Reducing nicotine in cigarettes to enable positive behavior change

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“Death... Is overwhelmingly caused by cigarettes and other combustibles...

Promotion of e-cigarettes and other innovative products is... likely to be beneficial where the appeal, accessibility and use of cigarettes are rapidly reduced.”

The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General, 2014
Overview

1) Combusted tobacco causes widespread death and disease. Nicotine is not the direct cause of the harm, but it sustains use of a vehicle that is deadly. Reducing nicotine would likely reduce smoking.

2) Alternative nicotine delivery systems (ANDS) have great potential to reduce harm. However, the availability of ANDS may not be enough to rapidly reduce smoking.

3) Policies that minimize the appeal of and reinforcement from cigarettes relative to ANDS may accelerate gains in public health. Reducing nicotine in combustibles and enabling the growth of ANDS may be complimentary and synergistic approaches to ending smoking.
Reducing nicotine would likely reduce smoking
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Smokers interested in quitting
Hatsukami et al., 2010
Addiction 105: 343-355
Reducing nicotine would likely reduce smoking
Reducing nicotine would likely reduce smoking

Smokers not trying to quit
Donny et al., 2015
NEJM 373: 1340-1349
Reducing nicotine would likely reduce smoking
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• Smokers switch to VLNC cigarettes report reduced satisfaction
• In real world context, relatively few are 100% compliant
• Most participants are mostly compliant (i.e., supplement with use of commercial cigarettes)
  • Most common time to cheat: first cigarette of the day
Reducing nicotine would likely reduce smoking

Smokers not trying to quit
Donny et al., 2015
NEJM 373: 1340-1349
Reducing nicotine would likely reduce smoking

![Bar chart showing percent self-reporting trying to quit 30-day follow-up across different nicotine levels.]

Smokers not trying to quit
Donny et al., 2015
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Reducing nicotine would likely reduce smoking

- Hatsukami et al., 2010; 2013 – pretreatment
  - Continuous abstinence
    - 13.5 vs 30.2% (ns; 2010 paper)
    - Similar to patch (2013 paper)

- Becker et al., 2008 – pretreatment
  - Continuous abstinence: VLNC+patch (32.8%) vs. NNC+patch (21.9%)

- Walker et al., 2012 - relapse prevention
  - Quitline/NRT/behavioral support with or without VLNC
  - Continuous abstinence: 23% vs. 15%

- McRobbie et al., 2016 - relapse prevention
  - Varenicline or NRT alone (N=100) or combined (N=100) with VLNC for 2 weeks
  - Continuous abstinence: OR > 2 at 1 & 4 (not 6 & 12) weeks
The availability of ANDS may not be enough to rapidly reduce smoking

• Nicotine reduction IS intrusive
  • Is it necessary?
  • Are less intrusive interventions adequate?
The availability of ANDS may not be enough to rapidly reduce smoking

“It’s excellent news that the number of vapers who have quit smoking is continuing to grow, but there are still 9 million smokers [3] compared to only 1.5 million vapers who don’t smoke at all.”

– Deborah Arnott
The availability of ANDS may not be enough to rapidly reduce smoking

Figure 5: Main reason for stopping using an e-cigarette among current smokers (2016)

- They didn't feel like smoking a cigarette: 25%
- They didn't help me deal with cravings for smoking: 20%
- I only ever tried them to see what they were like: 16%
- Other: 11%
- Don't know/ can't remember: 6%
- I felt I was using them too often compared with smoking: 4%
- They kept leaking: 4%
- I was concerned they were not safe enough: 4%
- They cost too much: 4%
- They were difficult to use or refill: 3%
The availability of ANDS may not be enough to rapidly reduce smoking
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Hajek et al., 2016
Psychopharmacology 234: 773-779
The availability of ANDS may not be enough to rapidly reduce smoking

Ex-ecig users and current smokers find e-cigarettes unsatisfactory and say that something closer to smoking might work for them... That thing might be a better nicotine delivery or it might be something closer to smoking. I think the latter is at the heart of the huge bet that lies behind heat-not-burn.

-Clive Bates
Reducing nicotine and ANDS as complimentary and synergistic approaches
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<table>
<thead>
<tr>
<th></th>
<th>VLNC</th>
<th>NNC</th>
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<tbody>
<tr>
<td>Number of days using alternative products, mean (SD)</td>
<td>27 (19)</td>
<td>15 (17)</td>
</tr>
<tr>
<td>Proportion of days using alternative products, mean (SD)</td>
<td>0.60 (0.36)</td>
<td>0.34 (0.35)</td>
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Reducing nicotine in cigarettes led to:
- Reduced smoking
- Greater use of ANDS, esp e-cigs

Conversely, greater uptake of non-combusted products was significantly associated with:
- Greater reductions in smoking
- More days smoking abstinent

Hatsukami et al., Addiction (2017) 112: 156-167
Reducing nicotine and ANDS as complimentary and synergistic approaches

Addiction (2017) 112: 6-7

- Prohibition
- Alternative nicotine option
- Discomfort/dysfunction
- Substitutable nicotine
- Reduced relative reinforcement
- Dissatisfaction
- Reduced abuse liability
- Gateway to smoking
Thank you for listening