

Smoking intensity and intent to continue smoking among menthol and non-menthol adolescent smokers in Canada

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Abstract

Purpose Research suggests that menthol cigarette use is associated with nicotine dependence. However, findings on the relationship between menthol smoking status and quantity of cigarettes smoked are less clear. The objective of this paper was to examine whether menthol cigarette smoking is associated with higher smoking intensity and intention to continue smoking among adolescents.

Methods A nationally representative sample of 4,736 Canadian students in grades 9–12 was drawn from the 2010–2011 Canadian Youth Smoking Survey. Associations between smoking intensity and menthol smoking were examined using linear regression. A logistic regression was used to examine whether menthol smoking increased the odds that a student reported intention to continue smoking.

Results Thirty-two percentage of smokers in grades 9–12 smoked menthol cigarettes in the last 30 days. Unadjusted average number of cigarettes reported by menthol smokers was 6.86 compared with 4.59 among non-menthol smokers ($p < 0.001$). Multivariable results showed that the average number of cigarettes smoked by menthol smokers was greater than non-menthol smokers ($\beta = 1.92$; 95 % CI = 1.16–2.68). Similar results were found using the total

number of cigarettes smoked in the past week. Additionally, menthol smokers had greater odds of reporting intent to continue smoking compared with non-menthol smokers (OR = 2.95; 95 % CI = 2.24–3.90). These results were similar when separate analyses were conducted for established smokers and experimental smokers.

Conclusions The findings of this study along with existing evidence suggest the need for banning mentholated tobacco products in Canada, in part because of its significant effect on adolescent smoking.

Keywords Tobacco · Smoking intensity · Menthol · Adolescent smokers

Introduction

In spite of the well-documented health risks associated with tobacco use, the prevalence of smoking remains high. Approximately, one in ten Canadian high school students in grades 10–12 are current smokers [1]. Research has shown that the majority of long-term adult smokers start smoking during adolescence [2, 3].

In July 2010, Canada implemented a ban on the sale of cigarettes, little cigars, and blunt wraps that contain certain additives (including most flavoring agents); however, menthol was excluded from the list of banned additives [4]. There is a growing concern that the increased popularity of menthol cigarettes among youth may hinder recent progress in preventing youth from smoking initiation, because youth are more likely to experiment with menthol brands than non-menthol cigarette brands [5–10]. A number of studies document that increasing menthol cigarette use among adolescents and young adults may in part be due to the tobacco industry's market segmentation policy aimed at

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young and inexperienced smokers [10–14]. In the USA, 12- to 17-year-olds have higher rates of menthol cigarette use than any other age category, with 57 % of adolescent smokers aged 12–17 reporting use of menthol cigarettes [7]. National survey data from Canada showed that about 30 % of students in grades 6–12 who smoked cigarettes in the last 30 days reported smoking menthol cigarettes [15]. The appeal of menthol cigarettes among youth stems from the perceived benefits of being less harmful and harsh than non-mentholated cigarettes, and of having a minty taste, which helps to mask the noxious properties of smoking inhalation [11, 14, 16, 17]. In a qualitative study of African American smokers, Richter et al. [17] found that taste was the main reason for smoking menthol rather than non-menthol cigarettes. The majority of participants in this study perceived menthol cigarettes to be refreshing, soothing, and smooth compared with non-mentholated cigarettes, which were perceived to be harsher and stronger.

Currently, there is inconsistent evidence on the effect of menthol smoking on cessation. While numerous studies suggest that menthol cigarette use is associated with poor cessation outcomes [5, 18–22], other studies found no significant difference in cessation-related outcomes between menthol and non-menthol smokers [23–25]. Using nationally representative US data (the 2003 and 2006/2007 Tobacco Use Supplement to the Current Population Survey), two studies found smoking menthol cigarettes was associated with decreased cessation [20], despite menthol smokers being more likely to attempt to quit [19]. A randomized controlled trial, on the other hand, indicated no significant effect of menthol smoking on 7-day point smoking abstinence rates [23]. However, Fu and colleagues' study was restricted to older smokers making pharmacotherapy-aided quit attempts and thus may not be generalizable to younger smokers or those who are not making pharmacotherapy-aided quit attempts.

One of the mechanisms by which menthol cigarette use may deter smoking cessation is the impact of menthol cigarette use on nicotine addiction. Findings from several studies have supported this hypothesized mechanism by finding that menthol cigarette use does indeed elevate nicotine addiction [5, 6, 8, 26–29]. Menthol smokers have shorter time-to-first cigarette, which is a marker for nicotine addiction. Among established smokers in grades 9–12, results from the 2004 U.S. National Youth Tobacco Survey indicated that menthol smokers were more likely to report the need for a cigarette within an hour compared with non-menthol smokers [27]. Inconsistent with the hypothesis that menthol smokers show increased nicotine addiction relative to non-menthol smokers, Collins and Moolchan [28] found that although adolescent menthol smokers had shorter time-to-first cigarette, they did not smoke

significantly more cigarettes per day, nor did they score higher in the Fagerstrom Test for Nicotine Dependence (FTND). However, of the 572 adolescents participating in their study, Collins and Moolchan [28] reported that only about 7 % ($n = 41$) were non-menthol smokers, so their study may have been underpowered to detect clinically significant differences in the number of cigarettes smoked and/or FTND scores.

While few studies have examined whether the quantity of cigarettes smoked differs significantly between menthol and non-menthol smokers, most of these studies have used non-representative samples, and several have primarily focused on adults. Drawing on a representative sample of high school students in Canada, the current study examined whether menthol smokers were more likely to intend to continue smoking over the next year, and whether the quantity of cigarettes smoked differed compared with non-menthol smokers.

Method

Data

To examine the use of menthol cigarettes and smoking behavior among Canadian high school students in grades 9–12, data from a nationally representative sample from the 2010–2011 Youth Smoking Survey (YSS) were analyzed. The YSS is a cross-sectional, biennial classroom-based survey that primarily tracks attitudes and behavior of children and adolescents with respect to tobacco use and substance abuse. The survey excludes those living on First Nations reserves, Canada's three northern Territories (Yukon, Nunavut, and Northwest Territories), attending special schools or schools on military bases. The province of New Brunswick did not participate in the 2010–2011 YSS cycle. Analyses examining national smoking rate from the previous YSS cycle demonstrated no difference in rates without New Brunswick. The total response rate for the 2010–2011 YSS at the school-board level was 82, 56 % of schools, and 73 % of students. All protocol and materials of the YSS received ethics approval from the University of Waterloo (the principal coordinator of the YSS), Health Canada, and institutions of consortium members where required. A detailed description of the design and procedure of the YSS has been documented elsewhere [30, 31]. About 31,396 students in grades 9–12 participated in the 2010/11 YSS. Analyses were restricted to students who were current established smokers ($n = 3,174$) (smoked in the past 30 days and have smoked at least 100 cigarettes in a lifetime) and experimental smokers ($n = 1,861$) (smoked in the past 30 days and have not smoked at least 100 cigarettes in a lifetime).

Smoking intensity and intent to continue smoking

Smoking intensity was defined as two continuous outcome variables and reflected the quantity of cigarettes smoked. The intensity measures were (1) the average number of cigarettes smoked on the days the respondent smoked and (2) the total number of cigarettes smoked in the past week prior to the survey.

Intent to continue smoking, a dichotomous outcome variable, was assessed from the question: “At any time in the next year do you think you will smoke a cigarette?” Students who answered “definitely yes” or “probably yes” were considered to show intent to continue smoking; otherwise, smokers were considered not to show intent to continue smoking. This question is one of the 3 questions frequently used to determine susceptibility to smoking among never smokers [32]. However, In the YSS data, this question was also asked to current smokers.

Independent variables

Menthol cigarette smokers were defined as those who indicated smoking at least one menthol cigarette in the last 30 days. A number of covariates were also included in the analysis, namely, school grade level (12, 11, 10, with grade 9 as the reference category); gender (1 = male, 0 = female); full home smoking restriction; parent or guardian smoking status; having at least a friend that smokes, and province of residence (Prince Edward Island, Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, with Newfoundland & Labrador as the reference category). Smoking status of friends was determined by response to the following question: “Your closest friends are the friends you like to spend the most time with. How many of your closest friends smoke cigarettes?” with response dichotomized to indicate either having at least one friend that smokes or no friends that smoke. Parent or guardian smoking status was obtained from a yes response to whether a student’s parents, step-parents, or guardians smoke cigarettes. Presence of total home smoking ban was dichotomized to indicate homes where smoking is not allowed inside the house, or any other rules.

Statistical analysis

To examine whether smoking intensity differs significantly between menthol smokers and non-menthol smokers, after adjusting for other covariates, a linear regression was conducted. To examine whether intent to continue smoking differed significantly between menthol and non-menthol smokers, a logistic regression was conducted. Survey weights were used in all analysis to produce population estimates and to adjust for unequal

Table 1 Weighted sample characteristics (%)

	Total (<i>n</i> = 4,736)
Intent to continue smoking	
Yes	89
No	11
Smoking intensity	
Average number of cigarettes on days smoked ^a	5.5(0.10)
Total number of cigarettes smoked in the past week ^a	32.8(0.67)
Menthol smoking status	
Menthol smoking	32
Non-menthol smoking	68
Gender	
Male	57
Female	43
Grade level	
12	34
11	27
10	22
9	17
Smoking-related exposure	
Presence of total home smoking ban	59
No total ban on smoking in home	41
At least one parent/guardian smokes	62
No parent/guardian smokes	38
At least one close friend smokes	92
No close friends smoke	8
Province of residence	
Newfoundland	2.4
Prince Edward Island	0.5
Nova Scotia	3.9
Quebec	16.8
Ontario	33.4
Manitoba	3.7
Saskatchewan	6.5
Alberta	15
British Columbia	17.8

Estimates for smoking intensity (*n* = 3,104)

^a Continuous variable, the value represents the mean and standard errors are in parenthesis

probabilities of selection. All analyses were carried out using Stata version 13.

Results

The weighted sample characteristics are reported in Table 1. Of the 4,736 students included in the study, the weighted results showed that 32 % of current smokers in grades 9–12 used menthol cigarettes in the last 30 days and

Table 2 Linear regression of smoking intensity among smokers in grades 9–12

Variable	Average CPD β (95 % CI)	Total CPD β (95 % CI)
Menthol smoking status		
Menthol smoking	1.92 (1.16–2.68)***	14.02 (9.20–18.85)***
Non-menthol smoking	Ref	Ref
Gender		
Male	1.10 (0.40–1.81)***	6.94 (2.40–11.48)***
Female	Ref	Ref
School grade level		
Grade 12	0.54 (–0.66 to 1.73)	5.73 (–1.72 to 13.18)
Grade 11	0.38 (–0.83 to 1.60)	2.91 (–4.44 to 10.27)
Grade 10	0.22 (–1.14 to 1.57)	3.32 (–4.87 to 11.51)
Grade 9	Ref	Ref
Smoking-related exposure		
Presence of total home smoking ban	–1.64 (–2.49 to –0.79)***	–9.93 (–15.22 to –4.63)***
No total ban on smoking in home	Ref	Ref
At least one Parent/guardian smokes	2.11 (1.30–2.92)***	15.00 (9.94–20.06)***
No parent/guardian smokes	Ref	Ref
At least one close friend smokes	2.36 (1.42–3.29)***	18.20 (12.67–23.73)***
No close friends smoke	Ref	Ref
Observations	3,104	3,104

Average CPD = average number of cigarettes smoked on the days that the respondent smoked

Total CPD = total number of cigarettes smoked in the past week prior to the survey

Analyses controlled for all covariates in the table and province of residence

Ref = reference category

*** $p < 0.01$; ** $p < 0.05$;

* $p < 0.1$

more than half (56 %) of the sample were male. Approximately 89 % intended to continue smoking, and the average number of cigarettes smoked daily was 5.5.

Cigarettes smoked per day

Unadjusted average number of cigarettes reported by menthol smokers was 6.86 compared with 4.59 among non-menthol smokers ($p < 0.001$). For the total number of cigarettes smoked in the past week, menthol smokers reported smoking 42.74 compared with 26.33 among non-menthol smokers ($p < 0.001$). Among current smokers, the linear regression results examining the association between intensity of smoking and menthol smoking status adjusting for other covariates are reported in Table 2. Multivariable regression results showed that the average number of cigarettes smoked by menthol smokers was 1.92 greater than non-menthol smokers (95 % CI 1.16–2.68). The total number of cigarettes smoked in the past week by menthol smokers was 14.02 greater than non-menthol smokers (95 % CI 9.20–18.85). In a separate analyses (results not shown) for established and experimental smokers, the amount smoked were similarly significantly greater for menthol smokers. In terms of demographics (see Average CPD, Table 2), the average number of cigarettes smoked was greater for males (95 % CI 0.40–1.81), those with a smoking parent or guardian (95 % CI 1.30–2.92), and among those for whom at least one friend smoked (CI

1.42–3.29). Students living in homes with a full smoking restriction smoked fewer cigarettes (95 % CI –2.49 to –0.79).

Intent to smoking in the next year

Results from the multivariable logistic regression examining the association between smoking menthol cigarettes and intent to smoking in the next year adjusting for other covariates are reported in Table 3. Menthol smokers had greater odds of intent to smoke in the next year compared with non-menthol smokers (OR 2.95, 95 % CI 2.24–3.90, column 1). Similar results were obtained when separate analyses were conducted for established smokers and experimental smokers. Among established smokers, menthol smokers were more likely to intend to smoke in the next year (OR 1.94, 95 % CI 1.36–2.76, column 2) relative to non-menthol smokers. Among experimental smokers, menthol cigarette use was similarly positively associated with intent to continue smoking in the next year (OR 2.89, 95 % CI 1.83–4.58, column 3). Results were similar when intent to continue smoking was defined as those who answered “definitely yes” that in the next year, they will smoke a cigarette (results not shown). In terms of other covariates included in the analysis (see column 1, Table 3), having at least one friend that smoked (OR 1.79, 95 % CI 1.03–3.10) was significantly associated with intent to continue smoking.

Table 3 Logistics regression of intent to continue smoking among smokers in grades 9–12

Variable	Established and experimental smokers AOR (95 % CI)	Established smokers AOR (95 % CI)	Experimental smokers AOR (95 % CI)
Menthol smoking status			
Menthol smoking	2.95 (2.24–3.90)***	1.94 (1.36–2.76)***	2.89 (1.83–4.58)***
Non-menthol smoking	Ref	Ref	Ref
Gender			
Male	0.97 (0.75–1.26)	1.10 (0.79–1.54)	0.70 (0.45–1.09)
Female	Ref	Ref	Ref
School grade level			
Grade 12	1.31 (0.88–1.96)	1.01 (0.59–1.75)	0.91 (0.46–1.80)
Grade 11	1.25 (0.87–1.79)	1.01 (0.59–1.72)	0.90 (0.51–1.60)
Grade 10	1.11 (0.76–1.63)	0.98 (0.55–1.76)	0.80 (0.44–1.43)
Grade 9	Ref	Ref	Ref
Smoking-related exposure			
Presence of total home smoking ban	0.87 (0.65–1.16)	0.74 (0.53–1.05)*	1.41 (0.91–2.20)
No total ban on smoking in home	Ref	Ref	Ref
At least one Parent/guardian smokes	1.02 (0.75–1.40)	0.87 (0.58–1.30)	0.69 (0.44–1.07)*
No parent/guardian smokes	Ref	Ref	Ref
At least one close friend smokes	1.79 (1.03–3.10)**	2.05 (0.98–4.31)*	1.15 (0.52–2.59)
No close friends smoke	Ref	Ref	Ref
Observations	4,736	2,969	1,767

Established smokers = smoked in the past 30 days and have smoked at least 100 cigarettes in a lifetime

Experimental smokers = smoked in the past 30 days and have not smoked at least 100 cigarettes in a lifetime

AOR adjusted odds ratio

Analyses controlled for all covariates in the table and province of residence AOR is adjusted odds ratio

*** $p < 0.01$; ** $p < 0.05$;

* $p < 0.1$

Discussion

The current study examined the association between menthol smoking and intent to continue smoking, and cigarettes smoked per day. This study is timely and germane to the ongoing discussion concerning menthol in cigarettes and corresponding smoking behavior, especially as it relates to the potential risk of nicotine addiction among adolescents. It was found that menthol smokers smoke more cigarettes and are more likely to intend to continue smoking in the next year relative to non-menthol smokers in a nationally representative sample of Canadian grade 9–12 students. Our findings are consistent with a growing body of research that has found menthol cigarettes to be a popular choice among smokers, especially the young smokers [6–9, 33]: about 32 % of smokers in our sample smoked menthol cigarettes within the last 30 days.

Our finding that adolescent menthol cigarette smokers smoked a greater number of cigarettes relative to non-menthol cigarette smokers contrast with previous research among adults, which has reported either no difference [24] or that menthol smokers smoke lower numbers of cigarettes relative to non-menthol smokers [25, 26, 34, 35]. Data from the 2002 International Tobacco Control Policy Evaluation Survey showed that adult smokers of a mentholated brand smoked fewer cigarettes per day than smokers of non-mentholated

brands [34]. Likewise, results from the Tobacco Use Supplement to the Current Population Survey showed that menthol smokers reported a mean of about 13 cigarettes per day compared with 15 among non-menthol smokers [26]. Among current and former adult smokers, Mendiondo et al. [34] found that the average number of cigarettes smoked per day was greater for non-menthol smokers. To our knowledge, only one study examined differences in quantity of cigarettes smoked per day among menthol and non-menthol adolescent smokers [28]. Collins and Moolchan [28] found that menthol cigarette smokers did not smoke more cigarettes per day than non-menthol adolescent smokers. However, the use of non-representative data and the composition of the sample (531 menthol smokers vs. 41 non-menthol smokers) limit generalization of Collins and Moolchan findings.

Results showing that menthol smokers were more likely to intend to continue smoking in the next year are consistent with previous research, indicating that menthol cigarette use is associated with lower rates of cessation [18–22] and with higher levels of nicotine addiction [6, 8, 26–29]. The higher likelihood of smoking next year among menthol smokers when compared to non-menthol smokers may in part be due to preference for menthol brands. Analysis restricted to experimental smokers showed similar results. Prior research has documented that the sensory properties of menthol make smoking more attractive to young smokers [5, 8, 10–13, 16].

This study has some limitations that are worth noting. First, causation cannot be determined from cross-sectional data. Second, the data are self-reported, and biochemical measures of smoking-related variables were not available in the YSS dataset. Third, due to lack of detailed brand information, we were not able to verify self-reported menthol cigarette use in the last 30 days and there is a possibility of misclassification of menthol smoking status. Fourth, our results are not completely comparable with previous research, since we used “intent to continue smoking,” which is different from the commonly used FTND scale or time-to-first cigarette. YSS data do not include these more traditional measures of nicotine addiction; future research should confirm our findings using validated nicotine dependence measures. Finally, given that the main variable of interest, menthol cigarette use, was not collected in previous YSS cycles, controlling for the price of cigarettes using just one cycle will have limited variability; hence, the price effect cannot be accurately estimated. However, our inclusion of provincial fixed effects will capture much of this effect, since a large part of cigarette pricing in Canada is attributable to provincial taxes. Though not reported, results were not different in a specification that includes cigarette prices. Despite these limitations, the results from this large, nationally representative dataset are consistent with the growing evidence that menthol cigarette may elevate the risk of nicotine addiction and have the difficulty of quitting.

Conclusion

Adolescent menthol smokers smoke more cigarettes and report their intent to continue smoking in the next year more frequently than non-menthol smokers. A recent scientific evaluation of the possible health effects of menthol cigarettes conducted by the Food and Drug Administration suggests that menthol in cigarettes is likely associated with increasing nicotine dependence, and menthol smokers are therefore less likely to quit smoking successfully [5]. The findings of this study along with existing evidence suggest the need for banning menthol in Canada, in part because of its significant effect on youth smoking.

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Conflict of interest None.

References

1. Youth Smoking Survey (2010–11) Supplementary Tables, Youth Smoking Survey 2010–11. Retrieved from http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/stat/_survey-sondage_2010-2011/table-eng.php#t4b
2. Chassin L, Presson CC, Sherman SJ, Edwards DA (1990) The natural history of cigarette smoking: predicting young-adult smoking outcomes from adolescent smoking patterns. *Health Psychol* 9(6):701–716. doi:10.1037/0278-6133.9.6.701
3. Khuder S, Dayal H, Mutgi A (1999) Age at smoking onset and its effect on smoking cessation. *Addict Behav* 24(5):673–677. doi:10.1016/S0306-4603(98)00113-0
4. Health Canada (2010) Retrieved from http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/_2010/2010_112-eng.php
5. Food and Drug Administration (2013) Preliminary scientific evaluation of the possible public health effects of menthol versus nonmenthol cigarettes. Retrieved from <http://www.fda.gov/downloads/ScienceResearch/SpecialTopics/PeerReviewofScientificInformationandAssessments/UCM361598.pdf>
6. Nonnemaker J, Hersey J, Homs G, Busey A, Allen J, Vallone D (2013) Initiation with menthol cigarettes and youth smoking uptake. *Addiction* 108(1):171–178. doi:10.1111/j.1360-0443.2012.04045.x
7. Giovino GA, Villanti AC, Mowery PD, Sevilimedu V, Niaura RS, Vallone DM, Abrams DB (2013) Differential trends in cigarette smoking in the USA: is menthol slowing progress? *Tobacco control, tobaccocontrol-2013*. doi: 10.1136/tobaccocontrol-2013-051159
8. Hersey JC, Ng SW, Nonnemaker JM, Mowery P, Thomas KY, Vilsaint MC, Haviland ML (2006) Are menthol cigarettes a starter product for youth? *Nicotine Tob Res* 8(3):403–413. doi:10.1080/14622200600670389
9. Villanti AC, Giovino GA, Barker DC, Mowery PD, Sevilimedu V, Abrams DB (2012) Menthol brand switching among adolescents and young adults in the National Youth Smoking Cessation Survey. *Am J Public Health* 102(7):1310–1312. doi:10.2105/AJPH.2011.300632
10. Lee YO, Glantz SA (2011) Menthol: putting the pieces together. *Tob control* 20(Suppl 2):ii1–ii7. doi:10.1136/tc.2011.043604
11. Klausner K (2011) Menthol cigarettes and smoking initiation: a tobacco industry perspective. *Tob Control* 20(Suppl 2):ii12–ii19. doi:10.1136/tc.2010.041954
12. Kreslake JM, Wayne GF, Connolly GN (2008) The menthol smoker: tobacco industry research on consumer sensory perception of menthol cigarettes and its role in smoking behavior. *Nicotine Tob Res* 10(4):705–715. doi:10.1080/14622200801979134
13. Yerger VB (2011) Menthol’s potential effects on nicotine dependence: a tobacco industry perspective. *Tob Control* 20(Suppl 2):ii29–ii36. doi:10.1136/tc.2010.041970
14. Anderson SJ (2011) Marketing of menthol cigarettes and consumer perceptions: a review of tobacco industry documents. *Tob Control* 20(Suppl 2):ii20–ii28. doi:10.1136/tc.2010.041939
15. Manske SR, Rynard V, Minaker L (2013) Flavoured tobacco use among Canadian youth: evidence from Canada’s 2010/2011 Youth Smoking Survey. Waterloo: Propel Centre for Population Health Impact, 1–2. Retrieved from www.yss.uwaterloo.ca/index.cfm?section=5&page=288

16. Ahijevych K, Garrett BE (2010) The role of menthol in cigarettes as a reinforcer of smoking behavior. *Nicotine Tob Res* 12(suppl 2):S110–S116. doi:10.1093/ntr/ntq203
17. Richter P, Beistele D, Pederson L, O’Hegarty M (2008) Small-group discussions on menthol cigarettes: listening to adult African American smokers in Atlanta, Georgia. *Ethn Health* 13:171–182. doi:10.1080/13557850701784694
18. Gundersen DA, Delnevo CD, Wackowski O (2009) Exploring the relationship between race/ethnicity, menthol smoking, and cessation, in a nationally representative sample of adults. *Prev Med* 49(6):553–557. doi:10.1016/j.ypmed.2009.10.003
19. Levy DT, Blackman K, Tauras J, Chaloupka FJ, Villanti AC, Niaura RS, Abrams DB (2011) Quit attempts and quit rates among menthol and nonmenthol smokers in the United States. *Am J Public Health* 101(7):1241–1247. doi:10.2105/AJPH.2011.300178
20. Delnevo CD, Gundersen DA, Hrywna M, Echeverria SE, Steinberg MB (2011) Smoking-cessation prevalence among US smokers of menthol versus non-menthol cigarettes. *Am J Prev Med* 41(4):357–365. doi:10.1016/j.amepre.2011.06.039
21. Okuyemi KS, Faseru B, Cox Sanderson L, Bronars CA, Ahluwalia JS (2007) Relationship between menthol cigarettes and smoking cessation among African American light smokers. *Addiction* 102:1979–1986. doi:10.1111/j.1360-0443.2007.02010.x
22. Gandhi KK, Foulds J, Steinberg MB, Lu SE, Williams JM (2009) Lower quit rates among African American and Latino menthol smokers at a tobacco treatment clinic. *Int J Clin Pract* 63:360–367. doi:10.1111/j.1742-1241.2008.01969.x
23. Fu SS, Okuyemi KS, Partin MR, Ahluwalia JS, Nelson DB, Clothier BA et al (2008) Menthol cigarettes and smoking cessation during an aided quit attempt. *Nicotine Tob Res* 10:457–462. doi:10.1080/14622200801901914
24. Hyland A, Garten S, Giovino GA (2002) Mentholated cigarettes and smoking cessation: findings from COMMIT. *Tob Control* 11:135–139. doi:10.1136/tc.11.2.135
25. Muscat JE, Richie JP, Stellman SD (2002) Mentholated cigarettes and smoking habits in whites and blacks. *Tob Control* 11:368–371. doi:10.1136/tc.11.4.368
26. Fagan P, Moolchan ET, Hart A Jr, Rose A, Lawrence D, Shavers VL, Gibson JT (2010) Nicotine dependence and quitting behaviors among menthol and non-menthol smokers with similar consumptive patterns. *Addiction* 105(s1):55–74. doi:10.1111/j.1360-0443.2010.03190.x
27. Wackowski O, Delnevo CD (2007) Menthol cigarettes and indicators of tobacco dependence among adolescents. *Addict Behav* 32(9):1964–1969. doi:10.1016/j.addbeh.2006.12.023
28. Collins CC, Moolchan ET (2006) Shorter time to first cigarette of the day in menthol adolescent cigarette smokers. *Addict Behav* 31(8):1460–1464. doi:10.1016/j.addbeh.2005.10.001
29. Muscat JE, Chen G, Knipe A, Stellman SD, Lazarus P, Richie JP (2009) Effects of menthol on tobacco smoke exposure, nicotine dependence, and NNAL glucuronidation. *Cancer Epidemiol Biomark Prev* 18(1):35–41. doi:10.1158/1055-9965.EPI-08-0744
30. Elton-Marshall TE, Leatherdale ST, Manske SR, Wong K, Ahmed R, Burkhalter R (2011) Research methods of the Youth Smoking Survey (YSS). *Chronic Dis Inj Can* 32(1):47–54. Retrieved from <http://www.phac-aspc.gc.ca/publicat/cdic-mcbc/32-1/ar-07-eng.php>
31. University of Waterloo (2011) Youth Smoking Survey (YSS): 2010/2011 YSS Microdata User Guide. Waterloo: Propel Centre for Population Health Impact, 1–50. Retrieved from http://www.yss.uwaterloo.ca/results/yss10_user_guide.pdf
32. Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Merritt RK (1996) Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol* 15:355–361. doi:10.1037//0278-6133.15.5.355
33. Azagba S, Sharaf MF (2014) Binge drinking and marijuana use among menthol and non-menthol adolescent smokers: findings from the Youth Smoking Survey. *Addict Behav* 39(3):740–743
34. Giovino GA, Sidney S, Gfroerer JC, O’Malley PM, Allen JA, Richter PA, Cummings KM (2004) Epidemiology of menthol cigarette use. *Nicotine Tob Res* 6(Suppl 1):S67–S81. doi:10.1080/14622203710001649696
35. Mendiondo MS, Alexander LA, Crawford T (2010) Health profile differences for menthol and non-menthol smokers: findings from the national health interview survey. *Addiction* 105(s1):124–140. doi:10.1111/j.1360-0443.2010.03202.x