Modeling the Impact of Smokeless Tobacco with Modified-risk Claims on Population Health

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For illustrative purposes only. Not actual corporate structure; does not reflect all Altria subsidiaries.
Continuum of Risk

- Not all tobacco products present the same risk

(Directional only – not to scale; adapted from Hatsukami et al.)
Range of Potentially Lower Risk Products

Heat-not-Burn  E-Vapor  Smokeless

Note: Third party trademarks are the property of their respective owners and are included for informational purposes only.
Copenhagen® Snuff Fine Cut – Proposed Claim

1. Draws the attention of adult smokers

2. Single disease focus
   - Neither states nor implies that the product presents no risk of lung cancer or other disease

3. Desired single use behavior

IF YOU SMOKE, CONSIDER THIS:

Switching completely to this product from cigarettes reduces risk of lung cancer.

WARNING: This product can cause gum disease and tooth loss.

WARNING: This product can cause mouth cancer.
MRTPA Statutory Requirements (§ 911(g)(1))

- The candidate product, as it is actually used by consumers, will:

  1. Significantly reduce harm and the risk of tobacco-related disease to individual tobacco users; and

  2. Benefit the health of the population as a whole taking into account both users of tobacco products and persons who do not currently use tobacco products.

“FDA encourages the development and application of innovative analytical methods to make preliminary estimates of the potential effects of some change in the marketplace. Methods … include secondary data analyses and computational modeling.”

ALCS Cohort Model

- Developed and validated the cohort model
- Used best practices as described by
  - Institute of Medicine (IOM)
  - Society for Medical Decision Making (SMDM)
  - International Society of Pharmacoeconomics and Outcomes Research (ISPOR)
Modeling the Impact of the Claim

- Risk of using smokeless tobacco relative to cigarette smoking
- Changes in product use patterns due to the modified risk claim

Benefit/Risk
Estimate population benefit/risk by comparing the difference in All-cause Mortality between the Base Case and Modified Case.
Time-Staggered Multiple Cohort Approach

- Models a complete population of Males Born in the U.S.

Modeling the Impact of the Claim

Linked Mortality Analysis

- Risk of using smokeless tobacco relative to cigarette smoking
- Changes in product use patterns due to the modified risk claim

Benefit/Risk
Risk of Smokeless Tobacco (ST) Relative to Smoking

- The increased likelihood of all-cause mortality estimated from ALCS Linked Mortality Analysis*

- We estimated the risk for Smokeless Tobacco Use to be 9% of Cigarette Smoking

Modeling the Impact of the Claim

**Linked Mortality Analysis**
Risk of using smokeless tobacco relative to cigarette smoking

**Altria Claim Comprehension & Intentions Study**
Changes in product use patterns due to the modified risk claim

**Benefit/Risk**
Estimate relative percent difference between response of Test and Control group

Applied the estimated relative percent differences to Base Case transition rates to generate the Modified Case transition rates
<table>
<thead>
<tr>
<th>Adult Tobacco Use Behavior</th>
<th>Change in Likelihood of Behavior* (Relative Impact Factor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cigarette Smokers Switching to Copenhagen® Snuff</td>
<td>1.21</td>
</tr>
<tr>
<td>2. Cigarette Smokers Transitioning to Dual Use</td>
<td>1.25</td>
</tr>
<tr>
<td>3. Dual Users Switching to Copenhagen® Snuff</td>
<td>1.06</td>
</tr>
<tr>
<td>4. Former Smokeless Tobacco Users Relapsing to Copenhagen® Snuff</td>
<td>1.00</td>
</tr>
<tr>
<td>5. Never Users Initiating with Copenhagen® Snuff</td>
<td>0.94</td>
</tr>
</tbody>
</table>

*Results not statistically significant.
Modeling Framework

Base Case – World As Is Today

- Never Tobacco User
  - Cigarette Smoker
    - Former Cigarette Smoker
    - Former Dual User
  - Dual User
    - Former ST User

Modified Case – Future World

- Never Tobacco User
  - Cigarette Smoker
    - 21% Increase
    - Former Cigarette Smoker
    - Former Dual User
    - Former ST User
    - Dual User
    - 2
    - 3
  - ST User
    - 5
    - Former ST User

# Adult Male Transition Rates

<table>
<thead>
<tr>
<th>Tobacco Use Transition</th>
<th>Base Case Transitions* (From the Literature)</th>
<th>Modified Case Transitions* (Adjusted from CCI Study)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Current smoker → ST</td>
<td>1.4%</td>
<td><strong>21% Increase</strong> 1.7%</td>
</tr>
<tr>
<td><strong>2</strong> Current smoker → Dual user (ST + cigarettes)</td>
<td>3.2%</td>
<td>4.0%</td>
</tr>
<tr>
<td><strong>3</strong> Dual user → ST</td>
<td>17.4%</td>
<td>18.4%</td>
</tr>
<tr>
<td><strong>4</strong> Former ST → ST</td>
<td>1.8%</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>5</strong> Never user → ST</td>
<td>1.6%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

*Five year transition rates

Modeling Framework

**Base Case – World As Is Today**

- **Never Tobacco User**
  - **Cigarette Smoker**
  - **Dual User**
  - **Former Cigarette Smoker**

**Modified Case – Future World**

- **Never Tobacco User**
  - **Cigarette Smoker**
  - **Dual User**
  - **ST User**
  - **Former Cigarette Smoker**
  - **Former Dual User**
  - **Former ST User**

**Approximately 93,000 premature deaths prevented over 60 years following claim authorization**
Sensitivity Analysis: What if?

Impact to Smokers:
Change in rate of Cigarette Smokers switching to smokeless tobacco
\((Switching)\)

- All other transition rates kept the same as those in the Modified Case scenario
Sensitivity Analysis: What if?

Impact to Smokers:
Change in rate of Cigarette Smokers switching to smokeless tobacco (Switching)

Impact to Non-Users:
Change in rate of Never Tobacco Users initiating on smokeless tobacco (Initiation)

- All other transition rates kept the same as those in the Modified Case scenario
Sensitivity Analysis

- Concurrently vary:
  - Change in rate of Never Tobacco Users initiating on smokeless tobacco (*Initiation*)
  - Change in rate of Cigarette Smokers switching to smokeless tobacco (*Switching*)

- All other transition rates kept the same as those in the Modified Case scenario
Summary

- Models can serve as important tools for evaluating population health impact

FDA Remarks on Population Health Benefit

FDA: “Computational modeling estimated a relatively small net population health benefit from market authorization of Copenhagen Snuff Fine Cut with the proposed modified risk claim.”

Source: FDA TPSAC presentation slide 49.
A Computational Model for Assessing the Population Health Impact of Introducing a Modified Risk Claim on an Existing Smokeless Tobacco Product

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