FORMS of TOBACCO

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

*Electronic nicotine delivery systems (ENDS) 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

- 20.8% currently used any product;
- 3.9% used 2 or more tobacco products
- 16.7% use any “combustible” product

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

AMERICAN CIGARETTES

- 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 Snus 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

Copyright © The Regents of the University of California. All rights reserved.
**HEALTH CONSEQUENCES of SMOKELESS TOBACCO USE**

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

**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)

**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)

**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

---

Copyright © The Regents of the University of California. All rights reserved.
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

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

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>9.4</td>
</tr>
<tr>
<td>25-44</td>
<td>5.2</td>
</tr>
<tr>
<td>45-64</td>
<td>2.2</td>
</tr>
<tr>
<td>65+</td>
<td>0.6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>High school students</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>11.3</td>
</tr>
<tr>
<td>2021</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Middle school students</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Tobacco product</th>
<th>Most risk</th>
<th>Intermediate risk</th>
<th>Least risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible</td>
<td>IQOS</td>
<td>Snus</td>
<td>None</td>
</tr>
</tbody>
</table>

ELECTRONIC CIGARETTES: Potential health risks

- Propylene glycol may cause respiratory irritation and increase the risk for asthma
- Glycerin may cause lipoid 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

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.*

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*

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.

Copyright © The Regents of the University of California. All rights reserved.