

Original Investigation

# An Expert Elicitation on the Effects of a Ban on Menthol Cigarettes and Cigars in the United States

David T. Levy PhD<sup>1,✉</sup>, Christopher J. Cadham MA<sup>1</sup>, Luz Maria Sanchez-Romero MD, PhD<sup>1,✉</sup>, Marie Knoll MA<sup>1</sup>, Nargiz Travis MA<sup>1</sup>, Zhe Yuan MS<sup>1</sup>, Yameng Li MS<sup>1</sup>, Ritesh Mistry PhD<sup>2</sup>, Clifford E Douglas JD<sup>3</sup>, Jamie Tam PhD<sup>4,✉</sup>, Aylin Sertkaya PhD<sup>5</sup>, Kenneth E. Warner PhD<sup>3</sup>, Rafael Meza PhD<sup>6,✉</sup>

<sup>1</sup>Department of Oncology, Georgetown University-Lombardi Comprehensive Cancer Center, Washington, DC, USA;

<sup>2</sup>Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, MI, USA; <sup>3</sup>Department of Health Management and Policy, University of Michigan School of Public Health, Ann Arbor, MI, USA; <sup>4</sup>School of Public Health, Yale University, Hartford, CT, USA; <sup>5</sup>ERG, Lexington, MA, USA; <sup>6</sup>Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, MI, USA

Corresponding Author: David T. Levy, Georgetown University, 3300 Whitehaven Street, NW, Suite 4100, Washington, DC 20007, USA. Telephone: 202 687 0863; Fax: 202-687-8444; E-mail: [DL777@georgetown.edu](mailto:DL777@georgetown.edu)

## Abstract

**Introduction:** The US Food and Drug Administration announced its intention to ban menthol in cigarettes. However, information is needed on how a federal ban would affect population health.

**Aims and Methods:** We conducted an expert elicitation to gauge the impact of a menthol cigarette and cigar ban in the United States. We developed and pilot tested a questionnaire that focused on tobacco use transitions of current smokers (age 18–24 menthol, age 35–54 menthol, and age 35–54 nonmenthol) and potential menthol smokers (age 12–24). Using a structured expert elicitation, we estimated mean net transitions under a ban from cigarette use to combustible tobacco product, smokeless tobacco, novel nicotine delivery product (NNDPs, such as e-cigarettes) use, or no tobacco use.

**Results:** Eleven experts provided responses. Of those ages 12–24 who would have initiated menthol cigarette use in the absence of a ban, the experts estimated that 41% would still initiate combustible products under a ban, while 18% would initiate with NNDPs and 39% would not initiate regular tobacco use. Combustible use by menthol smokers ages 35–54 was expected to decline by 20% postban relative to preban rates, half switching to NNDPs and half quitting all tobacco use. Menthol smokers ages 18–24 were expected to reduce combustible use by 30%, with 16% switching to NNDPs. Greater reductions in combustible use were estimated for African Americans across the three age groups. Negligible impacts were expected for current adult nonmenthol smokers.

**Conclusions:** According to expert opinion, a menthol ban is expected to substantially reduce smoking initiation and combustible tobacco product use among current menthol smokers.

**Implications:** The US Food and Drug Administration recently announced its intention to ban menthol in cigarettes, but information on the potential impact on smoking and other nicotine product use is limited. We conducted an expert elicitation to gauge the impact of a menthol cigarette and cigar ban in the United States. A panel of experts estimated that menthol smokers ages 35–54 would reduce combustible tobacco use by 20%, with half switching to

e-cigarettes and half quitting all nicotine use. Larger reductions were expected at younger ages, and menthol smoking initiation was reduced by 59% with 18% instead using e-cigarettes. African Americans were expected to have greater reductions in combustible tobacco use than the rest of the population.

## Introduction

Despite an overall decline in smoking, menthol cigarette use remains stable in the United States and accounts for roughly one-third of the cigarette market.<sup>1-3</sup> Menthol use has been associated with increased smoking initiation, higher nicotine dependence, and decreased smoking cessation.<sup>4-7</sup> Menthol cigarettes are disproportionately used by youth, young adults, women, and African Americans—and contribute to tobacco-related health disparities.<sup>3,8</sup>

Recognizing the role that menthol flavoring plays in facilitating smoking, Brazil banned menthol cigarettes in 2012 and was soon followed by Ethiopia, Canada, Turkey and the European Union.<sup>9</sup> In the United States, more than 20 localities and 2 states (California and Massachusetts) have banned menthol cigarettes.<sup>10</sup> Recently, the Food and Drug Administration (FDA) announced its intention to ban menthol in cigarettes nationwide.<sup>11</sup> However, evidence is needed that such a ban would improve public health.<sup>12,13</sup>

While an extensive literature examines menthol use in general,<sup>4-7</sup> less is known about the impact of a menthol ban. A recent literature review found strong evidence of the effect of a ban on increasing smoking cessation, but a paucity of evidence for the impact on smoking initiation.<sup>14</sup> Additionally, a menthol ban may indirectly impact nonmenthol smokers, such as through network effects (eg, the influence of a peer quitting menthol cigarettes on a nonmenthol smoker).<sup>14,15</sup>

To better gauge the potential impact of a menthol cigarette ban in the United States, we conducted an expert elicitation (EE). In this process, the judgment of a group of experts is systematically collected and synthesized to develop point estimates and credible bounds for an unknown parameter.<sup>16-22</sup> EEs have been used by the US Environmental Protection Agency and other federal agencies, as well as the Intergovernmental Panel on Climate Change.<sup>17</sup> In the field of tobacco control, EEs have been used to estimate the health risks and behavior regarding low-nitrosamine smokeless tobacco<sup>23,24</sup> and the effects of requiring low-nicotine content cigarettes.<sup>25</sup>

We sought to assess the potential effects on cigarette use of a federal menthol ban on tobacco and e-cigarette product use through an EE. We focused on the effect of a ban on menthol flavoring in both cigarettes and cigars, since little cigars have been found to be a close substitute for cigarettes.<sup>26-28</sup> Results from this EE offer estimates of the potential effects of a menthol ban on tobacco use and

can be applied in future simulation of the public health impacts to inform policy.

## Materials and Methods

We developed the elicitation process and analysis in five main steps: questionnaire development, pilot testing, expert selection, the elicitation, and data aggregation. A detailed description is available as a [Supplementary Report](#).

### Questionnaire Development

A questionnaire was developed to seek judgment on behavioral transitions under a *Status Quo Scenario* in which there is no ban on menthol flavors in tobacco products and under a federal *Menthol Ban Scenario* that bans menthol in cigarettes and cigars. We asked separate questions for the total population and the African American population (see [Supplement 3](#)).

We asked about different tobacco use behaviors by age group and menthol or nonmenthol smoking status ([Table 1](#)). Experts provided best estimates for a range of transitions in response to a ban. First, we asked about initiation among youth and young adults (ages 12–24) who would have initiated menthol cigarette use by age 24 under the Status Quo. Experts considered a range of transitions that included instead initiating into (1) nonmenthol cigarettes, (2) nonmenthol cigars (including little cigars), (3) illicit menthol cigarettes or cigars,<sup>29</sup> (4) smokeless tobacco, (5) novel nicotine delivery products (NNDPs, such as e-cigarettes and heated tobacco products), and (6) no regular tobacco product (cigarette, cigar, smokeless, or NNDP) use.

We then asked about product switching and cessation over a 2-year period among: (1) current adult menthol smokers (ages 35–54) to isolate the effects when smoking is more established and (2) young adult menthol smokers (ages 18–24) to gauge the impact when patterns of use are less established. While the status quo for those who would have initiated into menthol cigarettes is well defined, we asked the experts about transitions that would occur in the absence of a ban among those already current smokers to provide the relevant status quo. The transitions under the Status Quo and the Menthol Ban Scenarios fall into the same categories of use listed above for ages 12–24, but with transitions in terms of switching rather than initiating and of quitting rather than not using tobacco products.

**Table 1.** The Questions Included Under the Status Quo (No Ban) and Menthol Ban Scenarios

| Questions # | Age group | Type of user              | User population       | Scenario    | Transition type         |
|-------------|-----------|---------------------------|-----------------------|-------------|-------------------------|
| 1           | 12–24     | Future menthol smokers    | All, African American | Menthol Ban | Initiation              |
| 2           | 18–24     | Current menthol smoker    | All, African American | Status Quo  | Switching and cessation |
| 3           | 18–24     | Current menthol smoker    | All, African American | Menthol Ban | Switching and cessation |
| 4           | 35–54     | Current menthol smoker    | All, African American | Status Quo  | Switching and cessation |
| 5           | 35–54     | Current menthol smoker    | All, African American | Menthol Ban | Switching and cessation |
| 6           | 35–54     | Current nonmenthol smoker | All, African American | Status Quo  | Switching and cessation |
| 7           | 35–54     | Current nonmenthol smoker | All, African American | Menthol Ban | Switching and cessation |

Finally, we included a question for nonmenthol smokers ages 35–54 to examine any indirect effects of a ban. For this age group, the experts were given the option of continued nonmenthol cigarette use as well switching into menthol cigarette use. The transitions under the Status Quo fall into the same categories listed above for menthol smokers at ages 18–24 and 35–54. Although nonmenthol smokers are allowed to become menthol smokers in the Status Quo Scenario, they are not expected to be illicit menthol smokers in the Menthol Ban Scenario.

To facilitate the experts' responses to each question, we asked them to estimate the transitions of 100 representative individuals in each subgroup of users. The experts' assignments of the 100 individuals were required to add to 100. Experts were asked to focus on transitions into and out of regular rather than experimental use, since regular use is more directly relevant to health outcomes. Regular use for cigarettes was defined as current use and having smoked at least 100 cigarettes in one's lifetime. For other tobacco products, we asked experts to apply their own definitions of regular use. Cessation was defined as having quit regular use for at least 6 months. Switching products was defined as having switched to regular use of another product and no longer being a regular user of the original product. Rather than provide experts with all possible combinations of dual and poly-product use, we asked experts to consider dual users of cigarettes with other products as exclusive cigarette users. Since some smokers use both menthol and nonmenthol cigarettes, experts were asked to distinguish based on the product primarily used.

### Pilot Testing

The questionnaire was piloted by 10 individuals who had tobacco control research experience. Pilot testers provided written feedback on the structure of the questionnaire. Overall, feedback from pilot testers was positive and the questionnaire was shortened and re-ordered to address their concerns.

### Expert Selection

We adopted a three-pronged approach to the identification of experts. First, we selected lead and senior authors of studies identified in a scoping review on the impact of menthol and flavor bans.<sup>14</sup> Second, we searched Scopus to identify individuals who were among the most published authors on the topic of menthol tobacco. Similar to the method adopted by the FDA for their expert panel,<sup>21</sup> we selected the top 30 authors identified by Scopus and removed those with an H-Index of less than 20. Finally, we consulted expert advisors of our FDA-sponsored TCORS 2.0 Center (CAsToR) on their recommendations. Our methodology originally identified 82 experts. Three experts were eliminated because of affiliations with CAsToR. Of the remaining 79 experts, 16 were identified and ranked based on their menthol publications and H-Index. In consultation with our expert advisors, we determined that 10 experts would be sufficient. We sent invitations to participate to the 12 top-ranked experts. They were informed that they would receive \$1200 in compensation conditional upon completion. All but one invitee agreed to participate, leaving a final sample of 11 experts (listed in [Supplement 1](#)).

### Elicitation Process

First, we asked our experts to review a compilation of background materials. These included Wave 2 Population Assessment of Tobacco and Health (PATH) data on menthol versus nonmenthol cigarette and e-cigarette use prevalence, a review on menthol versus nonmenthol cessation and initiation,<sup>7</sup> a review on studies of menthol bans,<sup>14</sup> and

the FDA's Preliminary Scientific Evaluation of the Possible Public Health Effects of Menthol versus Nonmenthol Cigarettes Report.<sup>5</sup>

In the first round, experts completed an online questionnaire using the Qualtrics platform. At the end of the questionnaire, experts provided brief answers to four open-ended questions regarding (1) their conception of "regular use" for noncigarette products, (2) likely sources for illicit menthol products under the ban, (3) whether transitions would substantially differ by gender, and (4) the impact of raising the minimum age for tobacco products to 21 on their estimates.<sup>7</sup>

For the second round, we shared the anonymized responses to the questionnaire along with a summary of the group mean, minimum, and maximum for each transition with each participating expert. Experts were given the option of revising their responses, which enabled them to consider others' answers and possibly move toward consensus.<sup>16,17,21</sup> In addition to their revisions, we also asked experts to indicate their level of confidence for each question (1 = not at all to 4 = very).

### Data Aggregation

We analyzed outcomes from the second round of the EE. We present the mean and median for each transition corresponding to the particular question. We used the mean to ensure that all transitions sum to 100%, but also considered the median as a way of eliminating extreme estimates. As a gauge of uncertainty, we also report minimum and maximum responses.

For each age and menthol group, we estimated average net transitions under the ban. Individual net transitions were calculated as the change in use for each product category between the Status Quo and Menthol Ban Scenarios, that is, the net transitions due to the ban. For example, if an expert indicated that out of 100 menthol smokers, 40 would transition to NNNDPs under the status quo and 60 under the menthol ban, then the net transition due to the ban is 20 (=60 - 40). We then calculated the mean net transition over all 11 experts. While different combustible products were included in the Status Quo and Menthol Ban Scenarios, we aggregated all combustibles (cigarettes and cigars) into a category of total combustibles.

### Results

All 11 experts completed both rounds. Responses changed little between rounds and four experts did not change their answers in the second round. The most frequent changes observed were an increase in estimates for switching to nonmenthol cigarette use or quitting and a decrease in switching to NNNDP use (see [Supplementary Report](#) for further discussion).

#### Initiation by Those Aged 12–24 Who Would Have Become Menthol Cigarette Users

The responses of experts on the transitions of 12–24-year olds who would have otherwise initiated menthol use are presented in [Table 2](#). The Status Quo was 100% menthol cigarette use by age 24. Under a ban, experts on average estimated that 33.0% would instead initiate nonmenthol cigarettes, 5.5% would initiate nonmenthol cigars, and 2.6% would initiate illicit cigarettes, implying that a total of 41.1% would still initiate combustibles. An average of 17.6% would initiate NNNDPs (e-cigarettes or heated tobacco), 2.2% would initiate smokeless tobacco, and 39.1% would not use tobacco and NNNDP products.

Box plots in Figure 1A show that the median estimates were similar to the mean except for total combustible use (46.0% vs. 41.1%) and no product use (30.0% vs 39.1%), for which there were wide variations in responses. Box plots also show a wide variation in the percent of menthol smokers who would remain combustible product users, with one expert's estimate at 83.0% compared to the median (46.0%). There was wide variation in the percent transitioning to no use, with two estimates at 92.0% and 80.0% compared to a median of 30.0%. There was less variation in the estimates for transition to NNDP use with most experts responding close to 15%, but two below 10%.

The experts generally anticipated greater impacts of a menthol ban on African Americans compared to the total population. Experts estimated that African Americans ages 12–24 years would be less likely to initiate nonmenthol cigarettes (26.3% vs. 33.0% for the total population) and NNDPs (14.6% vs. 17.6%), and more likely to become nonusers (48.2% vs. 39.1%).

### Product Switching by Menthol Smokers Ages 18–24

The experts' mean responses on switching and cessation among menthol smokers ages 18–24 are presented in Table 3. Under the Status Quo over the next 2 years, 70.2% of menthol smokers were expected to remain menthol smokers, while 6.9% were expected to become nonmenthol cigarette smokers and 3.5% cigar smokers, implying that 80.6% would remain combustible users. The experts anticipated an additional 8.5% would switch to NNDPs and 1.5% to smokeless tobacco, with 9.4% quitting all regular tobacco product use. Under a menthol ban, the percent that would remain combustible users was expected to drop from 80.6% to 50.5% (40.3% nonmenthol cigarettes, 6.5% illicit menthol cigarettes, and 3.7% nonmenthol cigars), a 30.1 percentage point (pp) reduction. About a quarter (a 15.6 pp increase) were expected to switch to NNDP use, while 3.7% would switch to smokeless tobacco and 21.7% would quit all tobacco use.

Boxplots in (Figure 1B) show that the median was similar to the mean for all categories. The variation in net effects was greatest for reducing combustible product use (mostly 10%–42%) and for those switching to NNDPs (mostly 5%–25%) with less variation in quitting regular use, despite one outlier.

Under a ban, African American menthol smokers ages 18–24 were predicted to be less likely to switch to nonmenthol cigarettes (35.1% vs. 40.3% for the whole population) or NNDPs (21.6% vs. 24.1%) and to be more likely to quit all regular use (25.2% vs. 21.7%) than the rest of the population.

### Product Switching by Menthol Smokers Ages 35–54

Under the Status Quo, 67.9% of menthol smokers ages 35–54 were expected to remain menthol smokers over the next 2 years, while 4.6% were expected to become nonmenthol cigarette smokers and 2.7% cigar smokers, implying that 75.2% would remain combustible product users (Table 4). About 10.0% were expected to switch to NNDPs, almost 3.0% to smokeless tobacco and 12.5% would quit all regular use. Under a ban, experts expected 55.1% to remain combustible users (45.7% nonmenthol cigarettes, 5.7% illicit menthol cigarettes, and 3.7% nonmenthol cigars), resulting in a reduction in combustible product use of 20.1 pp. One-fifth (20.0%) were expected to switch to NNDP use (a 10.3 pp increase from the Status Quo), while 2.4% would switch to smokeless tobacco (a 0.2 pp decrease) and 22.5% quit all tobacco use (10 pp increase).

The medians are comparable to the means for all transitions. Figure 1C also shows the largest net changes and widest ranges for those remaining combustible users and those switching to NNDPs. With an interquartile range of 0%–23%, there was one negative value of –10%. There was less variation in transitions to no use. With an interquartile range of 4%–12%, there were two outliers of 26% and 36%.

Under a menthol ban, African American menthol smokers ages 35–54 were expected to be less likely to become nonmenthol smokers than the population as a whole (39.6% vs. 45.7%). The

**Table 2.** Transitions of Ages 12–24 Who Would Have Initiated as Menthol Smokers, Under a Menthol Ban, Total and African American Population (% Transitions)

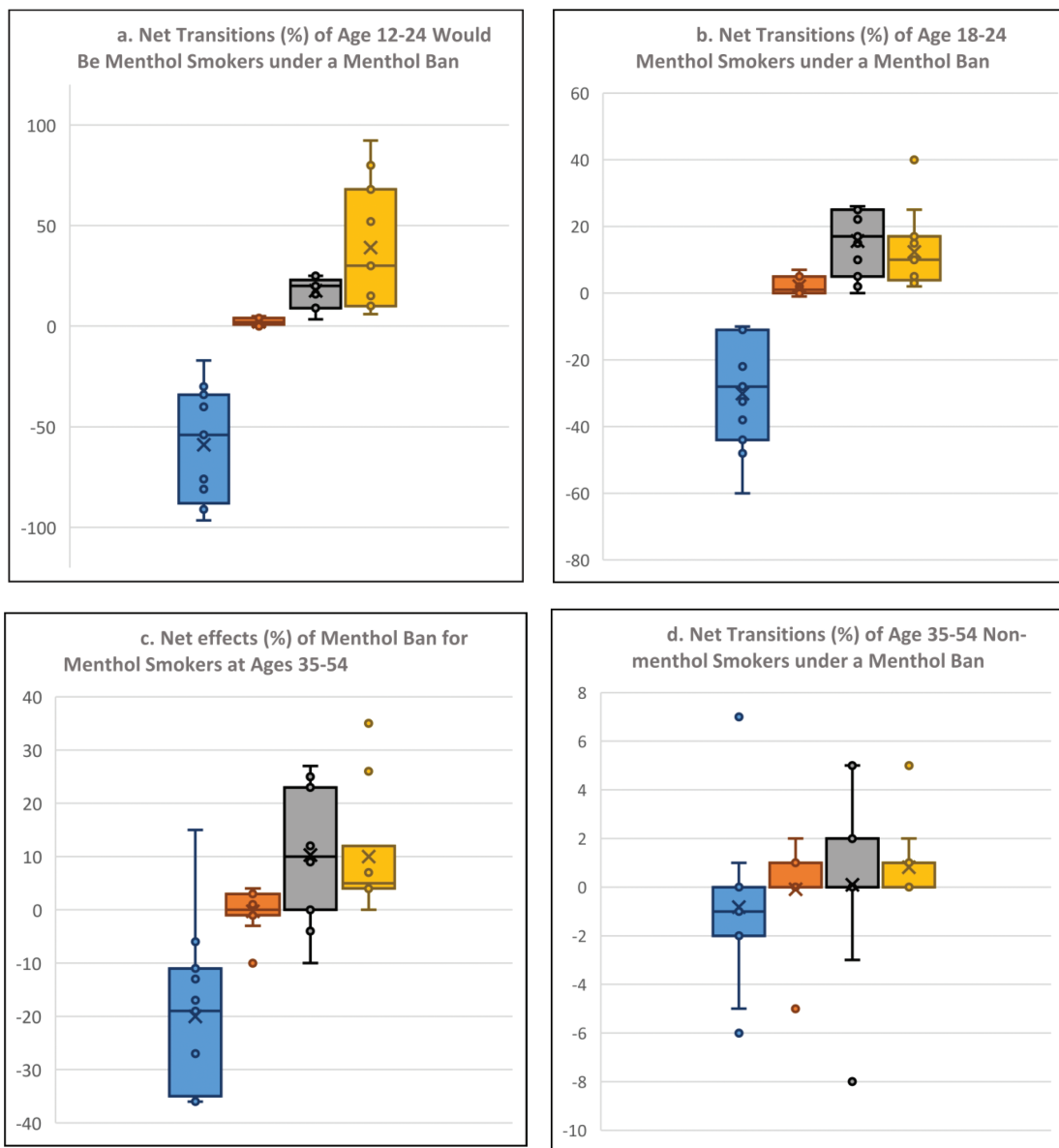
| Product type                                                                                                                                                | Status Quo <sup>a</sup> | Total population |     |      |                         | African American population |      |      |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------|-----|------|-------------------------|-----------------------------|------|------|-------------------------|
|                                                                                                                                                             |                         | Mean             | Min | Max  | Net effect <sup>b</sup> | Mean                        | Min  | Max  | Net effect <sup>b</sup> |
| Become <b>nonmenthol cigarette</b> users (exclusively or with other products)                                                                               | —                       | 33.0             | 1.9 | 79.0 | —                       | 26.3                        | 1.3  | 73.0 | —                       |
| Become <b>nonmenthol cigar</b> users (exclusively or with other products, but not cigarettes)                                                               | —                       | 5.5              | 0.0 | 20.0 | —                       | 6.7                         | 0.0  | 25.0 | —                       |
| Become <b>illicit menthol cigarette or cigar</b> user                                                                                                       | —                       | 2.6              | 0.0 | 10.0 | —                       | 3.6                         | 0.0  | 10.0 | —                       |
| <b>Total combustible</b> use (status quo all menthol cigarettes) <sup>c</sup>                                                                               | 100.0                   | 41.1             | 3.5 | 83.0 | –58.9                   | 36.6                        | 3.2  | 81.0 | –63.4                   |
| Become exclusive <b>smokeless tobacco or other oral</b> tobacco product users                                                                               | —                       | 2.2              | 0.0 | 5.0  | 2.2                     | 0.6                         | 0.0  | 3.0  | 0.6                     |
| Become <b>NNDP</b> users, such as e-cigarettes or heated tobacco products (exclusively or in combination with other products, but not cigarettes or cigars) | —                       | 17.6             | 3.4 | 25.0 | 17.6                    | 14.6                        | 1.8  | 23.0 | 14.6                    |
| <b>No tobacco or NNDP</b> use                                                                                                                               | —                       | 39.1             | 6.0 | 92.3 | 39.1                    | 48.2                        | 10.0 | 95.0 | 48.2                    |

NNDP = novel nicotine delivery product.

<sup>a</sup>No Status Quo Scenario was included for the initiation question, the question asked exclusively about those who would have become menthol cigarette users, as such the Status Quo is 100% total combustible use.

<sup>b</sup>Net effects are measured as changes from menthol cigarette use in the Status Quo Scenario to other categories under the Menthol Ban Scenarios and are computed as the mean.

<sup>c</sup>Total combustible use is measured as the sum of all the transitions to all combustible products, cigarettes, cigars, and illicit products.



**Boxplot Legend:** ■ = net change in combustible use, ■ = net change in smokeless tobacco use, ■ = net change in novel nicotine delivery product use, ■ = net change in initiation or switching to no regular use

**Figure 1.** Boxplots of menthol smoker transitions by age group. Notes: Interquartile boxes (2nd and 3rd quartiles, middle line = median and X = mean).

experts expected African Americans to be more likely to quit under the ban (27.8% vs. 22.5%) and to switch to nonmenthol cigars (7.5% vs. 3.7%). With only a small percent (5.1% vs. 9.7%) switching to NNDPs under the Status Quo, the percentage point increase under the ban was more like the total population (11.9% vs. 10.3%).

### Product Switching by Nonmenthol Smokers Ages 35–54

The experts’ responses for nonmenthol smokers are presented in Table 5. Under the status quo, 76.6% were expected to remain nonmenthol smokers, while 2.1% were expected to switch to menthol

cigarette use, 0.7% to cigar use, 8.1% to NNDPs, 1.7% to smokeless tobacco, and 10.8% would quit all regular use. Under the ban, all categories of use stayed about the same, except for the percent quitting all use, which increased marginally from 10.8% to 11.6%.

Figure 1D indicates that the medians were comparable to the means, although with some difference in individual estimates between the Status Quo and Menthol Ban Scenarios.

Compared to the total population, African Americans were expected to be slightly more likely to continue being nonmenthol cigarette smokers (79.9% vs. 77.6%) and switch nonmenthol cigars (2.3% vs. 1.0%) under a menthol ban, but the differences were minimal.

**Table 3.** Transitions of Age 18–24 Menthol Smokers in the Next 2 Years Under the Status Quo and a Menthol Ban, Total and African American Population (% Transitions)

| Product type                                                                                                                                                            | Total population |             |                          |      |      | African American population |             |                          |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|--------------------------|------|------|-----------------------------|-------------|--------------------------|-------|-------|
|                                                                                                                                                                         | Status Quo       | Menthol Ban | Net effects <sup>a</sup> |      |      | Status Quo                  | Menthol Ban | Net effects <sup>a</sup> |       |       |
|                                                                                                                                                                         | Mean             | Mean        | Mean                     | Min  | Max  | Mean                        | Mean        | Mean                     | Min   | Max   |
| Continue to be menthol cigarette smokers (exclusively or with other products)                                                                                           | 70.2             | —           | —                        | —    | —    | 79.6                        | —           | —                        | —     | —     |
| Switch to nonmenthol cigarettes (exclusively or with other products, except menthol cigarettes)                                                                         | 6.9              | 40.3        | —                        | —    | —    | 3.2                         | 35.1        | —                        | —     | —     |
| Switch to cigars, especially little cigars, filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                                     | 3.5              | —           | —                        | —    | —    | 4.7                         | —           | —                        | —     | —     |
| Switch to nonmenthol cigars, especially little cigars, filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                          | —                | 3.7         | —                        | —    | —    | —                           | 8.9         | —                        | —     | —     |
| Switch to illicit menthol cigarette or cigar use                                                                                                                        | —                | 6.5         | —                        | —    | —    | —                           | 7.6         | —                        | —     | —     |
| <b>Total combustible use<sup>b</sup></b>                                                                                                                                | 80.6             | 50.5        | -30.1                    | -60  | -10  | 87.5                        | 51.6        | -35.9                    | -53.0 | -90.0 |
| Switch to exclusive smokeless tobacco or other oral tobacco products                                                                                                    | 1.5              | 3.7         | 2.2                      | -1.0 | 7.0  | 0.5                         | 1.6         | 1.1                      | 1.0   | 0.0   |
| Switch to novel nicotine delivery products, such as e-cigarettes or heated tobacco products (exclusively or combined with other products, but not cigarettes or cigars) | 8.5              | 24.1        | 15.6                     | 0.0  | 26.0 | 4.2                         | 21.6        | 17.4                     | 19.0  | -1.0  |
| Quit regular use of all tobacco or novel nicotine delivery products                                                                                                     | 9.4              | 21.7        | 12.3                     | 2.0  | 40.0 | 7.8                         | 25.2        | 17.4                     | 8.0   | 0.0   |

<sup>a</sup>Net effects are measured as the mean of the differences between the transitions from menthol cigarette use in the Status Quo and transitions under a Menthol Ban Scenarios.

<sup>b</sup>Total combustible use is the sum of all the transitions to all combustible products, cigarettes, cigars, and illicit products.

### Confidence Level of Reviewers

For the initiation questions relating to those ages 12–24, nearly half of the experts marked their responses as less confident (rank 1 or 2), with a slight tendency for those less confident to predict higher rates of transition to no tobacco use after a ban. For the other age groups, approximately 90% of experts marked their responses as confident (rank 3 or 4). We compared the answers of experts based on their level of confidence for individual questions and did not find clear differences.

### Discussion

Based on an EE, we estimate that within 2 years after implementation of a federal menthol cigarette and cigar ban in the United States, total combustible prevalence among menthol smokers ages 35–54 would decline by about 20% from 75% to 55%, with about 10% switching to NNNDP use and 10% quitting all regular product use. Among those ages 18–24, a larger percentage were expected to reduce combustible tobacco use and switch to NNNDPs. The experts estimated a negligible impact on nonmenthol smokers ages 35–54, although a slightly higher percentage were expected to quit. Of those ages 12–24 who would have initiated menthol cigarette use under the status quo, about 41% were still expected to initiate combustibles, while nearly 18% would initiate NNNDPs and 39% would not initiate tobacco or NNNDP use at all. However, experts generally had less confidence in their answers regarding this younger age group.

The experts' estimates compared favorably to a recent review of studies on the impact of menthol bans.<sup>14</sup> Those studies' estimates of

cessation following implemented bans reported 29%–63% increases in quit attempts and a 24% increase in quit success compared to before a ban,<sup>14</sup> implying overall higher quit rates of 6%–16%, similar to the experts' average estimate of 10% for 35–54-year-old menthol smokers. Regarding switching to non-cigarette tobacco products, studies of implemented bans<sup>14</sup> indicated switching rates of 28%–76% and studies of hypothetical bans indicated 11%–46% switch rates. These estimates overlap with the experts' estimates for 18–24-year-old menthol smokers and 35–54-year-old menthol smokers. The literature on hypothetical bans<sup>14</sup> indicates 12%–30% switching to e-cigarettes, greater than the experts' estimate for 35–54-year-old menthol smokers of 10% but overlapping estimates for 18–24-year-old current menthol smokers and 12–24-year olds who would have initiated menthol cigarettes.

We compared our experts' estimates of cigarette smoker's Status Quo transitions to PATH transitions over 2 years (see [Supplement 2](#)). Except for 35–54-year-old menthol smokers' quit rates (12.5% compared to 6.9%–9.9% from PATH) and 18–24-year-old menthol smoker quit rates (9.4% vs. 12.0%–16.1% from PATH), the transitions reported by the experts were reasonably close for PATH menthol and nonmenthol smokers' quit rates and PATH e-cigarette use rates. We note that the experts' estimates were provided in 2020 following a large increase in e-cigarette use and are compared to earlier PATH estimates (2013/2014–2015/2016 and 2014/2015–2016/2017), providing additional confidence in the experts' answers.

We also asked the experts about the effects of a menthol ban on African Americans, the population with the highest menthol cigarette use.<sup>3</sup> Their estimates of effects on African Americans were

**Table 4.** Transitions of Age 35–54 Menthol Smokers in the Next 2 Years Under the Status Quo and a Menthol Ban, Total and African American Population (% Transitions)

| Product type                                                                                                                                                            | Total population |             |                          |       |      | African American population |             |                          |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|--------------------------|-------|------|-----------------------------|-------------|--------------------------|-------|-------|
|                                                                                                                                                                         | Status Quo       | Menthol Ban | Net effects <sup>a</sup> |       |      | Status Quo                  | Menthol Ban | Net effects <sup>a</sup> |       |       |
|                                                                                                                                                                         | Mean             | Mean        | Mean                     | Min   | Max  | Mean                        | Mean        | Mean                     | Min   | Max   |
| Continue to be menthol cigarette smokers (exclusively or with other products)                                                                                           | 67.9             | —           | —                        | —     | —    | 79.3                        | —           | —                        | —     | —     |
| Switch to nonmenthol cigarettes (exclusively or with other products, except menthol cigarettes)                                                                         | 4.6              | 45.7        | —                        | —     | —    | 2.9                         | 39.6        | —                        | —     | —     |
| Switch to cigars, especially little cigars, filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                                     | 2.7              | —           | —                        | —     | —    | 3.3                         | —           | —                        | —     | —     |
| Switch to nonmenthol cigars, especially little cigars, filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                          | —                | 3.7         | —                        | —     | —    | —                           | 7.5         | —                        | —     | —     |
| Switch to illicit menthol cigarette or cigar use                                                                                                                        | —                | 5.7         | —                        | —     | —    | —                           | 6.7         | —                        | —     | —     |
| <b>Total combustible use<sup>b</sup></b>                                                                                                                                | 75.2             | 55.1        | -20.1                    | -36.0 | 15.0 | 85.5                        | 53.8        | -31.7                    | -70.0 | -11.0 |
| Switch to exclusive smokeless tobacco or other oral tobacco products                                                                                                    | 2.6              | 2.4         | -0.2                     | -10   | 4.0  | 1.1                         | 1.4         | 0.3                      | -5.0  | 3.0   |
| Switch to novel nicotine delivery products, such as e-cigarettes or heated tobacco products (exclusively or combined with other products, but not cigarettes or cigars) | 9.7              | 20.0        | 10.3                     | -10.0 | 27.0 | 5.1                         | 17.0        | 11.9                     | -3.0  | 26.0  |
| Quit regular use of all tobacco or novel nicotine delivery products                                                                                                     | 12.5             | 22.5        | 10.0                     | 0.0   | 35.0 | 8.3                         | 27.8        | 19.5                     | 0.0   | 50.0  |

<sup>a</sup>Net effects are measured as the mean of the differences between the transitions from menthol cigarette use in the Status Quo and transitions under a Menthol Ban Scenarios.

<sup>b</sup>Total combustible use is the sum of all the transitions to all combustible products, cigarettes, cigars, and illicit products.

larger than that for the overall population in terms of quitting or not initiating menthol cigarette use, but smaller for using NNNDPs. These results are consistent with a recent study that found that significantly more white menthol smokers than African American smokers reported they would switch to nonmenthol cigarettes under a menthol ban,<sup>30</sup> and the smaller reduction in NNNDPs is consistent with studies indicating lower use of e-cigarettes by African Americans than other racial-ethnic groups.<sup>31,32</sup> Therefore, according to expert opinion, a menthol ban has the potential to reduce health disparities experienced by African Americans that arise from smoking.<sup>33,34</sup>

### Limitations

The results of the EE are subject to limitations. While we adopted a well-defined selection process that screened for research expertise on menthol tobacco control issues, the results are dependent on the selected reviewers. A panel composed of a different group of experts, for example, retailers or tobacco industry executives, might have resulted in very different estimates.

The results may also depend on the structure of the EE. The questionnaire had 11 sets of questions, with as many as eight answers each, possibly leading to expert fatigue or confusion. The lack of change in answers between the first and second round might be because of the lack of an explicit discussion of first round results before the second round. Because the questionnaire was web based, it did not allow for a formal discussion which could have enabled experts to more confidently answer the questions and make it more likely they understood the questions in the same context. However, the survey pilot testers indicated that the questions were clear and

comprehensible, and no experts indicated that the questions were unclear. Unlike some EEs, such as those using the Cooke method,<sup>16,17</sup> no performance weighting was included in the analyses; all experts' responses were equally weighted. Instead of asking experts to provide a range for their estimates, we opted to focus on the range of experts' estimates.

EE methods that encourage round 2 group discussion and possibly additional rounds, such as the Delphi method and IDEA method, might have led to greater consensus.<sup>16,17,21</sup> Nevertheless, seeing the responses by the other experts in round 1 provided an opportunity for experts to make revisions in round 2. Additionally, because EEs rely on opinions, they are subject to heuristics and known biases that are difficult to correct.<sup>16,17,21,22</sup> In particular, although experts were given the option to revise their answers in round 2, anchoring of opinions may have occurred.<sup>16,17</sup>

The results of the EE may also depend on the phrasing and specific questions asked. For example, the experts did not indicate major "network" effects of a menthol ban on nonmenthol smokers ages 35–54. However, we did not ask experts about the impact of a menthol ban on younger (ages 12–24) nonmenthol smokers, for whom network effects may be more prominent given stronger peer influence at these ages. We considered including specific examples of illicit menthol products ("illicits") in the survey instructions but were concerned about the potential for biasing the expert's answers. Instead, to better understand expert's interpretation of the concept, we asked the experts to specify what they considered to be illicit products. Most experts indicated Indian reservations, imports from abroad, counterfeit in-country manufacturing, and do-it-yourself

**Table 5.** Transitions of Age 35–54 Nonmenthol Smokers in Next 2 Years Under the Status Quo and a Menthol Ban, Total and African American Population (% Transitions)

| Product type                                                                                                                                                                          | Total population |             |                          |      |     | African American population |             |                          |       |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|--------------------------|------|-----|-----------------------------|-------------|--------------------------|-------|-----|
|                                                                                                                                                                                       | Status Quo       | Menthol Ban | Net effects <sup>a</sup> |      |     | Status Quo                  | Menthol Ban | Net effects <sup>a</sup> |       |     |
|                                                                                                                                                                                       | Mean             | Mean        | Mean                     | Min  | Max | Mean                        | Mean        | Mean                     | Min   | Max |
| Switch to <b>menthol cigarettes</b> (excl. or with other products, except nonmenthol cigarettes)                                                                                      | 2.1              | —           | —                        | —    | —   | 10.9                        | —           | —                        | —     | —   |
| Continue to be <b>nonmenthol cigarette</b> smokers (exclusively or with other products)                                                                                               | 76.6             | 77.6        | 79.0                     | —    | —   | 69.9                        | 79.9        | —                        | —     | —   |
| Switch to <b>cigars</b> , especially little cigars filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                                            | 0.7              | —           | —                        | —    | —   | 2.4                         | —           | —                        | —     | —   |
| Switch to <b>nonmenthol cigars</b> , especially little cigars, filtered cigars, or cigarillos (exclusively or with other products, but not cigarettes)                                | —                | 1.0         | 1.0                      | —    | —   | —                           | 2.3         | —                        | —     | —   |
| <b>Total combustible use<sup>b</sup></b>                                                                                                                                              | 79.4             | 78.6        | -0.8                     | -6.0 | 7.0 | 83.2                        | 82.2        | -1.0                     | -12.0 | 1.0 |
| Switch to exclusive <b>smokeless tobacco</b> or other oral tobacco products                                                                                                           | 1.7              | 1.6         | -0.1                     | -8.0 | 5.0 | 0.7                         | 0.8         | 0.1                      | -2.0  | 1.0 |
| Switch to <b>novel nicotine delivery products</b> , such as e-cigarettes or heated tobacco products (exclusively or in combination with other products, but not cigarettes or cigars) | 8.1              | 8.2         | -0.1                     | -5.0 | 2.0 | 5.6                         | 6.0         | 0.4                      | -8.0  | 5.0 |
| <b>Quit</b> regular use of all tobacco or novel nicotine delivery products                                                                                                            | 10.8             | 11.6        | 0.8                      | 0.0  | 5.0 | 10.5                        | 11.0        | 0.5                      | -5.0  | 7.0 |

<sup>a</sup>Net effects are measured as the mean of the differences between the transitions from menthol cigarette use in the Status Quo and transitions under a Menthol Ban Scenarios.

<sup>b</sup>Total combustible use is the sum of all the transitions to all combustible products, cigarettes, cigars, and illicit product.

postmarket products, for example, flavorings to imbue cigarettes and cigars with mentholated flavor. Less commonly noted were Internet sales.

The timing of the survey could also influence the results. In particular, youth nicotine vaping product rates increased substantially in 2019<sup>35,36</sup> and rapid declines were recently experienced in cigarette smoking by youth and young adults.<sup>37,38</sup> These recent events may explain in part the wide variation in rates of quitting and switching to NNDPs given by the experts for those ages 12–24 who would have initiated menthol cigarettes and for those ages 18–24 already menthol smokers.

Although females typically have higher rates of menthol use than males,<sup>3,39</sup> the questionnaire did not distinguish sex differences. In response to open-ended questions, only two experts answered that there were no substantial differences between males and females. The results also may depend on other policies in effect. For example, one expert noted that the desirability of illicit products may depend on cigarette taxes<sup>40</sup> and others noted the potential importance of flavor bans on e-cigarettes. Regarding the impact of raising the minimum purchase age to 21, half of respondents indicated no impact while others indicated potentially important impacts on smoking initiation.

Our results also depend on how policies are specified. The results reported above are for a ban on menthol applied to both cigarettes and cigars, to limit substitution from cigarettes to little cigars. We did not specify a ban on other flavors of cigars, since we concentrated on what we felt was the most likely policy scenario. We did however ask the experts about the impact of a menthol ban on just cigarettes, which one of the experts indicated would have substantially less impact (see [Supplementary Report](#)). In addition, we asked experts about the impact of a menthol ban that is

extended to all nicotine delivery products. The experts generally indicated reduced impacts for smoking cessation in that scenario in comparison to a ban on both cigarettes and cigars (data not shown, see [Supplementary Report](#)). In general, EEs, like modeling, require simplifications, and real-world impacts are likely to be considerably more complicated because of the complex marketplace, use patterns, and potential policy variations.

### Concluding Thoughts

While EEs are subject to limitations, our results can be useful information to policy makers. They provide an added perspective on the implications of the current literature related to a specific policy, and the range of responses given by the experts offers a gauge of the uncertainty around the impacts of that policy. In particular, they can help gauge the impact of a policy where empirical evidence is very limited, such as the impact of a menthol ban on youth smoking initiation. In addition, the EE can be used to provide direct inputs for modeling the impact of a menthol ban on the public health, both in terms of best estimates of key transitions and plausible ranges for those estimates. For example, the FDA's initial attempts to ban menthol were struck down by the court because of the lack of such evidence.<sup>14,15</sup> We are currently developing a simulation model informed by our EE results to provide such evidence.

In conclusion, our experts predict substantial impacts of a menthol ban in terms of reduced smoking initiation. Large reductions in combustible use were also predicted for current menthol smokers, particularly those at younger ages. In addition, especially large reductions in overall smoking were expected for African Americans under a menthol ban. While EEs are subject to limitations, our results are consistent with other studies and provide additional evidence in support of a menthol cigarette and



cigar ban as an effective strategy to reduce combustible tobacco product use.

## Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

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## Declaration of Interests

None declared.

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