters

Download and share health information on social media platforms

Teach students the facts about vaping



## E-CIGARETTE, OR VAPING, PRODUCTS VISUAL DICTIONARY





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