Understanding the Public Health Consequences of Menthol Cigarettes: A Computational Modeling Approach

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Objectives

- To show a specific example of the utilization of simulation modeling in public health
- To highlight the benefits of collaboration and complementary expertise in simulation analysis
- To bring attention to additional expertise needed in the field of tobacco simulation
- To put in perspective the meaning of quantitative simulation results

Menthol and TPSAC

The 2009 Family Smoking Prevention and Tobacco Control Act charges the Food and Drug Administration's (FDA) Tobacco Products Scientific Advisory Committee (TPSAC) with developing a report and recommendations that address "the issue of the impact of the use of menthol in cigarettes on the public health including such use among children, African Americans, Hispanics, and other racial and ethnic minorities."

Disease risk from Menthol vs Non-Menthol Cigarettes

In the TPSAC Menthol Report:

The evidence is insufficient to conclude that it is more likely than not that smokers of menthol cigarettes have increased risk for diseases caused by smoking compared with smokers of non-menthol cigarettes.

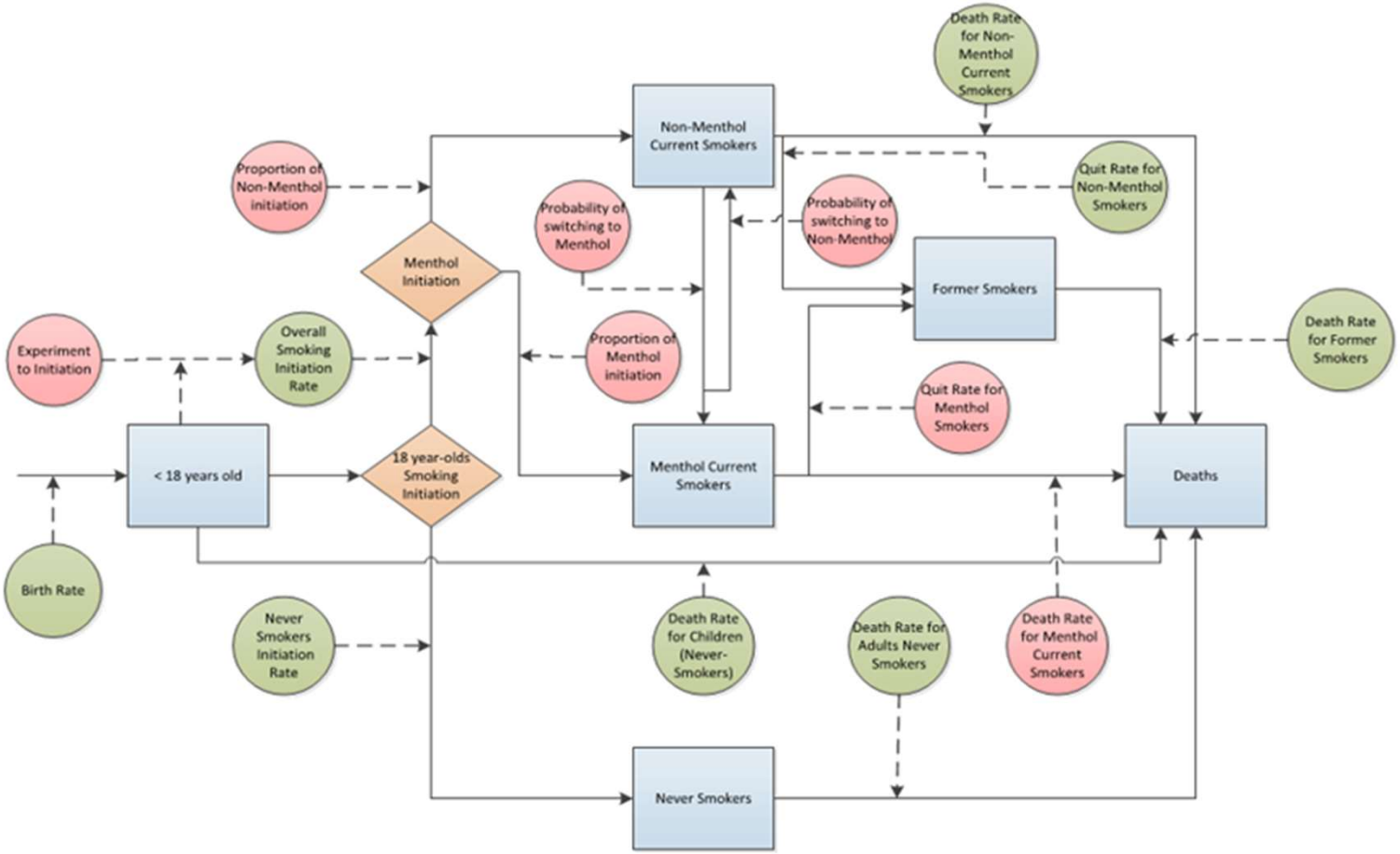
TPSAC Overall Recommendation to the FDA

Removal of menthol cigarettes from the marketplace would benefit public health in the United States

Menthol Harm

Results from empirical research show that individuals who experiment with menthol cigarettes are more likely to become regular smokers, and those who smoke menthol cigarettes are less likely to quit smoking

Block Diagram of Menthol Cigarettes Prevalence Model



Estimated Public Health Effect of Menthol in the General Population. TPSAC Report vs Updated Parameters

	Cumulative Excess Initiation				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050	2,288,534	4,429,326	6,710,101	9,124,867	
Update 2018-2060		1,261,941	2,282,866	3,333,301	4,389,620
	Cumulative Excess Premature Deaths				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050	17,182	67,182	164,590	327,565	
Update 2018-2060		79,381	200,851	333,694	465,458
	Cumulative Life-years Lost				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050					
Update 2018-2060		296,302	1,384,200	3,134,939	5,244,762

Estimated Public Health Effect of Menthol on the African American Population. TPSAC Report vs Updated Parameters

	Cumulative Excess Initiation				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050	461,273	859,101	1,262,086	1,656,005	
Update 2018-2060		292,761	533,250	778,295	1,023,171
	Cumulative Excess Premature Deaths				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050	4,716	16,381	35,250	66,524	
Update 2018-2060		34,282	71,999	104,660	134,807
	Cumulative Life-years Lost				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050					
Update 2018-2060		137,740	558,208	1,125,330	1,722,065

Estimated Public Health Effect of Menthol on the African American Population. TPSAC Report vs Updated Parameters

	Cumulative Excess Initiation				
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050	461,273	859,101	1,262,086	1,656,005	
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	Cumulative Excess Premature Deaths				
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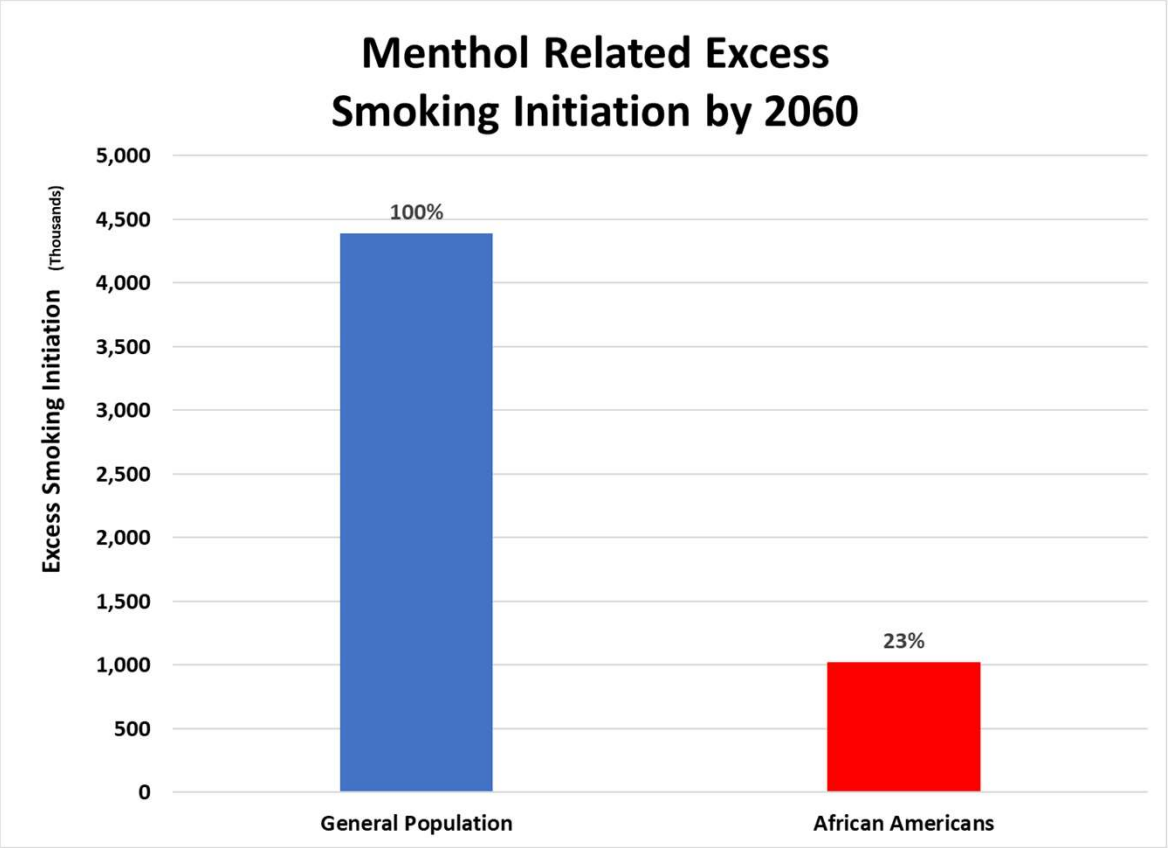
	2020	**2030**	**2040**	**2050**	**2060**
TPSAC Report 2010-2050					
Update 2018-2060		137,740	558,208	1,125,330	1,722,065

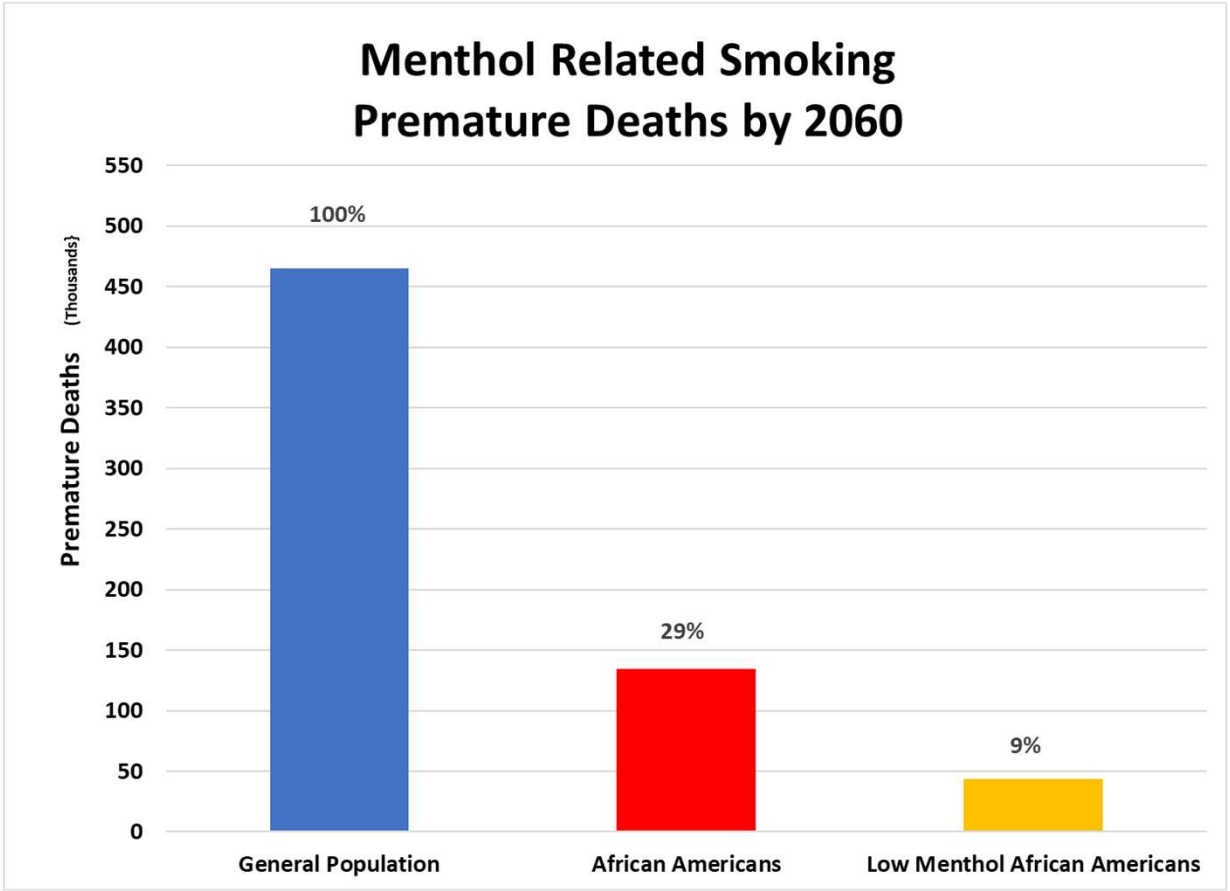
Estimated Public Health Effect of Menthol on the African American Population vs a Hypothetical Low Menthol African American Population

	Cumulative Excess Premature Deaths			
	2030	**2040**	**2050**	**2060**
African American Population	34,282	71,999	104,660	134,807
Low Menthol AA Population	2,272	9,580	23,819	43,935
	Cumulative Life-years Lost			
	2030	**2040**	**2050**	**2060**
African American Population	137,740	558,208	1,125,330	1,722,065
Low Menthol AA Population	6,750	51,946	177,094	412,665

Results


Menthol Related Excess Smoking Initiation by 2060
Excess Smoking Initiation (Thousands)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
100%
23%
General Population
African Americans

Results


Menthol Related Smoking
Premature Deaths by 2060
Premature Deaths (Thousands)
550
500
450
400
350
300
250
200
150
100
50
0
100%
29%
9%
General Population
African Americans
Low Menthol African Americans

Objectives

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- To bring attention to additional expertise needed in the field of tobacco simulation
- To put in perspective the meaning of quantitative simulation results
- To discuss the value of computational modeling approaches to tobacco regulation.

Thank you!