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ABCs of Tobacco

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Topics for Today

- Arc of tobacco use in US
- What is in tobacco smoke?
- How does smoking cause harm?
- Nefarious industry practices
Adult Per Capita Cigarette Consumption and Major Smoking/Health Events—United States, 1900-2015

Nicotine enters brain

Stimulation of nicotine receptors

Dopamine release

Prefrontal cortex

Nucleus accumbens

Ventral tegmental area

Dopamine Reward Pathway

Nicotine enters brain
Compounds in Tobacco Smoke

An estimated 7,000 compounds in tobacco smoke, including 69 proven human carcinogens

<table>
<thead>
<tr>
<th>Gases</th>
<th>Particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>Nicotine</td>
</tr>
<tr>
<td>Hydrogen cyanide</td>
<td>Nitrosamines</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Lead</td>
</tr>
<tr>
<td>Benzene</td>
<td>Cadmium</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Polonium-210</td>
</tr>
</tbody>
</table>

Nicotine does NOT cause the ill health effects of tobacco use.
Tobacco’s Deadly Toll

- 540,000 deaths in the U.S. each year*
- 4.8 million deaths worldwide each year
  --Current trends show >8 million deaths annually by 2030
- 42,000 deaths in the U.S. due to second-hand smoke exposure
- >16 million in U.S. with smoking related diseases
  (60% with COPD)
- 34 million smokers in U.S. (76.1% daily smokers, averaging 14.1 cigarettes/day, 2016)

* Carter et al, NEJM, Feb 12, 2015
Behavioral Causes of Annual Deaths in the United States, 2000

Flegal KM, Graubard BI, Williamson DF, Gail, MH. Excess deaths associated with underweight, overweight, and obesity. JAMA 2005;293:1861-1867

* Also suffer from mental illness and/or substance abuse
Health Consequences of Smoking

- **Cancers**
  - Acute myeloid leukemia
  - Bladder and kidney
  - Cervical
  - Colon, liver, pancreas
  - Esophageal
  - Gastric
  - Laryngeal
  - Lung
  - Oral cavity and pharyngeal
  - **Prostate (↓ survival)**

- **Pulmonary diseases**
  - Acute (e.g., pneumonia)
  - Chronic (e.g., COPD)
  - **Tuberculosis**

- **Cardiovascular diseases**
  - Abdominal aortic aneurysm
  - Coronary heart disease
  - Cerebro-vascular disease
  - Peripheral arterial disease
  - **Type 2 diabetes mellitus**

- **Reproductive effects**
  - Reduced fertility in women
  - Poor pregnancy outcomes (ectopic pregnancy, congenital anomalies, low birth weight, preterm delivery)
  - Infant mortality; **childhood obesity**

- **Other effects:** cataract; osteoporosis; Crohn's; periodontitis; poor surgical outcomes; Alzheimers; rheumatoid arthritis; less sleep
Causal Associations with Second-hand Smoke

- Developmental
  - Low birthweight
  - Sudden infant death syndrome (SIDS)
  - Pre-term delivery
  -- Childhood depression

- Respiratory
  - Asthma induction and exacerbation
  - Eye and nasal irritation
  - Bronchitis, pneumonia, otitis media, bruxism in children
  - Decreased hearing in teens

- Carcinogenic
  - Lung cancer
  - Nasal sinus cancer
  - Breast cancer? (younger, premenopausal women)

- Cardiovascular
  - Heart disease mortality
  - Acute and chronic coronary heart disease morbidity
  - Altered vascular properties

There is no safe level of second-hand smoke.
Adverse Health Effects of Tobacco Use

People with mental illness or substance use disorders die about 5 years earlier than those without these disorders; many of these deaths are caused by smoking cigarettes.

The most common causes of death among people with mental illness are heart disease, cancer, and lung disease, which can all be caused by smoking.

Drug users who smoke cigarettes are four times more likely to die prematurely than those who do not smoke.

Nicotine has mood-altering effects that can temporarily mask the negative symptoms of mental illness, putting people with mental illness at higher risk for cigarette use and nicotine addiction.

Tobacco smoke can interact with and inhibit the effectiveness of certain medications taken by mental health and substance abuse patients.

**QUITTING: HEALTH BENEFITS**

<table>
<thead>
<tr>
<th>Time Since Quit Date</th>
<th>Benefit</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Circulation improves, walking becomes easier</td>
</tr>
<tr>
<td></td>
<td>Lung function increases up to 30%</td>
</tr>
<tr>
<td>2 weeks to 3 months</td>
<td>Lung cilia regain normal function</td>
</tr>
<tr>
<td></td>
<td>Ability to clear lungs of mucus increases</td>
</tr>
<tr>
<td>1 to 9 months</td>
<td>Coughing, fatigue, shortness of breath decrease</td>
</tr>
<tr>
<td>1 year</td>
<td>Risk of stroke is reduced to that of people who have never smoked</td>
</tr>
<tr>
<td>5 years</td>
<td>Risk of CHD is similar to that of people who have never smoked</td>
</tr>
<tr>
<td>10 years</td>
<td>Risk of cancer of mouth, throat, esophagus, bladder, kidney, pancreas decrease</td>
</tr>
<tr>
<td>after 15 years</td>
<td>Risk of cancer of mouth, throat, esophagus, bladder, kidney, pancreas decrease</td>
</tr>
</tbody>
</table>

- Excess risk of CHD decreases to half that of a continuing smoker
- Lung cancer death rate drops to half that of a continuing smoker
## Never Too Late to Quit*

<table>
<thead>
<tr>
<th>Age of quitting smoking</th>
<th>Years of life saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>10</td>
</tr>
<tr>
<td>35-44</td>
<td>9</td>
</tr>
<tr>
<td>45-54</td>
<td>8</td>
</tr>
<tr>
<td>55-64</td>
<td>4</td>
</tr>
</tbody>
</table>

*Jha, NEJM Jan 24, 2013*
Evidence Review* shows Stopping Smoking Improves BH

- Cochrane Collaborative meta-analysis of 26 papers
- Smoking cessation leads to: ↓ depression, anxiety, stress and ↑ mood and quality of life
- Effect sizes of smoking cessation ≥ or = anti-depressive drugs for mood or anxiety disorders
- Among smokers with pre-existing alcohol use disorder, smoking cessation leads to ↓ likelihood of recurrence or continuation of their alcohol use disorder
- Smoking cessation interventions during addictions treatment has been associated with a 25% ↑ likelihood of long-term abstinence from alcohol and illicit drugs

* Taylor et al, BMJ, 2014
Smoking and Behavioral Health: The Heavy Burden

- 240,000 annual deaths from smoking occur among patients with CMI and/or substance abuse

- This population consumes 40% of all cigarettes sold in the United States
  -- higher prevalence
  -- smoke more
  -- more likely to smoke down to the butt

- People with SMI die earlier than others, and smoking is a large contributor to that early mortality

- Greater risk for nicotine withdrawal

- Social isolation from smoking compounds the social stigma
Targeted Marketing

IT'S A PSYCHOLOGICAL FACT: PLEASURE HELPS YOUR DISPOSITION

How’s your disposition today?

EVER FEEL MAD AS A HENS? It's only human, when things really oppose you. But, remember this psychological fact: pleasure helps your disposition. Everyday pleasures, like smoking for instance, are important. So if you're a smoker, smoke for the most pleasure. That means smoke Camel!

No other cigarette is so rich-tasting, yet so mild!

Schizophrenic.

The New Merit. We've got flavor down to a science.

Other low tars are pretty one-dimensional. Dull. But the New Merit is a whole other story: big new taste with lower tar. And that's exciting. In fact, the New Merit has as much taste as cigarettes with up to 57% more tar. Big taste, lower tar all in one. For New Merit, having two sides is just normal behavior.

Source: http://industrydocuments.library.ucsf.edu/tobacco/docs/bgl0019

NEWPORT

pleasure!

SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, And May Complicate Pregnancy.
Industry Targets BH population

- Pushed Doral to homeless shelters, and psychiatric facilities
- R. J. Reynolds & "consumer subcultures, "(gay/Castro)" and "street people"
Financial Impact

- People with mental illnesses and/or addictions may spend up to 1/3 their income on cigarettes*
- A pack a day smoker spends on average…
  - $7.86** per day
  - $55.02 per week
  - $220.08 per month
  - $2,640.96 per year
  - $26,409.60 per 10 years

*Steinberg, 2004

**Average CA price 2018 including taxes (Campaign for Tobacco-Free Kids)
Tobacco Tipping Point?

- National Adult smoking prevalence at modern low of 13.9% in 2017 (NHIS)
- Youth smoking prevalence at all-time low in 2017 (NYTS):
  - High school: 7.6%; Middle school: 2.1%
- Smokers smoke fewer cigarettes
- Physicians at 1% smoking prevalence
- Lung cancer deaths in women declining
- Increasing stigmatization of smoking
Relative Harm of Nicotine-containing Products

Types of E-Cigarettes

- E-cigarettes are known by various names, including “e-cigs,” “e-hookahs,” “mods,” “vape pens,” “tank systems,” and “electronic nicotine delivery systems.”

- Some e-cigarettes are made to look like regular cigarettes, cigars, or pipes, while others resemble pens, USB sticks, and other items.

- E-cigarettes can be used to deliver marijuana and other drugs.
“Heat Not Burn”

- iQOS (Philip Morris) – “I Quit Ordinary Smoking” – uses actual tobacco in the shape of small Marlboro cigarettes that are heated at high temperatures instead of using nicotine-laced liquid.

- PMI estimates that 4.7 million adult consumers have stopped smoking and switched to using iQOS (390% increase in global heated product volume).
ENDS Controversy

**Opponents**
- Not completely safe
- Gateway
- Prevents cessation and promotes dual use
- Secondhand vapor exposure
- Renormalizes smoking
- Seductive flavors
- Nicotine and the developing brain

**Advocates**
- Less toxic form of nicotine delivery
- Helps with smoking cessation
- More acceptable than other cessation medications
- No evidence for gateway theory
- Modeling exercise in recent NAM report show net public health gain