

Potential Effects on Tobacco Tax Revenues of a Ban on the Sale of Flavored Tobacco Products: 2024 Update

Introduction

In recent years, state and local governments in the U.S. have implemented policies banning the sale of flavored tobacco products, with the most comprehensive banning the sale of all flavored products, including menthol cigarettes and mint/menthol flavored e-cigarettes. At the same time, policies banning the sale of some flavored tobacco products, particularly menthol cigarettes, have been implemented at the national level in a few countries, including Canada (following the implementation of provincial-level flavor bans in several provinces), the European Union, Ethiopia, Senegal, and Uganda. Efforts to evaluate the effects of these policies on prevalence, consumption, and sale of tobacco and vaping products are ongoing and new evidence is rapidly emerging.

Literature Review

A variety of methodological approaches have been applied in efforts to understand the potential and actual impact of a ban on the sale of flavored tobacco products on the use of these products and on overall tobacco product use. This section briefly reviews the key findings from these studies.

Several studies have assessed the impact of a flavor ban by asking tobacco users how they would respond to the implementation of a ban. Many of these have focused on a ban on menthol cigarettes, with potential responses for menthol smokers including quitting, switching to non-menthol cigarettes, and switching to menthol or other flavored other tobacco products, while also considering changes in daily cigarette consumption among those who switch to non-menthol cigarettes. D'Silva and colleagues (2015), for example, using data from the 2014 Minnesota adult tobacco survey found that among

the 25 percent of adult smokers who smoked menthol cigarettes, just under half said that they would quit smoking in response to a ban on the sale of menthol cigarettes, about one in four would switch to non-menthol cigarettes, and about one in eight would switch to menthol e-cigarettes; the remainder would switch to another menthol tobacco product, buy menthol cigarettes on-line or from another country, or switch to another non-menthol tobacco product. In contrast, Rose and colleagues (2019), using the longitudinal data from the Truth Initiative young adult cohort found that menthol smokers were more likely to switch to non-menthol cigarettes (almost one in three) than to try to quit (less than one in four). In general, studies that assess what menthol smokers say they are likely to do in response to a ban on the sale of menthol cigarettes produce a wide range of findings, with switching to non-menthol cigarettes and trying to quit smoking as the most likely responses.

Other studies have used experimental approaches to assess the role of flavors in product choices among tobacco and other nicotine product users. These studies have generally taken a broader approach considering a wide array of flavors and products, in contrast to the studies that ask menthol smokers about their responses to a ban on the sale of menthol cigarettes. Buckell and colleagues (2017, 2019, 2019), for example, conducted discrete choice experiments with adult smokers and young adult smokers, vapers and/or recent quitters that considered a variety of flavor bans, including a ban on menthol cigarettes only, a ban on flavored e-liquids only, and a comprehensive flavor ban on all products. They found that banning flavors in one product but not another led to some quitting but also substitution to other products (e.g., a ban on menthol cigarettes led to an increase in use of e-

cigarettes), while a comprehensive ban on flavors would increase the likelihood of ‘opting out’ (quitting) the most, with a relatively large reduction in e-cigarette use and a modest increase in cigarette use. In another discrete choice experiment, Shang and colleagues (2018) found that flavors were the most important product attribute in youth e-cigarette choices, concluding that a ban on flavored e-liquids could reduce vaping uptake among youth. In an alternative approach, Guillory and colleagues (2019) examined menthol smokers’ product choices in a virtual store, where the mix of available products was varied to reflect bans on the sale of menthol cigarettes and other menthol tobacco products, finding that some menthol smokers did not purchase any cigarettes when menthol products were banned, while many purchased a non-menthol brand. In yet another experimental approach, Bold and colleagues (2019) assessed the impact of substituting non-menthol cigarettes for menthol cigarettes among a group of menthol smokers, finding that the switch led to an increase in motivation to quit and a reduction in average cigarette consumption. In general, studies using various experimental approaches find that flavor bans would likely reduce the use of tobacco and other nicotine products by inducing quitting and deterring uptake while at the same time leading some to switch to non-flavored products in response to the ban.

Additional evidence on the potential impact of a flavor ban comes from studies based on US data. Courtemanche and colleagues (2017), using data from the 1999-2013 national youth tobacco surveys found that the implementation of the 2009 ban on the sale of flavored cigarettes reduced the prevalence of youth smoking and the average number of cigarettes consumed by young smokers, but increased the likelihood that young smokers chose menthol cigarettes, cigars, and pipes. Tauras and colleagues (2010), using data from the 2003 and 2006/07 waves of the Tobacco Use Supplement to the Current Population Survey found some evidence of substitution between menthol and non-menthol cigarettes based on differences in relative prices, but concluded that the two were imperfect substitutes for one another, particularly for young adults and African Americans. Again, the limited studies of this nature suggest that a comprehensive ban on flavored tobacco and other nicotine products would be effective in reducing the overall use of tobacco/nicotine products, while at the same time

inducing substitution towards non-flavored products.

Until recently, the most relevant evidence has come from Canada, where comprehensive bans on the sale of menthol cigarettes have been in place for many years, beginning at the provincial level with Nova Scotia’s ban implemented in May 2015 and culminating in a national ban in October 2017. In a series of studies, Chaiton and colleagues examined the effects of the ban on menthol cigarette sales in Ontario, implemented on January 1, 2017. One month after implementation, they found that almost three in ten menthol smokers tried to quit smoking, double the number that indicated that they would try to quit prior to the implementation of the ban (Chaiton, et al., 2018). In a follow up study, Chaiton and colleagues (2019) found that quit rates among menthol smokers were almost 50 percent higher one year after the ban compared to quit attempts among non-menthol smokers (63 percent for daily menthol smokers, 62 percent for non-daily menthol smokers, and 43 percent for non-menthol smokers), with similar differences observed for successful quitting (24 percent for daily menthol smokers, 20 percent for non-daily menthol smokers, and 14 percent for non-menthol smokers). Most recently, in a two-year follow-up, Chaiton and colleagues (2021) found that the differences in quitting between menthol and non-menthol smokers grew over time, with less relapse among menthol smokers than among non-menthol smokers. Chaiton and colleagues (2019) also observed a significant decline in sales of both menthol and all cigarettes following the Ontario ban, while seeing no significant change in sales in British Columbia, where a ban had not been implemented. Finally, Soule and colleagues (2019) found that Ontario’s menthol ban also induced menthol smokers to switch to non-menthol cigarettes and to seek menthol cigarettes from other sources, including in the ‘black market’, on First Nation reserves, or in other jurisdictions.

Evidence on the impact of Canada’s national menthol ban is also available. Data from recent waves of the International Tobacco Control Policy Evaluation Study’s (ITC Project) longitudinal surveys of smokers in Canada are consistent with the findings from Chaiton and colleagues research on the impact of the Ontario ban (Chung-Hall, et al., 2021). Specifically, the ITC-Canada surveys were conducted from July through November 2016 and from April through July 2018. The 2016 surveys

were conducted after the implementation of provincial bans in Nova Scotia, Alberta, and New Brunswick, but before or during the implementation of provincial bans in Quebec (August 2016), Ontario (January 2017), Prince Edward Island (May 2017), and Newfoundland and Labrador (July 2017). The national ban was implemented in October 2017, between the two waves of the survey. The timing of the surveys allowed the ITC team to assess the impact of the provincial and subsequent national menthol bans on 1,319 smokers who were not subject to the ban in the 2016 wave of the survey. The ITC researchers found that menthol smokers were more likely to try to quit than non-menthol smokers after the ban (59 percent vs. 49 percent), and were twice as likely to have quit smoking for at least six months (12 percent vs. 6 percent). More than half (59 percent) of menthol smokers switched to non-menthol cigarettes following the ban, while almost one in five menthol smokers continued to smoke menthol cigarettes after the ban (mostly purchased on First Nations reserves, but also from outside Canada, online, or in duty free shops). However, further analysis showed that more than half of those who reported smoking menthol cigarettes after the ban were actually smoking non-menthol brands (Chung-Hall, et al, 2023). In addition, the ITC team found that relatively small percentages of menthol smokers switched to vaping (including both non-menthol and menthol product) and dual use of non-menthol cigarettes and vaping products.

In contrast, Carpenter and Nguyen (2020) found that the provincial and national bans led to a mix of intended and unintended effects. Based on their analysis of provincial sales data, they found that the bans were effective in virtually eliminating menthol cigarette sales, but had little impact on non-menthol cigarette sales. The lack of impact on non-menthol sales is not surprising, given the very low market share for menthol cigarettes— less than three percent – in the years leading up to the national ban, as well as the increased taxes and implementation of plain packaging in the year following the national ban. Similarly, based on their analysis of survey data, they found that the bans significantly reduced the prevalence of menthol cigarette smoking among both youths and adult. However, they found that youth smoking prevalence was unaffected as young smokers switched from menthol to non-menthol cigarettes, in contrast to their finding that there was no substitution from menthol to non-menthol

cigarettes among adults. Finally, similar to the ITC team, Carpenter and Nguyen found that some menthol smokers evaded the bans by purchasing menthol cigarettes on First Nations reserves.

Preliminary research from the European Union's May 2020 ban on menthol cigarettes also shows a positive impact on quitting behaviors. Kyriakos and colleagues' (2022) analysis of data from the ITC Netherlands survey found that pre-ban menthol smokers were significantly more likely to attempt to quit than non-menthol smokers (66.9 percent vs. 49.6 percent) and a higher, but non-significant proportion of pre-ban menthol smokers reported quitting (26.1 percent vs. 14.1 percent).

Finally, research on the impact of state and local flavor bans is starting to emerge in the US. Farley and Johns (2017) analysis of data from New York City's Youth Risk Behavior Survey found that the City's 2009 ban on certain flavored tobacco products was associated with reduced odds of ever trying flavored tobacco products and any tobacco use among youth.

Yang and colleagues' (2020) provided early estimates of the impact of San Francisco's comprehensive flavored products ban on the use of tobacco and other nicotine products among young adults. They found that the ban was effective in reducing the use of flavored tobacco and vaping products, as well as overall use of vaping products and cigars, but at the same time led to an increase in cigarette smoking. Consistent with the research from Canada, they found that some respondents were able to avoid the ban by buying from jurisdictions not subject to the policy, including from on-line vendors and localities outside of San Francisco. The authors noted that their study is subject to a number of limitations and that more research is needed to fully understand the impact of the ban.

In contrast, analysis of retail sales data by Gammon and colleagues (2022) found that total tobacco sales fell significantly in the first year after implementation of San Francisco's flavor ban, along with a 23 percent decrease in total cigarette sales, suggesting consumers did not broadly switch to nonflavored products.

Two studies that examined the impact of local flavor bans in Massachusetts found that the laws were associated with reduced tobacco use. Hawkins and colleagues (2021) found that Massachusetts counties

with greater implementation of flavored tobacco product restrictions saw reductions in the likelihood of current e-cigarette use and a decrease in the frequency of cigarette smoking among adolescent users. Kingsley and colleagues (2021) found that Salem and Attleboro experienced significantly smaller increases in current use of flavored and nonflavored tobacco products among youth following implementation of their flavor bans, compared to Gloucester, a locality with similar demographics but no flavored tobacco restriction.

Olson and colleagues' (2022) analysis of the impact of flavored tobacco bans in the Twin Cities area of Minnesota found that from 2016 to 2019, e-cigarette use and any tobacco use among youth increased by a lesser extent in the Twin Cities area than the rest of Minnesota, and cigarette, cigar, and hookah use prevalence decreased to a greater extent in the Twin Cities than the rest of the state.

Published studies about the experience in Massachusetts, the first state to prohibit the sale of menthol cigarettes and all other flavored tobacco products, have provided some insights into the early impacts of the state policy. Sales of flavored e-cigarettes were banned in November 2019 and sales of menthol cigarettes and all other flavored tobacco products were banned starting in June 2020, along with a new tax on e-cigarettes. Asare and colleagues (2021) found that the state policy was associated with a statistically significant decline in menthol and overall cigarette sales.

Several studies (Kingsley, et al., 2022; Asare, et al., 2022; Ali, et al., 2022) looked at the trend in cigarette sales in Massachusetts compared to trends in bordering states and found minimal and short-lived increases in sales in bordering states, particularly in New Hampshire, and an overall net decrease in sales among Massachusetts and its neighbors.

Ali and colleagues (2022) analyzed retail sales data from IRI and found that Massachusetts' policy was associated with a significant reduction in total e-cigarette sales (88.9 percent) after one year.

An analysis of Behavioral Risk Factor Surveillance Survey (BRFSS) data by Asare and colleagues (2023) showed that the Massachusetts policy was associated with an additional one percentage point decline in smoking among adults aged 25 and older in Massachusetts compared to states without flavored

tobacco bans. An online survey from the Massachusetts' Department of Public Health showed Black smokers were more likely to make a quit attempt in 2022 compared to white smokers, while preliminary analysis of BRFSS data by Kingsley and colleagues (2023) showed an increase in successful quitting among Black and Hispanic smokers.

To summarize, research on the potential and actual effects of comprehensive bans on the sale of flavored tobacco and other nicotine products suggests that these policies will have an impact on the use of the ban products and on overall use of tobacco and vaping products. These effects include increases in cessation among flavored product users, as well as reductions in initiation among potential users. At the same time, many continuing users are likely to substitute to non-flavored products, while some will avoid/evade the policy by obtaining flavored products on-line, from jurisdictions where the products remain available, or through illicit vendors.

Modeling the Impact of a Comprehensive Flavor Ban on Tobacco Tax Revenues and Public Health

The Canadian experience with a ban on menthol cigarette sales along with early experiences with Massachusetts' and California's comprehensive bans on the sale of flavored tobacco products provide the most relevant evidence for modeling the potential impacts of a comprehensive flavor ban on tobacco use and tobacco tax revenues.

Research indicates that the Canadian ban significantly increased smoking cessation among menthol smokers, with cessation rates 50 to 100 percent higher for menthol smokers than for non-menthol smokers following the implementation of the provincial and national bans. Given this range, I assume that a comprehensive flavor ban will raise the quit rate for menthol smokers by 75 percent relative to that of non-menthol smokers. Cornelius and colleagues (2023) reported state-specific rates of recent smoking cessation that range from 4.6 percent in West Virginia and Wisconsin to 10.8 percent in South Dakota, with a national cessation rate of 7.4 percent, using data from the 2018/19 Tobacco Use Supplement to the Current Population Survey (TUS-CPS). This implies that the quit rate for menthol smokers would rise to nearly 13 percent (between 8.1 to 18.9 percent in states) following the implementation of a comprehensive flavor ban, or that almost 5.6 percent (between 3.5 and 8.1 percent

in states) of menthol smokers overall would quit in the short run in response to a ban. Based on the same TUS-CPS data, three in ten smokers (30.6 percent) smoked menthol cigarettes, ranging from a low of 15.2 percent in Montana to a high of 60.1 percent in Hawaii. The TUS-CPS data also showed that menthol smokers smoke fewer cigarettes per month, on average, than non-menthol smokers – 313 cigarettes vs. 363 cigarettes, respectively. Given the prevalence of menthol smoking and lower average cigarette consumption among menthol smokers, menthol cigarettes account for approximately 27.6 percent of total cigarette consumption.

Among menthol smokers who continue to smoke after the ban, many will switch to non-menthol cigarettes or other tobacco products, while some will continue to smoke menthol cigarettes. The Canadian data suggest that roughly 70 percent of those who continue to smoke will substitute to non-menthol cigarettes, with the remainder purchasing menthol cigarettes from jurisdictions where they continue to be available and/or from illicit sources, or switching to other tobacco/nicotine products. Data from Massachusetts' and California's experiences suggest larger declines in tax-paid cigarette sales than implied by the declines in cigarette consumption observed in the ITC-Canada data, likely due to higher rates of menthol cigarette use in U.S. states compared to Canada. Given this, projected reductions in tax-paid sales were scaled up to be consistent with the initial declines observed following the implementation of the comprehensive policies in Massachusetts and California.

Given these data, overall tax paid cigarette sales are projected to fall by 19.2 percent in response to a comprehensive flavor ban, with a corresponding reduction in cigarette tax revenues. The extent of the expected declines varies across states, with relatively larger reductions in states with more menthol smokers and/or in states where menthol smokers consume relatively more cigarettes.

Projecting the impact of a comprehensive flavor ban on use of and tax revenues from other tobacco/nicotine products is more speculative given the limited data available. Kuiper and colleagues (2018) report the share of sales, by state and year, for menthol and non-menthol flavored other tobacco products for the period 2011 through 2015. Using the average shares for these five years, I constructed an estimate of the share of flavored (menthol and

other flavors) other tobacco product sales by state. This estimate is a weighted average of the shares by product, where the weights are based on Euromonitor data for the share of sales value accounted for by each type of product. Assuming that the reductions in sales of other flavored tobacco products are of a similar magnitude to the reduction in the sale of menthol cigarettes, other tobacco product sales and resulting other tobacco product tax revenues are projected to fall by would fall by 19.1 percent overall. Estimated declines in other tobacco product sales vary considerably across states, from a low of 3.0 percent in Alaska to a high of 30.2 percent in Delaware.

These estimated reductions in revenues are based on limited data and research evidence and are likely to be imprecise. To some extent, they are likely to overstate the actual declines in revenues as they do not consider the substitution between cigarettes and other tobacco products that might result from a flavor ban and given that at least some tobacco users who quit in response to the ban may eventually relapse and consume non-flavored products. They will likely overstate the decline in revenues in states where there are fewer opportunities for tobacco users to avoid the ban, while understating declines in states where there are relatively more opportunities to avoid the ban. Strengthened enforcement and increased penalties on illicit traders can reduce illegal sales of flavored products and lessen the impact of the flavor ban on tobacco tax revenues.

While a comprehensive flavor ban would lead to modest reductions in tobacco tax revenues, it will also improve public health given the reductions in tobacco use that result. As described above, a comprehensive flavor ban will result in almost 5.6 percent more menthol smokers quitting smoking in the short run. Given an estimated 24.7 million adult current smokers, 30.6 percent of whom smoke menthol cigarettes, this implies over 420,000 adults would quit smoking in response, resulting in over 98,000 fewer deaths caused by smoking. In addition, the limited existing evidence suggests that a comprehensive ban would also deter numerous young people from taking up tobacco use, adding to the public health benefits.

In addition, the reductions in tobacco use would lead to considerable health care cost savings. A recent study by Glantz, for example, found that a one

percentage point reduction in smoking prevalence nationally would reduce Medicaid costs by \$2.5 billion in the next year, implying that a comprehensive flavor ban could save several billion dollars in Medicaid spending in the year after its implementation. Finally, based on estimates from

Hodgson (1992), updated for inflation, smokers who quit will save about \$8,500 in lifetime health costs, implying an overall reduction in smoking-attributable lifetime health care spending of over \$4.4 billion among current menthol smokers.

References

- Ali FRM, King BA, Seaman EL, Vallone D, Schillo B. Impact of Massachusetts law prohibiting flavored tobacco products sales on cross-border cigarette sales. *PLoS One*. 2022;17(9):e0274022. Published 2022 Sep 13. doi:10.1371/journal.pone.0274022.
- Ali FRM, Vallone D, Seaman EL, et al. Evaluation of Statewide Restrictions on Flavored e-Cigarette Sales in the US From 2014 to 2020. *JAMA Netw Open*. 2022;5(2):e2147813. Published 2022 Feb 1. doi:10.1001/jamanetworkopen.2021.47813.
- Asare S, Majmundar A, Westmaas JL, et al. Association of Cigarette Sales With Comprehensive Menthol Flavor Ban in Massachusetts. *JAMA Intern Med*. 2022;182(2):231-234. doi:10.1001/jamainternmed.2021.7333.
- Asare S, Majmundar A, Westmaas JL, et al. Spatial Analysis of Changes in Cigarette Sales in Massachusetts and Bordering States Following the Massachusetts Menthol Flavor Ban. *JAMA Netw Open*. 2022;5(9):e2232103. Published 2022 Sep 1. doi:10.1001/jamanetworkopen.2022.32103.
- Asare S, Majmundar A, Xue Z, Jemal A, Nargis N. Association of Comprehensive Menthol Flavor Ban With Current Cigarette Smoking in Massachusetts From 2017 to 2021. *JAMA Intern Med*. 2023;183(4):383-386. doi:10.1001/jamainternmed.2022.6743.
- Babb S, Malarcher A, Schauer G, Asman K, Jamal A (2017). Quitting smoking among adults – United States, 2000-2015. *Morbidity and Mortality Weekly Report*, 65(52):1457-1464.
- Bold KW, Jatlow P, Fucito LM, Eid T, Krishnan-Sarin S, O'Malley S (2019). Evaluating the effect of switching to non-menthol cigarette among current menthol smokers: an empirical study of a potential ban of characterizing menthol flavour in cigarettes. *Tobacco Control* 0:1-7 doi:10.1136/tobaccocontrol-2019-055154.
- Buckell J, Marti J, Sindelar JL (2019). Should flavours be banned in cigarettes and e-cigarettes? Evidence on adult smokers and recent quitters from a discrete choice experiment. *Tobacco Control* 28:168-175.
- Buckell J, Marti J, Sindelar JL (2017). Should flavors be banned in e-cigarettes? Evidence on adult smokers and recent quitters from a discrete choice experiment. National Bureau of Economic Research Working Paper 23865. Cambridge MA: National Bureau of Economic Research.
- Buckell J, Sindelar JL (2019). The impact of flavors, health risks, secondhand smoke and prices on young adults' cigarette and e-cigarette choices: a discrete choice experiment. *Addiction* 114:1427-1435.
- Carpenter C, Nguyen HV (2020). Intended and unintended effects of banning menthol cigarettes. National Bureau of Economic Research Working Paper 26811. Cambridge MA: National Bureau of Economic Research.
- Chaiton, M., Schwartz, R., Cohen, J. E., Soule, E., Zhang, B., & Eissenberg, T. (2021). Prior daily menthol smokers more likely to quit 2 years after a menthol ban than non-menthol smokers: a population cohort study. *Nicotine & Tobacco Research*, 23(9), 1584-1589.
- Chung-Hall, J., Fong, G. T., Meng, G., Cummings, K. M., Hyland, A., O'Connor, R. J., ... & Craig, L. V. (2022). Evaluating the impact of menthol cigarette bans on cessation and smoking behaviours in Canada: longitudinal findings from the Canadian arm of the 2016–2018 ITC Four Country Smoking and Vaping Surveys. *Tobacco Control*, 31(4), 556-563.
- Chaiton MO, Nicolau I, Schwartz R, Cohen JE, Soule E, Zhang B, Eissenberg T (2019). Ban on menthol-flavoured tobacco products predicts cigarette cessation at 1 year: a population cohort study. *Tobacco Control* 0:1-7 doi:10.1136/tobaccocontrol-2018-054841.
- Chaiton M, Schwartz R, Cohen JE, Soule E, Eissenberg T (2018). Association of Ontario's ban on menthol cigarettes with smoking behavior 1 month after implementation. *JAMA Internal Medicine* 178(5):710-711.

- Chaiton M, Schwartz R, Shuldiner J, Tremblay G, Nugent R (2019). Evaluating a real world ban on menthol cigarettes: an interrupted time-series analysis of sales. *Nicotine & Tobacco Research* 0:1-4 doi:10.1093/ntr/ntz041.
- Chung-Hall, J., Fong, G. T., Meng, G., & Craig, L. V. (2023). Illicit cigarette purchasing after implementation of menthol cigarette bans in Canada: findings from the 2016–2018 ITC Four Country Smoking and Vaping Surveys. *Tobacco Control* doi:10.1136/tc-2022-057697.
- Cornelius ME, Wang TW, Jamal A, Loretan CG, Willis G, Graham-Glover B, et al. (2023). State-Specific Prevalence of Adult Tobacco Product Use and Cigarette Smoking Cessation Behaviors, United States, 2018–2019. *Prev Chronic Dis* 20:230132. DOI: <https://doi.org/10.5888/pcd20.230132>.
- Courtemanche CJ, Palmer MK, Pesko MF (2017). Influence of the flavored cigarette ban on adolescent tobacco use. *American Journal of Preventive Medicine* 52(5):e139-e146.
- D’Silva J, Amato MS, Boyle RG (2015). Quitting and switching: Menthol smokers’ responses to a menthol ban. *Tobacco Regulatory Science*, 1(1):54-60.
- Farley, S. M., & Johns, M. (2017). New York City flavoured tobacco product sales ban evaluation. *Tobacco control*, 26(1), 78-84.
- Gammon, D. G., Rogers, T., Gaber, J., Nonnemaker, J. M., Feld, A. L., Henriksen, L., ... & Andersen-Rodgers, E. (2022). Implementation of a comprehensive flavoured tobacco product sales restriction and retail tobacco sales. *Tobacco Control*, 31(e2), e104-e110.
- Glantz SA (2019). Estimation of 1-year changes in medical expenditures associated with reducing cigarette smoking prevalence by 1%. *JAMA Network Open* 2(4):e192307, doi:10.1001/jamanetworkopen.2019.2307.
- Guillory J, Kim AE, Nonnemaker JM, Bradfield B, Taylor NH, Dutra L, Feld A (2019). Effect of menthol cigarette and other menthol tobacco product bans on tobacco purchases in the RTI iShoppe virtual convenience store. *Tobacco Control* 0:1-8 doi:10.1136/tobaccocontrol-2019-054997.
- Hawkins, S. S., Kruzik, C., O'Brien, M., & Coley, R. L. (2022). Flavoured tobacco product restrictions in Massachusetts associated with reductions in adolescent cigarette and e-cigarette use. *Tobacco Control*, 31(4), 576-579.
- Hodgson TA (1992). Cigarette smoking and lifetime medical expenditures. *The Milbank Quarterly* 70(1):81-125.
- Kingsley M, McGinnes H, Song G, Doane J, Henley P. Impact of Massachusetts' Statewide Sales Restriction on Flavored and Menthol Tobacco Products on Tobacco Sales in Massachusetts and Surrounding States, June 2020. *Am J Public Health*. 2022;112(8):1147-1150. doi:10.2105/AJPH.2022.306879.
- Kingsley, M., Setodji, C. M., Pane, J. D., Shadel, W. G., Song, G., Robertson, J., ... & Ursprung, W. S. (2021). Longer-term impact of the flavored tobacco restriction in two Massachusetts communities: a mixed-methods study. *Nicotine and Tobacco Research*, 23(11), 1928-1935.
- Kingsley, M. Data presented on March 22, 2023 webinar, “Flavored Tobacco Sales Restrictions: Successes, Challenges, and Best Practices.” Available at <https://vimeo.com/811069091/de13044coe>.
- Kuiper NM, Gammon D, Loomis B, Falvey K, Wang TW, King BA, Rogers T (2018). Trends in the sale of flavored and menthol tobacco products in the United States during 2011-2015. *Nicotine & Tobacco Research* 20(6):698-706.
- Kyriakos, C. N., Driegen, P., Fong, G., Chung-Hall, J., Hyland, A., Geboers, C., ... & Filippidis, F. T. (2022). Impact of the European Union’s menthol cigarette ban on smoking cessation outcomes: longitudinal findings from the 2020–2021 ITC Netherlands Surveys. *Tobacco Control* doi:10.1136/tc-2022-057428.
- Massachusetts Department of Public Health, Evaluation of An Act Modernizing Tobacco Control: Overview and Preliminary Results, presented September 28, 2022, <https://www.mass.gov/doc/illegal-tobacco-task-force-public-meeting-fifty-one-minutes/download>.

Olson, L. T., Coats, E. M., Rogers, T., Brown, E. M., Nonnemaker, J., Ross, A. M., ... & Xu, X. (2022). Youth tobacco use before and after local sales restrictions on flavored and menthol tobacco products in Minnesota. *Journal of Adolescent Health, 70*(6), 978-984.

Rose SW, Ganz O, Zhou Y, Carnegie BE, Villanti AC, Rath J, Hair EC (2019). Longitudinal responses to restrictions on menthol cigarettes among young adult US menthol smokers, 2011-2016. *American Journal of Public Health 109*(10):1400-1403.

Shang C, Huang J, Chaloupka FJ, Emery SL (2018). The impact of flavour, device type, and warning messages on youth preferences for electronic nicotine delivery systems: evidence from an online discrete choice experiment. *Tobacco Control 27*:e152-159.

Soule EK, Chaiton M, Zhang B, Hiler MM, Schwartz R, Cohen JE, Eissenberg T (2019). Menthol cigarette smoker reactions to an implemented menthol cigarette ban (2019). *Tobacco Regulatory Science 5*(1):50-64.

Tauras JA, Levy D, Chaloupka FJ, Villanti A, Niaura RS, Vallone D, Abrams DB (2010). Menthol and non-menthol smoking: the impact of prices and smoke-free air laws. *Addiction 105*(S1):115-123.

Yang Y, Lindblom EN, Salloum RG, Ward KD (2020). The impact of a comprehensive tobacco product flavor ban in San Francisco among young adults. *Addictive Behaviors Reports 11*
doi.org/10.1016/j.abrep.2020.100273.

Suggested Citation

Chaloupka, F.J. *Potential Effects on Tobacco Tax Revenues of a Ban on the Sale of Flavored Tobacco Products: 2023 Update*, University of Illinois Chicago, 2024.

About Tobacconomics

Tobacconomics is a collaboration of leading researchers who have been studying the economics of tobacco control policy for nearly 30 years. The team is dedicated to helping researchers, advocates and policymakers access the latest and best research about what's working—or not working—to curb tobacco consumption and the impact it has on our economy. As a program of the University of Illinois Chicago, Tobacconomics is not affiliated with any tobacco manufacturer. Visit www.tobacconomics.org or follow us on Twitter <https://twitter.com/Tobacconomics>.