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# Illicit cigarette purchasing after implementation of menthol cigarette bans in Canada: findings from the 2016–2018 ITC Four Country Smoking and Vaping Surveys

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## ABSTRACT

**Objective** To examine the impact of menthol cigarette bans on use and purchasing of illicit cigarettes among menthol and non-menthol smokers in seven Canadian provinces.

**Methods** Data from 1098 non-menthol smokers and 138 menthol smokers in Canada who completed the ITC Four Country Smoking and Vaping Survey in 2016 (pre-ban) and 2018 (post-ban). Brand validation analysis was conducted to (1) compare self-reported use of menthols versus actual use of menthols as regular brand, and verify self-reported purchasing of menthols among pre-ban menthol smokers at post-ban; and (2) assess pre-post ban changes in purchasing of illicit cigarettes from First Nations reserves among non-menthol smokers and menthol smokers.

**Results** Among the subset of 138 pre-ban menthol smokers, 36 (19.5%) reported smoking menthols at post-ban. Brand validation analyses showed that 19 (9.0%) were actually using a non-menthol brand; of the 17 (10.5%) who were actually using a menthol brand, 13 (7.9%) bought a menthol brand at last purchase, and 4 (2.6%) bought a non-menthol brand. Among the full sample of smokers who purchased cigarettes from First Nations reserves at both pre-ban and post-ban, there was no change in purchasing of menthols (n=9 menthol smokers; 51.2% vs 51.2%, p=1.00), non-menthols (n=1024 non-menthol smokers; 9.1% vs 8.7%, p=0.69) or all cigarettes (menthol+non-menthol) (n=1086 smokers; 9.7% vs 9.2%, p=0.56).

**Conclusions** Actual rates of brand-verified menthol smoking were substantially lower than self-reported rates at post-ban. After Canada's menthol ban, there was no increase in illicit purchasing of menthol or non-menthol cigarettes from First Nations reserves.

## INTRODUCTION

Canada was one of the first countries in the world to ban menthol cigarettes, with all provinces implementing bans between 2015 and 2018. Cohort studies concluded that Canadian menthol cigarette bans were associated with a significantly greater percentage of quit attempts and quitting among menthol smokers compared with non-menthol smokers.<sup>1–4</sup>

Among the arguments that have been raised to oppose menthol bans, tobacco companies most often use the illicit trade narrative.<sup>5,6</sup> In Canada, however, multiple studies have found no increase

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ One argument that is used to question the value of the proposed ban on menthol cigarettes in the USA and other jurisdictions is that this would lead to significant increases in illicit purchasing of menthol cigarettes.
- ⇒ The ITC Canada cohort study reported a low rate of illicit menthol cigarette purchasing after menthol cigarette bans in seven Canadian provinces (2016–2018), consistent with studies that found no substantial increase in illicit cigarette trade after menthol bans in Nova Scotia (2015) and Ontario (2017).

## WHAT THIS STUDY ADDS

- ⇒ Evaluations of the impact of menthol cigarette bans on the illicit market in Canada have employed self-reported use or purchasing of menthol cigarettes to measure post-ban menthol smoking.
- ⇒ Brand validation analysis can be employed to assess whether these self-reports are valid, correcting for errors where a self-reported menthol brand was actually a non-menthol brand.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Brand validation analysis found that nearly half of smokers who reported smoking menthol cigarettes were not actually smoking a menthol brand at post-ban (19.5% vs 10.5%).
- ⇒ After Canada's menthol ban, there was no change in smokers' purchasing of menthol, non-menthol or all (menthol+non-menthol) cigarettes from First Nations reserves.
- ⇒ This evaluation study of Canada's menthol cigarette ban provides no support for the contention that a menthol ban increases illicit purchasing.

in illicit cigarette trade after menthol cigarette bans were implemented.<sup>2,7,8</sup>

In measuring illicit tobacco purchasing in Canada, First Nations reserves are a primary source, with the largest proportion of illicit cigarettes manufactured on reserves in the provinces of Ontario and Quebec.<sup>9–12</sup> Canadian First Nations reserves are lands set aside and legally held by the federal government for use of First Nations individuals,



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who comprise the largest share of the Indigenous population recognised in the Constitution.<sup>13 14</sup>

First Nations individuals can legally purchase cigarettes on reserves for personal use, with exemptions for applicable federal and provincial taxes. Sales of tax-exempt cigarettes to non-First Nations individuals is illegal; however, this is not well-enforced.<sup>9 15</sup> Since First Nations individuals account for a small proportion of the Canadian population (4.9% in 2016),<sup>14</sup> it is reasonable to assume that the vast majority of cigarette purchases on First Nations reserves are made by non-First Nations individuals. Provincial and federal menthol cigarette bans apply to First Nations reserves, which means that post-ban menthol cigarette purchases on reserves are illicit.

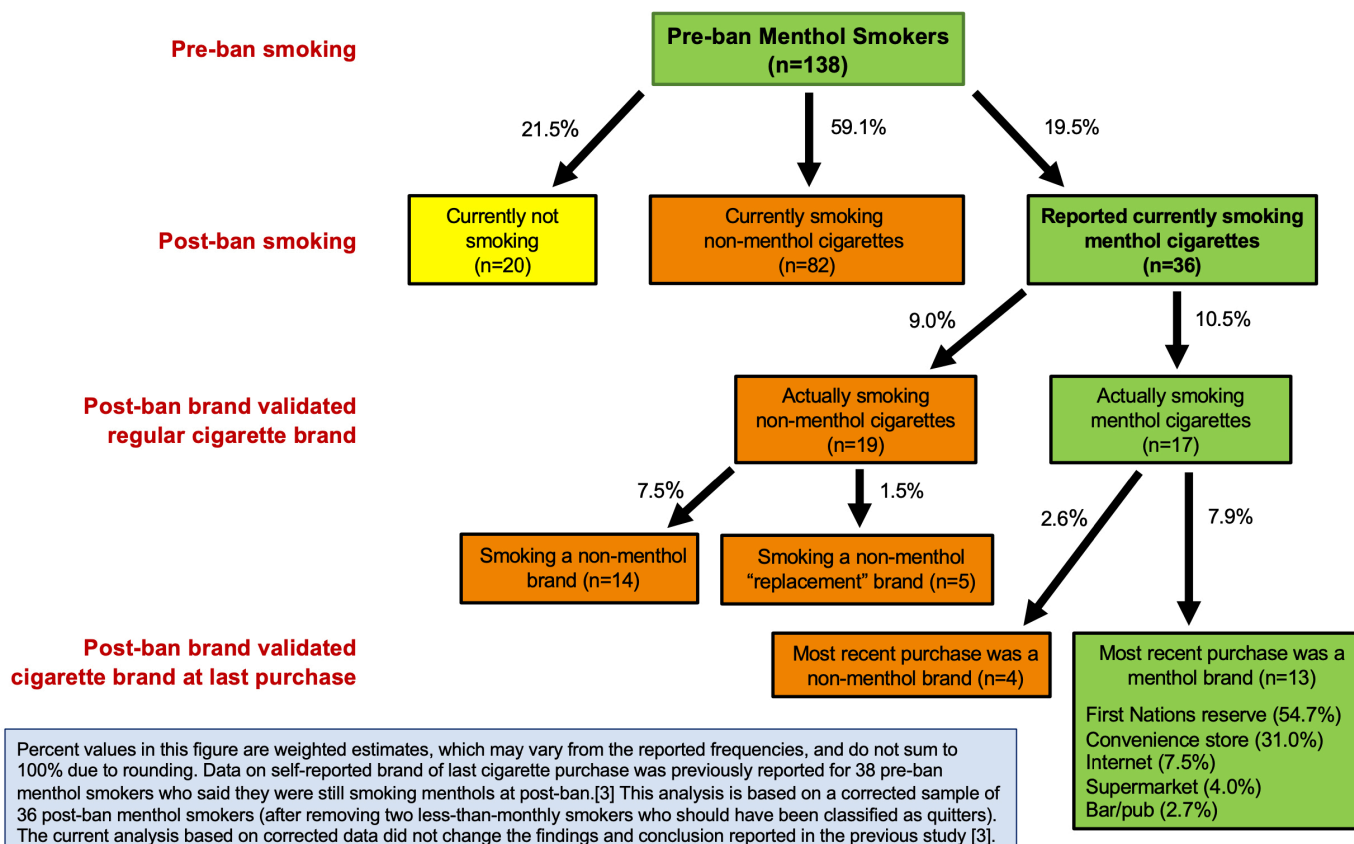
One Canadian study reported a significant increase in smokers' cigarette purchases from First Nations reserves in band-adopting provinces versus those in non-adopting provinces.<sup>16</sup> However, a key limitation of that study was that it examined illicit purchasing of all cigarettes (menthols+non-menthols) rather than just menthols, thereby combining cigarettes that were banned (menthols) with cigarettes that were not banned, the latter of which would have been more appropriately considered as a control type. Further, since menthols accounted for only about 5.0% of the Canadian cigarette market, the non-affected brands were weighted nearly 20 to 1 in the combined measure.

In our initial study, which focused on the impact of the Canadian menthol ban on cessation,<sup>3</sup> we also reported that 38 pre-ban menthol smokers (19.5%) said that they were still smoking menthols at follow-up. Of the 38, 20 (57.0%) reported that their most recent purchase was of a non-menthol brand; and of the 13 (36.1%) who reported a verified menthol brand as their

last purchase, 54.7% (n=6) bought them from a First Nations reserve.

Using data on pre-ban menthol smokers' self-reported use of menthols versus non-menthols as their regular brand at post-ban, this study extends our original evaluation by using brand validation analysis to: (1) provide a more detailed breakdown of self-reported versus actual use of menthols, with explicit correction of errors where smokers who reported smoking menthols were not actually smoking a menthol brand at post-ban; and (2) verify self-reported purchasing of menthols versus non-menthols at post-ban. We also examined pre-post ban changes in purchasing of cigarettes from First Nations among the same groups of: (1) *menthol smokers* who purchased *menthols* at pre-ban and post-ban, (2) *non-menthol smokers* who purchased *non-menthols* at pre-ban and post-ban, and (3) *all smokers* (menthol+non-menthol) who purchased *menthols and non-menthols* at pre-ban and post-ban. This allowed us to test for possible pre-post ban changes in cigarette purchasing from First Nations reserves in each group. Finally, we examined pre-post ban changes in purchasing of menthol, non-menthol and all cigarettes (menthol+non-menthol) among Indigenous and non-Indigenous smokers.

This study contributes critical data to assess the tobacco industry's argument that a menthol ban will lead to a widespread illicit market. Studies on Canada's menthol ban can inform regulatory policies for menthol cigarettes in other jurisdictions, including the USA, where the United States Food and Drug Administration (US FDA) solicited public comments, including research relevant to whether its proposed rule to prohibit menthol in cigarettes<sup>17</sup> could lead to increased illicit trade.



**Figure 1** Post-ban transitions in smoking behaviour and sources of menthol cigarette purchasing, based on self-reports of smoking behaviour, regular cigarette brand and cigarette brand last purchased among pre-ban menthol smokers.

## METHODS

Data are from the Canadian arm of the Wave 1 (2016) and Wave 2 (2018) ITC Four Country Smoking and Vaping (4CV) Survey. Details on participants, sampling and measures of pre-ban and post-ban smoking status have been previously reported.<sup>3</sup>

Pre-ban and post-ban menthol smokers were asked whether they had a regular brand of cigarettes. Smokers without a regular brand were asked to report the brand they last bought. Smokers with a regular brand were asked whether they bought this brand at last purchase (if 'yes', then asked to report the location of purchase; if 'no', then asked to report the brand they last bought). Cigarette brand names were coded as 'menthol' (ie, menthol brand names) or 'non-menthol' (ie, non-menthol brand names, non-menthol replacement brand names with 'blue' colour descriptors to suggest menthol-like qualities<sup>18</sup>).

Self-reported racial/cultural group was coded as 'Indigenous' (ie, Aboriginal (eg, North American Indian, Métis or Inuit)) or 'non-Indigenous' (ie, Chinese, South Asian, Filipino, Latin American, Southeast Asian, West Asian, Japanese, Korean, other).

Data were analysed using SAS-callable SUDAAN V.11. Longitudinal analyses among recontacted smokers were conducted using survey logistic regression models. Survey weights were applied to generate population-level estimates.

## RESULTS

Among the subset of 138 pre-ban menthol smokers, 36 (19.5%) said they still smoked menthols at post-ban. However, brand validation coding showed that 19 (9.0%) reported a non-menthol brand, and 17 (10.5%) reported a verified menthol brand at follow-up. Of the 17 who reported a verified menthol brand at post-ban, 13 (7.9%) bought a menthol brand, and 4 (2.6%) bought a non-menthol brand at their last purchase (figure 1). (Percent values are weighted estimates that may vary from reported frequencies, and do not sum to 100% due to rounding.)

Among the full sample of smokers, there was no change in purchasing from First Nations reserves among those who purchased: (1) menthol cigarettes at pre-ban and post-ban (n=9; 51.2% (n=4) vs 51.2% (n=4), p=1.00), (2) non-menthol cigarettes at pre-ban and post-ban (n=1024; 9.1% (n=100) vs 8.7% (n=101), p=0.69) and (3) all cigarettes at pre-ban and post-ban (n=1086; 9.7% (n=112) vs 9.2% (n=112), p=0.56) (online supplemental table 1). (Percent values are weighted estimates that do not correspond exactly with reported sample sizes.) There were no significant differences between Indigenous and non-Indigenous smokers in pre-ban and post-ban purchasing of cigarettes from First Nations reserves (online supplemental table 2).

## DISCUSSION

This study provides important evidence that menthol cigarette bans did not increase the use or purchasing of illicit menthol cigarettes in Canada. We found that among pre-ban menthol smokers, 19.5% (36/138) said they still smoked menthols at post-ban. However, brand validation analysis showed that only 10.5% (17/138) reported a verified menthol brand as their regular brand—of those, 7.9% (13/138) bought a menthol brand at their last purchase. (It should be noted that brand validation analysis can also be used to identify instances when a smoker claimed to be smoking a non-menthol brand but was actually smoking a menthol brand. We found no such cases of this opposite error.)

Additionally, there was no increase in purchasing of illicit menthol cigarettes from First Nations reserves after bans among

smokers who bought menthol cigarettes from this location at pre-ban and post-ban. Similarly, menthol bans have not appeared to increase purchasing of non-menthol cigarettes from First Nations reserves. This provides additional evidence that menthol bans had no impact on cigarette purchasing from First Nations reserves, since non-menthol cigarettes act as a 'control product' against which menthol cigarettes can be assessed—a strategy analogous to that used in our evaluation of the menthol ban on quitting, which compared non-menthol smokers to menthol smokers.<sup>3</sup>

Our results are consistent with those of previous research showing no increase in illicit cigarette purchasing after menthol cigarette bans in Canada,<sup>2 7 8</sup> England<sup>19</sup> and the Netherlands.<sup>20</sup> Together, findings from these three jurisdictions provide significant converging evidence that a menthol cigarette ban does not increase illicit trade. This converging evidence also lends greater confidence that the US FDA's proposed rule to prohibit menthol in cigarettes,<sup>17</sup> which would apply nationwide, including on Tribal lands, will not significantly increase illicit cigarette trade. Our empirical evidence supports Schroth *et al*'s analysis of the illicit cigarette market in the USA, which concluded that a menthol ban would not create a significant demand for contraband.<sup>5</sup> There is a need for further research to compare the accessibility and proportion of illicit cigarettes purchased, and the enforcement of regulations for illicit cigarette sales on reserves in Canada compared with reservations in the USA.

A strength of this study is using brand validation analysis to correct for errors in pre-ban menthol smokers' self-reported versus actual use of menthols at post-ban and to improve the validity of our measurement of illicit menthol cigarette purchasing at post-ban. Another strength is our individual-level longitudinal difference-in-differences analysis that reduces province-level confounders and provides an unbiased estimate of the effect of the menthol ban on both menthol and non-menthol smokers. Future research could use additional methods (eg, gap analysis of difference between survey-reported consumption and tax-paid sales, cigarette pack collection, post-ban use of menthol flavour cards/other additives) to measure illicit cigarette trade.<sup>20-22</sup>

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## SUPPLEMENTARY MATERIALS

**Supplementary Table 1.** Percentage of smokers who reported they made their last purchase of cigarettes from a First Nations reserve before and after the menthol ban.

Cigarette purchasing group	Smokers who reported last purchase of cigarettes from a First Nations reserve before menthol ban % (n)	Smokers who reported last purchase of cigarettes from a First Nations reserve after menthol ban % (n)	p-value
Purchased menthol cigarettes at both pre- and post-ban (n=9 menthol smokers)	51.2 (4)	51.2 (4)	1.00
Purchased non-menthol cigarettes at both pre- and post-ban (n=1024 non-menthol smokers)	9.1 (100)	8.7 (101)	0.69
Purchased cigarettes at both pre- and post-ban (n=1086 menthol + non-menthol smokers)	9.7 (112)	9.2 (112)	0.56

Tested for pre-post ban changes in purchasing of cigarettes from First Nations among the same groups of: a) **menthol smokers** who purchased **menthol cigarettes** at pre- and post-ban, b) **non-menthol smokers** who purchased **non-menthol cigarettes** at pre- and post-ban, and c) **all smokers** (menthol + non-menthol) who purchased **menthol and non-menthol cigarettes** at pre- and post-ban.

Percent values are weighted estimates that do not correspond exactly with reported sample sizes.

## SUPPLEMENTARY MATERIALS

**Supplementary Table 2.** Cigarette purchasing from First Nations reserves by Indigenous smokers and non-Indigenous smokers before and after the menthol ban.

Type of cigarette purchase	Time of cigarette purchase	Purchased cigarettes from a First Nations reserve		
		Indigenous % (n)	Non-Indigenous % (n)	Indigenous vs. non-Indigenous comparison p-value
Menthol cigarette purchase, among those who purchased menthol cigarettes at both pre- and post-ban	Pre-ban	0 (0)	51.2% (9)	-
	Post-ban	0 (0)	51.2% (9)	-
	Pre- and post-ban difference between Indigenous and non-Indigenous smokers who purchased menthol cigarettes from a First Nations reserve	-		
Non-menthol cigarette purchase, among those who purchased non-menthol cigarettes at both pre- and post-ban	Pre-ban	13.4 (35)	9.0 (1024)	0.38
	Post-ban	23.3 (35)	8.4 (1024)	0.05
	Pre- and post-ban difference between Indigenous and non-Indigenous smokers who purchased non-menthol cigarettes from a First Nations reserve	11%, p= 0.09		
All cigarette purchase, among those who purchased cigarettes at both pre- and post ban	Pre-ban	21.9 (37)	9.4 (1041)	0.10
	Post-ban	26.3 (37)	8.8 (1041)	0.03
	Pre- and post-ban difference between Indigenous and non-Indigenous smokers who purchased cigarettes from a First Nations reserve	5%, p=0.50		

Generalized estimating equation (GEE) regression models adjusted for sex, age group, and time-in-sample.