



## Reactions to using other nicotine and tobacco products instead of menthol cigarettes: A qualitative study of people who smoke menthol cigarettes in the United States

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### ABSTRACT

The US Food and Drug Administration is considering banning menthol cigarettes, which could result in some people who smoke menthol cigarettes switching to other tobacco products (OTPs). This qualitative study explored reactions to using OTPs instead of menthol cigarettes. People who smoke menthol cigarettes (N=40) completed a behavioral economic assessment of the effects of menthol cigarette price increases on OTP purchasing. At the highest price, most participants could not afford menthol cigarettes. Instead, they could purchase non-menthol cigarettes, little cigars/cigarillos (LCCs), e-cigarettes, smokeless tobacco, or medicinal nicotine, or they could abstain from tobacco use. Participants used the OTPs they purchased for three days. During follow-up sessions, participants (n=35) completed semi-structured interviews discussing their purchasing-decisions and experiences using OTPs instead of menthol cigarettes. Interviews were analyzed using reflexive thematic analysis methods. Factors influencing purchasing decisions included flavor, price, prior use of OTPs, interest in trying new OTPs, and perceived ability to satisfy nicotine cravings. Participants described positive experiences using e-cigarettes including the “refreshing” menthol flavor, ability to use in places where cigarettes are prohibited, and convenience of use relative to smoking. Among those using non-menthol cigarettes, many reported they were acceptable but less satisfying products compared to menthol cigarettes while others reported negative reactions to them such as tasting like “cardboard”. Reactions to smoking LCCs were mostly unfavorable but participants said it gave them “something to light”. Multiple considerations may affect switching to OTPs in light of pending menthol cigarette regulation including the availability of menthol-flavored alternatives and (dis)satisfaction with OTPs.

### 1. Introduction

In April 2022, the United States' Food and Drug Administration (FDA) issued a Notice of Proposed Rulemaking to prohibit menthol as a characterizing flavor in cigarettes for the protection of public health. ([Proposes Rules Prohibiting Menthol Cigarettes and Cigars, 2022](#)) If menthol cigarettes are no longer available to purchase, then several behavioral outcomes could occur for people who smoke menthol

cigarettes including: (1) quitting tobacco completely; (2) switching to other combusted tobacco products like non-menthol cigarettes or little cigars/cigarillos (LCCs); or (3) switching to non-combusted tobacco products like e-cigarettes. Cohort studies from Canadian provinces, which began banning menthol cigarettes in 2015, provide insight into how people who smoke menthol cigarettes adapted to the policy. After the provincial bans, people who smoked menthol cigarettes were more likely to make quit attempts compared to people who smoke non-

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menthol cigarettes. (Chaiton et al., 2020a; Chung-Hall et al., 2022) However, most people who smoked menthol cigarettes switched to smoking non-menthol cigarettes; but, there is also evidence, albeit limited, that use of cigars and e-cigarettes increased post-ban and the availability of menthol flavored products may have influenced this. (Chung-Hall et al., 2022; Chaiton et al., 2020b)

Overall, the Canadian results are encouraging that a US menthol cigarette ban would likely have positive public health outcomes by facilitating cessation for some. However, product switching is not fully understood and may differ between countries due to the different tobacco product marketplace/rates of use of other tobacco products (OTPs). One experimental approach to assess product switching is a behavioral economics task that enables researchers to explore how demand for tobacco products changes under different policy scenarios. The Experimental Tobacco Marketplace (ETM) task is a simulated online store that can manipulate tobacco product availability, price, messaging, or other characteristics to understand how potential regulations may affect purchasing decisions and product substitution. (Bickel et al., 2018)

We recently completed an ETM study to understand how increasing the price of menthol cigarettes affected purchasing of tobacco products by people who smoke menthol cigarettes. (Denlinger-Apte et al., 2021) In this study, participants underwent two ETM conditions: one in which menthol-flavored LCCs were available, and one in which they were not; we hypothesized menthol-flavored LCCs, when available, would be the primary substitutes due to their similar attributes to menthol cigarettes (i.e. combusted and flavored). (Denlinger-Apte et al., 2021) Instead, we found menthol-flavored e-cigarettes were the most commonly purchased product, with over two-thirds of participants buying them, followed by non-menthol cigarettes as the second most purchased alternative product. Our behavioral economic data suggest that some people will switch to potentially less harmful, non-combusted products if menthol cigarettes are no longer available; however, others may simply switch to non-menthol cigarettes, which would not confer any public health benefits.

We conducted follow-up interviews to obtain more nuanced understanding of participants' tobacco use behavior, opinions about proposed regulations, and experiences while participating in the ETM study. In a prior qualitative publication, we reported on participants' risk perceptions of menthol cigarettes, knowledge of and opinions about a potential menthol cigarette ban, and their anticipated behavioral response to a menthol cigarette ban. (Denlinger-Apte et al., 2022) Qualitative methods provide a depth and richness of knowledge that quantitative assessments typically cannot capture and are beneficial for exploring the nuance within tobacco regulatory science. The current qualitative manuscript examined participants' (1) decision-making regarding purchasing OTPs during the ETM task and (2) reactions to using OTPs instead of menthol cigarettes in the real world for three days. Such information may help regulators anticipate responses to a federal menthol ban so they can implement strategies to facilitate the transition away from combusted tobacco products.

## 2. Materials and methods

### 2.1. Participants

The study recruited adults who smoked menthol cigarettes from Providence, RI, USA and the surrounding area using multiple recruitment strategies. Additional details about recruitment and eligibility criteria have been reported elsewhere. (Denlinger-Apte et al., 2021; Denlinger-Apte et al., 2022) Brown University's Institutional Review Board (IRB) approved study procedures. Wake Forest University School of Medicine's IRB approved the qualitative data analysis plan. Participants provided written informed consent prior to participation.

### 2.2. Experimental Tobacco Marketplace Task

During two visits, participants completed the ETM task. The virtual store included the participant's usual brand menthol cigarette and OTPs including the corresponding non-menthol cigarette brand, menthol-, mint- and tobacco-flavored LCCs, menthol-, mint- and tobacco-flavored e-liquid pods (e-cigarette device available at no cost), menthol-, mint- and tobacco-flavored smokeless tobacco, mint- and original-flavored nicotine gum, and nicotine patches. Across ETM trials, the menthol cigarettes prices ranged from \$0.12-16.00 per cigarette, while the OTP prices remained constant. For each trial, participants could purchase as many or as few products as they wanted and were told that one trial would be actualized for real-life use. Participants received the products they purchased at the highest menthol cigarette price, when most participants could not afford menthol cigarettes. They were instructed to only use the study products during the three-day field assessments, providing behavioral validation for the task. The primary manuscript provides additional details about the study design. (Denlinger-Apte et al., 2021)

### 2.3. Interview Procedures

Participants completed the study between July 2018 and May 2019. Interviews occurred during the follow-up visit, after participants had completed both ETM conditions and field assessments. After participants completed all procedures and received compensation, author RDA used a semi-structured interview guide to conduct the interviews. The audio-recorded interviews averaged 15 (6-26 range) minutes in length. Although brief in duration, the purpose was to elicit specific information about experiences during the study and opinions regarding regulation. (Gray, 2009)

### 2.4. Data Analysis

Authors KDW and AES conducted reflexive thematic analysis by following the principles outlined by Braun and Clarke. (Braun and Clarke, 2006) They compared the interview transcripts to the audio recordings to ensure data quality and used Atlas.ti Version 8.4 for qualitative data management. (ATLAS.ti [computer program] (2020)) They developed a codebook by identifying relevant codes based on the questions from the interview guide as well as the project aims. They independently coded the transcripts and resolved coding discrepancies. Together, they updated the codebook when necessary. Upon coding completion, they reviewed the data iteratively using a single code or combinations of codes to identify patterns. They derived themes inductively based to their prevalence and salience in the data, with feedback from author RDA.

## 3. Results

In total, 40 participants completed both ETM visits and 35 participants completed interviews. Interviewees were, on average, 36.3 (SD=11.8) years old and smoked 20 (SD=8.6) cigarettes per day (see Supplemental Table 1). Themes and corresponding illustrative quotes are presented in Tables 1-5.

### 3.1. Decision-making during the Experimental Tobacco Marketplace task

Participants discussed a variety of factors influencing their decision-making while completing the ETM task including price, availability of menthol-flavored products, prior experiences with OTPs, interest in trying new products, and needing to satisfy nicotine cravings (Table 1). The majority of participants confirmed that price motivated them when completing the ETM task. Most said they first gravitated towards purchasing menthol cigarettes, but they often had a break-point (i.e., the price in which purchasing stopped). Prices of the OTP motivated some

**Table 1**  
Reasons for purchasing products from the Experimental Tobacco Marketplace

Theme	Illustrative Quotes
Menthol cigarette price	<i>Pretty much what I was gonna get for my buck... When I saw how cheap the menthols could be, that's when I would buy the menthols, and then when they got ridiculously expensive, that's when I bought the non-menthols, and that was that. (Male, 30-39)</i>
Purchased LCCs with leftover account balance	<i>I'm not gonna just buy one of those [LCCs], I'm gonna buy it if I have extra money leftover. Because if I was just trying to get my nicotine off those, I wouldn't have nearly enough. So I was trying to satisfy my nicotine with the JUUL first, and then if I had money leftover, go and buy a Dutch Master or something to smoke with. (Male, 18-19)</i>
Menthol flavor was their priority	<i>I would go with anything menthol, first off. Just because menthol to me is like, I don't know, I'm really attracted to it, I guess you could say. (Male, 20-29)</i>
Prior positive experiences with OTPs	<i>I figured just getting the non-menthol version of what I already smoked would be fine, because I've tried a Newport Red before my study, so I knew I could actually handle just smoking that... (Female, 20-29)</i>
Prior negative experiences with OTPs	<i>Yeah, I don't really like the kind of tobacco they use in cigars and little cigarillos. I've smoked them before, like a regular Dutch Master green grape or whatever, or like a Cuban cigar, but they're not really as pleasurable, they're kinda nasty because tobacco gets in your mouth. (Male, 20-29)</i>
Interested in trying OTPs	<i>Well, I never vaped before, I never did that before, so the fact that they had menthol, non-menthol and being open to something different than just smoking a cigarette, I wanted to give it a try to see if I like it. (Female, 50-59)</i>
Not interested in trying OTPs	<i>I wasn't really looking to try anything new in the study. (Female, 18-19)</i>
Satisfy nicotine cravings	<i>I'm not going to reduce to only smoking from twenty to two cigarettes a day because the cost for my brand changed. I'll still smoke my 20 cigarettes a day. I'm going to buy another brand though. (Female, 30-39)</i>

participants' purchasing decisions, specifically for LCCs – the cheapest products on the ETM. Of the participants who took home LCCs, about half mentioned they purchased the LCCs to use up the remainder of their ETM account balances after purchasing other alternative products.

When menthol cigarettes became prohibitively expensive, many participants prioritized buying other menthol-flavored products, predominantly e-cigarettes. Additionally, nearly two-thirds of participants said that prior experiences with OTPs affected their purchasing decisions. Some participants said they purchased non-menthol cigarettes, LCCs, or e-cigarettes because they had previously used the products, found them to be satisfactory, and therefore felt comfortable purchasing again. Others mentioned they did not purchase OTPs because of negative experiences, especially when using LCCs; so, for these individuals, the OTPs' availability or price on the ETM did not affect their purchasing decisions.

A few participants mentioned approaching the ETM task by considering what type(s) or how much product they needed to satisfy their nicotine cravings during the field assessments. All participants who mentioned nicotine cravings took home non-menthol cigarettes. Finally, some participants said they did not consider purchasing OTPs because they did not have any desire to use those products, while others expressed interest in trying different OTPs they had not previously used.

### 3.2. Reactions to using e-cigarettes

Across the two field assessments, 68-71% of participants took home e-cigarettes, (Denlinger-Apte et al., 2021) with just over half of participants indicating they had never used the device type (i.e. JUUL) prior to the study. Overall, participants described positive experiences when using the e-cigarette (Table 2). Many discussed the e-cigarette as a viable substitute for menthol cigarettes. Participants liked using the e-cigarette

**Table 2**  
Reactions to using e-cigarettes

Theme	Illustrative Quotes
Use where cigarettes are prohibited	<i>It was also easier, and I can smoke that thing anywhere, so I can be at work and not get yelled at for smoking... (Male, 30-39)</i>
No smoke smell	<i>It don't make your fingers stink or your clothes, and I can smoke it in areas where I can't smoke cigarettes. (Male, 30-39)</i>
Convenience of use	<i>It was quick, convenient, concealable... (Male, 20-29)</i>
Satisfied nicotine craving without smoking a cigarette	<i>You don't have to, like a cigarette is anywhere from 5, actually like 10 puffs on it, where a JUUL you just take 2 or 3 and you're fine, you don't have to keep smoking, so. It's actually, I think it'll make you quit or smoke less, and stop buying cigarettes. (Male, 50-59)</i>
Vape more	<i>I think that there should be a shut off button to tell you when you've had enough nicotine as you would in a cigarette... because I found myself sometimes constantly hitting off that vape. (Female, 50-59)</i>
Harshness or throat feel	<i>It was okay, but it was really light and I could barely feel it in my lungs and my throat. (Male, 20-29) I enjoyed that the vaping wasn't as harsh, no irritation of the throat, and there was no flame from a cigarette so it was a smoother hit, making the experience more enjoyable. (Male, 20-29) In the beginning I didn't like it... I didn't like the taste, I was pulling too hard, I was constantly coughing, but then when I, the next time I used it, I just like ran out of cigarettes and I was like oh let me try this right, so I started pulling on it like a cigarette so it wasn't that bad. (Female, 50-59)</i>
Poor battery life	<i>I had it yesterday, I charged it all morning long, and then it lasted until maybe 2 o'clock in the afternoon and then it died. (Male, 30-39)</i>
Reactions to e-cigarette flavors	
Menthol	<i>The classic menthol one was the one I would choose to smoke. The mint was kinda like too minty, and the non-menthol was smooth. (Male, 50-59)</i>
Mint	<i>I think the cool mint was a little bit better than the menthol...satisfied the, more of a menthol taste I guess. You could taste it in your throat. (Male, 30-39)</i>
Tobacco	<i>I just didn't tend to care for the mint and the menthol, I just didn't like it I guess. It just made me feel like I was puffing mouthwash, or like Vick's VapoRub or something like that so, the tobacco one was milder, I enjoyed the flavor of it... (Male, 20-29)</i>

indoors and in public spaces where smoking cigarettes is prohibited. Some participants, particularly those who were naive users, appreciated the lack of smoke smell. Many participants, especially those who had previously used e-cigarettes, found the device's size and ease of operation to be convenient. Some participants compared the e-cigarette to previously used devices and noted that it was much smaller and lighter. Several participants said they liked having the ability to take a few of puffs from the e-cigarette rather than smoke a whole cigarette. They also felt using the e-cigarette generally satisfied their nicotine craving. However, a few participants said they used the e-cigarette more frequently either due to being easily accessible or because the nicotine level was not as high as a cigarette. One participant suggested there should be a shut off button to let users know when they have vaped the amount of nicotine equivalent to a cigarette. The majority of participants who took home the e-cigarette described their reactions to the menthol-, mint- and tobacco-flavored e-liquid pods. About half preferred the menthol flavor, another third preferred the mint flavor, and a few preferred the tobacco flavor.

Participants reported mixed feelings about the e-cigarette's harshness and throat feel. Several said the vapor was too harsh on their throat, especially on first use. This experience was more common among naive

**Table 3**  
Reactions to smoking non-menthol cigarettes

Theme	Illustrative Quotes
Acceptable but not as good as menthol cigarettes	<i>Smoking the Newport Reds, the smoking was the same, its just smoking a different brand and they just taste a little bit shittier than the brand I would have liked, and that's pretty much the difference. (Male, 30-39)</i>
Disliked taste	<i>...they're kinda gross tasting [non-menthol cigarettes], but then afterwards it lingers, and then also on top of that I'm missing the taste of my menthol every time because I'm so used to it, so I, not every time but sometimes I'd, when I smoked a regular cigarette, a little afterwards I'd use the vape to kind of cover up the taste with the menthol taste. (Female, 20-29)</i>
Less satisfying cigarettes	<i>It does reduce the craving but it doesn't diminish it, whereas having a menthol cigarette would diminish the craving, it would be like "Oh, craving satisfied," whereas having one of those is like having a diet product versus the full amount of fat or sugar that would come in that product, it's like oh well now I want more of it, or I'm not as interested or it's not as satisfying (Female, 30-39)</i>
Harsher smoking experience	<i>I hate non-menthol cigarettes...I think they're horrible, I think they hurt, they hurt, they hurt my head, they hurt my throat, they stink even more than my cigarettes and I don't like them, but smoke them anyway. (Genderfluid, 30-39)</i>
Brand loyalty increased appeal	<i>I like the Newport Reds because, not that a brand name is deciphering, but they were Newport so it kinda made me feel like they're still Newport so they weren't that bad... (Female, 18-19)</i>
Smoking less	<i>I found that when I smoke the Newport Reds at home, I smoked less. And actually now that I think about it, I didn't cough as much phlegm either...I think maybe because I didn't desire it as much, so, I didn't look forward to it. (Female, 30-39)</i>

**Table 4**  
Reactions to smoking little cigars and cigarillos

Theme	Illustrative Quotes
Harsher smoking experience	<i>The silver ones [Dutch Master cigarillos], if I were to, I have smoked them before by themselves with no marijuana in them, they're a bit harsh, I tend to inhale without meaning to instead of like the traditional cigar you just leave it in your mouth to taste it, the flavor isn't my favorite but if I was craving nicotine and I had a dollar I would smoke it by itself probably. (Male, 20-29)</i>
Lasted longer than cigarettes	<i>Mm, not too pleasant, pretty harsh. I can only smoke half of one at a time and I put it out, and later I would smoke another half making it a whole one. (Male, 20-29) Those were a little harsh, it felt like it was like two cigarettes to one, so it was kinda hard because I was so used to smoking one cigarette, so sometimes I'd have to put it out and smoke it again, but once you put it out it doesn't taste right, it tastes like ash. (Female, 30-39)</i>
Mimicked lighting up cigarettes	<i>I didn't smoke a lot of them while I was in the study because I vastly preferred the JUUL over the Cheyenne's, but if I really wanted a cigarette and none were available, I did smoke it like a cigarette. (Male, 20-29)</i>
Preferred menthol flavoring	<i>I didn't like the non-menthols at all. Same reason as cigarettes. I just like menthol better. (Male, 20-29)</i>

users. A few described it as a smoother and less harsh hit than a cigarette, which they liked. However, a few others said they could barely feel the throat hit and would have liked it to be stronger. Several participants, particularly naïve users, stated there was a learning curve for properly using the e-cigarette, but their vaping experience improved over time. Some participants disliked frequently charging the e-cigarette and felt it needed a longer battery life. Other factors participants disliked about the e-cigarette were the e-liquid pods ran out quickly, it was easy to misplace, and the settings or strength of the hit were not adjustable, unlike other vaping products.

**Table 5**  
Study non-adherence

Theme	Illustrative Quotes
Adherence was challenging for the first cigarette of the day	<i>So mainly every single morning with my cup of coffee I'd have a cigarette. [Interviewer: Okay, did you try to use the vape during that time?] No [laughs]. I think the very first day I did and it wasn't doing the trick so I had a cigarette and then the next day I was like "No, I'll just do the cigarette first thing in the morning." (Female, 50-59)</i>
Adherence was challenging in social situations	<i>My girlfriend, she's not a good, she peer pressured me into smoking a couple times, I have to admit that she did, like she came over to my house and she's a smoker so she smokes what I smoke, the L&amp;M menthol 100's (Male, 30-39)</i>
Adherence was challenging in other situations	<i>Yes, in the mornings because I need that first cigarette to wake up with, and then being outside, I want that cigarette, waiting for the bus, and then like after dinner, and then before I go to bed I had to have my goodnight cigarette. But, when I didn't have those I was using the vape. (Female, 30-39)</i>
Not satisfied with the OTPs purchased from the ETM	<i>Well I wanted to stretch it, because I don't, because I tried to stay to the focus of the study and actually use only those devices those three days, and that was hard, that was real hard. So I figured, I said to myself, I said if I mix it up, maybe I'll last longer. (Male, 30-39)</i>

### 3.3. Reactions to smoking non-menthol cigarettes

Across the two field assessments, 37-44% of participants took home non-menthol cigarettes, (Denlinger-Apte et al., 2021) with the majority having previously tried non-menthol cigarettes. Most participants who used non-menthol cigarettes thought they were acceptable substitution products, although they did not prefer them (Table 3). Several reported strong negative reactions when smoking the non-menthol cigarettes (e.g. "horrible" or "disgusting"), while one participant thought the non-menthol cigarettes were more satisfying and had a better sensation than their menthol cigarettes. Many participants did not like the taste compared to their menthol cigarettes and felt smoking non-menthol cigarettes left them with an unpleasant aftertaste or a "chalky mouth". A few participants said they used the e-cigarette immediately after smoking a non-menthol cigarette to cover up the taste. Others who purchased non-menthol cigarettes liked that they were the same brand as their menthol cigarettes, and believed the tobacco was high quality because of the brand.

Compared to menthol cigarettes, a few participants described non-menthol cigarettes as less satisfying because they did not wake them up as much in the morning, were not as effective at calming them down, or they did not feel the non-menthol smoke in their lungs to the same extent as menthol smoke. One participant compared the difference between menthol and non-menthol cigarettes to the difference between full fat and diet food products. A few participants reported they smoked fewer non-menthol cigarettes or smoked less frequently, primarily because they found the non-menthol cigarettes less satisfying. Other participants described non-menthol cigarettes as harsher, saying they hurt their throat when smoking them, or resulted in headaches, nausea, or heartburn, although most of these participants continued to use them despite the negative experiences.

### 3.4. Reactions to smoking little cigars or cigarillos

Across the two field assessments, 12-17% of participants took home menthol-flavored LCCs while 0-22% took home tobacco-flavored LCCs, (Denlinger-Apte et al., 2021) with most indicating prior use of the products. Participants described the LCCs as harsher or stronger than menthol cigarettes (Table 4). They said it was harder to draw smoke, it hurt their lungs or chest to do so, or the nicotine content resulted in nausea or headaches. Several participants said the LCCs lasted longer

than their regular cigarettes, though they had mixed opinions on this experience. A few participants liked that they could smoke each LCC multiple times, and one appreciated the re-sealable packages. Alternatively, one participant felt they lasted too long and another did not like the taste of relit LCCs. Although not preferred, a few participants liked that LCCs gave them “something to light,” or resembled a cigarette, and would smoke them when they wanted a cigarette. Several participants compared the menthol- and tobacco-flavored LCCs, with all preferring the menthol flavor or reporting it was less harsh.

### 3.5. Study non-adherence

The majority of participants reported non-adherence during the field assessments (i.e., use of tobacco products not purchased from the ETM) with most smoking menthol cigarettes (see Table 5). Adherent and non-adherent participants identified the most challenging situations in which to avoid smoking menthol cigarettes: (1) the first cigarette of the day and (2) when spending time with friends or a significant other, particularly if they also smoked menthol cigarettes. Other situations participants reported as challenging for maintaining study adherence included the last cigarette of the day, after meals, during times of high stress, or following sexual activity. A few participants indicated adherence was difficult because the products they purchased from the ETM were hard to use, they did not like the OTP, or they ran out of ETM-purchased products.

## 4. Discussion

People who smoke menthol cigarettes may soon face a US tobacco market that does not include their preferred products. We previously reported that menthol e-cigarettes and non-menthol cigarettes functioned as the primary substitution products when menthol cigarette were restricted. (Denlinger-Apte et al., 2021) Here, we expanded upon the behavioral economic findings by exploring participants’ purchasing decisions while completing the ETM task as well as their experiences using OTPs in lieu of menthol cigarettes to better understand how people may react when menthol cigarettes are not available to purchase.

The feedback regarding short-term e-cigarette use was generally positive with participants reporting satisfactory nicotine levels, enjoyable flavors, and simplicity of use. As reported previously, a few participants even stated their intentions to switch completely to e-cigarettes if menthol cigarettes were no longer available. (Denlinger-Apte et al., 2022) For individuals who are unable or unwilling to quit using nicotine completely, switching to e-cigarettes could potentially yield public health benefits by reducing exposure to the harmful byproducts of combustion. (National 2018)

However, our qualitative data highlight a few potential concerns about switching to e-cigarettes. First, participants indicated they used the e-cigarette in locations where cigarettes are prohibited, also known as stealth vaping. (Yingst et al., 2019; Russell et al., 2021) Clean indoor air laws have contributed to the reductions in smoking prevalence in the US; (Becker et al., 2017) so, stealth vaping could be problematic if it contributes to re-normalizing tobacco use behavior in public. Additionally, this perception of being able to use e-cigarettes in tobacco-restricted locations could result in increased use. Typically, people will smoke a cigarette during a discrete period and then experience a short period of abstinence. With e-cigarettes, people can puff continuously on the device essentially eliminating periods of abstinence. Some participants stated they used the e-cigarette more than intended and one person suggested adding a shut-off button to help regulate nicotine exposure. Such patterns of e-cigarette use could result in increased nicotine dependence, which may make it difficult for people to quit tobacco completely. Another potential concern are the operational requirements for using e-cigarettes relative to smoking cigarettes. Although more participants felt the e-cigarette was convenient or easy to use, a few participants criticized the battery life for being too short or

said the e-liquid pods ran out too quickly. Others also mentioned forgetting or misplacing the e-cigarette due to its smaller size relative to cigarette packs. If people are not satisfied with how to operate the e-cigarette or having difficulty keeping track of it, then they may not view them as viable substitution products for menthol cigarettes.

Reactions to smoking non-menthol cigarettes during the field assessments varied. In general, most participants who purchased non-menthol cigarettes felt they were acceptable alternatives to menthol cigarettes albeit not preferred. This theme is consistent with the Canadian cohort study that found the majority of people who smoked menthol cigarettes switched to non-menthol cigarettes after the ban. (Chung-Hall et al., 2022) For these individuals, the policy benefits of a menthol cigarette ban are negligible, since switching from one combusted product to another would not have improved health outcomes. Yet, several participants noted without menthol flavoring, cigarettes were not as satisfying or appealing and some even reported reductions in smoking behavior compared to regular smoking habits, indicating a potential pathway to beneficial behavior change. Our qualitative findings align with a 4-week extended exposure study that found significant reductions in the number of cigarettes smoked per day, biomarkers of exposure, and decreases in cigarette satisfaction among people switched from menthol to non-menthol cigarettes. (Bold et al., 2020)

We included the corresponding non-menthol cigarette brand on the ETM as a potential substitute, anticipating brand loyalty could be an important factor for people affected by a menthol cigarette ban. Many participants who used non-menthol cigarettes said they did not like smoking them as much as menthol cigarettes; however, some appreciated that they were the same brand as their menthol cigarettes. This brand loyalty suggests a menthol cigarette ban could have little public health impact on these individuals, especially since the tobacco industry is prepared for pending policy changes. After the Canadian menthol ban, the tobacco industry created marketing campaigns intended to convey menthol cigarette appeal and characteristics (e.g., “smooth taste”, green packaging) for their new non-menthol brands. (Brown et al., 2017; Schwartz et al., 2018) Health communication campaigns highlighting brand loyalty as a tobacco industry tactic to maintain smoking behavior may help to discourage people from switching to non-menthol cigarettes in lieu of quitting or completely switching to non-combusted products.

Not surprisingly, our findings indicate that menthol flavoring, whether in other combusted or non-combusted products, was an important factor for purchasing decisions among people who smoke menthol cigarettes. However, menthol flavoring, depending mode of delivery, may be insufficient for fully addressing menthol cigarette cravings. Thus, dual purchasing of e-cigarettes and non-menthol cigarettes was common. (Denlinger-Apte et al., 2021) Some used the e-cigarette immediately after smoking non-menthol cigarettes to cover up the undesirable taste. If people use non-menthol cigarettes to satisfying their cigarette cravings and menthol e-cigarettes to satisfying their menthol craving, then the policy benefits will likely be negligible for these individuals. Future qualitative research with dual users of cigarettes and e-cigarettes should explore how people determine which product to use and when, since this information was beyond the scope of the current study.

Despite being the least expensive, mentholated, and combusted tobacco product available on the ETM, menthol LCCs were not the primary substitution products for menthol cigarettes, as hypothesized. (Denlinger-Apte et al., 2021) Among the few participants who took home LCCs, most reported the LCCs were harsher, lower quality products. Others specifically reported not buying LCCs because they had used them in the past and did not care for them. However, regardless of our study findings, the inclusion of flavored cigars as part of the FDA’s recent Notice of Proposed Rulemaking (Proposes Rules Prohibiting Menthol Cigarettes and Cigars, 2022) will ensure that flavored LCCs do not function as menthol cigarette substitutes.

There are a few limitations to acknowledge when interpreting the study results. First, qualitative research findings will not generalize to all

people who smoke menthol cigarettes. Second, we did not conduct subgroup analyses among participants identifying as racial/ethnic minorities due to the small sample size. Additional research is needed to understand if there are differences in use behaviors among these priority smoking populations who disproportionately smoke menthol cigarettes. Third, we restricted OTPs flavors to menthol, mint, or tobacco. However, LCCs and e-cigarettes are currently available in a variety of flavors, which may have limited purchasing. Future studies should examine how a additional flavor options affect use among people who smoke menthol cigarettes. Fourth, for participants who purchased e-liquids from the ETM, we loaned the e-cigarette device to them to use during the field assessments, which may reduce the external validity of the task. In the real world, the additional device costs could deter people from purchasing e-cigarettes. Fifth, for those who purchased multiple products from the ETM, we did not explicitly ask participants to make comparisons across products, so we do not have information on rank ordering of preference. Finally, non-adherence was common, suggesting that OTPs purchased from the ETM were not as appealing or satisfying as menthol cigarettes.

## 5. Conclusions

A recent simulation study estimated that banning menthol cigarettes could result in approximately 650,000 fewer smoking-attributable deaths in the US by the 2060. (Levy et al., 2021) The current study contributes important information to the literature about how people who smoke menthol cigarettes may respond if the FDA prohibits menthol as a characterizing flavor in cigarettes. Regulators and public health officials should be prepared to help people transition away from combusted tobacco by emphasizing the benefits of quitting smoking and making medicinal nicotine widely available as part of the policy implementation plan. For people who are unwilling or unable to stop using nicotine, the availability of menthol-flavored e-cigarettes, which many participants in the current study said functioned as substitutes for menthol cigarette, may help to minimize switching to non-menthol cigarettes. However, the FDA has yet to authorize the sale of any menthol-flavored e-cigarettes, likely due to concerns about youth appeal. (Denies Marketing, 2022) Public health messaging that clearly articulates the potential benefits and relative risks of e-cigarettes for adults who smoke while simultaneously acknowledging the harms of youth vaping will be critically important for balancing the tradeoffs between harm reduction and prevention.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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