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The Association Between Menthol Perceptions and Support for a Policy Ban Among US Smokers

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Objective: To examine the relationship between menthol perceptions and support for a national menthol ban.

Design: Descriptive cross-sectional study.

Participants: Data were collected from a nationally representative probability-based panel of adults aged ≥18 years during June 21, 2016 through July 18, 2016. A total of 1,303 respondents, including an oversample of 300 African Americans, completed the survey.

Main Outcome Measures: Weighted logistic regression models examined the relationship between menthol perceptions, specifically related to health and addiction, and the outcome measure: support for a menthol ban, by menthol smoking status. All models controlled for age, sex, education level, and race/ethnicity.

Results: The association between reporting accurate menthol health perceptions differed by menthol preference. Among non-menthol smokers, there was no association between accurate menthol health perceptions and support of a menthol ban while more accurate menthol perceptions of addiction were associated with greater support of a menthol ban (aOR=2.83, CI=1.19-6.72). Among menthol smokers, more accurate health-related menthol perceptions were associated with increased odds of supporting a menthol ban (aOR=3.90, CI=1.02-14.79) while more accurate menthol addiction perceptions were not.

Conclusions: Fewer current menthol smokers support a menthol ban than current non-menthol smokers given its effect on their preferred product. Given the large proportions of smokers who have misperceptions of the health consequences and addictive properties of menthol, there is a moral imperative to inform those who use these products. Findings suggest the need for tailored messaging strategies targeted to reach menthol smokers who will be most impacted by a ban, but also have the most to gain from such a policy change. *Ethn Dis.* 2018;28(3):177-186; doi:10.18865/ed.28.3.177.

Keywords: Menthol; Smoke-Free Policy; Health Communications

Introduction

Cigarette smoking prevalence rates in the United States are at an historic low, but the decline does not reflect the trends in menthol cigarette use. From 2000 through 2011, menthol cigarette use declined more slowly compared with non-menthol cigarette use (20% vs 37%, respectively), and it was calculated that 89% of the decline in cigarette consumption was attributed to non-menthol cigarettes rather than menthol cigarettes.[1] Moreover, data collected from the National Survey on Drug Use and Health (NSDUH) indicate the proportion of current menthol cigarette users (past 30-day use) increased 4.1% between 2008-2010 and 2012-2014, with menthol prevalence increasing for all age groups.[2] Recent data indicate that nearly a third of all current adult smokers and almost 60% of current youth smokers report using menthol cigarettes.[3,4] Studies have shown that menthol cigarette use is associated with increases in smoking initiation, higher levels of addiction, and more difficultly with quitting,[5-7] and menthol use is positively correlated with the co-use of cigars, alcohol, marijuana, and smokeless tobacco.[2,8-10] Taken together, this evidence indicates that menthol cigarettes play a key role in both facilitating uptake of cigarette use as well as slowing the decrease in overall cigarette preva-

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lence over the last several decades.

The use of menthol cigarettes continues to be more common among certain subgroups including youth, women, African Americans, Asians, Hispanics, and low-income individuals.[2,4,11] These patterns of use reflect a variety of factors including the appeal of flavors, as well as the marketing of mentholated products in low-income communities.[12,13] The cooling sensation of menthol masks the bitterness of tobacco and helps to reduce the harshness of early smoking, making menthol cigarettes a "starter product," particularly among youth.[3,6,13] Minority and lower-income communities have long been the target of sophisticated marketing and promotional efforts by the tobacco industry.[14-16] An interview with a former tobacco company employee revealed tactics to reduce price, increase marketing, and tailor advertisements toward African American and youth culture, including music and nightlife.[17] Other reviews of publicly available industry documents show that youth are specifically targeted for menthol products due to their inexperience, and marketing is intentionally placed in retailers and publications with African American target audiences.[13] For example, in high school neighborhoods in California, it was observed that for each 10 percentage point increase in the proportion of Black students, the proportion of menthol advertising increased, eg, the odds of a Newport promotion were 50% higher, and the cost of Newport was 12 cents lower.[12] At the same time, the tobacco industry funded sponsorship programs strategically established in African American communities and leadership organizations, and these relationships potentially prevented stronger rules on menthol products.[18] As a result, African Americans have consistently reported the highest prevalence rates of mentholated cigarette use, although recent data indicate menthol cigarette use has increased in White, Asian, and Hispanic smokers.[2]

In 2009, the Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act) gave the US Food and Drug Administration (FDA) the authority to regulate tobacco products. Although this landmark legislation banned the use of flavoring additives in cigarettes, menthol flavor was exempted from this policy. Soon after, the FDA's Tobacco Products Scientific Advisory Committee (TPSAC) was mandated to report on the public health impact of menthol in cigarettes. The Committee's 2011 report clearly states that "the removal of menthol cigarettes from the marketplace would benefit public health in the United States."[19] More specifically, the report provided detailed evidence that menthol cigarettes: 1) promote experimentation; 2) encourage co-use of other tobacco products; and 3) increase likelihood of addiction among youth smokers. In 2013, the FDA conducted another independent literature review related to the public health effects of menthol cigarettes that further supported the removal of menthol flavor from cigarettes.[20]

Our current study examines the relationship between menthol perceptions and support for a national menthol ban, particularly among current smokers.

Despite the comprehensive reviews of evidence by leading scientists who all recommended menthol cigarettes be removed from the marketplace, the FDA has failed to take any action related to either restricting or banning the sales of these products. In fact, since nonmenthol flavor additives in cigarettes have been banned, the market share of menthol has increased.[1] Tobacco companies, such as Reynolds American and Philip Morris USA, continue to expand the menthol market by pushing brands such as Newport Platinum Menthol and Marlboro Midnight.[21,22]

Although efforts to remove or restrict menthol tobacco products in the United States have stalled at the national level, progress is occurring across local jurisdictions. For example, in December 2013, Chicago became the first city in the country to prohibit the sale of all flavored tobacco products, including menthol, within 500 feet of city high schools.[23] In 2015, Berkeley, CA followed suit—banning the sale of flavored tobacco products, includ-

ing menthol and e-cigarette products, within 600 feet of schools. These legislative actions have been enacted, in part, to combat the targeted marketing of menthol products to youth and African Americans and to help reduce high prevalence rates of menthol tobacco use by Hispanic and Asian smokers.[2,24]

Despite these examples of local legislative actions to restrict the sales of menthol tobacco products, public support for these efforts vary. Several studies indicate greater support among African Americans, Hispanics, never and former smokers, and respondents with less than a high school education.[25,26] The FDA's recent announcement of intention to issue another Advance Notice of Proposed Rulemaking related to flavoring agents, including menthol, makes it imperative to examine current smokers' perceptions of menthol and their opinions of menthol-related policy actions in an effort to uncover potential barriers to supporting this important policy initiative.[27] This is especially relevant given long-standing efforts to oppose new tobacco control regulations through invoking 'smokers' rights.'[28] Additionally, smokers may benefit the most from policies that support quitting. Many regret starting to smoke, and up to 68% of adult smokers would like to quit.[29,30] But smokers may also have the most resistance to these policy changes. Our current study examines the relationship between menthol perceptions and support for a national menthol ban, particularly among current smokers. Advancing our understanding of the public's perception of menthol could help inform national education initiatives which, in turn, can help build support for critical menthol-related policy actions. Public support is critical considering that policy self-interest, defined as the extent to which an individual is directly affected by a policy, may be an important factor influencing the level of support for tobacco control regulations.[31]

Methods

Sample

This study uses data collected from the NORC AmeriSpeak® probability-based panel, designed to be representative of the US household population. The cross-sectional survey was conducted among a panel of adults aged ≥18 years, including an oversample of 300 African American interviews from June 21, 2016 through July 18, 2016. Computed according to the appropriate AAPOR formula,[32] the study completion rate was 38%, which is comparable to other studies using the Amerispeak® panel.[33,34] A total of 1,303 respondents completed the survey. Panel-based sampling weights were created via raking methods and used external population totals associated with the Current Population Survey (CPS; age, sex, education, race/ethnicity, housing tenure, telephone status, and census division). For this analysis, the focus is on the current smoking sample (N = 232). All study protocols were reviewed and approved for human subject research by the Chesapeake Institutional Review Board.

Measures

Demographic Variables

Demographic variables included respondents' age in years (18-24, 25-44, 45-64, 65 and up), sex (male, female), race/ethnicity (White non-Hispanic, Black non-Hispanic, other non-Hispanic, Hispanic), and educational attainment (less than high school or HS, some college, bachelor's degree or higher).

Current Smoking Status

Smoking status was measured by self-reported past 30-day cigarette use: "During the past 30 days, on how many days did you smoke cigarettes (even 1 or 2 puffs)?" Those who reported smoking on one or more days were categorized as current smokers. Menthol smoking status was also self-reported among current smokers, assessed with the item: "During the past 30 days, have you typically smoked menthol cigarettes or non-menthol cigarettes?" Participants were categorized as current menthol smokers or current non-menthol smokers.

Menthol Perceptions

Seven items were included to assess participants' menthol perceptions (Table 1). These items were drawn from the TPSAC report.[19] Participants rated their agreement with the items using a scale from 1 to 4, with 1 = "strongly agree" and 4 = "strongly disagree." Responses to these items were used to create separate scales for health effects (5 items; $\alpha = .83$) and addiction (2 items; $\alpha = .80$). A mean scale score was created for each participant using available data points (eg, if respondents only

Table 1. Health effects and addiction scale items

Health Effects Scale
Menthol cigarettes make it easier to quit smoking especially among African Americans.
There are health benefits of menthol compared to non-menthol cigarettes.
Menthol cigarettes are healthier than non-menthol cigarettes.
Menthol cigarettes are more natural than non-menthol cigarettes.
Menthol cigarettes contain less nicotine than non-menthol cigarettes.
Addiction Scale
Menthol in cigarettes is linked to becoming a regular smoker.
Youth smoking menthol cigarettes are more likely to become addicted to smoking.

had a response to one of the two addiction items, the one item was used as the scale score). Across the seven items, a total of five of the items were reverse coded to reflect higher scores for the desired responses. Each item also included a "don't know" response option; however, "don't know" responses were excluded from the development of the health and addiction scales. If a participant selected "don't know" for all items in each scale, this participant would not have a scale score and would ultimately be listwise deleted from any analysis.

A large percentage of responses to each question were "don't know" (approximately 11%-37%); therefore, a "don't know" index was created to assess the relationship between not knowing the answer and support for a ban on menthol. For each of the seven items, responses were dichotomized to reflect 1 = "don't know" and 0 = all other responses. The number of "don't know" responses were summed together to form an index. This index ranged from 0 – 7 (M = 2.82, SD = 2.59); higher index scores reflect less understanding of menthol.

Support of a Menthol Policy Ban

The following preamble preceded all questions related to support for a menthol policy ban: "The US Food and Drug Administration, or FDA, is the government organization with the authority to regulate menthol in cigarettes. A panel of scientists has told the FDA that getting rid of menthol cigarettes would reduce the number of people who start smoking." Participants were then asked: "Based on this information, do you think the FDA should ban menthol flavoring in cigarettes?" with response options of "Yes" or "No." This measure was used as a dichotomous outcome in all models.

Analytic Strategy

To inform the development of messages tailored separately for menthol and non-menthol smokers, patterns of menthol perceptions were examined within these individual groups to understand the unique relationship on support for a menthol ban. Three sets of weighted logistic regressions were used to examine this relationship. The first models included those who reported "don't know" to the menthol perception items by menthol preference. Four subsequent models examined the relationship between menthol health effects and addiction characteristics and the support for a ban overall and by menthol preference. All models controlled for age, sex, education level, and race/ethnicity. The overall models also controlled for menthol preference. Analyses were conducted using SAS Enterprise 7.1.

Results

Table 2 presents the overall demographic characteristics of each of the current smoking respondent groups. Among menthol smokers, approximately one-quarter (26%) were young adults (aged 18-24), with higher proportions of the group representing females, those with lower education levels, those identifying as Black/African American non-Hispanic, and those *not* in support of a menthol ban. Among the non-menthol smokers, only approximately 17% were young adults (aged 18-24). Among the non-menthol smokers, there was an even split on sex; a higher proportion had lower education levels and identified as White non-Hispanic; and a slightly higher proportion *not* in favor of a menthol ban. A statistically significant chi-square test for race/ethnicity shows that menthol preference varies as a function of race/ethnicity group, with the greatest apparent differences among White non-Hispanic and Black/African American non-Hispanic smokers.

Menthol Perceptions and Support for a Menthol Ban

Logistic regression models presented in Table 3 examine the relationship between reporting percep-

Table 2. Weighted sample descriptive statistics, N = 232

	Smoking status		
	Current, non-menthol smoker (n = 117)	Current, menthol smoker (n = 115)	P
Age			
18-24	16.93%	25.68%	.54
25-44	35.80%	27.23%	
45-64	29.60%	30.00%	
≥65	17.67%	17.09%	
Sex			.09
Male	52.32%	37.78%	
Female	47.68%	62.22%	
Education			.22
Less than high school/high school	60.56%	53.00%	
Some college	26.46%	38.39%	
Bachelor's degree or higher	12.98%	8.61%	
Race/ethnicity			<.001
White, Non-Hispanic	75.86%	34.17%	
Black/African-American, Non-Hispanic	6.87%	48.47%	
Other, Non-Hispanic	11.59%	6.87%	
Hispanic	5.67%	10.49%	
Support of a menthol ban			.38
Yes	44.89%	36.70%	
No	55.11%	63.30%	
Health Scale	3.49 (0.05)	3.24 (0.07)	<.001
Addiction Scale	2.61 (0.12)	2.58 (0.12)	.08
Don't Know Index	1.90 (0.22)	1.50 (0.22)	.18

Missing data were included in the computation of %'s, columns may not equal 100%

tions of menthol and support for a menthol ban among current non-menthol and menthol smokers. Analyses show that more instances of reporting "don't know" to menthol perception questions is positively associated with support for a menthol ban among non-menthol smokers, but negatively related to support for a ban among menthol smokers. For instance, among non-menthol smokers, adjusted odds ratios suggest that for every unit increase on the "don't know" index (ie, for every additional perception question answered as "don't know"), the odds of supporting a menthol ban were 1.24 times higher than not supporting a ban (aOR=1.24). Conversely, among menthol smokers, for every unit increase on the "don't know" index, the odds of supporting a menthol ban is .74 times lower than not supporting a ban (aOR = .74).

Logistic regression models examining the association between perceptions of menthol (addiction and health scales) in relation to support for a menthol ban are shown in Table 4. Findings suggest that while controlling for demographics and menthol preference, increases on the health and addiction scales indicate greater odds of supporting a menthol ban. For each unit increase on the health scale, people had 2.98 times the odds of supporting a menthol ban. Likewise, for each unit increase on the addiction scale, people had 2.13 times the odds of supporting a menthol ban. Furthermore, the findings in Table 5 suggest that the association between reporting more accurate perceptions of menthol health differed by menthol preference. That is, among non-menthol smokers, there was no association between accurate menthol health perceptions and support of a menthol ban; however, among menthol smokers, adjusted odds ratios suggest that for every unit increase on the menthol perceptions health scale, the odds of supporting a menthol ban are approximately 3.9 times higher than not supporting a ban (aOR=3.90). Likewise, among non-menthol smokers, adjusted odds ratios indicate that for every unit increase on the menthol

Table 3. Logistic regression: The effect of "don't know" about menthol perception items on support of a menthol ban among smokers

	Current, Non-Menthol Smokers				Current, Menthol Smokers			
Variable	*OR*	**CI**	*aOR*	**CI**	*OR*	**CI**	*aOR*	**CI**
"Don't Know" Index	1.19[b]	1.02 - 1.38	1.24[b]	1.05 - 1.46	.73[a]	.59 - .89	.74[a]	.61 - .91
Sex								
Female	--	--	1.34	.43 - 4.18	--	--	.83	.22 - 3.08
Male	--	--	ref.	ref.	--	--	ref.	ref.
Age								
25-44	--	--	1.67	.36 - 7.87	--	--	.91	.18 - 4.74
45-64	--	--	2.44	.48 - 12.36	--	--	.34	.05 - 2.28
≥65	--	--	2.47	.41 - 14.80	--	--	.8	.15 - 4.23
18-24	--	--	ref.	ref.	--	--	ref.	ref.
Race/Ethnicity								
Black/African American non-Hispanic	--	--	13.82	1.00 - 19.60	--	--	2.33	.55 - 9.87
Other non-Hispanic/Hispanic	--	--	2.45	.63 - 9.55	--	--	.98	.2 - 4.88
White non-Hispanic	--	--	ref.	ref.	--	--	ref.	ref.
Education								
Some college	--	--	1.21	.35 - 4.25	--	--	1.92	.51 - 7.25
≥Bachelor's degree	--	--	1.03	.26 - 4.13	--	--	.95	.15 - 6.06
< HS/HS degree/GED	--	--	ref.	ref.	--	--	ref.	ref.

a. P<.01.
b. P<.05.

Table 4. Logistic regression: The effect of the perceptions of menthol (health and addiction scales) on support of a menthol ban among smokers

	Health Scale		Addiction Scale	
Variable	*aOR*	**CI**	*aOR*	**CI**
Scale	2.98[a]	1.22 – 7.30	2.13[a]	1.23 – 3.69
Menthol smoking status				
Non-menthol	1.21	.47 – 3.12	1.41	.51 – 3.92
Menthol	ref.	ref.		
Sex				
Female	1.24	.54 – 2.85	1.48	.58 – 3.76
Male	ref.	ref.	ref.	ref.
Age				
25-44	.75	.25 – 2.29	.65	.17 – 2.40
45-64	.70	.24 – 2.06	.72	.21 – 2.46
≥65	1.14	.30 – 4.37	1.41	.30 – 6.56
18-24	ref.	ref.	ref.	ref.
Race/Ethnicity				
Black/African American non- Hispanic	3.96[a]	1.41 – 11.11	2.05	.65 – 6.39
Other non-Hispanic/Hispanic	1.68	.62 – 4.55	1.10	.34 – 3.62
White non-Hispanic	ref.	ref.	ref.	ref.
Education				
Some college	1.42	.60 – 3.34	2.01	.79 – 5.12
≥Bachelor's degree	1.12	.33 – 3.83	.38	.08 – 1.80
<HS/HS degree/GED	ref.	ref.	ref.	ref.

a. P<.05.

Table 5. Logistic regression: The effect of the perceptions of menthol (health and addiction scales) on support of a menthol ban among smokers

	Current, non-menthol smokers				Current, menthol smokers			
	Addiction		Health		Addiction		Health	
Variable	*aOR*	**CI**	*aOR*	**CI**	*aOR*	**CI**	*aOR*	**CI**
Scale	2.83[a]	1.19 - 6.72	3.08	.73 - 13.10	1.84	.76 - 4.45	3.90[a]	1.02 - 14.79
Sex								
Female	3.16	.77 - 13.06	1.67	.53 - 5.30	.8	.21 -3.08	.84	.23 - 3.05
Male	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Age								
25-44	.73	.09 - 5.85	1.07	.23 - 4.97	.68	.12 - 3.77	.49	.09 - 2.77
45-64	1.23	.15 - 10.12	1.63	.34 - 7.79	.38	.07 - 2.05	.19[a]	.04 - .98
≥65	1.01	.12 - 10.55	1.5	.22 - 10.19	1.85	.22 - 15.68	.7	.08 - 5.84
18-24	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Race/Ethnicity								
Black/African American non-Hispanic	9.02	.17 - 6.31	9.8	.90 - 10.45	2.14	.47 - 9.82	4.02[a]	1.04 - 15.53
Other non-Hispanic/Hispanic	.58	.10 - 3.24	1.84	.47 - 7.18	1.56	.26 - 9.36	1.13	.23 - 5.43
White non-Hispanic	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Education								
Some college	2.24	.49 - 10.22	1.09	.30 - 3.90	1.92	.48 - 7.69	1.42	.39 - 5.16
≥Bachelor's degree	.05	.01 - 0.42	1.44	.30 - 6.81	.97	.13 - 7.00	.38	.03 - 4.77
<HS/HS degree/GED	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.

a. P<.05.

perception addiction scale, the odds of supporting a menthol ban are approximately 2.8 times higher than not supporting a ban (aOR=2.83).

Discussion

Previous studies have found that support for a menthol ban differs by numerous demographic characteristics such as sex, educational attainment, smoking status and race/ethnicity, among others.[26] To our knowledge, this is the first study to examine whether and to what extent menthol-related perceptions are associated with support for a menthol ban among current smokers. The study group was limited to smokers because, overall, non-smokers exhibit more support for a ban than smokers. This is evidenced in our full data with 68% of non-smokers supporting a ban vs 34% of current smokers supporting a ban (data not shown).

Not surprisingly, fewer current menthol smokers support a ban compared with current non-menthol smokers.

Not surprisingly, fewer current menthol smokers support a ban compared with current non-menthol smokers. However, other research findings are mixed; one study found that menthol smokers viewed menthol cigarettes as safer or less harmful than non-menthol cigarettes,[15] while another recent study found that menthol smokers were more likely to perceive their brand as more harmful than other cigarette brands.[35] Some menthol smokers may be smoking menthol under the incorrect assumption that they are a healthier option than non-menthol cigarettes.[36] This is consistent in our respondent group that had lower menthol health perception scores among menthol smokers compared with non-menthol smokers. Scores for the addiction scale and the "don't know" index did not differ by menthol preference.

Nonetheless, more accurate perceptions of menthol among menthol smokers were found to reduce their odds of supporting a ban. This finding suggests that factors other than accurate health perceptions play a significant role in shaping opinions about menthol restrictions for those who use the product. This is consistent with decades of research that demonstrates the continued use of harmful tobacco use despite knowledge of health risks.[35] In contrast, non-menthol smokers that reported lower levels of accurate health perceptions were more likely to support a ban. This variation by menthol preference may reflect the menthol smoker's strong opinions to preserve their product choice and avoid decisions related to switching or quitting.

Findings revealed variations in levels of menthol-related health and addiction perceptions by menthol smoking status. The health perception scale was associated with increased support for a ban among menthol smokers, but not among non-menthol smokers. The addiction perception scale revealed the opposite results with more accurate perceptions associated with increasing support for a ban among non-menthol smokers. These findings highlight the need for tailored messaging strategies targeted to reach menthol smokers who will be most impacted by a ban, despite having the most to gain from such a policy change. Further research using qualitative methods is needed to help identify additional factors that may play a significant role in shaping attitudes toward a menthol ban, particularly among menthol smokers. Building public support is a critical factor as it can influence the policy agenda, decision-maker support, policy implementation, and compliance with new policies.[37]

Study Limitations

This study is not without limitations. Although this nationally representative, address-based sample correctly estimates the probability of selection, this study possesses the potential for measurement and nonresponse bias. Our sample demographics were compared with nationwide averages to determine how well our sample represents those who did not respond. Differences range from 0%-3.6% for age, race and sex. In addition, adding a small telephonic data collection subsample to the primarily online sample may have resulted in some mode differences. However, the subsample was too small to examine possible bias. Moreover, smoking status and brand preference relied on self-reported data.

Conclusion

There is clear evidence that removing mentholated tobacco products from the marketplace would significantly improve the health of the nation. Consistent research has shown that the facilitating appeal of menthol can be a mechanism during the initiation process, leading the smoker to continued use and nicotine dependence.[4] Although there is broad, overall public support for banning these products, those who use mentholated products require carefully designed public education efforts to help build support for restricting these harmful products. Given the large proportions of smokers who lack knowledge of the health consequences and addictive properties of menthol, there is a moral imperative to inform those who use these products. Helping to change knowledge and attitudes about the harmful effects of menthol among those who smoke mentholated cigarettes could be instrumental in promoting a policy initiative that would significantly improve the health of the nation.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Rath, Greenberg, Emelle, Green, Willett, Vallone; Acquisition of data: Rath, Emelle, Vallone; Data analysis and interpretation: Rath, Greenberg, Pitzer, Liu, Willett, Rose, Vallone; Manuscript draft: Rath, Greenberg, Pitzer, Emelle, Green, Liu, Rose, Hair; Statistical expertise: Pitzer, Liu; Administrative: Rath, Greenberg, Emelle, Green, Willett, Rose, Hair; Supervision: Rath, Greenberg, Vallone

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