HHS Public Access

Author manuscript

Tob Control. Author manuscript; available in PMC 2024 November 01.

Published in final edited form as:

Tob Control. 2023 November ; 32(6): 734–738. doi:10.1136/tobaccocontrol-2021-057227.

The Impact of Canada's Menthol Cigarette Ban on Quitting Among Menthol Smokers: Pooled Analysis of Pre-Post Evaluation from the ITC Project and the Ontario Menthol Ban Study and Projections of Impact in the United States

Geoffrey T. Fong[1,2,3], **Janet Chung-Hall**[1], **Gang Meng**[1], **Lorraine V. Craig**[1], **Mary E. Thompson**[4], **Anne C.K. Quah**[1], **K. Michael Cummings**[5], **Andrew Hyland**[6], **Richard J. O'Connor**[6], **David T. Levy**[7], **Cristine D. Delnevo**[8], **Ollie Ganz**[8], **Thomas Eissenberg**[9], **Eric K. Soule**[10], **Robert Schwartz**[11], **Joanna E. Cohen**[12], **Michael O. Chaiton**[11]

[1]Department of Psychology, University of Waterloo, Waterloo, Ontario, Canada

[2]School of Public Health Sciences, University of Waterloo, Waterloo, Ontario, Canada

[3]Ontario Institute for Cancer Research, Toronto, Ontario, Canada

[4]Department of Statistics and Actuarial Sciences, University of Waterloo, Waterloo, Ontario, Canada

[5]Medical University of South Carolina, Charleston, South Carolina, USA

[6]Roswell Park Comprehensive Cancer Center, Buffalo, New York, USA

[7]Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA

[8]Rutgers Center for Tobacco Studies, Rutgers University, New Brunswick, New Jersey, USA

[9]Center for the Study of Tobacco Products, Virginia Commonwealth University, Richmond, Virginia, USA

Corresponding Author: Geoffrey T. Fong, Department of Psychology, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1, Canada; gfong@uwaterloo.ca.

Contributors: GTF led the conceptualisation of the study and prepared the initial draft. MOC provided the Ontario Menthol Ban Study data, in coordination with GM, who conducted the analyses of the pooled dataset. CD and OG derived the estimates of numbers of menthol and non-menthol smokers from the 2019 NSDUH. All authors commented on drafts, and all authors approved the final version.

Competing interests: GTF has served as a paid expert witness or consultant for governments defending their country's policies or regulations in litigation. He also served as a member of the Brazil Health Regulatory Agency (ANVISA) 2014 Working Group on Tobacco Additives. He has also served as a member of the Expert Group for Article 9 (Regulation of the contents of tobacco products) and Article 10 (Regulation of tobacco product disclosures) of the WHO Framework Convention on Tobacco Control. KMC has received payment as a consultant to Pfizer, Inc., for service on an external advisory panel to assess ways to improve smoking cessation delivery in health care settings. He has also served as a paid expert witness in litigation filed against cigarette manufacturers. TE is a paid consultant in litigation against the tobacco industry and also the electronic cigarette industry and is named on a patent for a device that measures the puffing behavior of electronic cigarette users, patent application for a smoking cessation intervention. TE and EKS are named on a patent application for a smartphone app that measures the characteristics of electronic cigarette devices and e-liquids. No other authors declare any competing interests.

Footnotes

Patient consent for publication: Not required.

Ethics approval: The Canadian arm of the ITC Four Country Smoking and Vaping Survey was approved by the Office of Research Ethics at the University of Waterloo (ORE#20803/30709). The Ontario Menthol Ban Study was approved by the research ethics board of the University of Toronto.

Provenance and peer review: Not commissioned; externally peer reviewed.

[10]Department of Health Education & Promotion, College of Health and Human Performance, East Carolina University, Greenville, North Carolina, USA

[11]Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

[12]Institute for Global Tobacco Control, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Abstract

Introduction.—Between 2015–18, Canada banned menthol cigarettes. This study pooled data from two pre-post cohort studies (the Ontario Menthol Ban Study, and the ITC Canada Survey, conducted in 7 provinces) to derive more precise estimates of the impact of Canada's menthol ban on quitting and to apply these estimates to project the impact of a menthol ban in the United States (US).

Methods.—Weighted multivariable logistic analyses compared post-ban quit success of menthol smokers to non-menthol smokers (for daily smokers and for all smokers), controlling for sex, age, ethnicity, education, baseline smoking status, baseline cigarettes per day, and study regions. Projections to the US were created by multiplying the effect size of the Canadian menthol ban on quitting (percentage of increased quitting by menthol smokers) by the number of menthol smokers overall and among African Americans, from the 2019 National Survey on Drug Use and Health.

Results.—After the menthol cigarette ban, menthol smokers were more likely than non-menthol smokers to have quit smoking among daily smokers (difference=8.0%; 95% CI: 2.4%−13.7%,p=0.005); and all (daily+non-daily) smokers (difference=7.3%; 95% CI: 2.1% −12.5%,p=0.006). The projected number of smokers who would quit after a US menthol ban would be 789,724 daily smokers (including 199,732 African Americans) and 1,337,988 daily+non-daily (including 381,272 African Americans).

Conclusions.—This pooled analysis of Canada's menthol cigarette ban provides the foundation for estimating the impact of menthol bans in the US and other countries. Projections suggest that a US menthol cigarette ban would have a substantial impact on increasing quitting.

Introduction

Between 2015 and 2018, all Canadian provinces banned menthol in cigarettes. Two pre-post studies found that the Canadian menthol ban led to increases in quitting among menthol smokers compared to non-menthol smokers. This study pools data from those two cohort studies—the ITC Canada Survey[1] and the Ontario Menthol Ban Study[2]—to derive a more precise estimate of the impact of Canada's menthol ban on quitting.

The US Food and Drug Administration (FDA) announced on April 29, 2021 that they will work toward developing product standards "within the next year" to ban menthol as a characterizing flavor in cigarettes and cigars.[3] FDA further stated that, "This decision is based on clear science and evidence establishing the addictiveness and harm of these products and builds on important, previous actions that banned other flavored cigarettes in 2009." More specifically, that science indicates that menthol in cigarettes increases initiation, facilitates progression to regular smoking, increases dependence, and decreases

the likelihood of smoking cessation, especially among African American smokers. The large declines in cigarette consumption in the US over the last two decades has been in *nonmenthol* cigarettes.[4] During that same period, menthol's market share has continued to increase.[5]

We applied effect sizes from this pooled analysis of the impact of the Canadian menthol cigarette ban to project the impact of a proposed menthol ban in the US on cessation of cigarette smoking among adults—overall and among African Americans.

Methods

We analyzed pooled pre-post data from (a) the ITC Canada Survey across 7 provinces covering 83% of the Canadian population (Quebec, Ontario, Prince Edward Island, Newfoundland and Labrador, British Columbia, Saskatchewan, and Manitoba; n=1236 adult (18+) smokers, 128 pre-ban mainly menthol smokers) and (b) the Ontario Menthol Ban Study (n=1084 adult (18+) smokers, 295 pre-ban mainly menthol smokers). Both studies used similar definitions of menthol smoking status, and post-ban quitting, and were conducted within 1–2 months of each other at pre-ban (2016) and post-ban (2018) waves. The sampling strategies for each of the studies do not differ in ways that would affect our estimates. Additional details on the two surveys are provided in Supplemental Table 1.

Weighted multivariable logistic analyses compared post-ban quit success (those reporting no longer smoking at post-ban) of menthol smokers to non-menthol smokers (for daily smokers and for all smokers), controlling for common covariates: sex, age, ethnicity, education, baseline smoking status, baseline cigarettes per day, and study regions (ITC survey: 7 provinces; Ontario Study: Ontario as a separate region). ITC weights were rescaled to sum to the sample size to be comparable with the Ontario dataset, while weights in the Ontario dataset were assigned a value of 1 for each respondent. Respondents in the Ontario dataset were assigned to a single stratum, which was combined with the ITC strata to account for potential design effects.

Data from the 2019 National Survey on Drug Use and Health (NSDUH) were used to obtain the total number of daily and non-daily menthol cigarette smokers in the US, and the number of daily and non-daily African American menthol smokers. The NSDUH data for those 18 years and older were used to be consistent with the two Canadian studies. These numbers are presented in the first row of Table 1. The effect sizes from the pooled analysis of the Canadian menthol ban—the increased percentage of menthol smokers who quit vs. non-menthol smokers—was then multiplied by the number of menthol smokers (overall and among African Americans) to obtain the projected number of additional smokers who would quit in the US, assuming that the impact of a future US menthol ban would be that found in the Canadian menthol ban. These projections were made for all smokers and for daily smokers, using the corresponding effect sizes from the pooled analysis.

Results

Banning menthol cigarettes in Canada was associated with greater percentages in quitting at the post-ban survey among menthol smokers vs. non-menthol smokers. Table 1 presents the

quit rates for mainly menthol smokers vs non-menthol smokers from the pooled analysis for daily smokers (Row 2) and for all smokers (daily and non-daily) (Row 3). The effect size of the menthol ban was 8.0 percentage points among daily smokers (95% CI: 2.4–13.7) and 7.3 percentage points among daily and non-daily smokers combined (95% CI: 2.1–12.5).[1]

The projections of the potential impact of a US menthol ban are obtained by the product of each effect size and the number of corresponding menthol smokers from the NSDUH 2019 numbers of menthol smokers in Row 1. Applying the Canadian results to the US, where the percentage of current smokers who smoked menthol cigarettes was much higher (i.e., 40% overall and 85% among African Americans in 2019) than in Canada prior to the menthol ban (i.e., 9.5%[6]), a US menthol ban is projected to lead to increases in quitting of 789,724 daily smokers (95% CI: 236,917–1,352,402) and 1,337,988 all smokers (daily + non-daily) (95% CI: 384,901–2,291,075). Among African Americans, the projected increase in quitting would be 199,732 daily smokers (95% CI: 59,920–342,041) and 381,272 all smokers (95% CI: 109,681–652,863).

Further analysis to examine the impact of the Canadian menthol ban by ethnicity found a significant interaction effect, such that Black Canadian mainly menthol smokers were more likely than non-Black menthol smokers to have quit smoking at follow-up (p=.029). Additional details are provided in Supplemental Table 2. Because of the small sample size of Canadian Black smokers (n=30) and Black menthol smokers (n=4 mainly menthol smokers; n=9 occasional menthol smokers), we did not attempt to estimate post-ban quit rates among Canadian Black menthol smokers and to project those estimates to US African American smokers. Instead, we used the overall effect size to project the impact of a menthol ban on African American smokers.

Discussion

The pooled analysis combining the only two population-level cohort studies of the impact of the menthol cigarette ban in Canada strengthened the conclusion of each study that banning menthol cigarettes was associated with significant increases in quitting, including the new finding that the Canadian menthol ban showed similarly positive associations in both daily and non-daily menthol smokers—an association that had not been statistically significant in either study alone.

Our estimates of the association of the Canadian menthol ban on cigarette smoking are more modest compared to estimates from earlier studies derived from asking smokers and young people how they might respond to a menthol ban. In the 2010 Tobacco Use Supplement to the Current Population Survey (TUS-CPS), 39.0% of all menthol smokers and 46.8% of African American menthol smokers reported that they would stop smoking if menthol cigarettes were not available.[7] A US survey of adolescent and adult smokers found that among the 36% who were menthol smokers, 35% reported that they would quit smoking if “menthol were removed from cigarettes.”[8]

[1]More detailed analyses (not shown) found that the impact of the menthol ban on increasing quitting among menthol smokers compared to non-menthol smokers did not differ across the 7 provinces.

A recent study using expert elicitation[9] predicted that within two years after implementation of a US menthol cigarette and cigar ban, total combustible prevalence among menthol smokers ages 35–54 would decline by about 20% from 75% to 55%, with about 10% switching to novel nicotine delivery products such as e-cigarettes. This study also projected that a menthol cigarette and cigar ban would significantly decrease initiation of smoking among youth and young adults. A related simulation analysis[10] of a US menthol cigarette and cigar ban projected that cigarette smoking would decline by 14.7% in five years, reducing smoking- and vaping-attributable life-years lost by 8.8% over a 40-year period.

Those self-reported hypothetical quit rates among US smokers are higher than the actual quit rates among Canadian menthol smokers after menthol cigarettes were banned (22.3%). However, it is important to note that the Canadian evaluation study measured the quit rate at a single timepoint, and thus is not directly comparable to the hypothetical quit rate of either US survey, which was temporally unbounded.

This study has significant strengths. One strength is the similarity in the timing of the surveys and the definitions of menthol smoker and measures of quitting. Internal validity was heightened by the presence of non-menthol smokers as the comparison group; this constitutes a significant challenge to alternative explanations, which would have to have increased quitting among menthol smokers to a significantly greater extent than among non-menthol smokers to have produced the observed effect. Although there were some differences in the sampling and modality of the two surveys, the effect size (difference in quit rate between menthol smokers and non-menthol smokers) did not differ between the Ontario Menthol Ban Survey and the Ontario respondents of the ITC Canada Survey ($p=.56$), which increases the confidence in the pooled results, in accordance with the Bradford Hill principle that consistency of findings from studies employing different methodologies strengthens the likelihood of that effect.[11,12]

There are several limitations. First, the menthol measure in NSDUH is based on self-report, which is subject to some minor misclassification,[13] which would lead to slight differences in the number of menthol smokers that formed the basis for the projections.

Second, because of the small sample of Black Canadian smokers in this study, we used the overall effect size to project quit rates among African American smokers in response to a menthol cigarette ban in the US. We believe that applying our Canadian effect size from our pooled Canadian population cohort data to African American smokers might underestimate the possible impact of a menthol cigarette ban in the US, given the findings of surveys asking menthol smokers what they would do if menthol cigarettes were banned, which show that African American menthol smokers were more likely than White menthol smokers to say that they would quit[7,14], a pattern that is also suggested in the expert elicitation studies.[9,10]

The most specific data regarding what quit rates might be for Black menthol smokers relative to Non-Blacks in the US following a menthol ban come from our pooled Canadian analysis. Despite our low sample size of only 30 Black smokers, of which 4 were mainly menthol smokers, we did find that Black menthol smokers had a significantly higher quit

rate than non-Black menthol smokers (p=0.029; see Supplemental Table 2). But because of the very low sample size, we did not apply the *effect size* from this analysis. We instead used the general population effect size in our projections to African American menthol smokers. The studies on reactions to hypothetical bans, the projections of experts in elicitation studies, and our own small sample analyses, all suggesting that quit rates among African American menthol smokers would be higher, lead us to conclude that our projection of the number of additional African American menthol smokers who would quit after a US menthol cigarette ban, based on the general population effect size, is likely to be conservative.

Third, there are uncertainties about the extent to which the Canadian findings can be generalized to the US, as there are differences in the smoking and policy landscapes between the two countries. For example, the effect of a menthol cigarette ban could be affected by country differences in the illicit cigarette market. In Canada, interprovincial cigarette smuggling is negligible, possibly because the primary source of illicit cigarettes are First Nations reserves (most located in provinces of Ontario and Quebec) that have large distribution capacities;[15,16] however, there was a relatively small market for menthol cigarettes prior to bans. In contrast, a large portion of the US illicit tobacco market involves cross-border sales of bootlegged tobacco from states with low taxes that is trafficked to localities with substantially higher prices.[17,18]

Not surprisingly, tobacco companies have argued that a US menthol ban could lead to increased smuggling activity.[19,20] Others, however, have argued that a menthol cigarette ban would cut off supply of bootlegged cigarette brands and lead to an overall decrease in the illicit cigarette market[21] – which is consistent with finding of no surge in illicit menthol cigarettes after the Canadian province of Nova Scotia implemented a menthol cigarette ban.[22]

Finally, while both countries implemented a ban on non-menthol cigarettes prior to a similar ban on menthol cigarettes (Canada: July 2010,[23] before menthol cigarette bans implemented between May 2015 to October 2017;[24,25] US: September 2009,[26] before proposed menthol cigarette ban[3]), other important differences in the policy environments should be considered. For example, it is possible that strong restrictions on most forms of tobacco advertising and promotion in Canada led to different post-ban behaviours than would be observed in the US, where many forms of direct tobacco advertising (e.g., print media, billboards/outdoor, and point of sale) are still permitted, and exposure to menthol cigarette advertising specifically is higher among African American populations than other racial or ethnic groups.[27]

In summary, the findings from the evaluation of the actual menthol cigarette ban in Canada provides evidence that such bans can lead to significant increases in cigarette quitting. A menthol cigarette ban in the US is projected to lead to even greater proportional impact in reducing smoking in the US given its much higher proportion of menthol smokers, supporting the FDA's decision to move forward in the development of a rule to ban menthol cigarettes. This pooled analysis of Canada's menthol cigarette ban also provides the foundation for estimating the impact of menthol bans on quitting among smokers in other countries and jurisdictions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding:

The Canadian Arm of the ITC Four Country Smoking and Vaping Survey was supported by grants from the US National Cancer Institute (P01CA200512) and the Canadian Institutes of Health Research (FDN-148477). The Ontario Menthol Ban Study was supported by a grant from the US National Institute on Drug Abuse (R21DA04735801 and P50DA036105) and the Center for Tobacco Products of the US Food and Drug Administration; these grants also provided support for TE and EKS. Effort for CDD and OG were provided by a Tobacco Centers of Regulatory Science award from the US National Cancer Institute and the US Food and Drug Administration (U54CA229973). Additional support to GTF was provided by a Senior Investigator Award from the Ontario Institute for Cancer Research and the O. Harold Warwick Prize from the Canadian Cancer Society. The content of this article is solely the responsibility of the authors and does not necessarily represent the views of any of the funding sources.

References

1. Chung-Hall J, Fong GT, Meng G, et al. Evaluating the impact of menthol cigarette bans on cessation and smoking behaviors in Canada: Longitudinal findings from the Canadian arm of the 2016–18 ITC Four Country Smoking and Vaping Surveys. Tob Control. 2021. Epub ahead of print 2021 Apr 6. doi:10.1136/tobaccocontrol-2020-056259.
2. Chaiton MO, Nicolau I, Schwartz R, et al. Ban on menthol-flavoured tobacco products predicts cigarette cessation at 1 year: a population cohort study. Tob Control. 2020; 29:341–347. [PubMed: 31147474]
3. US Food and Drug Administration. FDA commits to evidence-based actions aimed at saving lives and preventing future generations of smokers. News release, 2021 Apr 29. Available from: https://www.fda.gov/news-events/press-announcements/fda-commits-evidence-based-actions-aimed-saving-lives-and-preventing-future-generations-smokers.
4. US Federal Trade Commission. Federal Trade Commission Cigarette Report for 2020. 2021. Available from: https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-cigarette-report-2020-smokeless-tobacco-report-2020/p114508fy20cigarettereport.pdf.
5. Delnevo CD, Giovenco DP, Villanti AC. Assessment of Menthol and Nonmenthol Cigarette Consumption in the US, 2000 to 2018. JAMA Netw Open. 2020;3(8):e2013601. doi:10.1001/jamanetworkopen.2020.13601. [PubMed: 32766798]
6. Canadian Tobacco, Alcohol and Drugs Survey (CTADS). Summary of Results and Detailed Tables for 2017. Available from: https://www.canada.ca/en/health-canada/services/canadian-alcohol-drugs-survey/2017-summary.html; https://www.canada.ca/en/health-canada/services/canadian-alcohol-drugs-survey/2017-summary/2017-detailed-tables.html#t1.
7. Hartman AM. What menthol smokers report they would do if menthol cigarettes were no longer sold. Presentation to Tobacco Products Scientific Advisory Committee, Food and Drug Administration. 2011 Jan 10–11. Available from http://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/TobaccoProductsScientificAdvisoryCommittee/UCM240176.pdf. Archived at http://www.webcitation.org/63dgWDpXw.
8. O'Connor RJ, Bansal-Travers M, Carter LP, et al. What would menthol smokers do if menthol in cigarettes were banned? Behavioral intentions and simulated demand. Addiction. 2012;107:1330–1338. [PubMed: 22471735]
9. Levy DT, Cadham CJ, Sanchez-Romero LM, et al. An expert elicitation on the effects of a ban on menthol cigarettes and cigars in the United States. Nicotine Tob Res. 2021;23:1911–1920. [PubMed: 34097061]
10. Levy DT, Meza R, Yuan Z, et al. Public health impact of a US ban on menthol in cigarettes and cigars: a simulation study. Tob Control. Epub ahead of print 2021 Sep 2. doi: 10.1136/tobaccocontrol-2021-056604.

11. Bradford Hill A The environment and disease: association or causation? J R Soc Med. 1965;58(5):295–300.
12. Cochran WG, Chambers SP. The planning of observational studies of human populations. J R Stat Soc Ser A Stat Soc. 1965;128:234–266.
13. Villanti AC, Mowery PD, Delnevo CD, et al. Changes in the prevalence and correlates of menthol cigarette use in the USA, 2004–2014. Tob Control 2016;25:ii14–ii20. [PubMed: 27729565]
14. O'Connor RJ, Bansal-Travers M, Carter LP, Cummings KM. What would menthol smokers do if menthol in cigarettes were banned? Behavioral intentions and simulated demand. Addiction 2012;107:1330–1338. [PubMed: 22471735]
15. Non-Smokers' Rights Association. *Backgrounder on the Canadian tobacco market* (Spring 2015) Technical report; 2015.
16. Schwartz R Canada: controlling illicit tobacco trade. In: Dutta S, editor. Confronting illicit tobacco trade: a global review of country experiences. Washington, DC: World Bank; 2019. 51–71.
17. National Research Council. 2015. Understanding the U.S. Illicit Tobacco Market: Characteristics, Policy Context, and Lessons from International Experiences. Washington, DC: The National Academies Press. 10.17226/19016.
18. Kurti M, von Lampe K, Johnson J The intended and unintended consequences of a legal measure to cut the flow of illegal cigarettes into New York City: the case of the South Bronx. Am J Public Health 2015;105(4):750–756. doi:10.2105/AJPH.2014.302340. [PubMed: 25713940]
19. Altria Client Services. Comment from Altria client services. Fed Reg. 2018;83(55):12294.
20. RAI Services Company. Comment from RAI services company. Fed Reg. 2018;83(55):12294.
21. Schroth KRJ, Villanti AC, Kurti M, et al. Why an FDA ban on menthol is likely to survive a tobacco industry lawsuit. Pub Health Rep 2019;134(3):300–306. doi:10.1177/0033354919841011. [PubMed: 30970219]
22. Stoklosa M No surge in illicit cigarettes after implementation of menthol ban in Nova Scotia. Tob Control 2019;28(6):702–704. doi: 10.1136/tobaccocontrol-2018-054552. [PubMed: 30309981]
23. Government of Canada. *Tobacco Reporting Regulations* (SOR/2000–273). 2000.https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-273/.
24. Canadian Cancer Society. Overview summary of federal/provincial/territorial tobacco control legislation in Canada, 2017. http://convio.cancer.ca/documents/Legislative_Overview-Tobacco_Control-F-P-T-2017-final.pdf.
25. Government of Canada. Order Amending the Schedule to the Tobacco Act (Menthol). 2017. https://canadagazette.gc.ca/rp-pr/p2/2017/2017-04-05/html/sor-dors45-eng.html.
26. U.S. Food & Drug Administration. Family Smoking Prevention and Tobacco Control Act. 2009. https://www.fda.gov/tobacco-products/rules-regulations-and-guidance/family-smoking-prevention-and-tobacco-control-act-table-contents.
27. Mills SD, Henriksen L, Golden SD, Kurtzman R, Kong AY, Queen TL, Ribisl KM. Disparities in retail marketing for menthol cigarettes in the United States, 2015. Health Place 2018 Sep;53:62–70. doi: 10.1016/j.healthplace.2018.06.011. [PubMed: 30055469]

What this paper adds

What is already known on this topic:

Between 2015–18, all Canadian provinces banned menthol in cigarettes. Two pre-post studies found that the menthol ban—one in Ontario and one in 7 Canadian provinces covering 83% of the Canadian population—led to increases in quit attempts and in quitting among menthol smokers compared to non-menthol smokers.

What this study adds:

This study pools data from those two cohort studies—the ITC Canada Survey and the Ontario Menthol Ban Study—which used the similar definitions of menthol smoker and of quitting at post-ban, and were conducted within 1–2 months of each other at pre-ban (2016) and post-ban (2018) waves— to derive a more precise estimate of the impact of Canada's menthol ban on quitting and to apply this estimate to project the impact of a menthol ban in the United States, where prevalence of menthol cigarette use is high among cigarette smokers (40%), and much higher among African American smokers (85%).

The pooled analysis found that if a US menthol cigarette ban had the same impact as the Canadian menthol ban, there would be a substantial increase in quitting among menthol smokers in the US, compared to non-menthol smokers, among all smokers and among African American smokers.

How this study might affect research, practice, or policy:

This pooled analysis of Canada's menthol cigarette ban provides the foundation for estimating the impact of menthol bans in the US and other countries.

Table 1.

Quit success among daily and all (daily + non-daily) menthol and non-menthol adult (18+) smokers after the Canadian menthol cigarette ban, with effect sizes applied to menthol smokers (all smokers and African American smokers), based on the number of US adult (18+) menthol smokers from the 2019 National Survey on Drug Use and Health (NSDUH)

	Percentage of quitters among adult smokers from the pooled analysis (7 provinces from ITC Survey + Ontario from Ontario Study)			**Effect size of Canadian Menthol Ban Applied to All US Adult Menthol Smokers**		**Effect size of Canadian Menthol Ban Applied to African American Adult Menthol Smokers**	
	Mainly menthol	**Non-menthol**	**Difference: Menthol ban effect size (95% CI)**	**All Smokers (95% CI)**	**Daily Smokers Only (95% CI)**	**All Smokers (95% CI)**	**Daily Smokers Only (95% CI)**
NSDUH 2019: Number of US Adult Menthol Smokers	N/A	N/A	N/A	**18,328,597**	**9,871,550**	**5,222,907**	**2,496,650**
Quit success: Daily smokers	21.2%	13.2%	8.0% (2.4%–13.7%) *	**N/A**	**789,724 (236,917–1,352,402)**	**N/A**	**199,732 (59,920–342,041)**
Quit success: All Smokers (Daily + Non-Daily)	22.3%	15.0%	7.3% (2.1%–12.5%) **	**1,337,988 (384,901–2,291,075)**	**N/A**	**381,272 (109,681–652,863)**	**N/A**

* p =0.005

** p = 0.006

Mainly menthol smokers: respondents who reported smoking menthol cigarettes “frequently” (Ontario Study) or reported a menthol brand as their usual brand (ITC Survey). Definition of “frequent” use of menthol is provided in Supplemental Table 1.

Quit success: Wave 1 smokers who reported at Wave 2 that they were not smoking at all.

Implementation of menthol cigarette bans in the 7 provinces included in analysis of the ITC Canada Survey data: Quebec (August 26, 2016), Ontario (January 1, 2017), Prince Edward Island (May 1, 2017), Newfoundland and Labrador (July 1, 2017), British Columbia (October 2, 2017), Saskatchewan (October 2, 2017), and Manitoba (October 2, 2017).