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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-059821
Article Type:	Original research
Date Submitted by the Author:	02-Dec-2021
Complete List of Authors:	Dearfield, Craig; The George Washington University Milken Institute of Public Health, Epidemiology Horn, Kimberly; Fralin Biomedical Research Institute at VTC Crandell, Ian; Virginia Tech-Center for Biostatistics and Health Data Sciences Bernat, D; The George Washington University Milken Institute of Public Health, Epidemiology
Keywords:	EPIDEMIOLOGY, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH

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BEHAVIORAL INTENTIONS IN RESPONSE TO A POTENTIAL MENTHOL BAN: EXAMINING SMOKERS IN PUBLIC HOUSING

Craig T. Dearfield, Ph.D.,[1] Kimberly Horn, Ed.D.,[2] Ian Crandell, Ph.D.,[3] and Debra H. Bernat, Ph.D.[1]

1. The George Washington University Milken Institute School of Public Health, Department of Epidemiology, 950 New Hampshire Ave, NW, Fifth floor, Washington, DC 20052, USA
2. Virginia Tech-Carilion Fralin Biomedical Research Institute, Blacksburg, VA, USA
3. Virginia Tech-Center for Biostatistics and Health Data Sciences, Roanoke, VA, USA

Address Correspondence To: Craig T. Dearfield, Ph.D.

Department of Epidemiology

The Milken Institute School of Public Health, The George Washington University

950 New Hampshire Ave., 5th Floor, Washington DC, 20052, USA

Phone: 202-994-0436

Email: cdearfield@gwu.edu

Word count: 2,783

ABSTRACT

Objectives: Local, national, and international policies are being proposed to ban the sale of menthol-flavored tobacco products. With more bans being implemented, it is increasingly important to understand reactions to these bans across different socioeconomic statuses. This study examined public housing residents' behavioral intentions if menthol-flavored cigarettes were no longer sold.

Setting: 15 District of Columbia Housing Authority properties between March 2019 and March 2021.

Participants: 221 District of Columbia Housing Authority residents ages 18-80 who reported smoking menthol cigarettes (83.3% African American/Black).

Primary and Secondary Outcomes: Cigarette quitting and switching intentions due to a hypothetical menthol-flavored product sales ban.

Results: Nearly one-half (48.0%) of residents said they intended to quit smoking if menthol-flavored products were no longer sold, while 27.2% were unsure if they would quit, and 24.9% reported they would not quit. Older residents (OR=0.94 per year, 95% CI=0.91, 0.97), senior/disabled building versus family building residents (OR=0.50, 95% CI=0.25, 0.97), those who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.98), and daily smokers (OR=0.42, 95% CI=0.21, 0.84) had lower odds of reporting quit intentions associated with a menthol ban. Of those not intending to quit, 40.7% reported they would switch to non-menthol cigarettes, 20% to another non-menthol product, 13% to menthol e-cigarettes (13.0%), and 20% to another menthol product.

Conclusions: Nearly three-quarters of smokers in public housing indicated a possibility of quitting smoking with a menthol ban. Results suggest that bans that include all flavors in all tobacco products may be most effective.

Article Summary

- A menthol flavor sales ban would remove preferred tobacco products from the market and may provide an additional unique influence towards cessation for smokers who use those products, especially African American menthol-flavored product users.

Strengths and Limitations:

- The study fills an important literature gap by providing a current examination of the potential consequences of a menthol-flavored product ban in a vulnerable population with high rates of menthol-flavored tobacco use.
- These data represent residents from one housing authority and may not generalize to other public housing authorities and other countries.
- Another limitation is the inability to assess the unique effects of menthol-flavored products on successful quitting because residents were reacting to a hypothetical ban.

INTRODUCTION

Menthol flavor in cigarettes contributes to decreased cessation efficacy and ongoing tobacco-related health disparities.[1-3] Currently, menthol is the last allowable characterizing flavor in cigarettes in the United States,[1] and menthol-flavored cigarette consumption was stable across the country between 2000 and 2018 when overall cigarette consumption declined.[4] Public housing residents have been shown to have higher smoking rates compared with the general population (33.6% versus 14%).[5, 6] Residents also represent the groups most likely to use menthol-flavored tobacco products, individuals of lower socioeconomic status (SES) and a high proportion of African Americans.[1, 2, 7] The prevalence of menthol-flavored cigarette use among those in families earning less than $35,000 (7.0%) is over double those in families earning more than $75,000 a year (2.3%),[8] and approximately 85% of all African American smokers use menthol-flavored cigarettes, compared with approximately 30% of White smokers.[9]

To improve quit rates and address these health disparities, local, state, national, and international policies are being proposed to ban the sale of menthol-flavored tobacco products. On April 29, 2021, the U.S. Food and Drug Administration (FDA) declared their intent to pursue tobacco product standards to ban menthol-flavored cigarettes.[1] The European Union banned menthol-flavored tobacco as part of a larger ban on flavorings in those products in 2020.[10, 11] Additionally, prior to a 2016 World Health Organization report, Brazil, 5 Canadian provinces (Alberta, Ontario, Quebec, New Brunswick and Nova Scotia), Ethiopia, Chile, and Turkey proposed or instituted menthol-specific or comprehensive flavor sales ban for tobacco products.[11] With bans going into effect across the world, often in tandem with smoke-free and

clean air rules in public and private spaces, it is increasingly important to understand how people respond to these bans, particularly those of lower socioeconomic status.

A ban on menthol-flavored tobacco products has a particular bearing on individuals living in the Department of Housing and Urban Development (HUD) housing, due to resident characteristics and the fact they live in settings where HUD prohibits using lit-tobacco products inside and within 25 feet of housing authority buildings. A menthol flavor sales ban may provide an additional unique influence towards cessation for smokers who use those products. These bans would remove preferred tobacco products from the market for menthol-flavored smokers who are less likely to successfully quit, especially African American menthol-flavored product users.[3, 12-15]

Evidence from the United States and Canada examining the impact of these bans on smokers indicates they promote cessation where implemented.[16] Following the implementation of a ban, menthol-flavored cigarette users are more likely to attempt to quit compared with nonmenthol-flavored cigarette users.[16-18] Evidence related to behavioral intentions in response to a hypothetical menthol-flavored product ban indicates many smokers intend to quit once it goes into effect. In a recent review of studies examining behavioral intentions if menthol-flavored products were no longer sold, between 24% and 64% of smokers indicated they would attempt to quit, with most studies estimating between 40 and 50% of US adults would intend to quit.[16] There are several important variations within these estimates. Notably, a higher proportion of African American menthol smokers indicate they would quit as a result of a hypothetical ban as their white menthol smoker peers (76.0% versus 30.3%).[19] Additionally, those who smoked less frequently, had greater current quit intentions, and had

made a quit attempt in the prior year were more likely to say they would quit if a menthol ban went into effect.[19, 20]

Another study examined the expected impact of a forthcoming ban in the European Union (EU). This study examining eight European countries found similar levels of expected behavior changes among menthol-flavored smokers, where 27.3% would find a way to get menthol-flavored products despite the ban, 17.6% would reduce the amount they smoked, and 16% would quit.[21] Of those who anticipated continuing to smoke, 20% said they would switch to another brand.

Evidence suggests that banning the sale of menthol-flavored products may increase intentions to quit and improve cessation outcomes among users of those products in the general population, but the behavioral intentions of residents of public housing in response to a potential menthol-flavored product ban are unexamined. The present study examined public housing residents' (1) intention to quit if menthol-flavored cigarettes were no longer sold in stores, and (2) expected alternative tobacco products of choice among those who did not intend to quit. The study fills an important literature gap by providing a current examination of the potential consequences of a menthol-flavored product ban in a vulnerable population with high rates of menthol-flavored tobacco use.

METHODS

Study Sample

Data were collected from residents of the Washington, DC Housing Authority (DCHA) between March 2019 and March 2021. Inclusion criteria required participants to be a DCHA property resident (not using Section 8 vouchers) between the ages of 18 and 80. Residents represented 15 DCHA properties, 8 family and 7 senior/disabled buildings. The present study

included residents who reported past 30-day use of menthol-flavored cigarettes and were not missing data for questions asking about behavioral intentions if menthol-flavored products were no longer sold (n=221).

Procedures

Data collection took place in community spaces on DCHA property. Study staff and DCHA administrators held survey participation events. DCHA and building staff advertised and told residents about the events. Residents who were interested in participating completed a screening assessment to establish eligibility and smoking status within the past 30 days. All eligible participants completed a consent form, which research staff read aloud to potential participants. Participants completed surveys using audio computer-assisted self-interviewing software (QDS), where all questions and answer options were read aloud to participants. Patients and the public were not involved in the design, conduct, reporting, or dissemination plans of the research. All study procedures were approved by The George Washington University Institutional Review Board.

Measures

Demographics. Respondents indicated their gender (male/female), age (in years, open numerical response), and race/ethnicity. Residents reported if they were Hispanic (yes/no), and selected as many racial categories as were applicable from the following: American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, and Other. The study applied DCHA classifications for building type (e.g., family or senior/disabled).

Cigarette and other tobacco use. Residents reported past 30-day use of cigarettes, cigars, little cigars and cigarillos, smokeless tobacco, hookah, and e-cigarettes. Cigarette smokers

indicated whether they usually used a menthol-flavored flavored product (yes/no), days used in the past 30 days (0-30), and the number of quit attempts in the past 3 months (open numerical response). Daily smoking was defined as smoking all days in the past 30 days.

Nicotine Dependency. The primary measure of nicotine dependency was smoking within 30 minutes of waking.[22, 23] Residents indicated if they typically first smoked within 5 minutes, between 5 to 30 minutes, between 31 to 60 minutes, or after 60 minutes of waking. This variable was dichotomized for analysis purposes (smoke within 30 minutes of waking and smoke 31+ minutes after waking).[22, 23]

Quitting and Switching Behavioral Intentions. Respondents reported whether they were thinking of quitting smoking cigarettes for good (yes/no). Those who said they were thinking of quitting indicated how sure they were that they could quit if they tried using a 4-point scale (very sure to not at all sure). Analysis used a dichotomized version of this variable (very sure/sure and not sure/not at all sure). Participants indicated if they would consider quitting if menthol-flavored cigarettes were no longer sold in stores (yes/no/not sure). A dichotomous variable was created for analysis purposes (yes and no/not sure). Residents who indicated they would not quit reported what they would do if menthol-flavored products were no longer sold. Response options included switching to non-menthol-flavored cigarettes, switching to some other non-menthol-flavored tobacco product, switching to menthol-flavored e-cigarettes, switching to some other menthol-flavored tobacco product, buying menthol-flavored cigarettes online, something else, or none of these. Participants could select multiple options.

Analysis

Descriptive statistics were used to assess intention to quit if menthol-flavored products were no longer sold and the alternative products of choice among those who said they would not

quit. Logistic regression modeling, clustered by data collection site, was used to assess characteristics associated with quit intentions if menthol-flavored products were no longer sold. The model included age, gender, senior/disabled or family building residence status, using a tobacco product besides cigarettes, smoking within 30 minutes of waking, daily smoking status, whether they were sure they could quit, and having made a quit attempt in the past 3 months to predict whether residents would quit if menthol-flavored products were no longer sold in stores. Because there was a substantial amount of missing data for race and ethnicity variables and most of the residents (83.3%, N=90/108) identified as Black or African American, it was not included in further analysis. Results from a test for multicollinearity between age and senior/disabled building resident status indicated they were significantly correlated ($r=0.22$, $p<0.01$), but not highly correlated. Both variables were included in the model due to the low risk for multicollinearity. The regression model included 177 cases with full data for all the included variables. All analyses were conducted using SAS software, version 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Descriptive Statistics

The sample included slightly more females and residents of Senior and Disabled buildings (Table 1). The mean age of participating residents was 57. Most residents reported thinking about quitting (regardless of the ban; 83.6%, N=184) and over one-half thought they could quit if they tried (very sure and sure; 54.7%, N=100). Additionally, most residents made at least one recent quit attempt during the last 3 months (60.2%, N=109). Close to one-half of residents were daily smokers (47.7%, N=105) and nearly two-thirds reported smoking within 30

minutes of waking (63.5%, N=150). Under 20% of respondents said they used another tobacco product (17.2%, N=38).

Table 1. Demographics, Tobacco Use Characteristics	
	% (N) or mean (SD)
Demographics	
Gender	
Female	60.6% (134)
Male	39.4% (87)
Age (Mean years, continuous)	57.2 (11.0)
Building Type	
Family	40.7% (90)
Senior or Disabled	59.3% (131)
Tobacco Use Characteristics	
Use Another Tobacco Product	
Yes	17.2% (38)
No	82.8% (183)
Smoke within 30 Minutes of Waking	
Yes	63.5% (139)
No	36.5% (80)
Daily smoker	
Yes	47.7% (105)
No	52.3% (115)
Thinking About Quitting	
Yes	83.6% (184)
No	16.4% (36)
How Sure You Could Quit Cigarettes?	
Very sure	23.5% (43)
Sure	31.2% (57)
Not sure	36.1% (66)
Not at all sure	9.3% (17)
How much support have you received to quit tobacco	
A lot of support	14.6% (26)
Some support	19.1% (34)
A little support	18.5% (33)
No support	47.8% (85)
Made at least 1 quit attempt	
Yes	60.2% (109)
No	39.8% (72)
Would quit if menthol-flavored cigarettes were no longer sold	
Yes	48.0% (106)
Not sure	27.2% (60)
No	24.9% (55)
Changes if Menthol-flavored Products are Banned[1] (n=54)	
Switch to non-menthol-flavored cigarettes	40.7% (22)
Switch to some other non-menthol-flavored product	20.4% (11)
Switch to menthol-flavored e-cigarette	13.0% (7)
Switch to other menthol-flavored product	20.4% (11)
Buy menthol-flavored cigarettes online	13.0% (7)
Something else	9.3% (5)
None of these	14.8% (8)
Note: [1]Participants were able to mark multiple options	

Overall, 48.0% (N=106) of residents said they would quit if menthol-flavored products were no longer sold, 27.2% (N=60) indicated they were not sure if they would quit, and 24.9% (N=55) indicated they would not quit. Of those who would continue smoking and answered questions about preferred alternatives (N=54), 40.7% (N=22) indicated they would switch to non-menthol-flavored cigarettes,20.4% (N=11) indicated switching to another non-menthol-flavored product, 20.4% (N=11) said they would use another menthol-flavored product, 13.0% (N=7) would switch to menthol-flavored flavored e-cigarettes, and 13.0% (N=7) would buy menthol-flavored cigarettes online. An additional 9.3% (N=5) indicated they would do something else and 14.6% (N=8) saying they would not do any of these options. Only one respondent specified the other action they would take as "chew gum" without making clear they would quit using tobacco.

Regression Results

Regression results indicated that increases in age (OR=0.94, 95% CI=0.91, 0.97) and living in a senior/disabled building (OR=0.50, 95% CI=0.25, 0.97) were associated with decreased odds that the resident would quit cigarettes if menthol-flavored flavored products were no longer available (Table 2). Residents who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.84) and daily smokers (OR=0.42, 95% CI=0.21, 0.84) were less likely to say they would quit without menthol-flavored products.

Table 2. Association Between Intentions to Quit if Menthol Were Not Available and Demographics and Tobacco Use

	Logistic Regression Model	
	OR	**95% CI**
Demographics		
Gender		
Female	1.33	0.42, 4.18
Male	ref	
Age (Mean years, continuous)	0.94**	0.91, 0.97
Building Type		

Senior or Disabled	0.50*	0.25, 0.97
Family	ref	
Tobacco Use		
Use Another Tobacco Product		
Yes	0.41	0.12, 1.35
No	ref	
Smoke within 30 Minutes of Waking		
Yes	0.48*	0.23, 0.98
No	ref	
Daily Smoker		
Yes	0.42*	0.21, 0.84
No	ref	
How Sure You Could Quit Cigarettes?		
Very Sure/Sure	1.76	0.87, 3.58
Not Sure/Not at all sure	ref	
Made at least 1 quit attempt (3 months)		
Yes	1.17	0.41, 3.32
No	ref	
** p<0.01, * p<0.05		

DISCUSSION

The primary aim of this study was to examine whether public housing residents would quit if menthol-flavored cigarettes were no longer sold, what factors were associated with intentions to quit if menthol-flavored tobacco products were no longer available, and other alternative products of choice if menthol-flavored cigarettes were no longer sold for those who did not intend to quit. Nearly three-quarters of menthol-flavored cigarette smokers indicated consideration of quitting cigarettes if menthol-flavored products were no longer sold, including those who said "Yes" or "Not sure." About 1 in 4 said they would continue smoking. Results indicate behavioral intentions for a potential menthol-flavored ban may be similar for vulnerable groups and the general population. In prior evidence assessing responses to a hypothetical menthol ban, findings showed 25–64% of smokers intended to attempt to quit smoking and 11–46% of smokers considered switching to other tobacco products, including 15– 30% to e-cigarettes.[16, 21] The current estimate of 48% of these public housing residents indicating they would attempt to quit with a ban in place aligns with the estimates from a range of populations

identified in studies in the review. This indicates findings from this vulnerable population with high rates of menthol-flavored tobacco use is similar to the general population. Additionally, residents reporting intentions to switch to another tobacco product align with the estimates from this review. Slightly fewer residents than the general population indicated they may switch to e-cigarettes. This is potentially due to e-cigarette use being less common in those of higher average age and lower SES, and primarily of African Americans, which were demographic groups represented in this sample.[24-26]

Results suggest smoking behavior has a high degree of influence on reactions to a menthol-flavor sales ban in a similar way to previous findings.[19, 20] Smoking within 30 minutes of waking and being a daily smoker significantly reduced the odds of residents' expressing an intention to quit if menthol-flavored products ceased to be sold. Older residents had lower odds of reporting intentions to quit, which aligns with evidence that older adults are less likely to want to quit than younger adults.[2] These findings may be due to older residents exhibiting more nicotine dependency characteristics and smoking more frequently as they may have smoked for longer.

A menthol-flavored ban may provide additional influence on this population of uniquely at-risk predominantly African Americans residents, given that they already live in HUD-mandated smoke-free housing. Evidence from a 40-year simulation of smoking projecting the influence of a menthol-flavored ban shows that between 323,000 and 633,000 deaths could be avoided, with the hypothetical ban potentially avoiding an estimated 237,000 deaths in African Americans.[27] The combination of these two policies (smoke-free housing and menthol-flavor ban) may exert a robust influence on a significant proportion of residents' smoking cessation intentions. However, it is important to underscore that 1 in 4 would continue smoking. Many of

these residents indicated they would switch to an unflavored product, which may increase their intent to quit and improve their cessation outcomes.[3, 16] Still, others plan to continue to use other menthol-flavored products. Prohibiting the sale of all characterizing flavors, as the proposed FDA nationwide menthol ban would,[1] should be considered to promote cessation among all resident tobacco users.

In the presence of a comprehensive menthol-flavored tobacco product sales ban, policies and programs will need to address the unique needs of those who report more dependency symptoms and are older, groups that are consistently less likely to say they will quit.[2] Further, menthol smokers, and especially African American menthol smokers, are more likely to attempt to quit, but less likely to sustain cessation.[12] African Americans who use menthol-flavored products are more likely to report an attempt to quit when asked about their reactions to a hypothetical sales ban.[16] To reach a population of African American public housing residents who use menthol-flavored cigarettes, interventions need to be tailored and consistently available to help them act on their intentions to quit and improve cessation outcomes.[28-31] Implementing cessation supports along with a menthol-flavored tobacco sales ban would help this group that is disproportionally impacted by menthol-flavored tobacco products and may be disproportionally affected by a sales ban.

Additionally, the evidence of long-term successful cessation following a menthol-flavored tobacco sales ban is insufficient. One study examining smokers one year after a menthol-flavored product ban found no significant difference in sustained cessation between menthol-flavored and nonmenthol-flavored product users for those who quit after the ban, but previously daily menthol smokers had a higher odds of sustaining cessation than previously daily

unflavored smokers if they quit before the ban.[17] Additional research is needed to identify long-term cessation outcomes for those affected by these sales bans.

This study has two limitations. First, these data represent residents from the Washington, DC housing authority and may not generalize to other public housing authorities and other countries. A second limitation is the inability to assess the unique effects of menthol-flavored products on successful quitting because residents were reacting to a hypothetical ban.

Despite limitations, these findings add timely evidence describing the impact of a menthol-flavored-flavor ban on a vulnerable population with high rates of tobacco use in the United States. Results show how public housing residents may react to a ban, which provides evidence that a ban could reduce smoking prevalence and help address current tobacco-related health disparities worldwide. Current results indicate that specialized programs for older and more dependent low-income African Americans with equivalent thrust may improve outcomes for those affected by a menthol-flavored product ban.[28, 30] For the new FDA ban and other international policies to achieve outcomes of reducing avoidable deaths and tobacco-related health disparities in the United States and in other nations proposing or implementing menthol flavor bans, it is essential to provide accessible and effective, evidence-based support for translating quit intentions into successful cessation.

Acknowledgements: The authors would like to thank the participants who gave their time and knowledge of the subject.

Contributorship Statement: CTD: conceptualization, data curation, formal analysis, methodology, software, project administration, writing – original draft, writing – review and editing; KH: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing; IC: formal analysis, investigation, methodology, software; DHB: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing

Competing Interests: The authors have no competing interests to disclose.

Funding: This work was supported by the National Institutes of Health, National Cancer Institute (R01 CA226074P to DHB and KH), and pilot funding from the George Washington Cancer Center (GWCC; PI Bernat).

Data Sharing: The data underlying this article will be shared on reasonable request to the corresponding author.

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BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-059821.R1
Article Type:	Original research
Date Submitted by the Author:	02-May-2022
Complete List of Authors:	Dearfield, Craig; The George Washington University Milken Institute of Public Health, Epidemiology Horn, Kimberly; Fralin Biomedical Research Institute at VTC Crandell, Ian; Virginia Tech-Center for Biostatistics and Health Data Sciences Bernat, D; The George Washington University Milken Institute of Public Health, Epidemiology
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	Epidemiology, Public health
Keywords:	EPIDEMIOLOGY, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH

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BEHAVIORAL INTENTIONS IN RESPONSE TO A POTENTIAL MENTHOL CIGARETTE SALES BAN: EXAMINING SMOKERS IN PUBLIC HOUSING

Craig T. Dearfield, Ph.D.,[1] Kimberly Horn, Ed.D.,[2] Ian Crandell, Ph.D.,[3] and Debra H. Bernat, Ph.D.[1]

1. The George Washington University Milken Institute School of Public Health, Department of Epidemiology, 950 New Hampshire Ave, NW, Fifth floor, Washington, DC 20052, USA
2. Virginia Tech-Carilion Fralin Biomedical Research Institute, Blacksburg, VA, USA
3. Virginia Tech-Center for Biostatistics and Health Data Sciences, Roanoke, VA, USA

Address Correspondence To: Craig T. Dearfield, Ph.D.

Department of Epidemiology

The Milken Institute School of Public Health, The George Washington University

950 New Hampshire Ave., 5th Floor, Washington DC, 20052, USA

Phone: 202-994-0436

Email: cdearfield@gwu.edu

Word count: 3,030

ABSTRACT

Objectives: Local, national, and international policies are being proposed to ban the sale of menthol-flavored tobacco products. With more bans being implemented, it is increasingly important to understand reactions to these bans across different socioeconomic statuses. This study examined public housing residents' behavioral intentions if menthol-flavored cigarettes were no longer sold.

Setting: 15 District of Columbia Housing Authority properties between March 2019 and March 2021.

Participants: 221 District of Columbia Housing Authority residents ages 18-80 who reported smoking menthol cigarettes (83.3% African American/Black).

Primary and Secondary Outcomes: Cigarette quitting and switching intentions due to a hypothetical menthol-flavored cigarette sales ban.

Results: Nearly one-half (48.0%) of residents said they intended to quit cigarette use if menthol-flavored products were no longer sold, while 27.2% were unsure if they would quit, and 24.9% reported they would not quit. Older residents (OR=0.94 per year, 95% CI=0.91, 0.97), senior/disabled building versus family building residents (OR=0.50, 95% CI=0.25, 0.97), those who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.98), and daily smokers (OR=0.42, 95% CI=0.21, 0.84) had lower odds of reporting quit intentions associated with a menthol ban. Of those not intending to quit, 40.7% reported they would switch to non-menthol cigarettes, 20% to another non-menthol product, 13% to menthol e-cigarettes (13.0%), and 20% to another menthol product.

Conclusions: Results suggest banning the sale of menthol-flavored products has the potential to impact cigarette smoking cessation. Nearly three-quarters of smokers in public housing indicated

a possibility of quitting smoking because of a menthol cigarette ban. Bans that include all flavors in all tobacco products may be most effective for facilitating overall tobacco cessation.

Article Summary

- A menthol flavor cigarette sales ban may provide an additional unique influence towards cessation for smokers who use those products, especially African American menthol-flavored cigarette users in public housing.

Strengths and Limitations:

- The study fills an important literature gap by providing a current examination of the potential consequences of a menthol-flavored cigarette ban in a population with high rates of menthol-flavored tobacco use.
- Study data represent residents from one public housing authority and may not generalize to other US public housing authorities and other countries.

INTRODUCTION

Menthol flavor in cigarettes contributes to ongoing tobacco-related health disparities.[1-3] Menthol flavoring contributes to smoking initiation among youth, increasing the harm of smoke particulates, increasing nicotine dependency symptoms, and making it harder to quit smoking.[2, 4, 5] Menthol is the last allowable flavor in cigarettes in the United States.[1] It is notable that menthol-flavored cigarette consumption based on market share data remained stable across the country between 2000 and 2018 when overall cigarette consumption declined.[6]

To improve quit rates and address tobacco-related health disparities, policies are being proposed to ban the sale of menthol-flavored tobacco products. Following bans in other countries,[7] on April 29, 2021, the U.S. Food and Drug Administration (FDA) declared their intent to pursue tobacco product standards to ban menthol-flavored cigarettes.[1] With bans going into effect across the world, it is increasingly important to understand how people respond to these bans, particularly those of lower socioeconomic status.

Evidence from the United States examining the effect of menthol sales bans on smokers indicates they promote cessation where implemented.[8] Evidence related to behavioral intentions in response to a hypothetical menthol-flavored product ban indicates some smokers intend to quit once it goes into effect. In a recent review of studies examining behavioral intentions if menthol-flavored products were no longer sold, between 24% and 64% of smokers indicate they would attempt to quit, with most studies of smokers in the US estimating between 40 and 50% of adults smokers intend to quit.[8] One study found that a higher proportion of African American menthol smokers report they would quit as a result of a hypothetical ban compared to white menthol smokers (76.0% versus 30.3%).[9] Additionally, those who smoke

less frequently, report greater current quit intentions, and report making a quit attempt in the prior year are more likely to say they would quit if a menthol ban went into effect.[9, 10]

A ban on menthol-flavored cigarettes may have a particular bearing on individuals living in the Department of Housing and Urban Development (HUD) housing. Public housing residents have been found to have higher smoking rates compared with the general population. The most recent examination of a nationally representative sample of public housing residents in 2017 showed that 33.6% of residents used tobacco[11] compared with 14% of the general population at that time.[12] More recent studies of public housing residents in 2019 as part of smoke-free rule evaluations estimate between 9.5% and 29.0% of residents smoke[13-15] compared with an estimated 20.8% of adults using any tobacco product and 16.7% of adults using cigarettes in 2019.[16] The 2017 study of public housing residents also showed that over 80% of residents who smoke are reported to be daily smokers and approximately two-thirds smoke more than 10 cigarettes per day.[11]

Public housing residents represent groups most likely to use menthol-flavored tobacco products in the US, notably individuals of lower socioeconomic status (SES) and a high proportion of African Americans.[1, 17, 18] The prevalence of menthol-flavored cigarette use among those in families earning less than $35,000 (7.0%) is double those in families earning more than $75,000 a year (2.3%),[19] and approximately 85% of all African American smokers use menthol-flavored cigarettes, compared with approximately 30% of White smokers.[20] Further, African Americans are especially targeted by the tobacco industry to use menthol-flavored products. [2, 21] A study of one public housing authority found 93.1% of residents who smoke use menthol-flavored cigarettes.[22] Although this is not nationally representative of all

public housing residents, results suggest that residents are susceptible to using menthol-flavored cigarettes.

Evidence suggests that banning the sale of menthol-flavored products may increase intentions to quit and improve cessation outcomes among users in the general population; however, behavioral intentions of public housing residents in response to a potential menthol-flavored product ban are under studied. The present study examined public housing residents' (1) intention to quit if menthol-flavored cigarettes were no longer sold, and (2) expected alternative tobacco products of choice among if they did not intend to quit. The study fills an important literature gap by providing a current examination of the potential consequences of a menthol-flavored product ban in a population with high rates of menthol-flavored tobacco use.

METHODS

Study Sample

Data were collected from residents of the Washington, DC Housing Authority (DCHA) between March 2019 and March 2021. Inclusion criteria required participants to be a DCHA property resident (not using Section 8 vouchers) between the ages of 18 and 80. Residents represented 15 DCHA properties, 8 family and 7 senior/disabled buildings. In the overall study, 754 residents completed surveys. Non-smokers were not included in this analysis (n=296) and 237 smokers were not included because they responded to an earlier version of the survey that did not contain questions about a hypothetical menthol ban (n=152), did not usually use menthol cigarettes (n=16), or had missing data for one or more of the menthol cigarette use questions (n=68). One respondent who identified as "non-binary" was omitted from the analysis because confidentiality could not be maintained. Thus, the present sample included 221 residents who

reported past 30-day use of menthol-flavored cigarettes and were not missing data for questions asking about behavioral intentions if menthol-flavored products were no longer sold.

Procedures

Data collection took place in community spaces on DCHA property. Study staff and DCHA administrators held survey participation events. DCHA and building staff advertised and told residents about the events. Flyers for the study were placed in common areas in buildings notifying residents where and when data collection events would be held, and resident council presidents and DCHA staff told residents about data collection events during community meetings. During data collection events, residents frequently found out about the event from other residents (word-of-mouth).[22, 23] Interested residents completed a screening assessment to establish residence and age eligibility and past 30-day smoking status. Eligible participants completed a consent form, which research staff read aloud. Participants completed surveys using audio computer-assisted self-interviewing software (QDS), where all questions and answer options were spoken to participants. Participants had the option to skip any question and end the survey at any point. Patients and the public were not involved in the research design, conduct, reporting, or dissemination. Residents received a $25 gift card for their survey participation. Study procedures were approved by The George Washington University Institutional Review Board.

Measures

Demographics. Respondents indicated their gender (male/female), age (in years, open numerical response), and race/ethnicity. Residents reported if they were Hispanic (yes/no), and selected as many racial categories as were applicable from the following: American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander,

White, and Other. The study applied DCHA classifications for building type (e.g., family or senior/disabled).

Cigarette and other tobacco use. Residents reported past 30-day use of cigarettes, cigars, little cigars and cigarillos, smokeless tobacco, hookah, and e-cigarettes using questions derived from the National Adult Tobacco Survey (NATS).[24] Cigarette smokers indicated whether they usually used a menthol-flavored flavored product (yes/no), days used in the past 30 days (0-30), and the number of self-identified quit attempts in the past 3 months (open numerical response). Daily smoking was defined as cigarette smoking all days in the past 30 days.

Nicotine Dependency. The primary measure of nicotine dependency was smoking within 30 minutes of waking.[25, 26] Residents indicated if they typically first smoked within 5 minutes, between 5 to 30 minutes, between 31 to 60 minutes, or after 60 minutes of waking. This variable was dichotomized for analysis purposes (smoke within 30 minutes of waking and smoke 31+ minutes after waking).[25, 26]

Quitting and Switching Behavioral Intentions. Respondents reported whether they were currently thinking of quitting smoking cigarettes for good (yes/no) from the NATS.[24] Those who said they were thinking of quitting indicated how sure they were that they could quit if they tried using a 4-point scale (very sure to not at all sure). Analysis used a dichotomized version of this variable (very sure/sure and not sure/not at all sure). Participants indicated if they would consider quitting if menthol-flavored cigarettes were no longer sold in stores (yes/no/not sure). A dichotomous variable was created for analysis purposes (yes and no/not sure). Residents who indicated they would not quit reported what they would do if menthol-flavored products were no longer sold. Response options included switching to non-menthol-flavored cigarettes, switching to some other non-menthol-flavored tobacco product, switching to menthol-flavored e-cigarettes,

switching to some other menthol-flavored tobacco product, buying menthol-flavored cigarettes online, something else, or none of these. Participants could select multiple options.

Analysis

Descriptive statistics assessed intention to quit if menthol-flavored products were no longer sold and the alternative products of choice among those who said they would not quit. Logistic regression modeling, clustered by data collection site, assessed characteristics associated with quit intentions if menthol-flavored products were no longer sold. Logistic regression models used complete case analysis. Regression models clustered by data collection site accounted for intragroup correlations that could arise from similarities in residents at each housing site. The model included age, gender, senior/disabled or family building residence status, using a tobacco product besides cigarettes, smoking within 30 minutes of waking, daily smoking status, whether they were sure they could quit, and having made a quit attempt in the past 3 months to predict whether residents would quit if menthol-flavored products were no longer sold. Because most residents (83.3%, N=90/108 [113 missing]) identified as Black or African American, race and ethnicity was not included in further analysis. Results from a test for multicollinearity between age and senior/disabled building resident status indicated these two variables were significantly correlated ($r=0.22$, $p<0.01$), but not highly correlated. Both variables were included in the model due to the low risk for multicollinearity.[27] The regression model included 177 cases with full data for all selected variables. Analyses were conducted using SAS software, version 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Descriptive Statistics

The sample included slightly more females and residents of Senior and Disabled buildings (Table 1). The mean age of participating residents was 57. Most residents reported thinking about quitting (regardless of the ban; 83.2%, N=184) and a high proportion thought they could quit if they tried (very sure and sure; 45.3%, N=100). Additionally, about half of the residents made at least one recent quit attempt during the last 3 months (49.3%, N=109). Close to one-half of residents were daily smokers (47.7%, N=105) and nearly two-thirds reported smoking within 30 minutes of waking (62.9%, N=150). Under 20% of respondents said they used another tobacco product (17.2%, N=38).

Table 1. Demographics, Tobacco Use Characteristics

	% (N) or mean (SD)
Demographics	
Gender	
Female	60.6% (134)
Male	39.4% (87)
Age (Mean years, continuous)	57.2 (11.0)
Building Type	
Family	40.7% (90)
Senior or Disabled	59.3% (131)
Tobacco Use Characteristics	
Use Another Tobacco Product	
Yes	17.2% (38)
No	82.8% (183)
Smoke within 30 Minutes of Waking	
Yes	62.9% (139)
No	36.2% (80)
Missing	0.9% (2)
Daily smoker	
Yes	47.5% (105)
No	52.0% (115)
Missing	0.5% (1)
Thinking About Quitting	
Yes	83.2% (184)
No	16.3% (36)
Missing	0.5% (1)
How Sure You Could Quit Cigarettes?	
Very sure	19.5% (43)
Sure	25.8% (57)
Not sure	29.9% (66)
Not at all sure	7.7% (17)
Missing	17.2% (38)
How much support have you received to quit tobacco	
A lot of support	11.8% (26)
Some support	15.4% (34)

A little support	14.9% (33)
No support	38.5% (85)
Missing	19.5% (43)
Made at least 1 quit attempt	
Yes	49.3% (109)
No	32.6% (72)
Missing	18.1% (40)
Would quit if menthol-flavored cigarettes were no longer sold	
Yes	48.0% (106)
Not sure	27.2% (60)
No	24.9% (55)
Changes if Menthol-flavored Products are Banned[1] (n=54)	
Switch to non-menthol-flavored cigarettes	40.7% (22)
Switch to some other non-menthol-flavored product	20.4% (11)
Switch to menthol-flavored e-cigarette	13.0% (7)
Switch to other menthol-flavored product	20.4% (11)
Buy menthol-flavored cigarettes online	13.0% (7)
Something else	9.3% (5)
None of these	14.8% (8)

Note:
[1]Participants were able to mark multiple options

Overall, given a menthol ban, 48.0% (N=106) of residents said they would quit, 27.2% (N=60) indicated they were not sure if they would quit, and 24.9% (N=55) indicated they would not quit. Of those who would continue smoking and answered questions about preferred alternatives (N=54), 40.7% (N=22) indicated they would switch to non-menthol-flavored cigarettes, 20.4% (N=11) indicated switching to another non-menthol-flavored product, 20.4% (N=11) said they would use another menthol-flavored product, 13.0% (N=7) would switch to menthol-flavored flavored e-cigarettes, and 13.0% (N=7) would buy menthol-flavored cigarettes online. An additional 9.3% (N=5) indicated they would do something else and 14.6% (N=8) saying they would not do any of these options. Only one respondent specified the other action they would take as "chew gum" without making clear they would quit using tobacco.

Regression Results

Regression results indicated that increases in age (OR=0.94, 95% CI=0.91, 0.97) and living in a senior/disabled building (OR=0.50, 95% CI=0.25, 0.97) were associated with decreased odds that residents would quit cigarettes if menthol-flavored flavored products were

no longer available (Table 2). Residents who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.84) and daily smokers (OR=0.42, 95% CI=0.21, 0.84) were less likely to say they would quit without menthol-flavored products.

Table 2. Association Between Intentions to Quit if Menthol Were Not Available and Demographics and Tobacco Use

	Logistic Regression Model	
	OR	**95% CI**
Demographics		
Gender		
Female	1.33	0.42, 4.18
Male	ref	
Age (per year, continuous)	0.94**	0.91, 0.97
Building Type		
Senior or Disabled	0.50*	0.25, 0.97
Family	ref	
Tobacco Use		
Use Another Tobacco Product		
Yes	0.41	0.12, 1.35
No	ref	
Smoke within 30 Minutes of Waking		
Yes	0.48*	0.23, 0.98
No	ref	
Daily Smoker		
Yes	0.42*	0.21, 0.84
No	ref	
How Sure You Could Quit Cigarettes?		
Very Sure/Sure	1.76	0.87, 3.58
Not Sure/Not at all sure	ref	
Made at least 1 quit attempt (3 months)		
Yes	1.17	0.41, 3.32
No	ref	

** p<0.01, * p<0.05

DISCUSSION

The primary study aim examined whether public housing residents had intentions to quit if menthol-flavored cigarettes were no longer sold, and what factors were associated with intentions to quit or other alternative products of choice among those who did not intend to quit if menthol-flavored cigarettes were no longer sold. Nearly three-quarters of menthol-flavored cigarette smokers indicated consideration of quitting cigarettes if menthol-flavored products were no longer sold. About 1 in 4 said they would continue smoking. Similar to the present

study, prior evidence in the general population assessing responses to a hypothetical menthol ban, showed 25–64% of smokers intended to attempt to quit smoking and 11–46% of smokers considered switching to other tobacco products, including 15– 30% to e-cigarettes. However, the intention to quit for African Americans were higher than these ranges. In one U.S. study where 79.4% of African Americans used menthol-flavored cigarettes, 76.0% of smokers expressed an intention to quit smoking when asked about a hypothetical ban, compared with 30.3% of whites.[9] Another U.S. study found 44.5% of African Americans who used menthol-flavored cigarettes said they would quit in the event of a ban on menthol-flavored cigarettes and 23.6% would switch to a non-menthol brand and try to quit.[28] African American young adults were also twice as likely to say they would quit than whites in response to hypothetical menthol sales restrictions.[29] Past studies also show that African American young adults indicated 79.3% intended to quit in the event of a menthol-flavored product ban.[30] The present study showed that residents with high rates of menthol-flavored tobacco use is similar to the general population and other African American populations. Additionally, residents reporting intentions to switch to another tobacco product aligned with the previously reported estimates.[8] Slightly fewer residents than the general population indicated they may switch to e-cigarettes. This is potentially due to e-cigarette use being less common in those of higher average age and lower SES, and African Americans, the demographic group predominantly represented in this sample.

Consistent with previous findings, results suggested smoking behavior has a high degree of influence on reactions to a menthol-flavor sales ban.[9, 10] Smoking within 30 minutes of waking and being a daily smoker significantly reduced the odds of residents' expressing an intention to quit if menthol-flavored products ceased to be sold. Older residents had lower odds of reporting intentions to quit, aligned with prior evidence that older adults are less likely to want

to quit than younger adults.[2] Findings may be due to older residents exhibiting more nicotine dependency characteristics and smoking more frequently as they may have smoked for longer.

A menthol-flavored ban may provide additional influence on this population of uniquely at-risk predominantly African Americans residents, given that they already live in HUD-mandated smoke-free housing. Evidence from a 40-year simulation of smoking projecting the influence of a menthol-flavored ban showed that between 323,000 and 633,000 deaths could be avoided, with the hypothetical ban potentially avoiding an estimated 237,000 deaths in African Americans. The combination of these two policies (smoke-free housing and menthol-flavor ban) may exert a robust influence on a significant proportion of residents' smoking cessation intentions. However, it is important to underscore that 1 in 4 would continue smoking. Many of these residents indicated they would switch to an unflavored product, which may increase their intent to quit and improve their cessation outcomes.[3, 8] Still, others planned to continue to use other menthol-flavored products. Prohibiting the sale of all characterizing flavors, as the proposed FDA nationwide menthol ban would,[1] and should be considered to promote cessation among all resident tobacco users.

In the presence of a comprehensive menthol-flavored tobacco product sales ban, policies and programs should address the unique needs of individuals who report more dependency symptoms and are older, and groups that are consistently less likely to say they will quit.[2] Further, menthol smokers, and especially African American menthol smokers, are more likely to attempt to quit, but less likely to sustain cessation. African Americans who use menthol-flavored products are more likely to report an attempt to quit when asked about their reactions to a hypothetical sales ban. To reach a population of African American public housing residents who use menthol-flavored cigarettes, interventions need to be tailored and consistently available to

help them act on their intentions to quit and improve cessation outcomes. Implementing cessation supports along with a menthol-flavored tobacco sales ban would help this group that is disproportionally impacted by menthol-flavored tobacco products and may be disproportionally affected by a sales ban.

Additionally, the evidence of long-term successful cessation following a menthol-flavored tobacco sales ban is insufficient. One study examining smokers one year after a menthol-flavored product ban found no significant difference in sustained cessation between menthol-flavored and nonmenthol-flavored product users for those who quit after the ban, but previously daily menthol smokers had a higher odds of sustaining cessation than previously daily unflavored smokers if they quit before the ban. Additional research is needed to identify long-term cessation outcomes for those affected by these sales bans.

This study has three limitations that warrant mention. First, these data represent residents from the Washington, DC housing authority and may not generalize to other public housing authorities and other countries. This is especially important because U.S. public housing consists of a racially diverse population, and the current study consisted of primarily African American residents. A second limitation is the inability to assess the unique effects of menthol-flavored cigarettes on successful quitting because residents were reacting to a hypothetical ban. Third, conducting complete case analysis for our regression models meant the analysis omitted 44 cases due to missing data on one or more predictor variables. Because of this, we cannot know how these residents would have affected the regression results and they may have attributes that made them skip the question that will be unmeasured.

Despite these limitations, study findings add timely evidence describing the impact of a menthol-flavored-flavor ban on a population with high rates of tobacco use in the United States.

Results showed how public housing residents may react to a ban in ways that could reduce smoking prevalence and address current tobacco-related health disparities. Findings also indicated that specialized programs for older and more dependent low-income African Americans may improve outcomes, including intention and action toward cessation. For the new FDA ban and other tobacco control policies to achieve outcomes of reducing avoidable US deaths and tobacco-related health disparities, it is essential to provide accessible and effective, evidence-based support for translating quit intentions into successful cessation.

Acknowledgements: The authors would like to thank the participants who gave their time and knowledge of the subject.

Contributorship Statement: CTD: conceptualization, data curation, formal analysis, methodology, software, project administration, writing – original draft, writing – review and editing; KH: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing; IC: formal analysis, investigation, methodology, software; DHB: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing

Competing Interests: The authors have no competing interests to disclose.

Funding: This work was supported by the National Institutes of Health, National Cancer Institute (R01 CA226074P to DHB and KH), and pilot funding from the George Washington Cancer Center (GWCC; PI Bernat).

Data Sharing: The data underlying this article will be shared on reasonable request to the corresponding author.

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BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-059821.R2
Article Type:	Original research
Date Submitted by the Author:	14-Jun-2022
Complete List of Authors:	Dearfield, Craig; The George Washington University Milken Institute of Public Health, Epidemiology Horn, Kimberly; Fralin Biomedical Research Institute at VTC Crandell, Ian; Virginia Tech-Center for Biostatistics and Health Data Sciences Bernat, D; The George Washington University Milken Institute of Public Health, Epidemiology
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	Epidemiology, Public health
Keywords:	EPIDEMIOLOGY, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH

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BEHAVIORAL INTENTIONS IN RESPONSE TO A POTENTIAL MENTHOL CIGARETTE SALES BAN: A SURVEY EXAMINING SMOKERS IN WASHINGTON, DC PUBLIC HOUSING

Craig T. Dearfield, Ph.D.,[1] Kimberly Horn, Ed.D.,[2] Ian Crandell, Ph.D.,[3] and Debra H. Bernat, Ph.D.[1]

1. The George Washington University Milken Institute School of Public Health, Department of Epidemiology, 950 New Hampshire Ave, NW, Fifth floor, Washington, DC 20052, USA
2. Virginia Tech-Carilion Fralin Biomedical Research Institute, Blacksburg, VA, USA
3. Virginia Tech-Center for Biostatistics and Health Data Sciences, Roanoke, VA, USA

Address Correspondence To: Craig T. Dearfield, Ph.D.

Department of Epidemiology

The Milken Institute School of Public Health, The George Washington University

950 New Hampshire Ave., 5th Floor, Washington DC, 20052, USA

Phone: 202-994-0436

Email: cdearfield@gwu.edu

Word count: 3,130

ABSTRACT

Objectives: Local, national, and international policies are being proposed to ban the sale of menthol-flavored tobacco products. With more bans being implemented, it is increasingly important to understand reactions to these bans among smokers of low socioeconomic status. This study examined public housing residents' behavioral intentions if menthol-flavored cigarettes were no longer sold.

Setting: 15 District of Columbia Housing Authority properties between March 2019 and March 2021.

Participants: 221 District of Columbia Housing Authority residents ages 18-80 who reported smoking menthol cigarettes (83.3% African American/Black).

Primary and Secondary Outcomes: Cigarette quitting and switching intentions due to a hypothetical menthol-flavored cigarette sales ban.

Results: Nearly one-half (48.0%) of residents said they intended to quit cigarette use if menthol-flavored products were no longer sold, while 27.2% were unsure if they would quit, and 24.9% reported they would not quit. Older residents (OR=0.94 per year, 95% CI=0.91, 0.97), senior/disabled building versus family building residents (OR=0.50, 95% CI=0.25, 0.97), those who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.98), and daily smokers (OR=0.42, 95% CI=0.21, 0.84) had lower odds of reporting quit intentions associated with a menthol ban. Of those not intending to quit, 40.7% reported they would switch to non-menthol cigarettes, 20% to another non-menthol product, 13% to menthol e-cigarettes (13.0%), and 20% to another menthol product.

Conclusions: Results suggest banning the sale of menthol-flavored products has the potential to impact cigarette smoking cessation. Nearly three-quarters of smokers in public housing indicated

a possibility of quitting smoking because of a menthol cigarette ban. Bans that include all flavors in all tobacco products may be most effective for facilitating overall tobacco cessation.

Strengths and Limitations:

- The study population includes a group with high rates of menthol-flavored tobacco use.
- Study data represent residents from one public housing authority and may not generalize to other US public housing authorities or other low socioeconomic status groups.
- The study assessed resident reactions to a hypothetical ban as opposed to the effect of an actual menthol-flavored sales ban.

INTRODUCTION

Menthol flavor in cigarettes contributes to ongoing tobacco-related health disparities.[1-3] Menthol flavoring contributes to smoking initiation among youth, increasing the harm of smoke particulates, increasing nicotine dependency symptoms, and making it harder to quit smoking.[2, 4, 5] Menthol is the last allowable flavor in cigarettes in the United States.[1] It is notable that menthol-flavored cigarette consumption based on market share data remained stable across the country between 2000 and 2018 when overall cigarette consumption declined.[6]

To improve quit rates and address tobacco-related health disparities, policies are being proposed to ban the sale of menthol-flavored tobacco products. Several other countries and many local U.S. jurisdictions ban the sale of flavored tobacco products, including menthol.[7, 8] On April 29, 2021, the U.S. Food and Drug Administration (FDA) declared their intent to pursue tobacco product standards to ban menthol-flavored cigarettes.[1] With bans going into effect across the world and on a local U.S. level., it is increasingly important to understand how people respond to these bans, particularly those of lower socioeconomic status.

Evidence examining the effect of proposed U.S. menthol sales bans on smokers indicates they promote cessation intentions.[9] Evidence related to behavioral intentions in response to a hypothetical menthol-flavored product ban indicates some smokers intend to quit once it goes into effect. In a recent review of studies examining behavioral intentions if menthol-flavored products were no longer sold, between 24% and 64% of smokers indicate they would attempt to quit, with most studies of smokers in the US estimating between 40 and 50% of adults smokers intend to quit.[9] One study found that a higher proportion of African American menthol smokers report they would quit as a result of a hypothetical ban compared to white menthol smokers (76.0% versus 30.3%).[10] Additionally, those who smoke less frequently, report

greater current quit intentions, and report making a quit attempt in the prior year are more likely to say they would quit if a menthol ban went into effect.[10, 11]

A ban on menthol-flavored cigarettes may have a particular bearing on individuals living in the Department of Housing and Urban Development (HUD) housing. In 2018, HUD instituted a smoke-free rule for all properties prohibiting lit tobacco products in indoor spaces and within 25 feet of housing authority buildings. Public housing residents have been found to have higher smoking rates compared with the general population. The most recent examination of a nationally representative sample of public housing residents in 2017 showed that 33.6% of residents used tobacco[12] compared with 14% of the general population at that time.[13] More recent studies of public housing residents in 2019 as part of smoke-free rule evaluations estimate between 9.5% and 29.0% of residents smoke[14-16] compared with an estimated 20.8% of adults using any tobacco product and 16.7% of adults using cigarettes in 2019.[17] The 2017 study of public housing residents also showed that over 80% of residents who smoke are reported to be daily smokers and approximately two-thirds smoke more than 10 cigarettes per day.[12]

Public housing residents represent groups most likely to use menthol-flavored tobacco products in the US, notably individuals of lower socioeconomic status (SES) and a high proportion of African Americans.[1, 18, 19] The prevalence of menthol-flavored cigarette use among those in families earning less than $35,000 (7.0%) is double those in families earning more than $75,000 a year (2.3%),[20] and approximately 85% of all African American smokers use menthol-flavored cigarettes, compared with approximately 30% of White smokers.[21] Further, African Americans use menthol-flavored products at a disproportionate rate, a disparity highly correlated with tobacco industry targeted advertising.[2, 22] Of note, the industry heavily advertised menthol-flavored products specifically in this community.[22] A study of one public

housing authority found 93.1% of residents who smoke use menthol-flavored cigarettes.[23] Although this is not nationally representative of all public housing residents, results suggest that residents are susceptible to using menthol-flavored cigarettes.

Evidence suggests that banning the sale of menthol-flavored products may increase intentions to quit and improve cessation outcomes among users in the general population; however, behavioral intentions of public housing residents in response to a potential menthol-flavored product ban are under studied. The present study examined public housing residents' (1) intention to quit if menthol-flavored cigarettes were no longer sold, and (2) expected alternative tobacco products of choice among if they did not intend to quit. The study fills an important literature gap by providing a current examination of the potential consequences of a menthol-flavored product ban in a population with high rates of menthol-flavored tobacco use.

METHODS

Study Sample

Data were collected from residents of the Washington, DC Housing Authority (DCHA) between March 2019 and March 2021. Inclusion criteria required participants to be a DCHA property resident (not using Section 8 vouchers) between the ages of 18 and 80. Residents represented 15 DCHA properties, 8 family and 7 senior/disabled buildings. In the overall study, 754 residents completed surveys. Non-smokers were not included in this analysis (n=296) and 237 smokers were not included because they responded to an earlier version of the survey that did not contain questions about a hypothetical menthol ban (n=152), did not usually use menthol cigarettes (n=16), or had missing data for one or more of the menthol cigarette use questions (n=68). One respondent who identified gender as "non-binary" was omitted from the analysis because confidentiality could not be maintained. Thus, the present sample included 221 residents

who reported past 30-day use of menthol-flavored cigarettes and were not missing data for questions asking about behavioral intentions if menthol-flavored products were no longer sold.

Procedures

Data collection took place in community spaces on DCHA property. Study staff and DCHA administrators held survey participation events. DCHA and building staff advertised and told residents about the events. Flyers for the study were placed in common areas in buildings notifying residents where and when data collection events would be held, and resident council presidents and DCHA staff told residents about data collection events during community meetings. During data collection events, residents frequently found out about the event from other residents (word-of-mouth).[23, 24] Interested residents completed a screening assessment to establish residence and age eligibility and past 30-day smoking status. Eligible participants completed a consent form, which research staff read aloud. Participants completed surveys using audio computer-assisted self-interviewing software (QDS), where all questions and answer options were spoken to participants. Participants had the option to skip any question and end the survey at any point. Residents received a $25 gift card for their survey participation. Study procedures were approved by The George Washington University Institutional Review Board.

Patient and Public Involvement

Patients and the public were not involved in the research design, conduct, reporting, or dissemination.

Measures

Demographics. Respondents indicated their gender (male/female), age (in years, open numerical response), and race/ethnicity. Residents reported if they were Hispanic (yes/no), and selected as many racial categories as were applicable from the following: American Indian or

Alaskan Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, and Other. The study applied DCHA classifications for building type (e.g., family or senior/disabled).

Cigarette and other tobacco use. Residents reported past 30-day use of cigarettes, cigars, little cigars and cigarillos, smokeless tobacco, hookah, and e-cigarettes using questions derived from the National Adult Tobacco Survey (NATS).[25] Cigarette smokers indicated whether they usually used a menthol-flavored flavored product (yes/no), days used in the past 30 days (0-30), and the number of self-identified quit attempts in the past 3 months (open numerical response). Daily smoking was defined as cigarette smoking all days in the past 30 days.

Nicotine Dependency. The primary measure of nicotine dependency was smoking within 30 minutes of waking.[26, 27] Residents indicated if they typically first smoked within 5 minutes, between 5 to 30 minutes, between 31 to 60 minutes, or after 60 minutes of waking. This variable was dichotomized for analysis purposes (smoke within 30 minutes of waking and smoke 31+ minutes after waking).[26, 27]

Quitting and Switching Behavioral Intentions. Respondents reported whether they were currently thinking of quitting smoking cigarettes for good (yes/no), as derived from the NATS.[25] Those who said they were thinking of quitting indicated how sure they were that they could quit if they tried using a 4-point scale (very sure to not at all sure). Analysis used a dichotomized version of this variable (very sure/sure and not sure/not at all sure). Participants indicated if they would consider quitting if menthol-flavored cigarettes were no longer sold in stores (yes/no/not sure). A dichotomous variable was created for analysis purposes (yes and no/not sure). Residents who indicated they would not quit reported what they would do if menthol-flavored products were no longer sold. Response options included switching to non-

menthol-flavored cigarettes, switching to some other non-menthol-flavored tobacco product, switching to menthol-flavored e-cigarettes, switching to some other menthol-flavored tobacco product, buying menthol-flavored cigarettes online, something else, or none of these. Participants could select multiple options.

Analysis

Descriptive statistics assessed intention to quit if menthol-flavored products were no longer sold and the alternative products of choice among those who said they would not quit. Logistic regression modeling, clustered by data collection site, assessed characteristics associated with quit intentions if menthol-flavored products were no longer sold. Logistic regression models used complete case analysis. Regression models clustered by data collection site accounted for intragroup correlations that could arise from similarities in residents at each housing site. The model included age, gender, senior/disabled or family building residence status, using a tobacco product besides cigarettes, smoking within 30 minutes of waking, daily smoking status, whether they were sure they could quit, and having made a quit attempt in the past 3 months to predict whether residents would quit if menthol-flavored products were no longer sold. Because most residents (85.6%, N=101/118 [103 missing]) identified as Black or African American, race and ethnicity was not included in further analysis. Results from a test for multicollinearity between age and senior/disabled building resident status indicated these two variables were significantly correlated ($r=0.22$, $p<0.01$), but not highly correlated. Both variables were included in the model due to the low risk for multicollinearity.[28] The regression model included 177 cases with full data for all selected variables. Analyses were conducted using SAS software, version 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Descriptive Statistics

The sample included slightly more females and residents of Senior and Disabled buildings (Table 1). The mean age of participating residents was 57. Most residents reported thinking about quitting (regardless of the ban; 83.2%, N=184) and a high proportion thought they could quit if they tried (very sure and sure; 45.3%, N=100). Additionally, about half of the residents made at least one recent quit attempt during the last 3 months (49.3%, N=109). Close to one-half of residents were daily smokers (47.7%, N=105) and nearly two-thirds reported smoking within 30 minutes of waking (62.9%, N=150). Under 20% of respondents said they used another tobacco product (17.2%, N=38).

Table 1. Demographics, Tobacco Use Characteristics

	% (N) or mean (SD)
Demographics	
Gender	
Female	60.6% (134)
Male	39.4% (87)
Age (Mean years, continuous)	57.2 (11.0)
Building Type	
Family	40.7% (90)
Senior or Disabled	59.3% (131)
Tobacco Use Characteristics	
Use Another Tobacco Product	
Yes	17.2% (38)
No	82.8% (183)
Smoke within 30 Minutes of Waking	
Yes	62.9% (139)
No	36.2% (80)
Missing	0.9% (2)
Daily smoker	
Yes	47.5% (105)
No	52.0% (115)
Missing	0.5% (1)
Thinking About Quitting	
Yes	83.2% (184)
No	16.3% (36)
Missing	0.5% (1)
How Sure You Could Quit Cigarettes?	
Very sure	19.5% (43)
Sure	25.8% (57)
Not sure	29.9% (66)
Not at all sure	7.7% (17)
Missing	17.2% (38)
How much support have you received to quit tobacco	

A lot of support	11.8% (26)
Some support	15.4% (34)
A little support	14.9% (33)
No support	38.5% (85)
Missing	19.5% (43)
Made at least 1 quit attempt (past 3 months)	
Yes	49.3% (109)
No	32.6% (72)
Missing	18.1% (40)
Would quit if menthol-flavored cigarettes were no longer sold	
Yes	48.0% (106)
Not sure	27.2% (60)
No	24.9% (55)
Changes if Menthol-flavored Products are Banned[1] (n=54)	
Switch to non-menthol-flavored cigarettes	40.7% (22)
Switch to some other non-menthol-flavored product	20.4% (11)
Switch to menthol-flavored e-cigarette	13.0% (7)
Switch to other menthol-flavored product	20.4% (11)
Buy menthol-flavored cigarettes online	13.0% (7)
Something else	9.3% (5)
None of these	14.8% (8)

Note:
[1]Participants were able to mark multiple options

Overall, given a menthol ban, 48.0% (N=106) of residents said they would quit, 27.2% (N=60) indicated they were not sure if they would quit, and 24.9% (N=55) indicated they would not quit. Of those who would continue smoking and answered questions about preferred alternatives (N=54), 40.7% (N=22) indicated they would switch to non-menthol-flavored cigarettes, 20.4% (N=11) indicated switching to another non-menthol-flavored product, 20.4% (N=11) said they would use another menthol-flavored product, 13.0% (N=7) would switch to menthol-flavored flavored e-cigarettes, and 13.0% (N=7) would buy menthol-flavored cigarettes online. An additional 9.3% (N=5) indicated they would do something else and 14.6% (N=8) saying they would not do any of these options. Only one respondent specified the other action they would take as "chew gum" without making clear they would quit using tobacco.

Regression Results

Regression results indicated that increases in age (OR=0.94, 95% CI=0.91, 0.97) and living in a senior/disabled building (OR=0.50, 95% CI=0.25, 0.97) were associated with

decreased odds that residents would quit cigarettes if menthol-flavored flavored products were no longer available (Table 2). Residents who smoked within 30 minutes of waking (OR=0.48, 95% CI=0.23, 0.84) and daily smokers (OR=0.42, 95% CI=0.21, 0.84) were less likely to say they would quit if menthol-flavored products were no longer sold.

Table 2. Association Between Intentions to Quit if Menthol Were Not Available and Demographics and Tobacco Use

	Logistic Regression Model	
	OR	**95% CI**
Demographics		
Gender		
Female	1.33	0.42, 4.18
Male	ref	
Age (per year, continuous)	0.94**	0.91, 0.97
Building Type		
Senior or Disabled	0.50*	0.25, 0.97
Family	ref	
Tobacco Use		
Use Another Tobacco Product		
Yes	0.41	0.12, 1.35
No	ref	
Smoke within 30 Minutes of Waking		
Yes	0.48*	0.23, 0.98
No	ref	
Daily Smoker		
Yes	0.42*	0.21, 0.84
No	ref	
How Sure You Could Quit Cigarettes?		
Very Sure/Sure	1.76	0.87, 3.58
Not Sure/Not at all sure	ref	
Made at least 1 quit attempt (3 months)		
Yes	1.17	0.41, 3.32
No	ref	

** p<0.01, * p<0.05

DISCUSSION

The primary study aim examined whether public housing residents had intentions to quit if menthol-flavored cigarettes were no longer sold, and what factors were associated with intentions to quit or other alternative products of choice among those who did not intend to quit if menthol-flavored cigarettes were no longer sold. Nearly three-quarters of menthol-flavored cigarette smokers indicated consideration of quitting cigarettes if menthol-flavored products

were no longer sold. About 1 in 4 said they would continue smoking. Similar to the present study, prior evidence in the general population assessing responses to a hypothetical menthol ban, showed 25–64% of smokers intended to attempt to quit smoking and 11–46% of smokers considered switching to other tobacco products, including 15– 30% to e-cigarettes. However, the intention to quit for African Americans were higher than these ranges. In one U.S. study where 79.4% of African Americans used menthol-flavored cigarettes, 76.0% of smokers expressed an intention to quit smoking when asked about a hypothetical ban, compared with 30.3% of whites.[10] Another U.S. study found 44.5% of African Americans who used menthol-flavored cigarettes said they would quit in the event of a ban on menthol-flavored cigarettes and 23.6% would switch to a non-menthol brand and try to quit.[29] African American young adults were also twice as likely to say they would quit than whites in response to hypothetical menthol sales restrictions.[30] Past studies also show that African American young adults indicated 79.3% intended to quit in the event of a menthol-flavored product ban.[31] The present study showed that residents with high rates of menthol-flavored tobacco use is similar to the general population and other African American populations. Additionally, residents reporting intentions to switch to another tobacco product aligned with the previously reported estimates.[9] Slightly fewer residents than the general population indicated they may switch to e-cigarettes. This is potentially due to e-cigarette use being less common in those of higher average age and lower SES, and African Americans, the demographic group predominantly represented in this sample.

Consistent with previous findings, results suggested smoking behavior has a high degree of influence on reactions to a menthol-flavor sales ban.[10, 11] Smoking within 30 minutes of waking and being a daily smoker significantly reduced the odds of residents' expressing an intention to quit if menthol-flavored products ceased to be sold. Older residents had lower odds

of reporting intentions to quit, aligned with prior evidence that older adults are less likely to want to quit than younger adults.[2] Findings may be due to older residents exhibiting more nicotine dependency characteristics and smoking more frequently as they may have smoked for longer.

A menthol-flavored ban may provide additional influence on this population of uniquely at-risk predominantly African Americans residents, given that they already live in HUD-mandated smoke-free housing. Evidence from a 40-year simulation of smoking projecting the influence of a menthol-flavored ban showed that between 323,000 and 633,000 deaths could be avoided, with the hypothetical ban potentially avoiding an estimated 237,000 deaths in African Americans. The combination of these two policies (smoke-free housing and menthol-flavor ban) may exert a robust influence on a significant proportion of residents' smoking cessation intentions. However, it is important to underscore that 1 in 4 would continue smoking. Many of these residents indicated they would switch to an unflavored product, which may increase their intent to quit and improve their cessation outcomes.[3, 9] Still, others planned to continue to use other menthol-flavored products. While local jurisdictions banned the sales of flavored tobacco products,[8] a nationwide policy may increase the benefits of removing these products from the market by reaching smokers in all national jurisdictions. Prohibiting the sale of all characterizing flavors, as the proposed FDA nationwide menthol ban would,[1] and should be considered to promote cessation among all resident tobacco users.

In the presence of a comprehensive menthol-flavored tobacco product sales ban, policies and programs should address the unique needs of individuals who report more dependency symptoms and are older, and groups that are consistently less likely to say they will quit.[2] Further, menthol smokers, and especially African American menthol smokers, are more likely to attempt to quit, but less likely to sustain cessation. African Americans who use menthol-flavored

products are more likely to report an attempt to quit when asked about their reactions to a hypothetical sales ban. To reach a population of African American public housing residents who use menthol-flavored cigarettes, interventions need to be tailored and consistently available to help them act on their intentions to quit and improve cessation outcomes. Implementing cessation supports along with a menthol-flavored tobacco sales ban would help this group that is disproportionally impacted by menthol-flavored tobacco products and may be disproportionally affected by a sales ban.

Additionally, the evidence of long-term successful cessation following a menthol-flavored tobacco sales ban is insufficient. One study examining smokers one year after a menthol-flavored product ban found no significant difference in sustained cessation between menthol-flavored and nonmenthol-flavored product users for those who quit after the ban, but previously daily menthol smokers had a higher odds of sustaining cessation than previously daily unflavored smokers if they quit before the ban. Additional research is needed to identify long-term cessation outcomes for those affected by these sales bans.

This study has three limitations that warrant mention. First, these data represent residents from the Washington, DC housing authority and may not generalize to other public housing authorities and other countries. This is especially important because U.S. public housing consists of a racially diverse population, and the current study consisted of primarily African American residents. A second limitation is the inability to assess the unique effects of menthol-flavored cigarettes on successful quitting because residents were reacting to a hypothetical ban. Third, conducting complete case analysis for our regression models meant the analysis omitted 44 cases due to missing data on one or more predictor variables. Because of this, we cannot know how

these residents would have affected the regression results and they may have attributes that made them skip the question that will be unmeasured.

Despite these limitations, study findings add timely evidence describing the impact of a menthol-flavored-flavor ban on a population with high rates of tobacco use in the United States. Results showed how public housing residents may react to a ban in ways that could reduce smoking prevalence and address current tobacco-related health disparities. Findings also indicated that specialized programs for older and more dependent low-income African Americans may improve outcomes, including intention and action toward cessation. For the proposed nationwide FDA ban and other tobacco control policies to achieve outcomes of reducing avoidable US deaths and tobacco-related health disparities, it is essential to provide accessible and effective, evidence-based support for translating quit intentions into successful cessation.

Acknowledgements: The authors would like to thank the participants who gave their time and knowledge of the subject.

Contributorship Statement: CTD: conceptualization, data curation, formal analysis, methodology, software, project administration, writing – original draft, writing – review and editing; KH: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing; IC: formal analysis, investigation, methodology, software; DHB: conceptualization, formal analysis, methodology, project administration, resources, supervision, writing – original draft, writing – review and editing

Competing Interests: The authors have no competing interests to disclose.

Funding: This work was supported by the National Institutes of Health, National Cancer Institute (R01 CA226074P to DHB and KH), and pilot funding from the George Washington Cancer Center (GWCC; PI Bernat).

Data Sharing: The data underlying this article will be shared on reasonable request to the corresponding author.

Ethics Approval Statement: The work on this study was approved by the George Washington University Institutional Review Board, number 180523.

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