

Quitting Cigarette Smoking after a Menthol Ban: Results from Ontario.

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Menthol Ban

- WHO & FDA: “menthol cigarettes pose a public health risk above that seen with non-menthol cigarettes”
- 35% of the US market
- Other nations such as Brazil, Ethiopia Turkey and the European Union have passed regulations to ban menthol tobacco products

Here comes the government

The FDA turns its attention to menthol cigarettes

Concerned about their appeal to children, the FDA wants to ban minty smokes





Opposing views

Flavour alternatives

“Kids could easily buy loose cigarettes stored in sealed baggies with unwrapped menthol cough drops.”

Contraband

“The Alabama State Trooper Association, the Organization of Black Law Enforcement Executives and other police groups have warned that a ban would create criminal enterprises.”

Ineffective

“It would also be ineffective. Jeff Washington, a 52-year-old who started smoking menthol Newports when he joined the Army in 1983, told The Wall Street Journal that if menthols were banned, “I’d start smoking Marlboros.”



Convenience Store Decisions

“If the FDA proceeds to adopt a rule restricting the use of menthol in cigarettes, there could be industry members that commence litigation against the agency in an effort to overturn the rule”

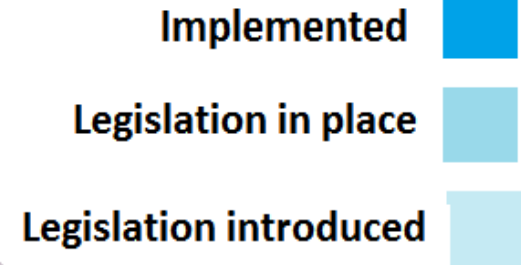
Is blue the new green?



Pre-ban traditional menthol cigarette packs (left) and post-ban non-menthol alternative packs (right).

Background

- Few countries have banned menthol cigarettes
- **January, 2017:** Ontario bans menthol
- **October, 2017:** Canada bans menthol



Alberta

Quebec

Ontario

New Brunswick

Prince Edward Island

Nova Scotia

Menthol in Canada

- In 2015: 1/3 had ever smoked menthol, 1.6% smoked in past 30 days
- 1/3 of youth current cigarette smokers in 2011 smoked menthol



Objectives

- Impact on sales of cigarettes
- Impact of presence of flavour alternatives
- Impact on quitting and continued use

Flavour substitution

- Legal flavours available in Ontario/Canada: All e-cigarette flavours, all flavours in large cigars (>6 g), some flavours in cigars >1.4g
- FDA considering allowing menthol in e-cigarettes.



Methods

- Pre-post evaluation study
- Eligibility: Ontario residents, 16+ years, with internet access, current smokers at baseline (i.e. past month smokers)
- Recruitment: random digit dialing (RDD) to obtain a representative sample of Ontario smokers + supplemental convenience sample of past-year menthol smokers (Sept-Dec 2016)
- Online survey at baseline & post-ban (Jan-March 2017) for menthol smokers only

Menthol alternatives

- Use of inserts or menthol spray to add menthol flavour to regular cigarettes was low (n=6).
- 22 additional individuals reported using mint NRT spray/gum/patch to menthol, but not clear if used as a substitute or an additive.





- 4% of occasional menthol used a flavoured cigars or e-cigarettes post ban who had not reported using before the ban, compared to 13% of daily menthol who had not used it before ($p < 0.000$).
- Use was also higher among regular menthol users among those who had used those flavoured products previously: 30% of occasional menthol smokers compared to 42% of daily menthol smokers used flavour ($p < 0.000$).

Alternative Flavours

	Post-Ban Flavoured E-Cigarette Use			Post-Ban Flavoured Cigar Use			Post-Ban Other Flavoured Tobacco Use		
	Odds Ratio	CI	P value	Odds Ratio	CI	P value	Odds Ratio	CI	P value
Daily Menthol Smoking (vs. Occasional) before the Ban	2.02	(1.31, 3.11)	0.002	1.69	(1.02, 2.78)	0.040	0.78	(0.45, 1.34)	0.366

*All analyses controlling for age, sex, education, income, marital status, race, cigarettes smoked per day and time to first cigarette before the ban, number of prior quit attempts, support for the ban, survey source, pre ban use of e-cigarettes, cigars, and other tobacco products (hookah, pipe, bidis, smokeless)

Abstinence among those making an attempt

	Not smoking		
	Odds Ratio	CI	P value
Daily Menthol Smoking (vs. occasional) at baseline	1.42	(0.76,2.66)	0.273
Flavoured e-cigarette use after the ban	0.51	(0.27,0.97)	0.04
Flavored cigar use after the ban	0.25	(0.09,0.69)	0.008
Other flavoured products use after the ban (hookah, pipe, bidis, smokeless)	0.41	(0.08-2.11)	0.286

*All analyses controlling for age, sex, education, income, marital status, race, cigarettes smoked per day and time to first cigarette before the ban, number of prior quit attempts, support for the ban, survey source, pre ban use of e-cigarettes, cigars, and other tobacco products (hookah, pipe, bidis, smokeless)

Purchased menthol cigarettes since the ban

Non Menthol:	0.3%
Occasional Menthol:	5.0%
Daily Menthol:	22%

$p < 0.001$



Most people who purchased did from First Nations Reserves: no increase in rate among daily menthol smokers over time.

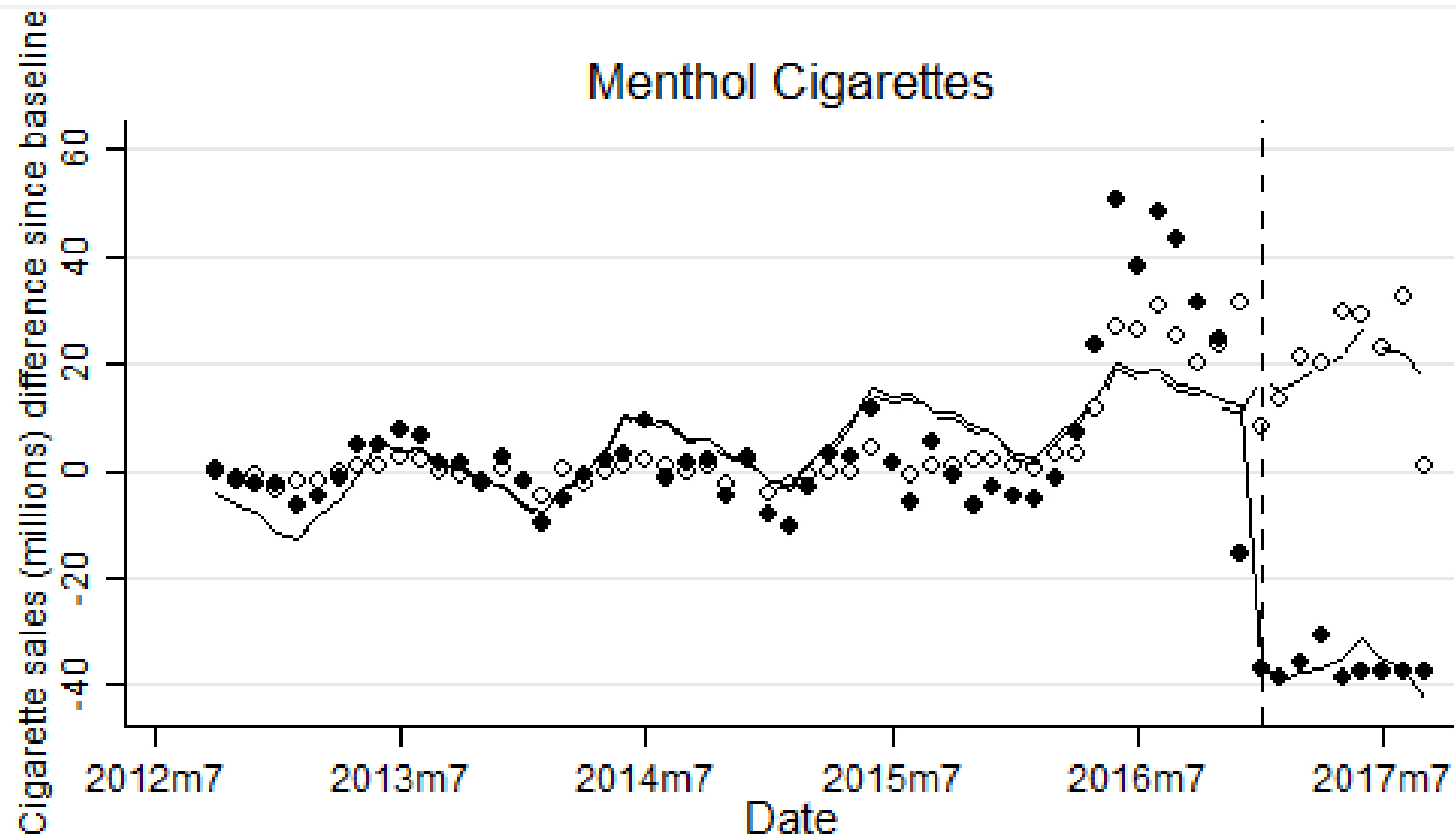
Short term follow up: 21%
Long term follow up: 21%

Menthol Sales



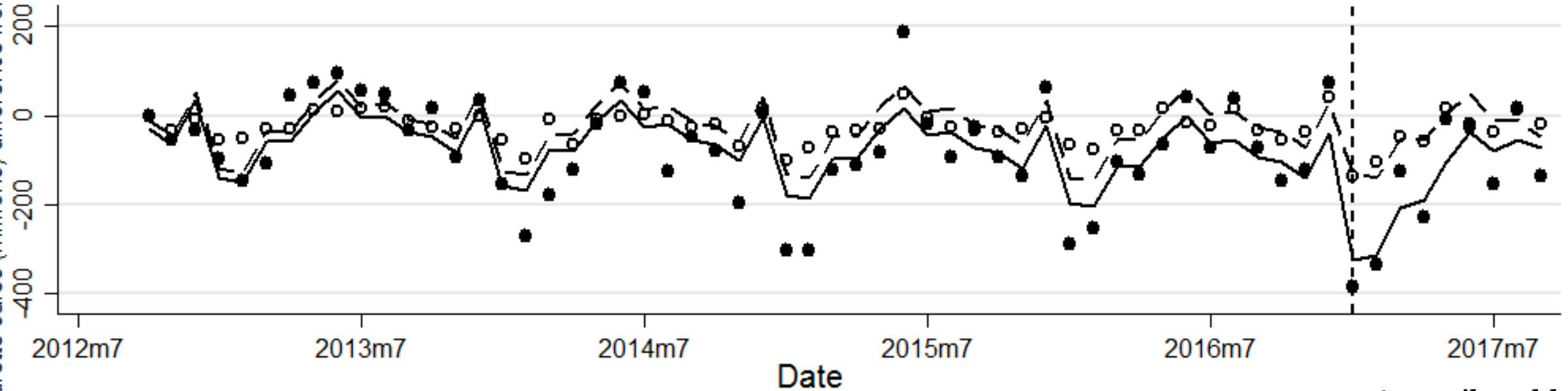
Methods

- Reported net sales data by month from October 2012- October 2017
- Menthol ban in in January 2017 in Ontario but not BC
- Segmented regression to identify changes in intercept and slope of trends associated with regulations, controlling for seasonality, centering on sales at baseline
- Is there a “break” in the trend associated with the timing of the intervention?



Cigarette sales (millions) difference from baseline

Total Cigarettes



11% attributable drop in sales

Ontario

● Actual

— Predicted

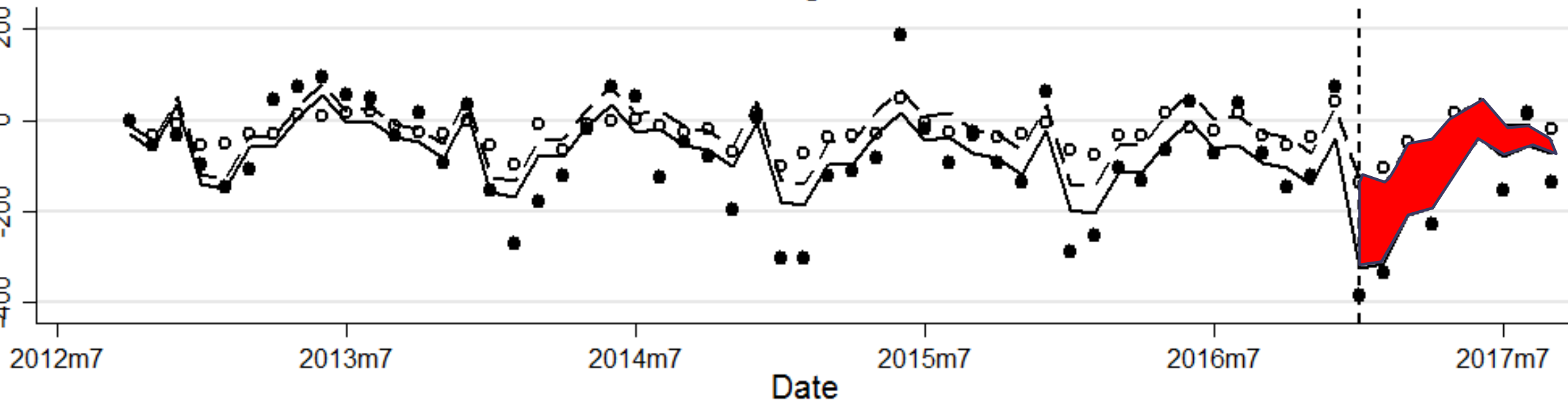
British Columbia

○ Actual

- - - Predicted

Cigarette sales (millions) difference from baseline

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Long Term Quitting Behaviour

Methods

- Pre-post evaluation study
- Eligibility: Ontario residents, 16+ years, with internet access, current smokers at baseline (i.e. past month smokers)
- Recruitment: random digit dialing (RDD) to obtain a representative sample of Ontario smokers + supplemental convenience sample (Sept-Dec 2016)
- Online survey at baseline & one year post-ban (Jan-Aug 2018). Additional follow up Jan-March 2017 for menthol smokers.

Exposure category

- Baseline reported menthol use
 1. “non-menthol users” -> not used menthol cigarettes in the past year
 2. “daily menthol users” -> used menthol cigarettes daily in the past year
 3. “non-daily (occasional) menthol users” -> used menthol occasionally or rarely in the past year

Outcomes & Covariables

- **Primary outcome:** reported point prevalence quitting at 1-year post-ban (Reported “Not at all” to smoking menthol or regular cigarettes)
- **Secondary outcome:** reported making a serious quit attempt (“Since Jan 1, 2017 have you made a serious attempt to quit for good?”)
- Other variables: sex, education, race, and number of cigarettes smoked per day, daily or occasional smoking, use of e-cigarettes or cigars post ban, date of follow up, and survey source.

Statistical analysis

- Separate crude and adjusted Poisson regression models with robust variance adjustment
- Sensitivity subgroup analysis: age, sex, race, daily or occasional smoking
- Sensitivity lost to follow up, outcome definitions

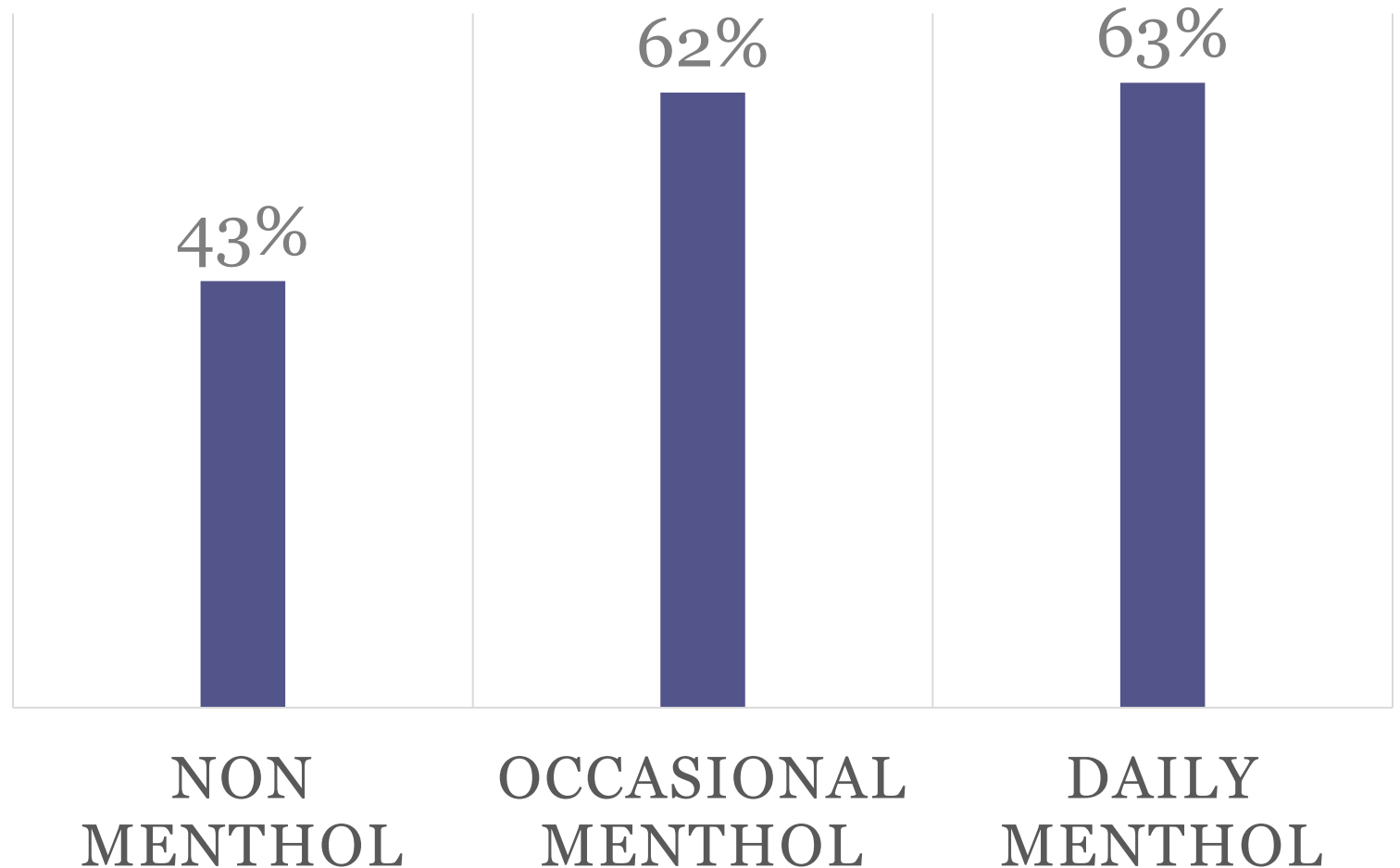
Sample characteristics

- N= 913 participants
 - 306 (34%) non-menthol cigarette smokers
 - 420 (46%) occasional menthol smokers
 - 187 (21%) were daily menthol cigarette smokers at baseline.

Comparing daily menthol smokers to non menthol:

- More likely to be **female** (65% vs 50%)
- More likely to be a **young adult (16-29)** (16% vs. 4%)
- More likely to be **non-white** (20% vs 11%)
- More likely to have **more than high school** education (73% vs 59%)

QUIT ATTEMPTS



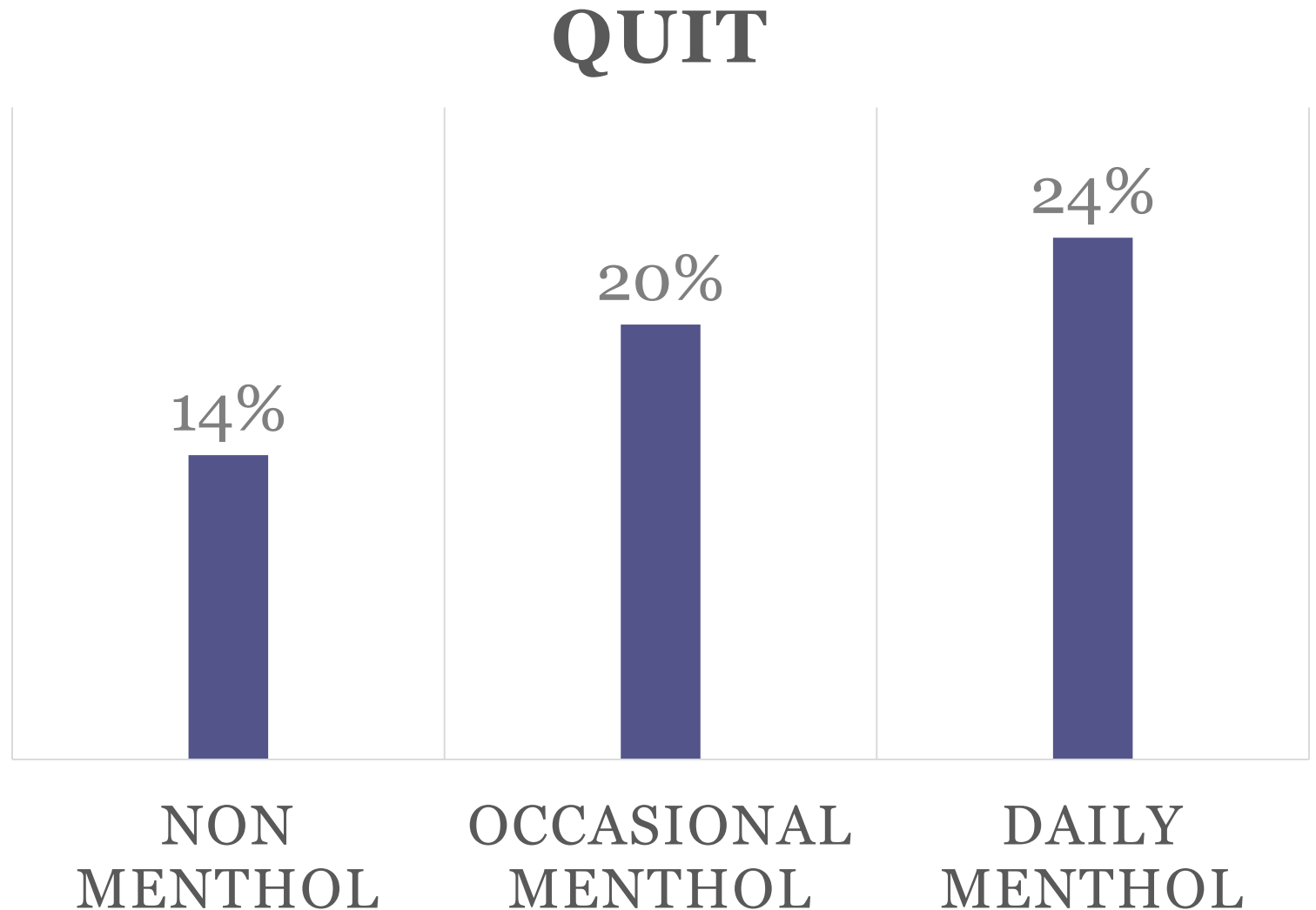
Daily Menthol Smokers
were more likely to
have made a quit
attempt at follow up

$p < 0.001$

Daily Menthol Smokers
were more likely to be
quit at follow up

$P=0.014$

1.9 quit attempts
for daily vs 1.0 for
non menthol



Association between post-ban abstinence/attempting to quit and smoking behaviour prior to menthol ban in Ontario, Canada

Menthol use	Quit		Quit attempt	
	Crude RR (95% CI)	Adjusted RR (95% CI)	Crude RR (95% CI)	Adjusted RR (95% CI)
No menthol	1.00	1.00	1.00	1.00
Occasional	1.41 (1.01-1.97) p=0.042	1.09 (0.74-1.62) P=0.651	1.44 (1.24-1.66) p<0.001	1.09 (0.92-1.30) p=0.306
Daily	1.60 (1.09-2.33) p<0.01	1.62 (1.08-2.42) p=0.018	1.45 (1.23-1.72) p<0.001	1.25 (1.03-1.50) P=0.02

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Sensitivity Analyses

- Models stratified by sex (female, male), age (<30 , ≥ 30), race (white, non-white) and tested for interaction with quit and quit attempts.
- Limited to daily smokers to daily smokers only. (Quit RR: 1.62 95% CI: 1.07, 2.45.)
- Limiting to those who did not purchase menthol cigarettes (Quit RR: 2.39; 95% CI: 1.56, 3.65)
- One month (RR: 1.56; 95% CI: 1.04, 2.35) and six month self report cessation outcomes (RR: 1.61; 95% CI: 1.01, 2.55) similar magnitude to point prevalence smoking
- Menthol status and education associated with lost to follow up; Treating lost to follow up as still smoking (Quit RR: 2.34 (95% CI: 1.51, 3.62)

Strengths & Limitations

- First long-term population-based pre-post evaluation of smoking behaviours after the implementation of a menthol-flavoured tobacco ban demonstrates significant quitting behaviour among menthol smokers
- Impact likely larger among populations with more menthol smoking
- Little awareness or conflict over implementation over ban suggest awareness raising and support for cessation could increase rates of quitting

Thank you! Questions/Comments?

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