

Reactions to hypothetical flavor bans among smokers using menthol cigarettes or flavored cigars, and users of flavored e-cigarettes

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- Support grants
 - R03, NIDA, "Modeling the impact of flavor bans among young adult tobacco users using discrete choice experiments and agent-based modeling"
 - Pilot grant, CAsToR, "Examining and modeling the impact of E-cigarette ban"

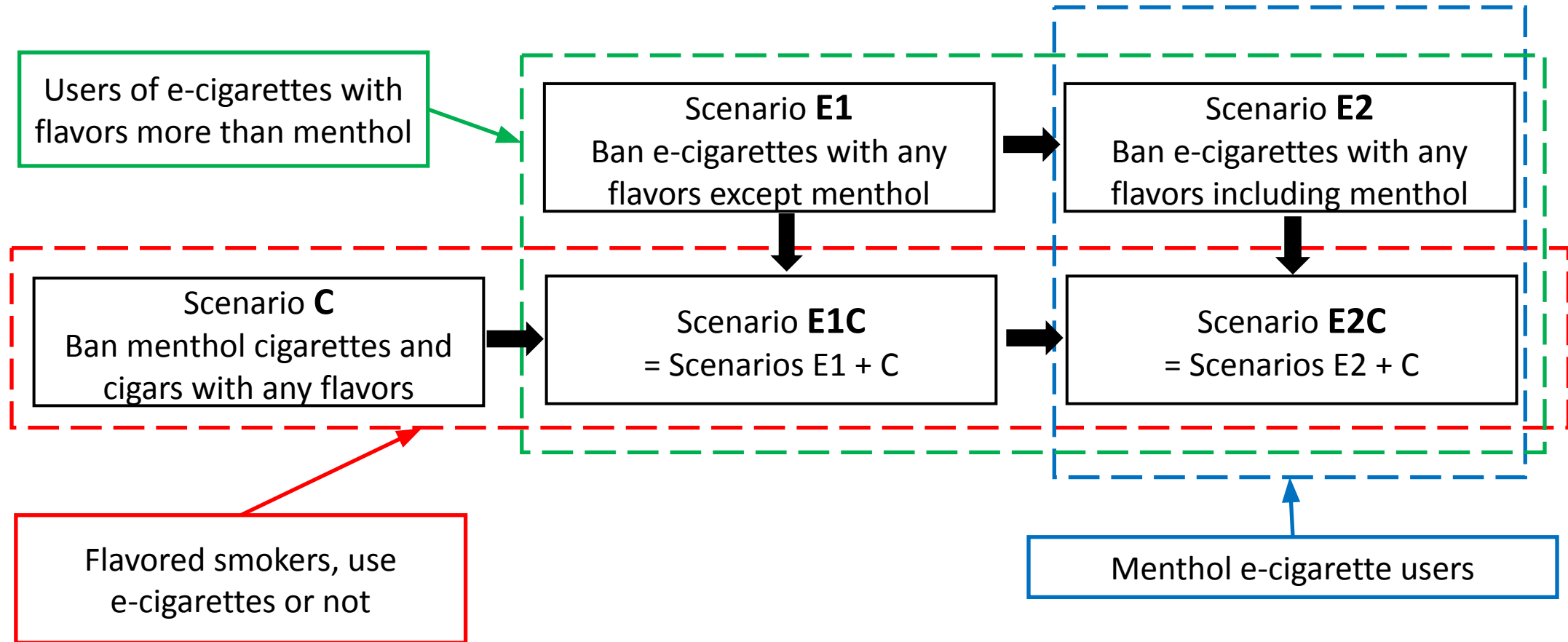
Related publications

1. 2023, *Reactions to hypothetical flavor bans among current users of flavored e-cigarettes. Trans. Behav. Med.*
2. 2022, *Should menthol e-cigarettes be banned? Reaction of adult smokers and users of e-cigarettes to hypothetical bans. Tob. Control.*
3. 2022, How smokers of menthol cigarettes and flavored cigars might respond to FDA's proposed bans. *Nicotine Tob Res.*
4. 2021, The impact of flavors, device, nicotine levels, and price on adult e-cigarette users' tobacco and nicotine product choices. *Tobacco Control.*
5. 2021, Perceived health risks associated with the use of tobacco and nicotine products during the COVID-19 pandemic. *Tobacco Induced Diseases.*
6. 2020, The impact of a comprehensive tobacco product flavor ban in San Francisco among young adults, *Addictive Behaviors Reports*
7. 2020, Agent-based Modeling in Tobacco Regulatory Science: Exploring 'What if' in Waterpipe Smoking. *Tobacco Regulatory Science*

Introduction

- Characterizing flavors to tobacco and nicotine products promotes initiation of use, increases nicotine dependence, and reduces cessation among current users. Removing added flavors may reduce their use.
- Various flavor ban policies were proposed, discussed, and implemented at the local, state and federal levels.
 - FDA may announce menthol cigarette and flavored cigar bans in Fall 2023.
- We aimed to examine current users' reactions to various hypothetical flavor bans
 1. The substitutability among various tobacco products
 2. Jointed impact of bans on menthol cigarettes, flavored cigars, and flavored cigarettes
 3. Heterogeneity among users

Ban scenarios in this study



Data collections

- Survey on flavored smoker, December 2022, Amazon Mechanical Turk
 - Adults who smoked menthol cigarettes or flavored cigars (including little cigars or cigarillos) at least once a week in the past 30 days, may use e-cigarettes or not.
 - Demographics and tobacco use in the past 30 days.
- Survey on users of flavored e-cigarettes, May 2022, Amazon Mechanical Turk.
 - Adults who currently used flavored e-cigarettes at least once a week in the past 30 days and did not use other product including cigarettes and cigars.
 - Demographics, e-cigarette use status, and whether former or never smokers.
- Reactions to each ban scenario
 - Respondents were asked, under the assumption that the banned products could not be obtained anywhere, whether would they quit all tobacco and nicotine products, or keep/start using products that were still legally available as alternatives.
 - Reactions were categorized into (1) quit all use; (2) use e-cigarettes; (3) user other products (e.g., IQOS, hookah, smokeless tobacco); and (4) use cigarettes or cigars.

Flavored smokers' characteristics

Table 1. Current smokers of menthol cigarettes or flavored cigars who may have used e-cigarettes or not (N=2552)

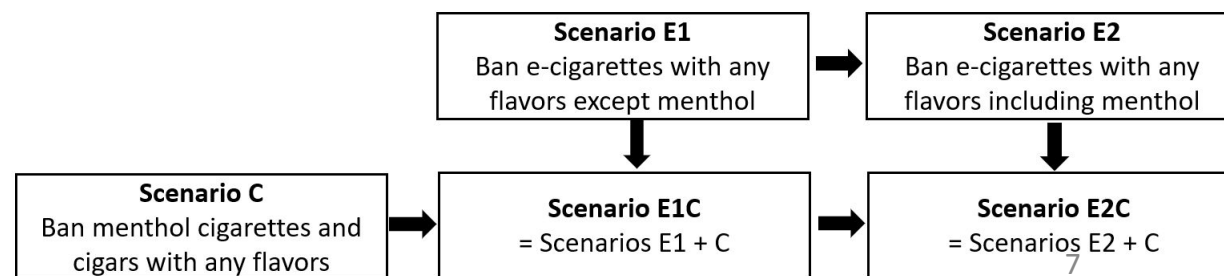
		Percent
Gender	Male	56.4
	Female	43.7
Age group	18-24	5.2
	25-34	40.0
	35-64	46.8
	65 and above	8.0
Race /ethnicity	Non-Hispanic White	62.1
	Non-Hispanic Black	14.2
	Non-Hispanic Asian	3.3
	Hispanic	18.7
	Other/mixed race	1.8
Educational attainment	High school or less	11.8
	Above high school and lower than a bachelor	21.7
	Bachelor or higher	66.5
Household income	Less than \$24,999	17.8
	\$25,000 to \$49,999	30.8
	\$50,000 to \$74,999	24.3
	\$75,000 to \$99,999	16.0
	\$100,000 or more	11.1

Table 2. Tobacco use status of current smokers (N=2552)

		Percent
Smoking frequency	Daily	85.5
	Not daily	14.5
Intention to quit smoking	Very much	39.5
	Somewhat	50.4
	Not at all	10.0
If concurrently use non-flavored cigarettes or cigars	Yes	36.0
	No	64.0
Using menthol cigarettes, menthol cigars, or non-menthol flavored cigars	Menthol cigarettes only	50.7
	Menthol cigars only	11.0
	Non-menthol flavored cigars only	8.7
	Cigars with both menthol and other flavors	2.5
	Menthol cigarettes and menthol cigars	7.4
	Menthol cigarettes & non-menthol flavored cigars	11.2
	All three flavored products	8.5
If concurrently use e-cigarettes	No use	57.7
	Only tobacco flavor or non-flavored e-cigarettes	6.2
	Menthol flavor	17.2
	Any flavors except menthol	7.8
	Menthol and other flavors	11.1

Flavored smokers' reactions

		Ban scenario	Reaction to a ban: the unit is percent with standard deviation in parenthesis			
			Quit all tobacco/nicotine use	² Use e-cigarettes	³ Use other products	Switch to non-flavored cigarettes or cigars
Smokers of either menthol cigarettes or flavored cigars (N=2552)	Concurrently use e-cigarettes (N=1080)	C	13.1 (1.0)	48.3 (1.5)	5.8 (0.7)	32.7 (1.4)
		E1C	14.7 (1.1)	44.8 (1.5)	6.8 (0.8)	33.7 (1.4)
		E2C	19.6 (1.2)	28.1 (1.4)	10.9 (0.9)	41.3 (1.5)
	Do not use e-cigarettes (N=1472)	C	12.6 (0.9)	38.8 (1.3)	2.2 (0.4)	46.3 (1.3)
		E1C	17.2 (1.0)	33.3 (1.2)	2.9 (0.4)	46.6 (1.3)
		E2C	20.5 (1.1)	20.8 (1.1)	7.1 (0.7)	51.6 (1.3)



Multinomial logistic regression of current flavored smokers (N=2552)

- Reference: switching to e-cigarettes and other tobacco products
- Adjustment of demographics and tobacco use-related variables.

		Odd ratios	
		Quit all tobacco and nicotine use	Switch to non-flavored smoking
Ban scenario	C (ref)	1	1
	E1C	1.45(1.21,1.74)**	1.12(0.99,1.27)
	E2C	2.58(2.16,3.09)**	1.74(1.54,1.98)*
Gender	Male (ref)	1	1
	Female	1.17(1.01,1.36)*	0.91(0.82,1.01)
Age group, in years	18-24 (ref)	1	1
	25-34	0.74(0.54,1.01)	0.8(0.62,1.03)
	35-64	0.65(0.48,0.89)**	0.87(0.67,1.12)
	65 and above	1.57(1.09,2.27)*	1.01(0.73,1.4)
Race/ethnicity	Non-Hispanic White (ref)	1	1
	Non-Hispanic Black	1.15(0.94,1.4)	0.75(0.64,0.87)**
	Non-Hispanic Asian	1.24(0.83,1.85)	1.04(0.78,1.39)
	Hispanic	0.59(0.46,0.74)**	0.96(0.84,1.09)
	Others	0.93(0.55,1.55)	1.01(0.68,1.5)
¹ Education attainment		0.51(0.46,0.57)**	0.73(0.67,0.8)**
² Household income		1.05(0.98,1.11)	0.91(0.87,0.95)**

Boldface indicates statistical significance, with * for p<0.05, and ** for p<0.01

Smoking frequency	Daily (ref)	1	1
	Not daily	3.57(2.97,4.28)**	0.89(0.75,1.05)
Intent to quit smoking	Very much (ref)	1	1
	Somewhat	0.66(0.56,0.77)**	0.99(0.88,1.10)
Concurrently use of non-flavored cigarette or cigar use	Not at all	0.87(0.68,1.11)	1.12(0.93,1.35)
	no (ref)	1	1
	Yes	0.88(0.73,1.05)	1.83(1.63,2.06)**
	Menthol cigarettes only (ref)	1	1
Menthol cigarettes, menthol cigars, and non-menthol flavored cigars use	Menthol cigars only	0.14(0.09,0.22)**	0.51(0.42,0.61)**
	Non-menthol flavored cigars only	0.82(0.66,1.04)	0.83(0.69,1)*
	Cigars with menthol and other flavors	0.21(0.11,0.39)**	0.34(0.24,0.48)**
	Menthol cigarettes and menthol cigars	0.18(0.12,0.26)**	0.79(0.67,0.93)**
	Menthol cigarettes & Non-menthol flavored cigars	0.98(0.74,1.28)	1.04(0.84,1.28)
	All three flavored products	0.36(0.24,0.54)**	0.8(0.65,0.98)*
	No use (ref)	1	1
Concurrently use of e-cigarette use	Tobacco flavor or non-flavored	0.53(0.36,0.77)**	0.73(0.59,0.89)**
	Menthol flavor	0.8(0.65,0.98)*	0.52(0.45,0.6)**
	Any flavors except menthol	1.32(1.03,1.69)*	0.53(0.43,0.65)**
	Menthol and other flavors	0.63(0.48,0.82)**	0.39(0.32,0.47)**

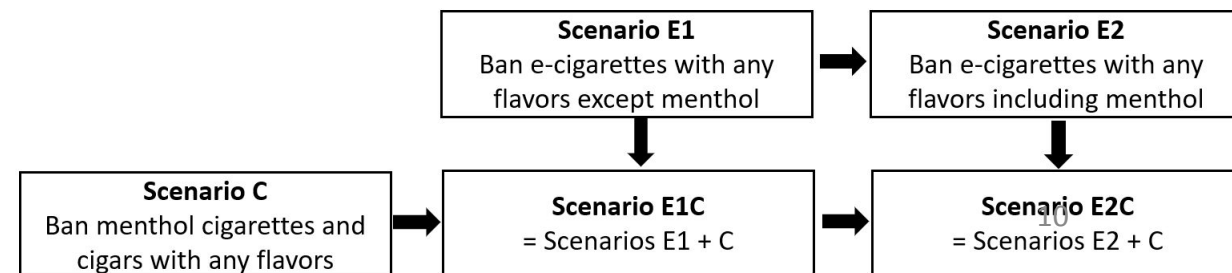
Characteristics of users of flavored e-cigarettes

		Menthol and other flavors (n=418)	Any flavors except menthol (n=861)	Menthol but not other flavors (n=1068)
Gender	Male	59.3	55.9	58.2
	Female	40.7	44.1	41.8
Age	18-34 years	46.2	51.0	53.3
	35-59 years	49.5	45.3	43.5
	60 years or older	4.3	3.7	3.2
Race /ethnicity	White, not Hispanic	72.3	64.0	68.7
	Black, not Hispanic	9.3	8.0	8.3
	Asian, not Hispanic	3.8	3.4	2.3
	Hispanic	11.7	22.2	18.9
	Other/mixed race	2.9	2.4	1.8
Educational attainment	High school or less	5.5	7.9	2.4
	Above high school and below bachelor	18.7	22.7	9.2
	Bachelor or higher	75.8	69.5	88.4
Household income	Less than \$24,999	10.5	12.1	9.0
	\$25,000 to \$49,999	28.0	28.6	32.2
	\$50,000 to \$74,999	27.0	32.4	28.6
	\$75,000 to \$99,999	19.6	15.1	17.6
	\$100,000 or more	14.8	11.9	12.6
Intention to quit e-cigarettes	Very much	15.8	13.9	7.2
	Somewhat	53.8	51.0	58.4
	Not at all	30.4	35.1	34.4
History of using e-cigarettes	Less than one year	13.4	14.3	8.5
	1-5 years	62.2	65.0	70.6
	More than 5 years	24.4	20.7	20.9
Major e-cigarette device used	Disposable	36.6	41.2	31.8
	Tanks, or vape pens	27.8	28.2	31.2
	Mods	22.0	18.6	26.7
	Rechargeable	13.6	12.0	10.3
Used e-cigarettes daily		89.2	87.0	88.3
Used tobacco or non-flavored e-cigarette		33.5	8.3	15.7
Obtained e-cigarettes from Internet		35.2	27.9	17.0
Obtained e-cigarettes from friends		54.8	43.0	56.3
Former cigarette smoker		72.0	81.1	84.8

Note: The chi-square test showed that the above three flavor groups were significantly different across most variables except gender, age group, and e-cigarette use frequency.

Reactions of the users of flavored e-cigarettes

	Ban scenario	Response to each ban scenario (%)			
		Quitting all use	Using E-cigarettes	Using cigarettes or cigars	Using others products
Used menthol and other flavors (n=418)	E1	9.3	78.2	9.8	2.7
	E2	17.2	45.9	21.3	15.6
	E1C	11.7	70.1	12.7	5.5
	E2C	19.4	43.8	22.3	14.6
Used flavors except for menthol (n=861)	E1	12.1	72.6	8.4	7
	E2	16.8	49.0	19.2	15
	E1C	17.2	62.3	11.7	8.9
	E2C	20.2	47.9	18.4	13.6
Used menthol but not other flavors (n=1,068)	E2	8.4	36.9	38.9	15.9
	E2C	8.7	35.8	33.6	21.9



Multinomial logistic regression of users of flavored e-cigarettes (N=2347)

- Reference: using non-flavored or tobacco flavored e-cigarettes
- Adjustment of demographics and tobacco use-related variables.
- Separate models for each of the three flavor groups.

	Ban scenario	Quitting all tobacco use	Switching to any alternative products
Used menthol and other flavors (n=418)	E1 (ref)	1	1
	E2	3.52(2.22,5.57)**	5.49(3.84,8.13)**
	E1C	1.45(0.90,2.34)	1.67(1.12,2.48)*
	E2C	4.27(2.71,6.73)**	5.87(4.03,8.55)**
Used flavors except menthol (n=861)	E1 (ref)	1	1
	E2	2.37(1.74,3.24)**	3.52(2.75,4.50)**
	E1C	1.86(1.37,2.52)**	1.61(1.24,2.08)**
	E2C	3.08(2.27,4.18)**	3.38(2.64,4.33)**
Used menthol but not other flavors (n=1068)	E2 (ref)	1	1
	E2C	1.07(0.76,1.51)	1.05(0.87,1.28)

Multinomial logistic regression of users of flavored e-cigarettes (N=2347)

- Reference: using non-flavored or tobacco flavored e-cigarettes
- Adjustment of demographics and tobacco use-related variables.
- One model for all users of flavored e-cigarettes because the results of separate models indicated the associations with demographic and tobacco use variables were roughly similar among the three flavor groups

		Quitting all tobacco use	Switching to other products
Gender	Male (ref)	1	1
	Female	1.17(1,1.36)*	0.97(0.86,1.08)
Age	18-34 years(ref)	1	1
	34-59 years	0.78(0.6,1.01)	1.01(0.79,1.3)
	60 years or older	0.82(0.63,1.08)	1.04(0.81,1.34)
Race/ethnicity	White, not Hispanic (ref)	1	1
	Black, not Hispanic	0.79(0.6,1.03)	0.98(0.79,1.2)
	Asian, not Hispanic	1.39(0.95,2.02)	0.81(0.57,1.15)
	Hispanic	0.5(0.39,0.65)**	0.81(0.7,0.94)**
	Others	1.65(1.06,2.57)*	1.68(1.15,2.46)**
Educational attainment	High school or less (ref)	1	1
	Above high school and below bachelor	1.47(1.08,1.99)*	1.43(1.06,1.92)*
	Bachelor or higher	0.67(0.5,0.91)**	1.88(1.43,2.49)**
Household income	Less than \$24,999 (ref)	1	1
	\$25,000 to \$49,999	0.99(0.77,1.29)	1(0.81,1.23)
	\$50,000 to \$74,999	0.74(0.56,0.97)*	0.86(0.7,1.07)
	\$75,000 to \$99,999	1.13(0.85,1.5)	0.71(0.57,0.9)**
	\$100,000 or more	1.25(0.93,1.67)	0.83(0.65,1.06)

		1	1
Intent to quit e-cigarettes	Not at all (ref)	1	1
	Somewhat	2(1.59,2.52)**	2.06(1.7,2.5)**
	Very much	1.74(1.35,2.25)**	1.22(0.99,1.5)
History of using e-cigarettes	Less than one year (ref)	1	1
	Between one and five	0.97(0.77,1.23)	0.99(0.83,1.19)
	More than five years	0.91(0.68,1.21)	1.17(0.95,1.44)
If used e-cigarettes daily		0.38(0.31,0.47)**	0.76(0.62,0.91)**
If concurrently used tobacco or non-flavored e-cigarette		0.38(0.28,0.51)**	1.07(0.92,1.25)
If obtained e-cigarettes from the Internet		0.5(0.41,0.61)**	0.63(0.55,0.72)**
If obtained e-cigarettes from friends		0.64(0.55,0.76)**	0.84(0.74,0.94)**
If former smokers		0.59(0.5,0.71)**	1.98(1.68,2.34)**
Used e-cigarette device	Disposable (ref)	1	1
	Tanks, or vape pens	0.86(0.71,1.05)	1.6(1.39,1.84)**
	Mods	0.93(0.75,1.15)	2.01(1.73,2.35)**
	Rechargeable	0.93(0.73,1.18)	1.37(1.13,1.67)**
Flavors used	Both menthol and other	1	1
	Any flavors except	1.03(0.85,1.25)	1.01(0.86,1.17)
	Menthol but not other	0.68(0.53,0.87)**	1.72(1.45,2.04)**

boldface indicates statistical significance, with * for p<0.05, and ** for p<0.01

Summary-1

- When menthol cigarettes and flavored cigars were banned, fewer than half of current flavored smokers would switch to non-flavored smoking and all others may either quit or switch to e-cigarettes or other products.
- If menthol e-cigarette is banned together menthol cigarettes and flavored cigars, more smokers would quit, but more would use non-flavored cigarettes or cigars.
- A ban of flavored e-cigarettes may lead some users switch to smoking or other products, particularly among those who used menthol flavors only (if menthol flavor was banned).

Summary-2

- “Heavy” users (e.g., daily use and no intention to quit) would be less likely to quit.
- Compared with menthol cigarettes smokers, those who smoke menthol cigars, may be less likely to quit all tobacco use, but they also would be less likely to switch to non-flavored smoking.
- Flavored cigarette or cigar smokers who also used non-flavored versions would be more likely to switch to non-flavored combustible products.
- Compared with smokers who do not use e-cigarettes, dual cigarette/e-cigarette users, regardless of whether they use flavored products or not, may be more likely to switch to using e-cigarettes exclusively rather than quitting or switching to non-flavored combustible products.
- Banning menthol cigarettes and flavored cigars may have additional value for respondents who used e-cigarettes with menthol flavor only, because menthol cigarettes and flavored cigars are attractive alternatives for this group.
- Users of disposable e-cigarettes would be less likely to switch to other products than those used tanks, vape pens, mods, or rechargeable e-cigarettes
- Demographics

Limitations

- Although recruited nationally, our samples were not representative of US users.
- Participants' stated reactions to hypothetical ban scenarios were unlikely to be entirely consistent with what may occur in reality.
- Reactions were sensitive to how the related questions were asked.
- Banned products may be obtained readily through illegal sales.
- Not include nicotine replacement therapy (NRT) as an alternative.
- May be biased by the COVID-19 pandemic.

Discussions

- For both flavored smokers under a ban of menthol cigarettes and flavored cigars, and users of flavored e-cigarettes under a ban of flavored e-cigarettes, adding a ban on menthol e-cigarettes, would lead to more users to quit but also more users switch to non-flavored smoking.
- To examine the tradeoff between the harm reduction (i.e., from quitting all use) and harm increases (i.e., those who used e-cigarettes switch to cigarettes or cigars), we need an understanding of the relative harm between various tobacco and nicotine products, especially between cigarettes and e-cigarettes.