



FORMS of TOBACCO



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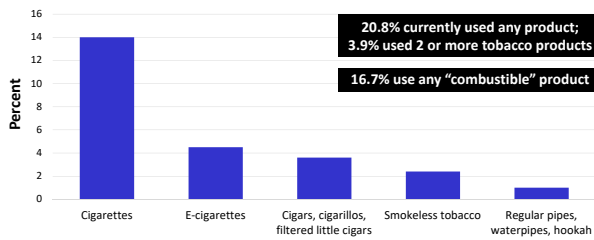
- Cigarettes
- Smokeless tobacco
 - Chewing tobacco
 - Snuff
 - Snus
- Cigars
- Pipes
- Hookah (waterpipe smoking)
- Electronic nicotine delivery systems (ENDS)*



*e-cigarettes are devices that deliver nicotine and are not a form of tobacco.
Image courtesy of the Centers for Disease Control and Prevention / Rick Ward



CURRENT* ADULT USE of ANY FORM of TOBACCO or E-CIGARETTES, U.S., 2019



*Respondent reported using "every day" or "some days" at the time of survey.

Cornelius ME, et al. (2020). *MMWR* 69:1736-1742.



AMERICAN CIGARETTES

- Most common form of tobacco used in U.S.
- Sold in packs (20 cigarettes/pack)
- Total nicotine content, per cigarette:
 - Average 13.3 mg (range, 12.4 to 14.2 mg)
- Nicotine yield, per cigarette:
 - Approximately 1 to 2 mg



Marlboro is a registered trademark of Philip Morris, Inc.



SMOKELESS TOBACCO

- Chewing tobacco
 - Loose-leaf
 - Plug
 - Twist
- Snuff
 - Moist (cut)
 - Loose
 - Pouch
 - Dry
- Snus



The Copenhagen and Skoal logos are registered trademarks of U.S. Smokeless Tobacco Company. Red Man and General Snus are registered trademarks of Swedish Match.



SMOKELESS FORMS of TOBACCO

- Estimated 5.9 million users in the U.S. in 2019 (2.4%)
- Adult males (4.7%) more likely than adult females (0.3%) to be current users
 - Prevalence highest among
 - White, Non-Hispanic
 - Adults aged 25-44 years
 - Residents of the Midwest and Southern U.S.
 - Those having less than a college degree
- Significant health risks
- Numerous carcinogens
 - Nicotine exposure comparable to that of smokers, leading to:
 - Physical dependence
 - Withdrawal symptoms after abstinence



HEALTH CONSEQUENCES of SMOKELESS TOBACCO USE

- Periodontal effects
 - Gingival recession
 - Periodontitis
 - Dental attrition/abrasion
 - Root surface caries
- Oral leukoplakia
- Cancer
 - Oral cancer
 - Pharyngeal cancer



Oral Leukoplakia
Image courtesy of Dr. Sol Silverman -
University of California San Francisco



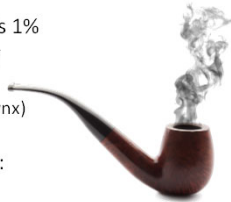
CIGARS

- Cigar products
 - Traditional (premium or large)
 - Cigarillos
 - Filtered (little) cigars
- Estimated 8.7 million cigar smokers in the U.S. in 2019 (3.6%)
 - Prevalence higher among black, non-Hispanics
- Tobacco content of cigars varies greatly
- One cigar can deliver enough nicotine to establish and maintain dependence
- Cigar smoking is not a safe alternative to cigarette smoking



PIPE TOBACCO

- Prevalence of pipe smoking in the US is 1%
- Pipe smokers have an increased risk of death due to:
 - Cancer (lung, oral cavity, esophagus, larynx)
 - Chronic obstructive pulmonary disease
- Risk of smoking tobacco-related death: cigarettes > pipes ≈ cigars



HOOKAH (WATERPIPE SMOKING)

- Tobacco flavored with fruit pulp, honey, and molasses; users inhale smoke that is passed through water via a "waterpipe"
 - Also known as shisha, narghile, goza, hubble bubble
- Popular among young adults in coffee houses, bars, and lounges
 - In 2013–2014, 31.9% of adults reported use during the past year
- Nicotine, tar and carbon monoxide levels comparable to or higher than those in cigarette smoke
- Long-term use associated with increased risk of:
 - Coronary artery disease
 - Obstructive lung disease
 - Cancers (lung, head/neck, esophagus, stomach)



Image courtesy of Mr. Sami Romman / www.hookah-shisha.com



ELECTRONIC CIGARETTES

- Battery-operated devices that create a vapor for inhalation
 - Simulates smoking but does not involve combustion of tobacco
- Also known as
 - E-cigarette
 - E-hookah, Hookah pen
 - Vapes, Vape pen, Vape pipe
 - Electronic nicotine delivery system (ENDS)



Image from: <https://www.fda.gov/tobacco-products/products-ingredients-components/vaporizers-e-cigarettes-and-other-electronic-nicotine-delivery-systems-ends>



ELECTRONIC CIGARETTES: Components

- Power source
 - Rechargeable or disposable battery
- Cartridge containing liquid solution
 - Propylene glycol
 - Glycerin
 - Flavorings (fruit, chocolate, mint, cola, candy, etc.)
 - Nicotine (0-36 mg/mL)
- Electronic atomizer/vaporizer
 - Heating element vaporizes liquid at temperatures 149-248 degrees Fahrenheit



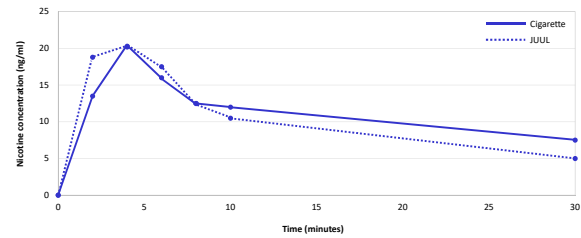


NICOTINE POD SYSTEMS

- Nicotine liquid stored in small plastic cartridges (aka “pod”)
 - Use nicotine salts (protonated form) derived from tobacco
 - Less harsh than tobacco smoke
- Compact, portable design
 - Prefilled cartridges
 - Refillable (customize flavors)



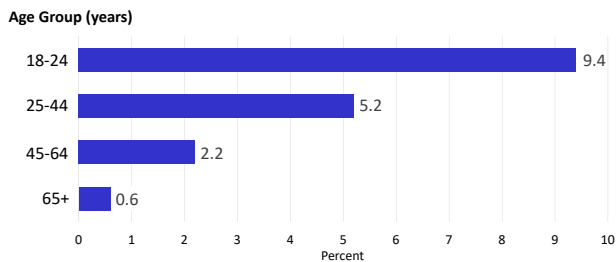
PLASMA NICOTINE CONCENTRATIONS: Cigarettes and JUUL



Hajek P, et al. (2020). *Addiction* 115:1141–1148.



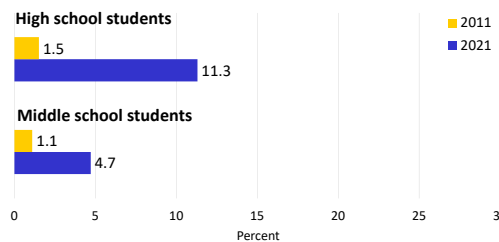
CURRENT E-CIGARETTE USE in ADULTS— U.S., 2020



Cornelius ME, et al. (2022). *MMWR* 71:391–405.



PAST MONTH E-CIGARETTE USE— U.S. MIDDLE & HIGH SCHOOL STUDENTS



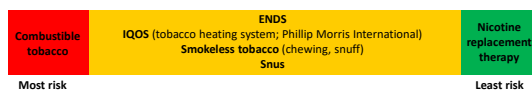
Centers for Disease Control and Prevention. (2015). *MMWR* 64:381–385. Lee et al. (2021). *MMWR* 70:1387–1389.



TOBACCO HARM REDUCTION

“Minimizing harms and decreasing total morbidity & mortality, without completely eliminating tobacco and nicotine use.”

- Acknowledges that complete abstinence is the ideal outcome, but accepts alternative ways to reduce harm among tobacco users
- Continuum of health risk:



Institute of Medicine. (2001). Committee to Assess the Science Base for Tobacco Harm Reduction. *Clearing the Smoke: Assessing the Science Base for Tobacco Harm Reduction*. Washington (DC): National Academies Press (US).



ELECTRONIC CIGARETTES: Potential health risks

- Propylene glycol may cause respiratory irritation and increase the risk for asthma
- Glycerin may cause lipid pneumonia on inhalation
- Nicotine is highly addictive and can be harmful
 - Refill cartridges with high concentrations of nicotine are a poisoning risk, especially in children
- Carcinogenic substances are found in some aerosols
- Use of e-cigarettes leads to emission of propylene glycol, particles, nicotine, and carcinogens into indoor air
 - Long-term safety of second hand exposure to e-cigarette aerosols is unknown

Electronic cigarettes are not proven to be safe.



ENDS: Emerging Health Risks

- E-cigarette, or Vaping Product Use-Associated Lung Injury (EVALI)
 - Total of 2,668 hospitalized cases and 60 deaths reported (median age, 24 years)
 - Symptoms: dyspnea, cough, fatigue, myalgias, fever, bilateral pulmonary infiltrates
 - All patients with history of using e-cigarettes or vaping products
- Daily use of ENDS is an independent risk factor for respiratory disease. Dual use with combustible tobacco is riskier than using either product alone
- Limited evidence suggests ENDS use might negatively affect endothelial function and arterial stiffness

The long-term health effects of ENDS are unknown

Krishnasamy et al. (2020). *MMWR* 69:90-94.
Bhatta DN, Glantz SA. (2020). *Am J Prev Med* 58:182-190.
Skotsimara, et al. (2019) *Eur J Prev Cardiol* 26:1219-1228.



ENDS for SMOKING CESSATION RESULTS from CLINICAL TRIALS

- ENDS can reduce the desire (craving) to smoke cigarettes and alleviate nicotine withdrawal symptoms
- Some subjects reduce the number of cigarettes smoked or quit smoking using ENDS
 - In one trial, 80% of subjects still using ENDS at 1-yr follow-up
- ENDS use appears to be well-tolerated
- Have not been proven effective as an aid for sustained smoking cessation

Long-term safety and efficacy data are lacking.



ENDS for SMOKING CESSATION RECOMMENDATIONS FOR CLINICIANS

- Assess ENDS use when screening for tobacco use
- Actively discourage use of ENDS with current non-smokers
- Until more is known about the potential risks, ENDS should not be promoted as a **safe** alternative to smoking
- The evidence is insufficient to assess the balance of benefits and harms using ENDS for tobacco cessation*
 - Clinicians should direct patients to other cessation interventions with proven effectiveness and established safety.*

*USPSTF (2021). *JAMA* 325:265-279.



ENDS for SMOKING CESSATION RECOMMENDATIONS FOR CLINICIANS (cont'd)

- ENDS might have a role for patients who are unable to quit smoking using proven methods
 - Weigh risks and benefits on a case-by-case basis
 - To achieve meaningful health benefits from ENDS, patients should fully switch to ENDS and stop smoking cigarettes completely*
 - The ultimate goal should be to stop using ENDS completely to achieve the maximum health benefit*

*USDHHS (2020). Smoking Cessation. A Report of the Surgeon General <https://www.hhs.gov/sites/default/files/2020-cessation-sgr-full-report.pdf>



FORMS of TOBACCO: SUMMARY

- Cigarettes are, by far, the most common form of tobacco used in the U.S.
- Other forms of tobacco and nicotine delivery devices exist, and some are increasing in popularity.
- All forms of tobacco are harmful.
- The safety/efficacy of e-cigarettes/ENDS not been not established.
- Attention to all forms of tobacco is needed.