Recent Advances in Clinical Medicine: Smoking Cessation

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Disclosures

- No significant financial disclosures
Learning Objectives

• Understand the personal and societal impact of smoking
• Understand the policy and physician-based challenges underlying smoking cessation
• Options for smoking cessation
• Individualized approach
Smoking Rates

• 25% of US smokes

• 51M cigarette smokers over 12yo

• Nationally declining rates since late 1990s
Percent of Students Reporting Daily Cigarette Use, by Grade

Denotes significant difference between 2016 and 2017

SOURCE: University of Michigan, 2017 Monitoring the Future Study
However...

- Lower income patients smoke more
  - 40% w/ no high school diploma or GED smoke

- Persons with mental illness smoke more
  - The 25% of smokers account for >40% of all cigarettes smoked
FIGURE 1. Estimated percentage of high school students who currently use any tobacco products, \(* = 2\) tobacco products, and select tobacco products — National Youth Tobacco Survey 2011–2015
National Impact

• 480K premature deaths annually in US
  – 5.8M current smoking children will die

• ~$300B in annual costs
  – ½ medical expenditures, ½ lost productivity from morbidity
Additional Morbidity

- Asthma control
- COPD
- CV risk: stroke, MI, PVD, AAA
As We All Know – Smoking Causes Cancer

- 30% of all cancer deaths
- Cancer-related deaths 2x that of non-smokers
  - Heavy smokers 4x
- 90% of lung cancer cases

- Other cancers...H&N, esophageal, gastric, pancreatic, cervical, kidney, bladder
Pharmacobiology of Addiction

NIH National Institute on Drug Abuse
Sep 2019
Counseling Tailored to Population

• Young vs. Old(er)
  – Polytobacco abuse in those <26yo
  – >5% of all 12-26yo use >3 tobacco types

• Men vs. Women
  – Cortisol levels
  – ↑women smokers, also less likely to quit
  – Varenicline differences in sexes?

• Co-existent Mental Illness
  – Smoke more
  – Less likely to quit
Women vs. Men

- Cortisol differences
- Women need more meds
- Timing of cessation different
So What Can We Do?

- Public health initiatives
- We as providers
FIGURE 6 State and local smoke-free restaurant and bar laws have expanded rapidly in the United States, 2002–2012.
Cost vs. Sales

- **Total Sales (million packs)**
- **Real Cigarette Price**

**Fiscal Year**
- 1970
- 1973
- 1976
- 1979
- 1982
- 1985
- 1988
- 1991
- 1994
- 1997
- 2000
- 2003

- $1.20
- $1.70
- $2.20
- $2.70
- $3.20
- $3.70
- $4.20

**Graph Legend**
- Pink line: Cigarette Sales (million packs)
- Blue line: Real Cigarette Price
FIGURE 8 Impact of tobacco taxes and smoke-free laws on adult and youth smoking prevalence in New York City, 1993 to 2007.
SOURCES: McGoldrick presentation (June 11, 2012); CDC (2007b); and New York City Department of Health and Mental Hygiene (2012).
FIGURE 9  The tobacco industry outspends state tobacco prevention efforts by 23 to 1. Although tobacco-related state and federal revenues comprise around $40 billion, state tobacco control program budgets are less than $500 million, which is less than the Centers for Disease Control and Prevention (CDC)-recommended $3.7 billion, and 23 times less than the $10.5 billion spent by the tobacco industry on marketing and promotion.

SOURCES: McAfee presentation (June 11, 2012); Campaign for Tobacco-Free Kids (2012b,d); CDC (2007c).
Ms. Smith

- 55yo F with CAD s/p MI and stent 3y ago, mild COPD, worsening cough, sputum production, and dyspnea
- Continues to smoke 1ppd despite addressing the issue in the past
- “I’ve tried and quit before but I just can’t seem to keep at it.”

- “Ms. Smith, let me tell you about our options”
### Pharmacologic – Nicotine Replacement

**Summary of Findings for the Main Comparison**

**Nicotine replacement therapy versus control for smoking cessation**

**Patient or population:** people who smoke cigarettes  
**Settings:** clinical and non-clinical, including over the counter  
**Intervention:** nicotine replacement therapy of any form

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative comparative risks* (95% CI)</th>
<th>Relative effect (95% CI)</th>
<th>No of Participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assumed risk</td>
<td>Corresponding risk</td>
<td>RR 1.55 (1.49 to 1.61)</td>
<td>64,640 (133 studies)</td>
</tr>
</tbody>
</table>
| Smoking cessation at 6+ months follow-up  
Follow-up: 6 to 24 months | Study population |                          |                              |                                |
|                        | 105 per 1000 | 162 per 1000 (156 to 168) |                              |                                |
| Limited behavioural support | 40 per 1000 | 62 per 1000 (60 to 64) |                              |                                |
| Intensive behavioural support | 150 per 1000 | 232 per 1000 (224 to 242) |                              |                                |
### Pharmacologic – Bupropion

#### Bupropion for smoking cessation

**Patient or population:** people who smoke  
**Intervention:** bupropion

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<tr>
<td></td>
<td>Assumed risk</td>
<td>Corresponding risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>115 per 1000¹</td>
<td>187 per 1000</td>
<td>RR 1.62 (1.49 to 1.76)</td>
<td>high²,³</td>
</tr>
<tr>
<td><strong>Assumed risk</strong></td>
<td></td>
<td>(172 to 203)</td>
<td>13728 (44 studies)</td>
<td></td>
</tr>
<tr>
<td><strong>Bupropion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bupropion versus placebo/control. Abstinence</strong></td>
<td>186 per 1000¹</td>
<td>221 per 1000</td>
<td>RR 1.19 (0.94 to 1.51)</td>
<td>low³,⁴,⁵</td>
</tr>
<tr>
<td><strong>Bupropion and NRT versus NRT alone. Abstinence</strong></td>
<td>254 per 1000¹</td>
<td>244 per 1000</td>
<td>RR 0.96 (0.85 to 1.09)</td>
<td>moderate⁴</td>
</tr>
<tr>
<td><strong>Follow-up: 6+ months</strong></td>
<td></td>
<td></td>
<td>4086 (8 studies)</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2. Network meta-analysis of smoking cessation with each first-line pharmacotherapy versus placebo and versus each other.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Odds ratio (95% credible interval)</th>
<th>No. of studies (direct comparisons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRT vs Placebo</td>
<td>1.84 (1.71, 1.99)</td>
<td>119</td>
</tr>
<tr>
<td>Bupropion vs Placebo</td>
<td>1.82 (1.6, 2.06)</td>
<td>36</td>
</tr>
<tr>
<td>Varenicline vs Placebo</td>
<td>2.88 (2.4, 3.47)</td>
<td>15</td>
</tr>
<tr>
<td>Bupropion vs NRT</td>
<td>0.99 (0.86, 1.13)</td>
<td>9</td>
</tr>
<tr>
<td>Varenicline vs NRT</td>
<td>1.57 (1.29, 1.91)</td>
<td>0</td>
</tr>
<tr>
<td>Varenicline vs Bupropion</td>
<td>1.59 (1.29, 1.96)</td>
<td>3</td>
</tr>
</tbody>
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Posterior median odds range from 0.5 to 3.5.
**Fig. 2** Varenicline plus nicotine patch vs varenicline plus placebo patch: the early outcome

**Fig. 3** Varenicline plus nicotine patch vs varenicline plus placebo patch: the late outcome
Non-pharmacologic

- Quit helplines
- Automated text messaging
- Self-help printed materials
- Social media forums
- Cognitive Behavioral Therapy/smoking cessation clinics
### Non-pharmacologic

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Illustrative absolute effects* (95% CI)</th>
<th>Relative effect (95% CI)</th>
<th>No of Participants (studies)</th>
<th>Quality of the evidence (GRADE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assumed successful quitters without intervention</td>
<td>Estimated quitters with intervention</td>
<td>RR 1.17 (1.11 to 1.24)</td>
<td>18,682 (47 studies)</td>
</tr>
<tr>
<td></td>
<td>Pharma-therapy (with variable level of behavioural support)</td>
<td>Additional behavioural support (in addition to pharma-therapy)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation at longest follow-up</td>
<td>Study population¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up: 6 - 24 months</td>
<td>180 per 1000</td>
<td>210 per 1000 (199 to 222)</td>
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***Personalize the approach***
Combination is Best

**FIGURE 4** Effectiveness of and estimated abstinence rates for interventions delivered by various numbers of clinician types. Individuals are more likely to stop smoking if more clinicians are involved in a quit attempt.

NOTE: Abstinence rate = percentage of people who achieve long-term abstinence from smoking.

SOURCES: Sarna presentation (June 11, 2012) and Fiore et al. (2008).
• I tell her the best rates of quitting are a combination of varenicline + NRT + tailored counseling
  – Education re: realistic quit rates
  – Realistic goal setting
  – Quit date
  – Engagement of family members
  – Engagement of other providers

• “I’ve been thinking about these e-cigarettes to help me quit...what do you think?”
What do we know about e-cigarettes?

- Marketed in 2007, devices that heat solvents, flavors, or nicotine
  - >7000 flavors available
- Largely unregulated
  - 2016 – illegal to sell <18yo
- 1/2 all smokers have used e-cigs
  - 20% currently use
- Tradeoff: 10% of never smokers use e-cigs vs. 12% of former smokers use e-cigs
Death toll rises from mysterious lung illness linked to vaping.

CDC maps number of vaping-related deaths in the US.
I WANT TO START A NO VAPING CAMPAIGN

This isn't cause of vaping. I got Pneumonia that saved my life, the vaping would've killed me!
Advice from the FDA

- 805 lung injury cases in 46 states and 12 deaths
  - 2/3 18-34yo
- 77% of patients used a THC-containing product
  - ?vitamin E acetate
  - However no one product or source identified
- Lipoid pneumonia may be the majority of the cases
- Refrain from all e-cigarette/vaping use
Summary

• Smoking rates have dropped overall but there are still significant at-risk populations and ongoing challenges
• Need for future improved funding and regulation
• E-cigarettes probably have a role in the right patient but requires more safety data and regulation
• Individualized and multimodality approach has the best outcomes
References

- https://www.drugabuse.gov/publications/research-reports/tobacco-nicotine-e-cigarettes/references
References


