OVERVIEW OF TOPICS TO COVER TODAY

• Health effects of tobacco
• Tobacco dependence
• Epidemiology
• Types of tobacco products
• Cessation/Treatment
• Prevention strategies
• Family Smoking Prevention and Tobacco Control Act
HEALTH CONSEQUENCES

• In the US: over 480,000 people die from tobacco related diseases each year
  – Globally, nearly 6 million annually

• What’s in tobacco that is so harmful?
  – Nicotine
  – Carbon monoxide or CO (when burned)
  – Carcinogens (e.g., tobacco-specific nitrosamines, PAHs)

• Morbidity and mortality caused by CO and carcinogens

• Smoked tobacco use increases risk of:
  – coronary heart disease by 2 to 4 times
  – stroke by 2 times
  – Lung cancer by 13-23 times (women and men)
  – chronic obstructive lung diseases (such as emphysema) by 10 times
TOBACCO DEPENDENCE/WITHDRAWAL

• Effects of tobacco: mild euphoria, reduced stress, increased energy, and appetite suppression
• Dependence likely caused by nicotine
• Symptoms of withdrawal generally start within 2 - 3 hours after the last tobacco use, and peaks about 2 - 3 days later
  – Intense craving for tobacco
  – Anxiety, restlessness, impatience
  – Difficulty concentrating
  – Drowsiness or trouble sleeping, as well as bad dreams and nightmares
  – Headaches
  – Increased appetite and weight gain
  – Irritability or depression
GLOBAL SOURCES OF EPIDEMIOLOGICAL DATA

• Lack of standardized data on a global level

• Global Tobacco Surveillance System—1999+
  – Collaborative effort among WHO, United States Centers for Disease Control and Prevention, and the Canadian Public Health Association
  – Surveys
    • Global Youth Tobacco Survey (GYTS)
    • Global School Personnel Survey (GSPS)
    • Global Health Professions Student Survey (GHPSS)
    • Global Adult Tobacco Survey (GATS)
GYTS: Current Cigarette Smokers
EPIDEMIOLOGY: US RATES

- Currently, about 17% of US adults smoke cigarettes
- Rates higher if you include any tobacco product
ADULT SMOKING PREVALENCE BY STATE

The figure presents the percentage of adults in each state who were current smokers in 2013.
EPIDEMIOLOGY: US RATES (ADULTS, CIGARETTES ONLY)

- Gender
  - 19% of men
  - 15% of women
- Race
  - 29% of American Indians/Alaska Natives
  - 18% of whites (non-Hispanic)
  - 18% of blacks (non-Hispanic)
  - 11% of Hispanics
- Socio-economic status
  - 26% of adults who live below the poverty level
  - 15% of adults who live at or above the poverty level
EPIDEMIOLOGY: US RATES (ADULTS, CIGARETTES ONLY)

- Adults with mental illness
  - 36% of adults with mental illness are smokers
- Adults with substance use disorders: ~80%
- Adults with MH or SUD account for 40% of all cigarettes smoked in the US
• Current use of cigarettes among youth:
  – 2.5% of middle school students
  – 9.2% of high school students

• Rates higher if you include any tobacco product (cigarettes, cigars, ECIGs, hookah, smokeless tobacco)
  – 7.7% of middle school students
  – 24.6% of high school students

• Most adult smokers (80%) began smoking before age 18
<table>
<thead>
<tr>
<th>Tobacco Product</th>
<th>Overall</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any tobacco product†</td>
<td>24.6%</td>
<td>20.9%</td>
<td>28.3%</td>
</tr>
<tr>
<td>Electronic cigarettes</td>
<td>13.4%</td>
<td>11.9%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Hookahs</td>
<td>9.4%</td>
<td>9.8%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>9.2%</td>
<td>7.9%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Cigars</td>
<td>8.2%</td>
<td>5.5%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Smokeless tobacco</td>
<td>5.5%</td>
<td>1.2%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Snus</td>
<td>1.9%</td>
<td>0.8%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Pipes</td>
<td>1.5%</td>
<td>0.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Bidis</td>
<td>0.9%</td>
<td>0.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Dissolvable tobacco</td>
<td>0.6%</td>
<td>0.4%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
TYPES OF TOBACCO PRODUCTS (US)

- Cigarettes
- Cigars
- Smokeless tobacco (“dip”, “chew” or “snus”)
- Waterpipe (hookah)
- E-cigarettes (legally, tobacco)
CIGARETTES

- Modern cigarette developed in the early 1800s
- At the start of the 20th century, less than 0.5% of the population smoked
- Consumption peaked in the US in 1965: ~50% of men and 33% of women smoked
- *Smoking and Health: Report of the Advisory Committee to the Surgeon General* (1964)
- Start to see changes to cigarettes: “light” “filtered”; health claims
Adult per capita cigarette consumption, U.S., 1900-2011
CIGARETTES

20,679* Physicians say "LUCKIES are less irritating"

"It's toasted"

Your Throat Protection against irritation against cough

1930
CIGARETTES

Viceroy
FILTER
the Smoke!

As your Dentist, I would recommend Viceroy

1949
CIGARETTES

Guard Against Throat-Scratch
enjoy the smooth smoking of fine tobaccos

...smoke PALL MALL
the cigarette whose mildness
you can measure

Study This Puff Chart:
PUFF BY PUff...YOU'RE ALWAYS AHEAD WITH PALL MALL

Outstanding
...and they are mild!

P.S. LET A CARTON OF PALL MALLS SAY "MERRY CHRISTMAS" FOR YOU

1951
This is It!
L&M Now King Size
Or Regular

Much More Flavor
Much Less Nicotine!

It's the FILTER that Counts—and L&M has the Best!

L&M have already won the quickest, most enthusiastic nation-wide acceptance a cigarette ever had. Now, L&M comes to you in king-size, too—the same great cigarette—at the same low price as regular.

In either size—only L&M Filters give you the Miracle Tip—the effective filtration you need. You get much more flavor—much less nicotine—a light and mild smoke. Remember, it's the filter that counts...and L&M has the best!

Today, buy L&M king-size or regular. They're just what the doctor ordered!

L&M—America's Highest Quality Filter Cigarette
EM STANDS OUT FROM ALL THE REST

Much more flavor... Light and Mild
Effective filtration... draws e-a-s-y
Highest quality tobaccos... low nicotine

EM FILTERS
EGERT & WINKS TOBACCO CO

SMOKERS EVERYWHERE SAY--
"I've got EM... and
EM's got everything!"

EM is America's Best Filter Cigarette...
and it's sweeping the country!
TYPES OF TOBACCO PRODUCTS

Kent—the one show you proof of greater health protection

Every week, millions see convincing evidence that KENT's "Micronite" Filter is the cigarette filter that really works—giving you a smoking pleasure, yet removing up to 7 times more nicotine and tar than other filter cigarettes.

If, out of every 3 smokers, you want to achieve the same and satisfied in tobacco, you want more than just a promise that a filter-tip cigarette will give you the health protection you need.

And KENT is the one cigarette that gives you all you want. Every week, millions of communications—dozens of KENT's Micronite Filter tested before your very eyes—proved against other filter tip brands selected at random from packages bought at retail.

The pictures shown here were taken during one of these tests, as mentioned by Jonathan Flake, your host on the building TV show, The WBA.

To 1 out of every 3 cigarette smokers:
cigarette that can health protection

1. Everything equals. Beautiful particles of tobacco ash which you'd think would be seen on a simple sheet of plain white paper. Instead, the KENT filter removes almost 100% of the particles. Which means that when you smoke a KENT you know you're smoking a cigarette with a filter tip brand that gives you more protection than just plain jive talk.

2. Walks with you. Notice how much more than the KENT filter that come each time you take a smoke from the KENT plastic filter. It shows that the KENT filter is more complete in removing the particles that can cause an allergic reaction in some smokers.

3. Time is recorded. Makes it easier for the smoker to know when the cigarette is ready. It also helps to know when the cigarette is ready to smoke. What's more, the filter-tipped cigarette gives you the satisfaction that has been so sure to be achieved in recent years.

4. And there’s your answer. When the paper is lifted, you can see a clear difference in the health protection you get from a KENT as compared to the filter-tip brand you may have been smoking.

5. Against all claims. Here are the results of the tests that were performed in a laboratory showing how KENT filter tip filters against all cigarettes. As you can see by the picture, this filter tip removes the nicotine and tar from the filter tip brands. Repeated tests that, when you smoke, the same ingredients that have caused the health problems have been disabled. Here is further proof that the KENT filter-tip cigarette is the healthiest cigarette you can smoke. Why don’t you save smoking KENT today?
Considering all I’d heard, I decided to either quit or smoke True.

I smoke True.
Cigarettes

- Smokers believe “light” and “ultra light” cigarettes decrease health risks of smoking (Kozlowski, Goldberg, et al., 1998; Giovino et al., 1996).

- Smokers switch to low yield cigarettes instead of quitting (Giovino et al., 1996).

- Changes increased sales without harm reduction

- Past modifications did not alter exposure: changing puff topography, covering vent holes
TYPES OF TOBACCO PRODUCTS

- Cigars
  - 5.0% of US adults use (>1 in past 30 days)
  - 8.2% of high school students
  - 1.9% of middle school students

http://www.smokefree.gov/tob-cigarillo.aspx
TYPES OF TOBACCO PRODUCTS

Waterpipe, or hookah

- Current use among high school students: 9% (has been increasing)
- CO exposure is much higher than cigarettes (Eissenberg et al., 2011)
TYPES OF TOBACCO PRODUCTS

• Smokeless tobacco
  – “Dip”, “Chew” (e.g., Skoal, Wintergreen)
  – Snus (Swedish)
  – Marlboro snus, Camel snus
  – Camel orbs, sticks, dissolvable strips
  – Verve disc

• Health effects? In Sweden, low rates of lung cancer, but effects in US not known
Smoke without fire
Suck on an e-cigarette and it produces a cloud of nicotine-carrying vapour with none of the toxic by-products of burning tobacco.

- LED lights up when the smoker draws on the cigarette
- Sensor detects when smoker takes a drag
- Heater vaporises nicotine
- Cartridge holds nicotine dissolved in propylene glycol
- Battery controls heater and light
- Microprocessor
E-CIGARETTES: WHAT ARE THEY REALLY?
From Breland et al., (in press), *Annals of the NY Academy of Sciences*
**E-CIGARETTES: WHAT ARE THEY REALLY?**

**E-liquids**

- **Base**: Propylene Glycol, Vegetable Glycerin
- **Flavors**: Various tobacco, fruit, and other flavors
  - Other flavors include: chocolate, caramel, amaretto, popcorn, etc.
- **Nicotine**: 0-36 mg/mL +
- **Other**: Water, additives
  - Additives include: sweeteners: stevia, sucralose, ethyl maltol; sour additives: mactic acid, acetic acid, lemon or lime juice; ethyl alcohol; menthol; pyrazines?
Electronic cigarettes: Promise or peril?

• **Promising!** “If governments, parliaments, regulation agencies, and experts are able to restrain their yearning to restrict access to e-cigarettes, **these products are likely to represent a revolution in public health.**” Etter, 2013.

• **Perilous!** “Urged on by myopic health professionals who seem to have lost any population health focus they might have had, **this may become one of the biggest blunders of modern public health.**” Chapman, 2013.

• **Middle ground.** “… [our responses to ECIGs] will provide the greatest public health benefit when they are proportional, based on evidence, and incorporate a rational appraisal of likely risks and benefits.” Hajek et al., 2014.
Who uses ECIGs?

• Adolescents and adults
• Use is more common among current smokers (9-21%)
• Some use among former smokers (1 – 22%)
• Some adult ECIG users report having never smoked cigarettes (0.2% to 10%)
• Some adolescent ECIG users report having never smoked cigarettes
Teen e-cigarette use triples from 2013-2014

Estimated percentage of high school students who used tobacco in the preceding 30 days

THE WASHINGTON POST
ECIGs: Health Effects

- Overall, concerns about nicotine and other toxicant delivery
- Short-term use
  - No carbon monoxide delivery; no harmful effects on cardiovascular system
- Adverse events
  - Poisonings reported: rapid increase in poison center calls and ER case reports
  - Some other adverse effects reported in the literature (lipoid pneumonia, burns)
- Long-term use
  - Unknown; many concerns about ECIG aerosol constituents
- Dependence?
  - May be associated with lower dependence than cigarettes
ECIG nicotine delivery varies greatly

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A: 16 mg/mL</td>
<td>B: 18 mg/mL</td>
<td>C: 18 mg/mL</td>
<td>D: 8 mg/mL</td>
</tr>
<tr>
<td>A: 24 mg/mL</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Time of blood sampling, relative to a 10-puffufe bout
ECIG Effects on Tobacco Cigarette Smoking

• Much controversy on this topic!
• Difficult to determine when all ECIG devices/liquid combinations are treated the same
• Surveys: results mixed
• Dual use is a concern:
  - 68% of current ECIG users also current cigarette smokers (Weaver et al., 2015)
• Experimental studies: RCTs show effectiveness similar to nicotine patch
  - Note: RCTs done with low nicotine concentration ECIGs
SUMMARY

• Overall, tobacco use has been going down in the US (by small amounts in recent years)
• Use of other products may be increasing
• Hard to determine long-term impact of new products
• Major concern—Will people switch to new “safer” products rather than quit? Or become dual users?
• Will youth start using new products?
SMOKING CESSATION

• ~70% of smokers say they want to quit
• 45% make quit attempts
• Relapse rates are high
• Tobacco produces dependence: very difficult to quit
• Tobacco is as addictive as heroin or cocaine
SMOKING CESSATION

• Medications to quit can increase likelihood of success
  – Nicotine replacement therapy (nicotine patch, gum, inhaler, lozenge, nasal spray)
  – Non-nicotine medications:
    • bupropion (Zyban/Wellbutrin)
    • varenicline (Chantix)
• 1-800 QUIT-NOW (counseling)
• Websites
• Emerging trend: technology
# ESTIMATED ABSTINENCE RATES—BEHAVIORAL THERAPIES

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Abstinence rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No counseling/behavioral therapy</td>
<td>11.2</td>
</tr>
<tr>
<td>Relaxation/breathing</td>
<td>10.8</td>
</tr>
<tr>
<td>Cigarette fading</td>
<td>11.8</td>
</tr>
<tr>
<td>Social support</td>
<td>14.4-16.2</td>
</tr>
<tr>
<td>Practical counseling</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Source: Treating Tobacco Use and Dependence: 2008 Update (Clinical Practice Guideline, Fiore et al., 2008)
## ESTIMATED ABSTINENCE RATES—MEDICATIONS

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Abstinence rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>13.8</td>
</tr>
<tr>
<td>Chantix</td>
<td>33.2</td>
</tr>
<tr>
<td>High dose nicotine patch (more than 25 mg)</td>
<td>26.5</td>
</tr>
<tr>
<td>Wellbutrin (Zyban, bupropion)</td>
<td>24.2</td>
</tr>
<tr>
<td>Nicotine patch 6-14 weeks</td>
<td>23.4</td>
</tr>
<tr>
<td>Nicotine gum</td>
<td>19.0</td>
</tr>
<tr>
<td>Long term patch + ad lib gum or spray</td>
<td>36.5</td>
</tr>
<tr>
<td>Patch + Wellbutrin</td>
<td>28.9</td>
</tr>
<tr>
<td>Patch + antidepressants (Paxil, Effexor)</td>
<td>24.3</td>
</tr>
</tbody>
</table>
QUESTIONS?
What about ECIG regulation?

- FDA Center for Tobacco Products regulates: cigarettes, smokeless tobacco, roll-your-own tobacco
- ECIGs, hookah, cigars not currently regulated by FDA
- FDA is going through the “deeming” process so that they can extend their authority to include ECIGs, hookah, and cigars.
  - Issue a proposed rule
  - Obtain public comment via docket
  - Address all comments (over 135,000 received)
  - Issue final rule