

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

Thaddaeus Hannel

Global Forum on Nicotine, June 13, 2019



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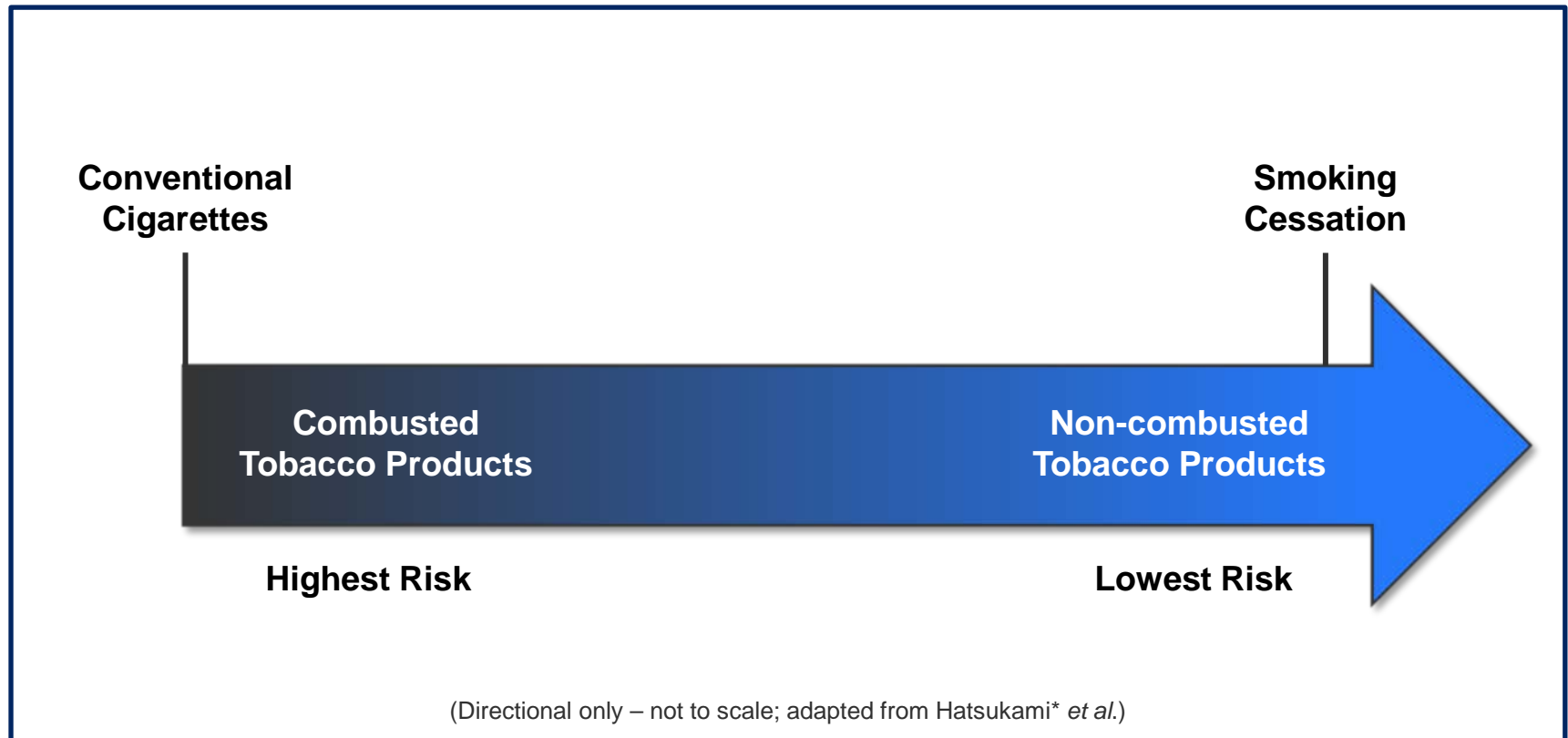
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Altria Operating Structure



Continuum of Risk

- Not all tobacco products present the same risk



Range of Potentially Lower Risk Products



Heat-not-Burn



E-Vapor



Smokeless

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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**



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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. Methodsinclude secondary data analyses and **computational modeling**.”

Source: Food and Drug Administration Center for Tobacco Products, 2012: Guidance for Industry - Modified Risk Tobacco Product Applications: Draft Guidance. Center for Tobacco Products.

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)

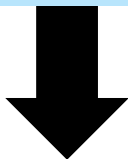


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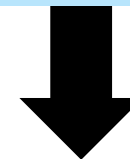
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Modeling the Impact of the Claim

Risk of using
smokeless tobacco relative
to cigarette smoking



Changes in product use
patterns due to the modified
risk claim

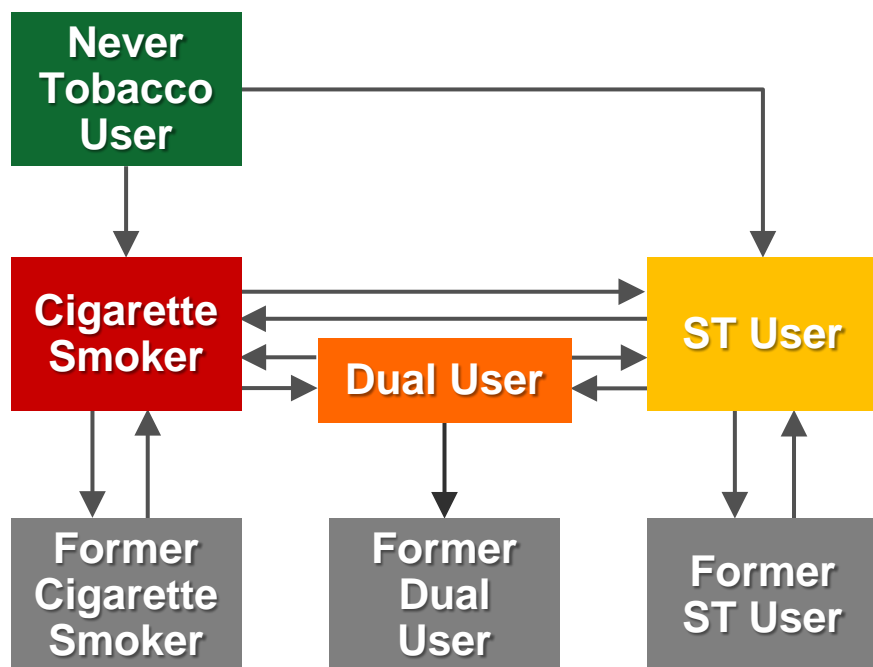


Benefit/Risk

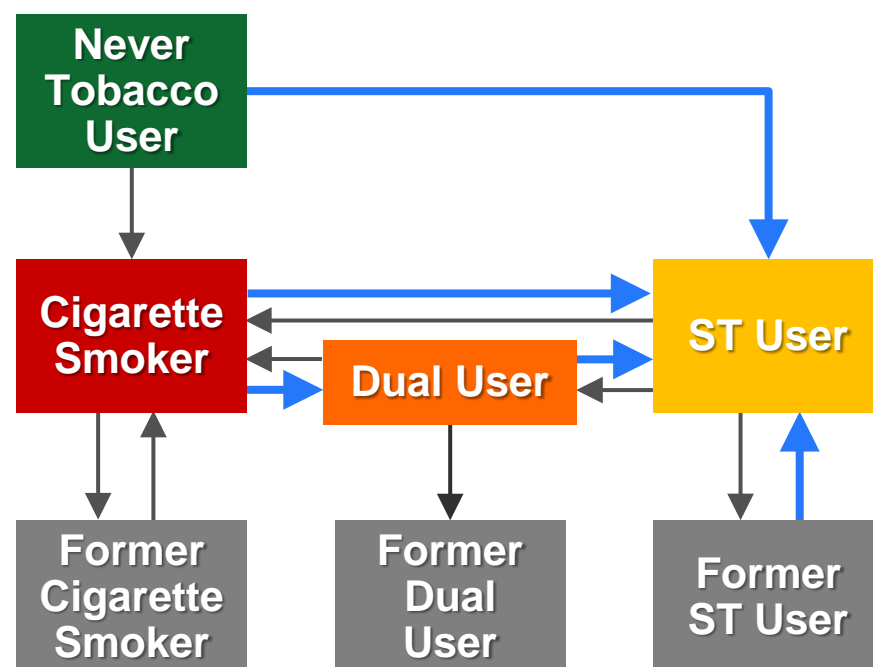


Modeling Framework

Base Case – World As Is Today



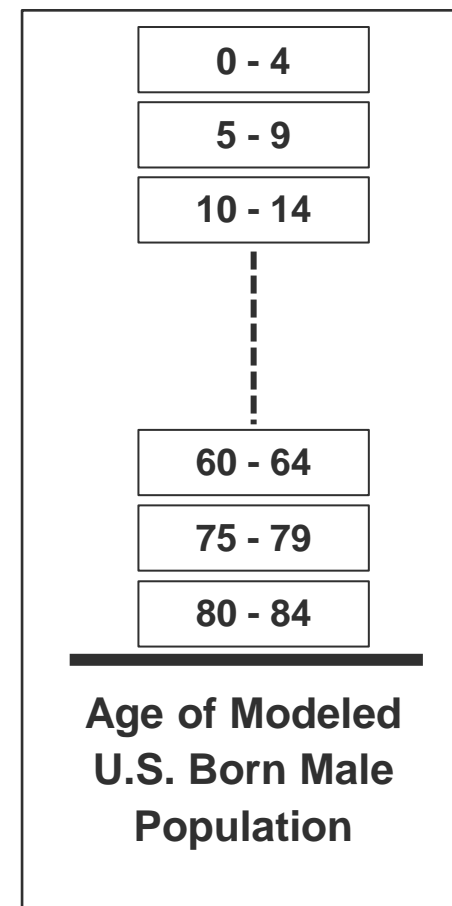
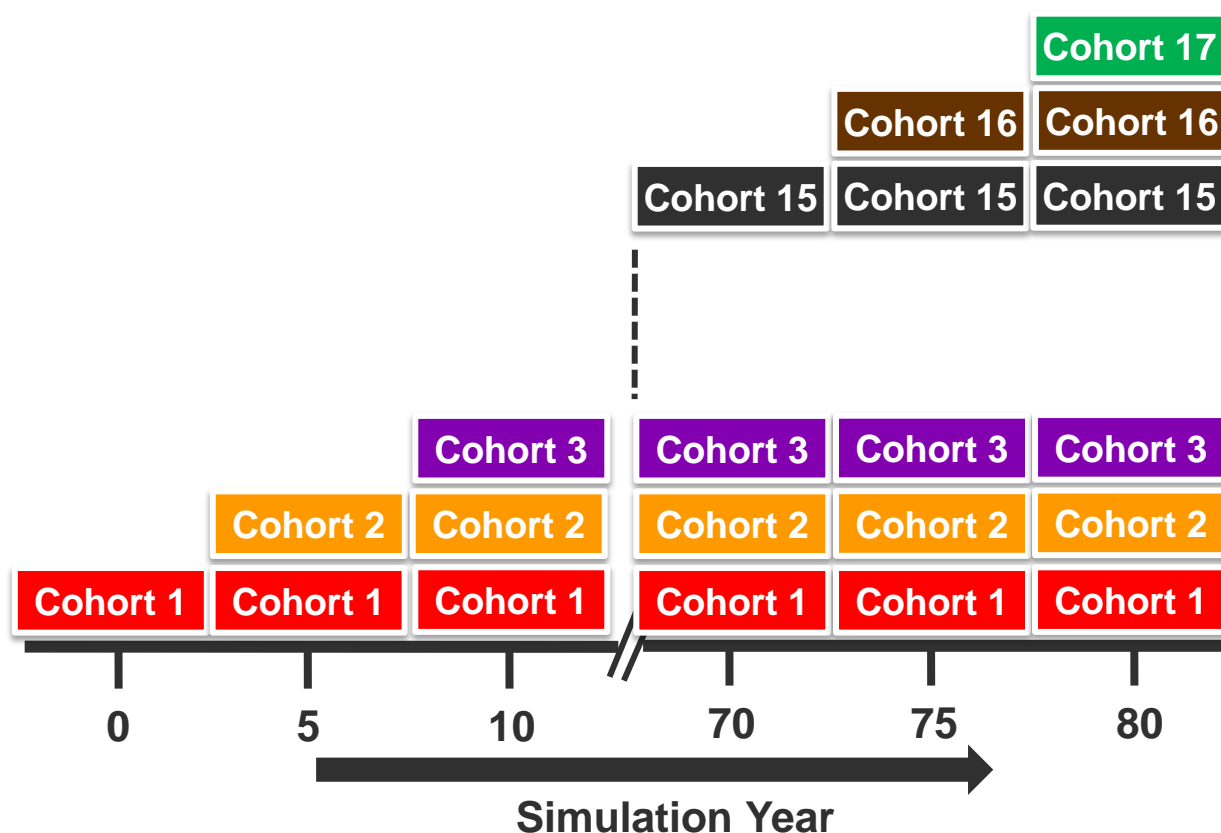
Modified Case – Future World



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.

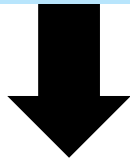


Single Cohort Approach based on: Bachand, Annette M.; Sulsky, Sandra I., (2013) A dynamic population model for estimating all-cause mortality due to lifetime exposure history. Regul. Toxicol. Pharmacol. 67;2

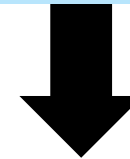
Modeling the Impact of the Claim

Linked Mortality Analysis

Risk of using
smokeless tobacco relative
to cigarette smoking



Changes in product use
patterns due to the modified
risk claim

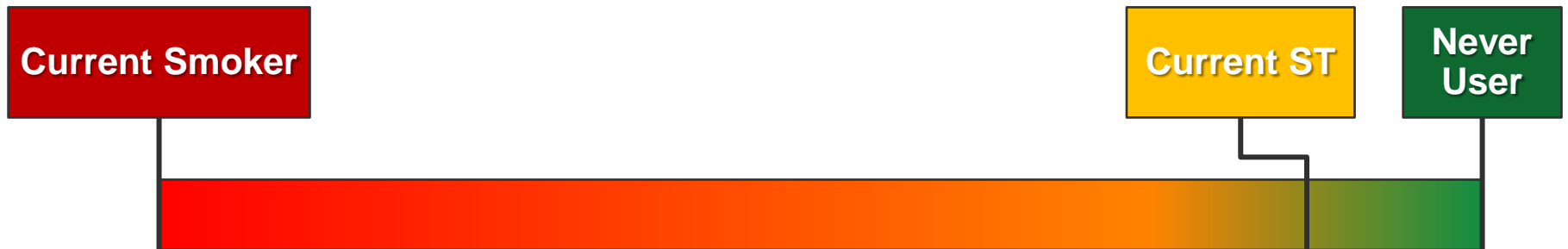


Benefit/Risk



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

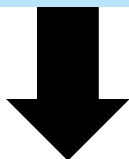
*Fisher, M.T.; Tan-Torres, S.M.; Gaworski, C.L.; Black, R.A.; Sarkar, M., (2019) Smokeless tobacco mortality risks: An analysis of two contemporary nationally representative longitudinal mortality studies. Harm Reduct. J. 16;27



Modeling the Impact of the Claim

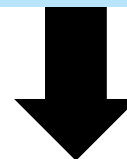
Linked Mortality Analysis

Risk of using
smokeless tobacco relative to
cigarette smoking



Altria Claim Comprehension & Intentions Study

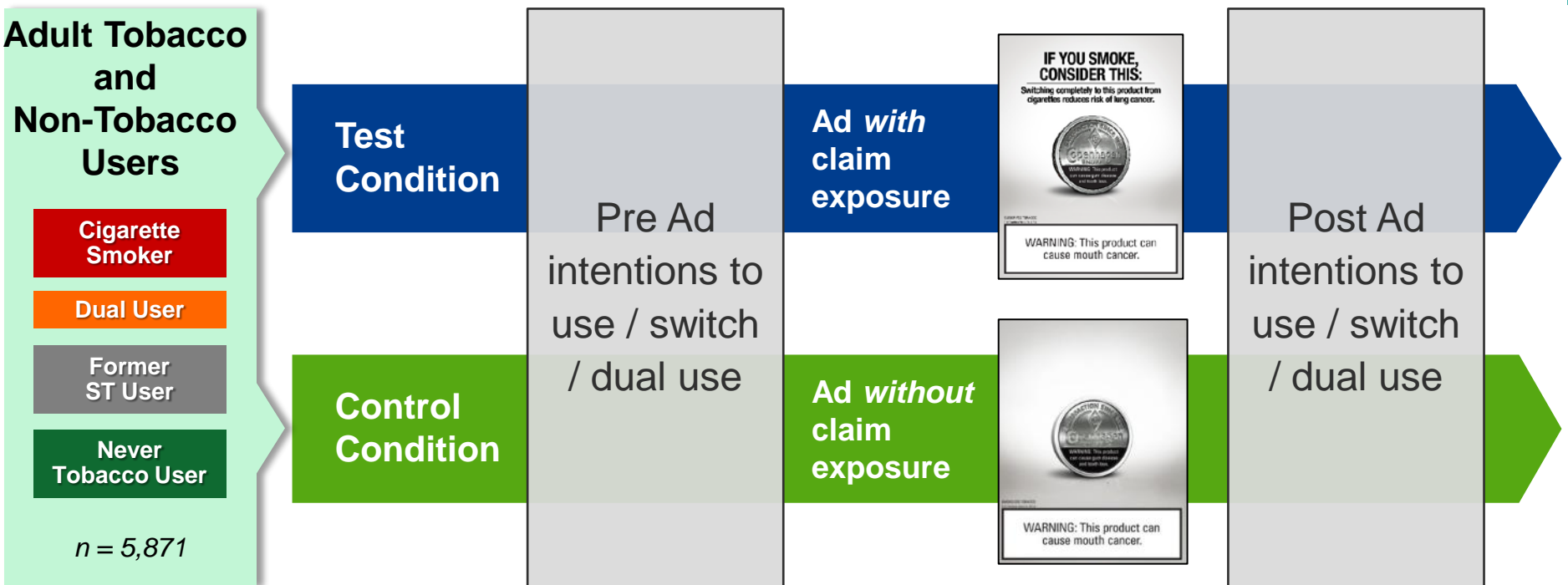
Changes in product use
patterns due to the modified
risk claim



Benefit/Risk



Altria Claim Comprehension & Intentions Study (CCIS)



- 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



Relative Impact

Adult Tobacco Use Behavior

Change in Likelihood of
Behavior*
(Relative Impact Factor)

1	Cigarette Smokers Switching to Copenhagen® Snuff	1.21
2	Cigarette Smokers Transitioning to Dual Use	1.25
3	Dual Users Switching to Copenhagen® Snuff	1.06
4	Former Smokeless Tobacco Users Relapsing to Copenhagen® Snuff	1.00
5	Never Users Initiating with Copenhagen® Snuff	0.94

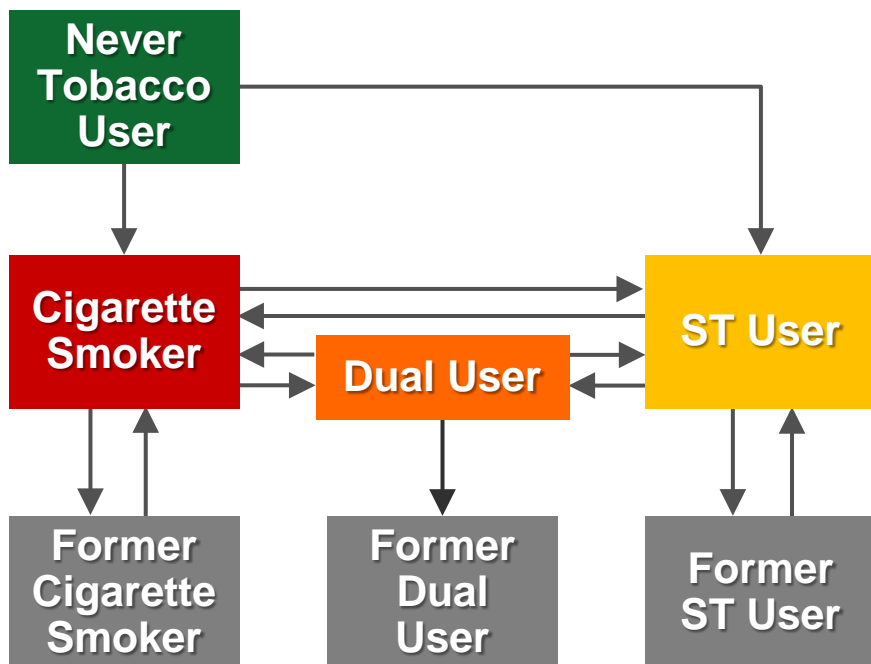
*Results not statistically significant.



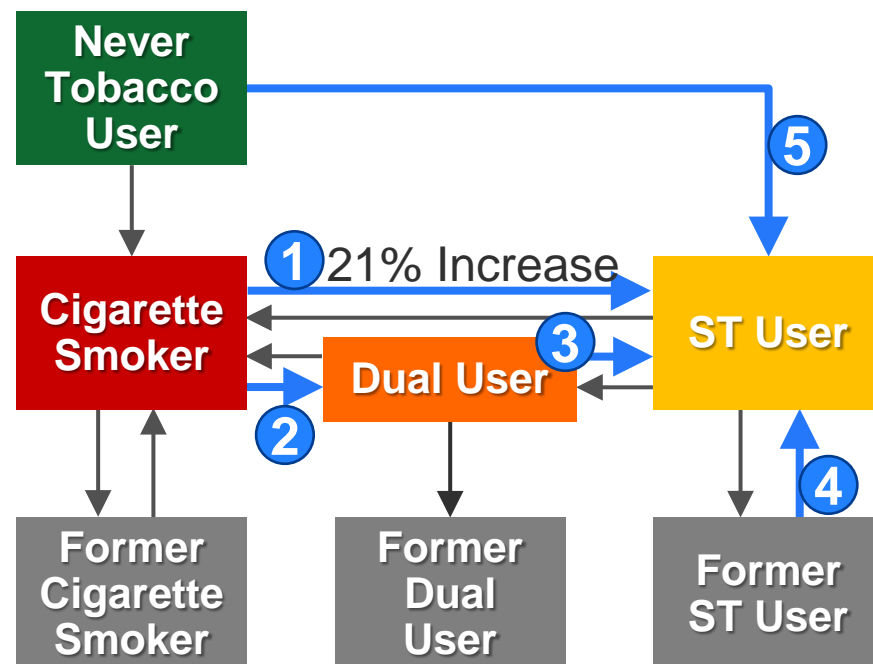
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Modeling Framework

Base Case – World As Is Today



Modified Case – Future World



Adult Male Transition Rates

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

*Five year transition rates

Base case transition rates largely informed by Tam J., Day H.R., Rostron B.L., Apelberg B.J. A systematic review of transitions between cigarette and smokeless tobacco product use in the United States. BMC Public Health. 2015;15:258

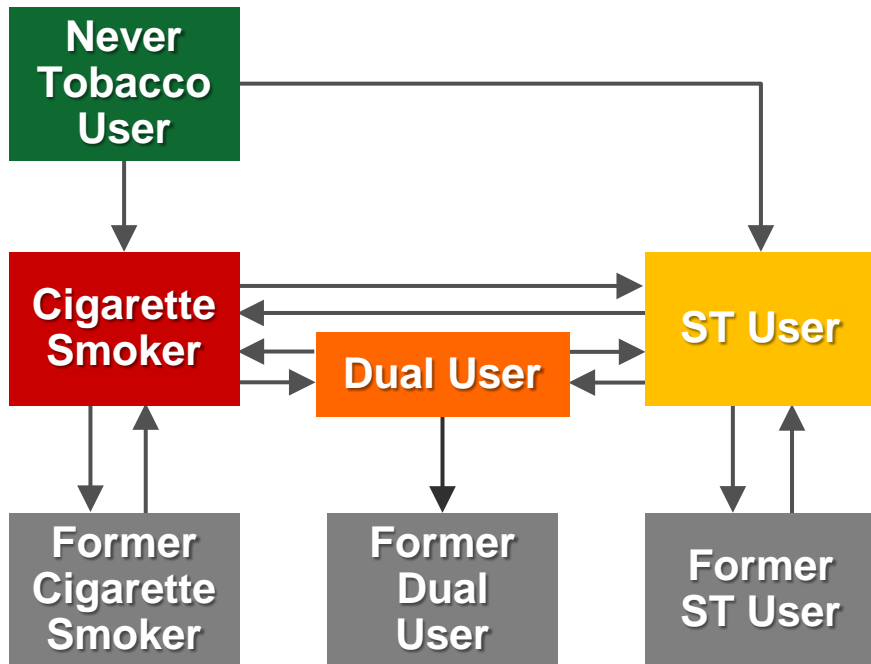


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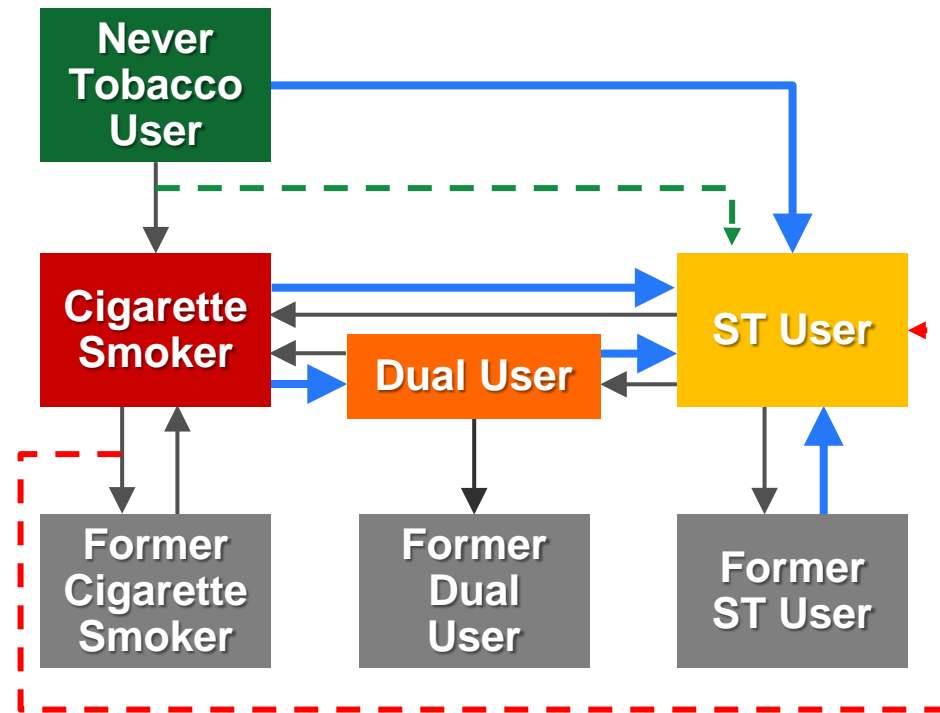
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Modeling Framework

Base Case – World As Is Today



Modified Case – Future World



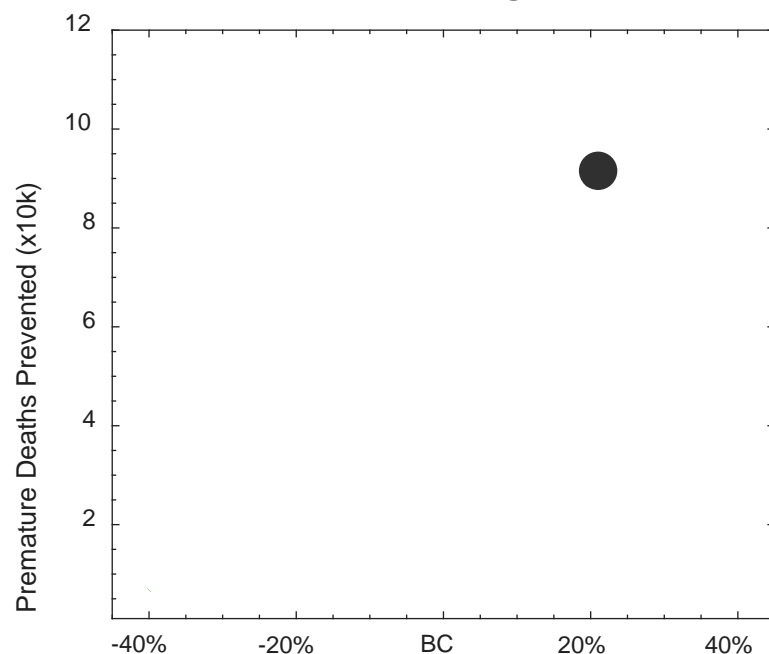
Approximately 93,000 premature deaths prevented over 60 years following claim authorization



Sensitivity Analysis: What if?

Impact to Smokers:

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



Switching from Smoking to Using ST

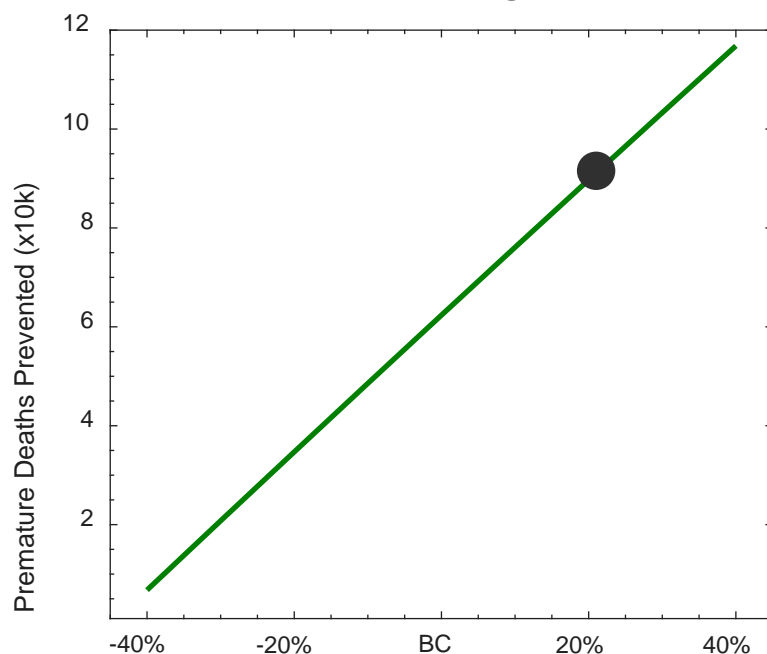
- All other transition rates kept the same as those in the Modified Case scenario



Sensitivity Analysis: What if?

Impact to Smokers:

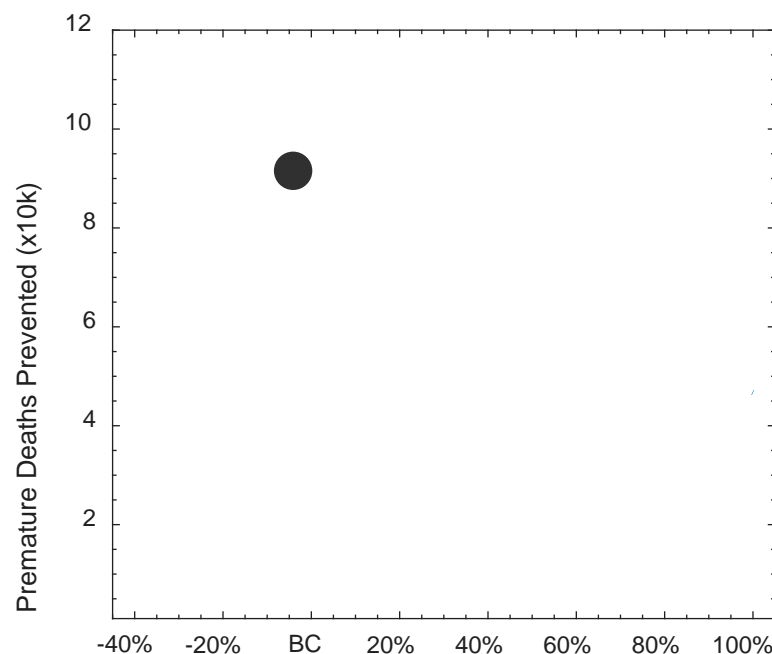
Change in rate of Cigarette Smokers switching to smokeless tobacco
(*Switching*)



Switching from Smoking to Using ST

Impact to Non-Users:

Change in rate of Never Tobacco Users initiating on smokeless tobacco
(*Initiation*)

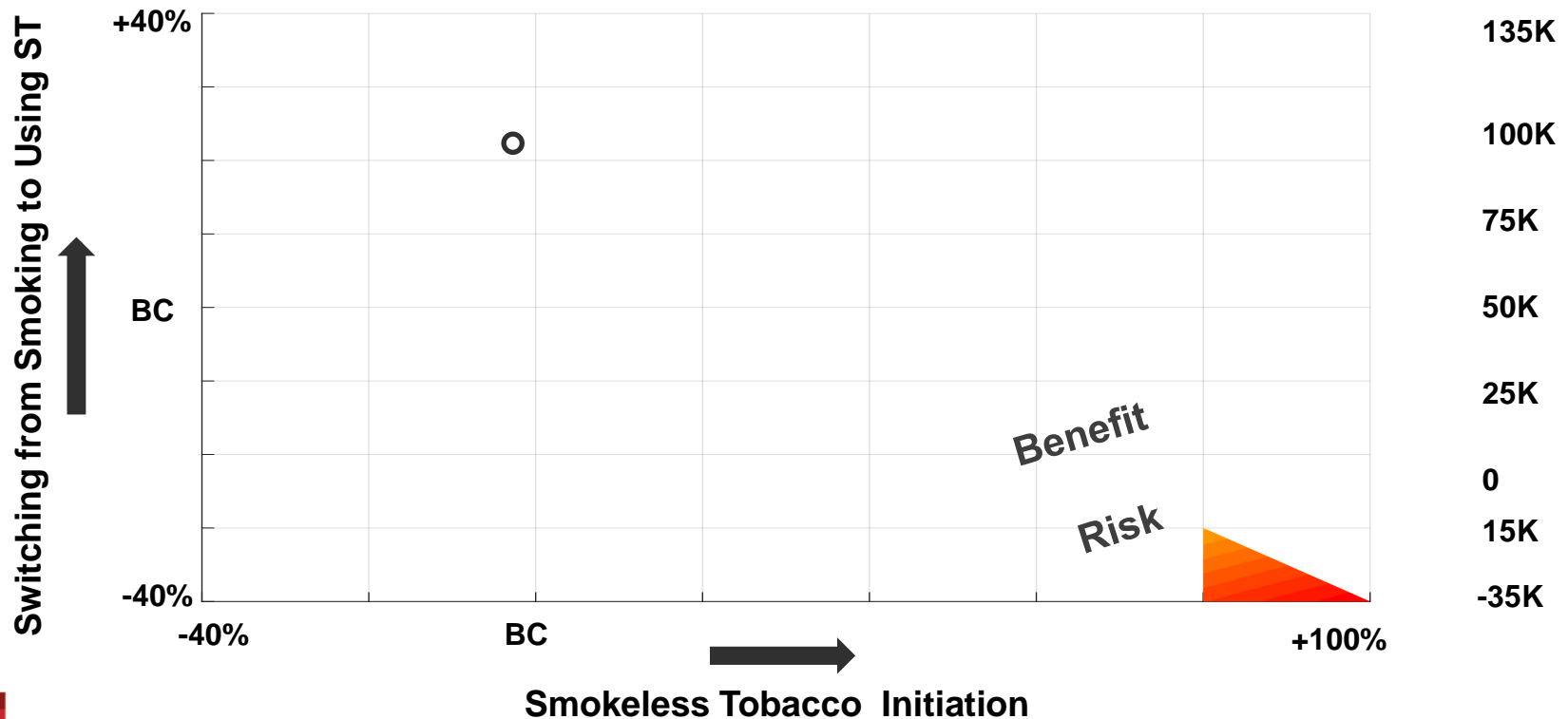


Smokeless Tobacco Initiation

- 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.





Article

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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