

# **A Breath of Fresh Air: The Effect of Public-Place Smoking Bans on Indigenous Youth in Canada**

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This work is preliminary and incomplete.

# Objectives

- We estimate the effect of public-place smoking bans on Canadian youth, overall and for Indigenous peoples.
- We consider how the bans affected smoking, exposure to second-hand smoke, self-assessed health and subjective well-being.

# Background

## Public-Place Smoking Bans

- Canada is well-known for its progressive tobacco control policies, including public-place smoking bans (World Health Organization n.d).
- Public-place bans are the most important non-price deterrent of smoking (Joossens and Raw 2006).

# Public-Place Smoking Bans in Canada



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## Montreal says cannabis can be smoked wherever cigarettes are allowed

# Marijuana legalization will start in Newfoundland and roll westward

By Patrick Cain National Online Journalist, News Global News

THE GLOBE AND MAIL CANNABIS

## Halifax smoking ban coincides with legalization

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## No smoking zones – where you can and can't light up a

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## Iqaluit city council passes new cannabis bylaw

Fines range from \$200 for first offence to \$10,000 for multiple offences

By COURTNEY EDGAR

## B.C. to allow marijuana use in public, but it won't be sold in li stores

## Background

# Public-Place Smoking Bans -- Adults

- Carpenter et al. (2011) find that bans had no effect on smoking among Canadian adults. However, they reduced exposure to second-hand smoke in public places with no displacement to vehicles or homes.
- In the United States, Adda and Cornaglia (2010) find that bans displaced smoking to private spaces, and thus increased exposure to second-hand smoke in those contexts.

# Background

## Public-Place Smoking Bans -- Adults

- There is evidence that public-place bans improved **self-assessed health** among non-smoking adults in Germany and the United Kingdom (Kuehnle and Wunder 2017; Wildman and Hollingsworth 2013).
- There is evidence that public-place bans improved **subjective well-being** among smokers in the United States and European countries (Odermatt and Stutzer 2015; Brodeur 2013), as well as married women with dependent children in the United Kingdom (Yang and Zucchelli 2017).

# Background

## Public-Place Smoking Bans -- Youth

- It is important to differentiate between adults and youth because take-up usually occurs in adolescence (Jarvis 2004), and there is evidence that deterring take-up may reduce eventual smoking rates (Auld 2005).
- There is evidence that public-place bans reduced youth smoking in the United States (Hawkins et al. 2016; Botello-Harbaum et al. 2009; Siegel et al. 2005; Wakefield et al. 2000; Tauras et al. 2013).



## Background

# Public Place Smoking Bans -- Research Gaps

- Smoking and Exposure to Second-Hand Smoke
  - **Youth in Canada**
  - **Indigenous Peoples in Any Country**
- Self-Assessed Health and Subjective Well-Being
  - **Youth in Any Country**
  - **Indigenous Peoples in Any Country**

# Background

## Indigenous Peoples in Canada

- Smoking rates are 33, 31 and 56 percent of First Nations, Métis and Inuit youth, respectively, compared to 11 percent of non-Indigenous youth (Jetty 2017).
- Indigenous youth are also more likely to be exposed to second-hand smoke (Stevenson et al. 2017).
  - Elders believe that recreational and habitual use of tobacco is disrespectful to Indigenous culture and spiritual traditions (Orisatoki 2013).

# Background

## Indigenous Peoples in Canada

- Indigenous peoples have higher rates of smoking-related morbidity and mortality (Jetty 2017).
- This is compounded by a lower socio-economic status, on average, and being under-served by the health system (Burton et al. 2015; Reading and Wien 2009).

***Public-place smoking bans may exacerbate or reduce inequalities to the extent they affected Indigenous and non-Indigenous youth differently.***

# Data

- We use eight cycles of the Canadian Community Health Survey (CCHS), ranging from 2003 to 2012.
  - An objective of the CCHS is to support research on small populations through large sample sizes.
  - The CCHS includes Northern Canada (i.e. Yukon, Northwest Territories, Nunavut). However, it excludes First Nations peoples living on reserve.

# Data

- Our sample consists of Canadian youth aged 12 to 17.
  - A household representative provided basic demographic and socio-economic information, otherwise youth were themselves respondents.
  - Interviews were not conducted without a guarantee of privacy.

# Summary Statistics

	Non-Indigenous	Indigenous
Age 12 to 13, Percent	33.991 (0.452)	32.958 (1.755)
Age 14 to 15, Percent	35.816 (0.462)	39.332 (1.860)
Age 16 to 17, Percent	30.192 (0.437)	27.710 (1.597)
Female, Percent	48.243 (0.478)	53.672 (1.849)
Two-Parent Family, Percent	73.133 (0.436)	54.459 (1.877)
Lone-Parent Family, Percent	17.567 (0.356)	27.199 (1.687)
Other Living Arrangements, Percent	9.299 (0.321)	18.342 (1.543)
Less than High School Family, Percent	3.384 (0.174)	9.065 (0.957)
High School Family, Percent	15.887 (0.345)	22.490 (1.529)
Post-Secondary Family, Percent	80.727 (0.374)	68.446 (1.687)
Real Equivalent Income, 2006 Dollars	41,737 (336.5)	31,929 (1,065.0)
Rural, Percent	19.60 (0.330)	23.363 (1.366)
Observations	29,676	2,379

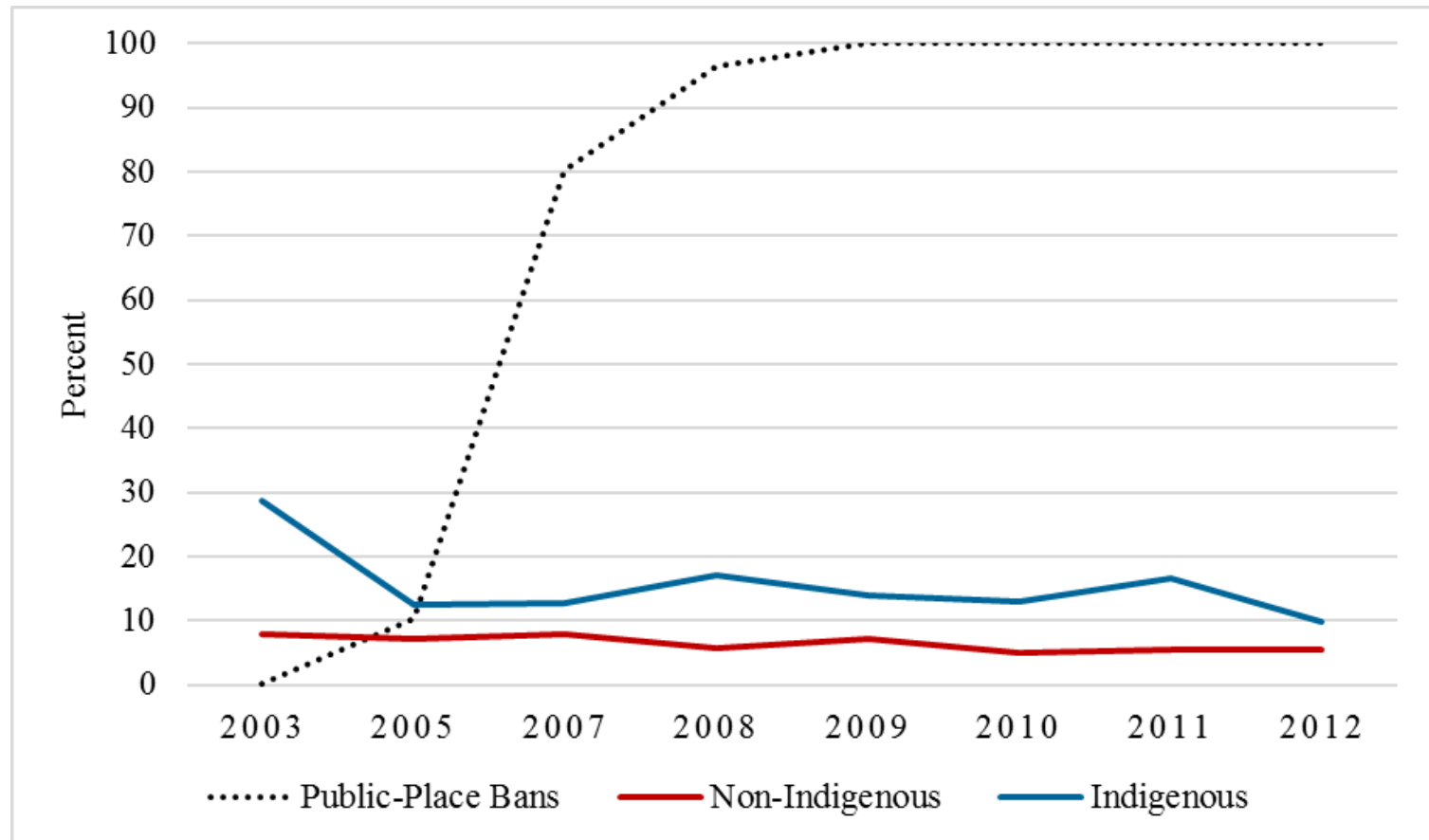
Standard errors are reported in parentheses.

# Dependent Variables

- Smoking and Exposure to Second-Hand Smoke
  - Daily or occasional smoker (0-1)
  - Exposed to second-hand smoke in public places (0-1)
  - Exposed to second-hand smoke in vehicles (0-1)
  - Exposed to second-hand smoke in home (0-1)
  - Number of people who smoke in home (1-15)
- Self-Assessed Health and Subjective Well-Being
  - Excellent or very good health (0-1)
  - Life satisfaction (1-5)

- Indigenous youth were less likely to be daily or occasional smokers as a larger proportion were affected by public-place bans.

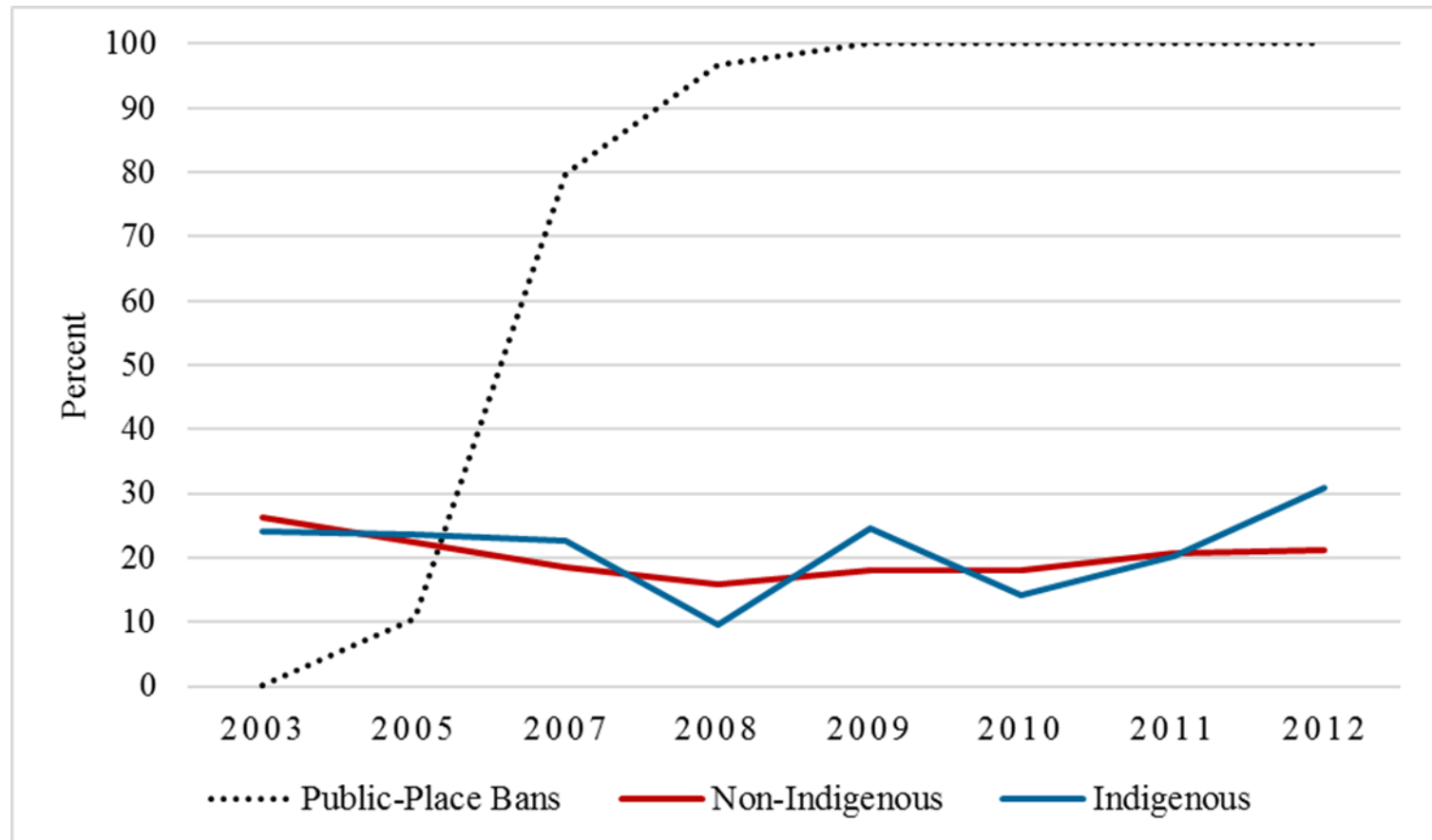
Proportion of Youth Affected by Public-Place Bans and Daily or Occasional Smoking among Non-Indigenous and Indigenous Youth





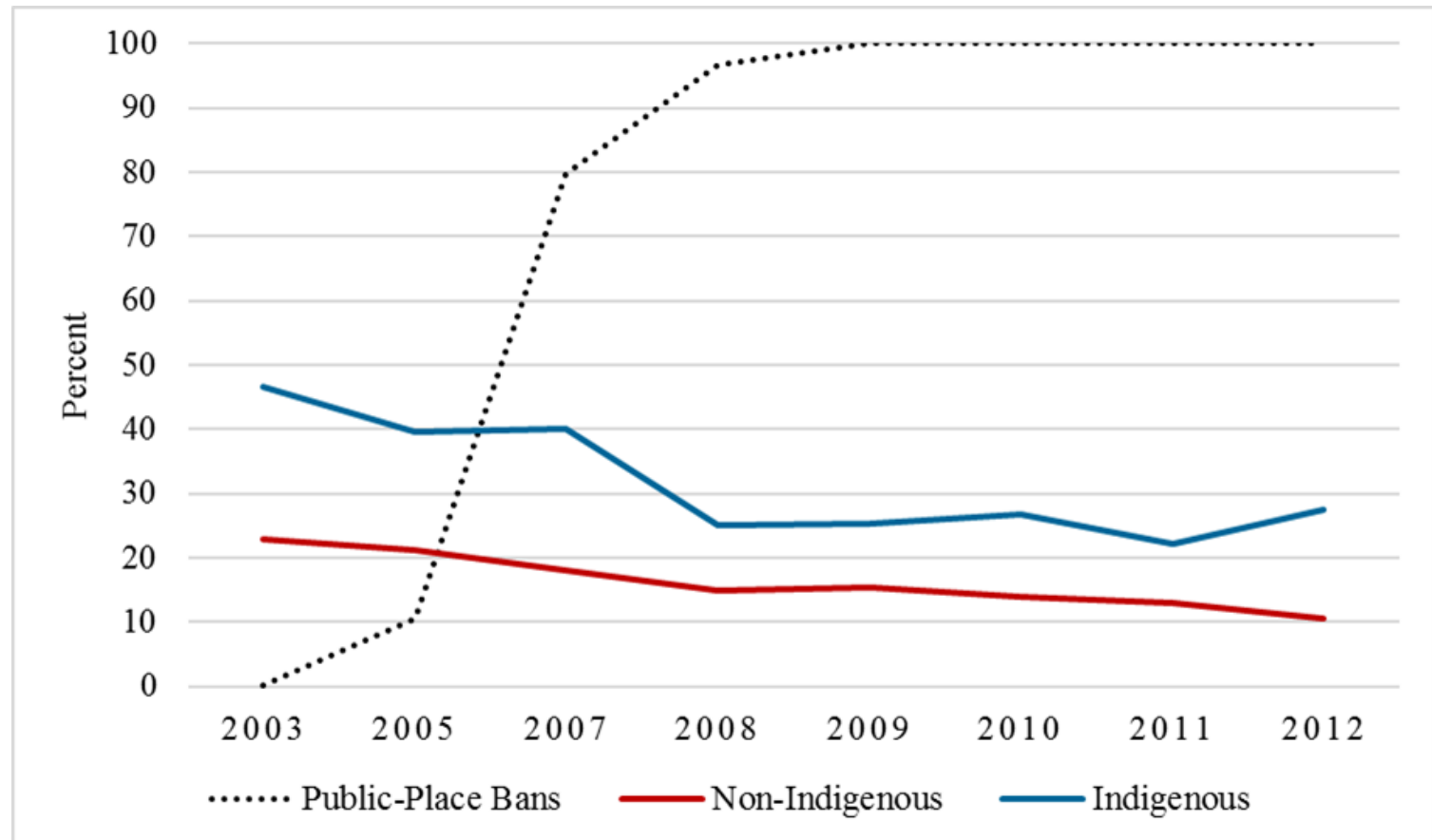
- There was little change in exposure to second-hand smoke in public places as a larger proportion of youth were affected by the bans.

Proportion of Youth Affected by Public-Place Bans and Exposure in Public Places among Non-Indigenous and Indigenous Youth



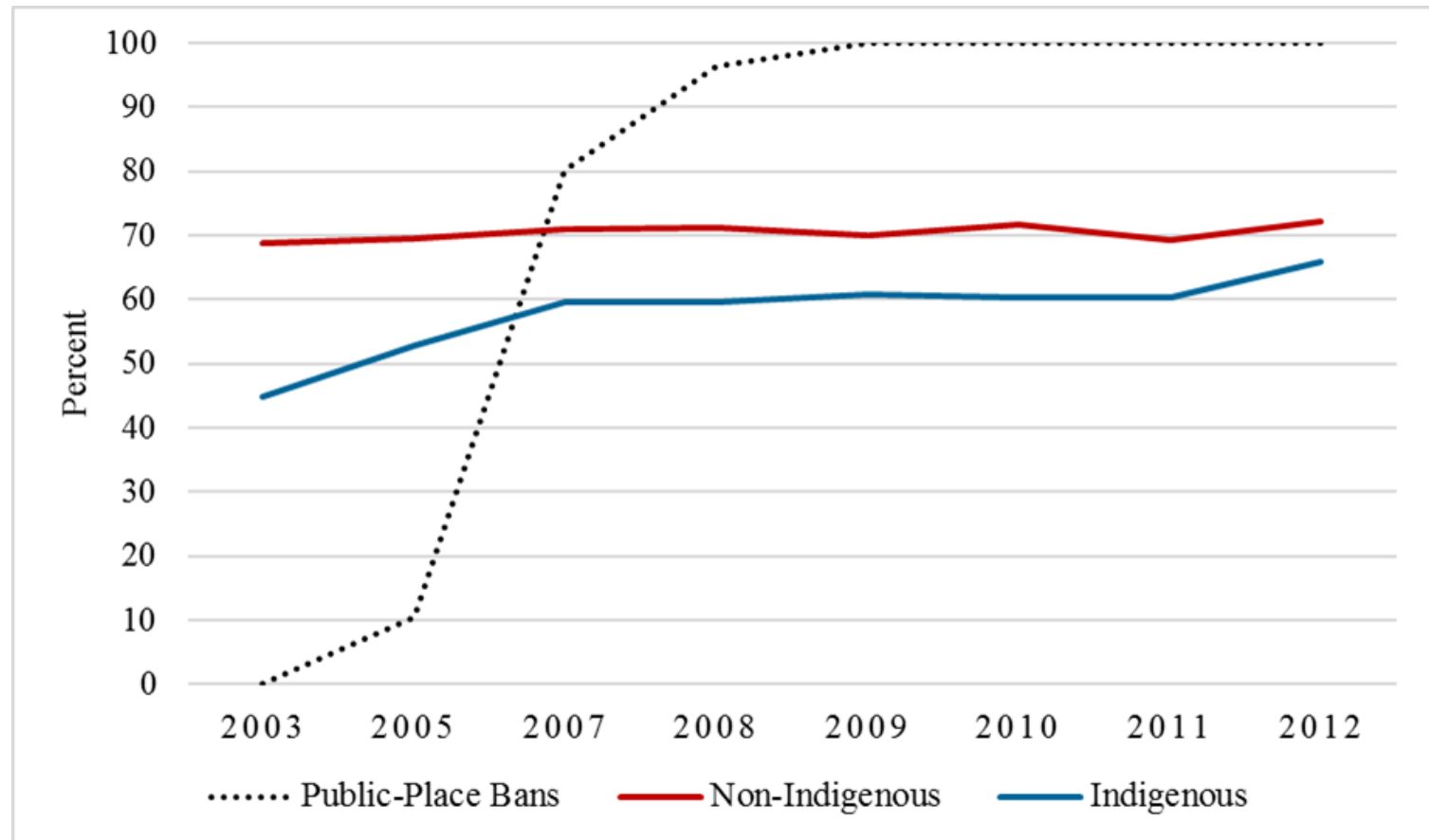
- Exposure to second-hand smoke in home declined as a larger proportion of youth were affected by public-place bans.

Proportion of Youth Affected by Public-Place Bans and Exposure in Home among Non-Indigenous and Indigenous Youth



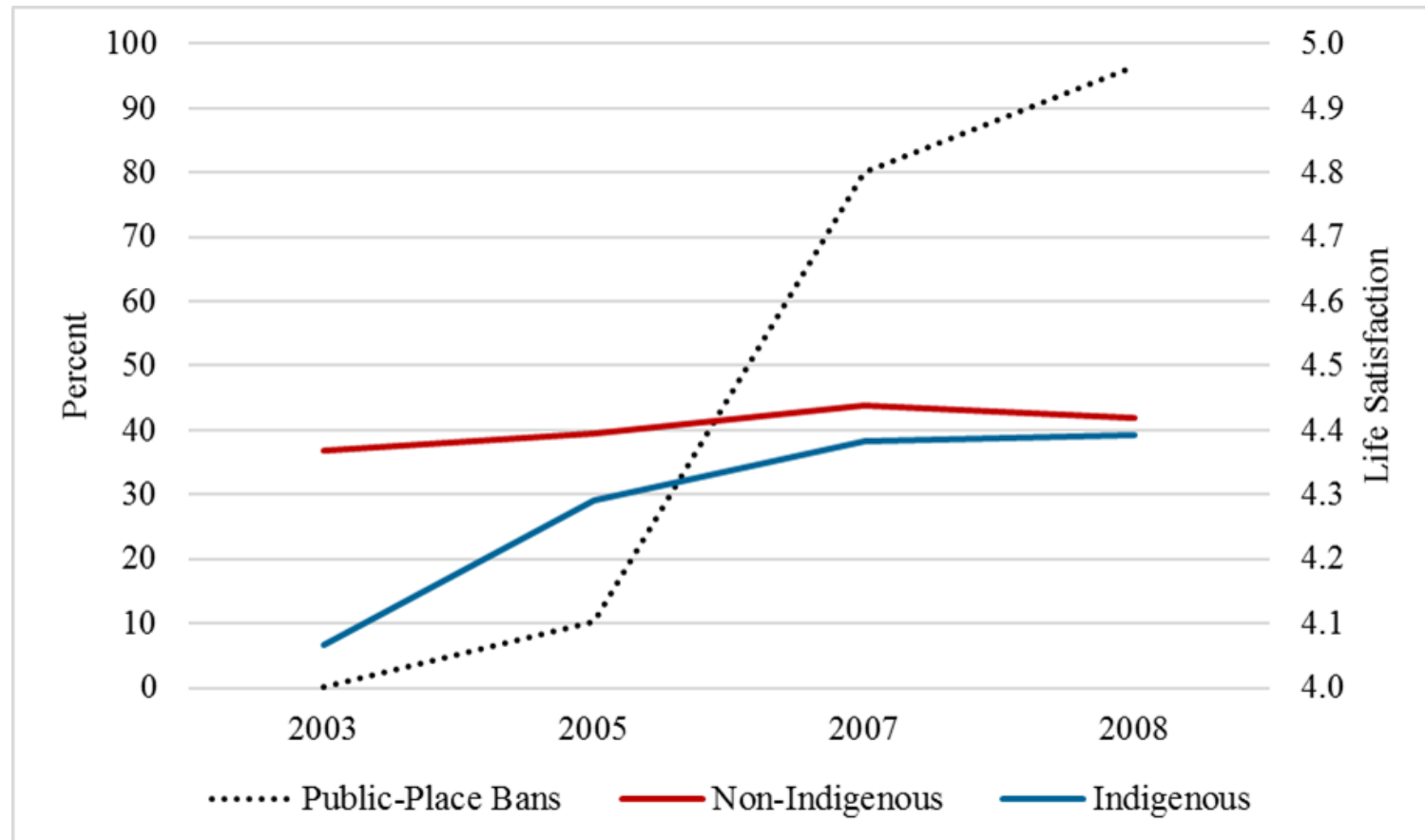
- Indigenous youth were more likely to report excellent or very good health as a larger proportion were affected by public-place bans.

Proportion of Youth Affected by Public-Place Bans and Excellent or Very Good Health among Non-Indigenous and Indigenous Youth



- Life satisfaction improved among Indigenous youth as a larger proportion of youth were affected by public-place bans.

Proportion of Youth Affected by Public-Place Bans and Life Satisfaction among Non-Indigenous and Indigenous Youth



# Methods

- For each dependent variable, we estimate a difference-in-differences model that allows for heterogeneity between Indigenous and non-Indigenous youth.

$$Y_i = \alpha_1 \text{Bans}_i + \alpha_2 (\text{Bans}_i \times \text{Indigenous}_i) + \alpha_3 \text{Indigenous}_i + \beta \text{Province/Territory}_i + \gamma \text{Year}_i + \delta X_i + \varepsilon_i$$

$Y_i$  denotes the dependent variable.

$\alpha_1$  is the average effect of the bans.

$\alpha_2$  is the differential effect of the bans on Indigenous youth.

$\alpha_3$  is the coefficient on an Indigenous dummy variable.

$X_i$  is a set of covariates.

$\beta$ ,  $\gamma$  and  $\delta$  are parameters to be estimated.

$\varepsilon_i$  is the error term.

# Findings

## Smoking and Exposure

	Daily or Occasional Smoker	Exposed in Public Places	Exposed in Vehicles	Exposed in Home	Number of People
Baseline Probability	0.038	0.198	0.142	0.147	–
Public-Place Bans	-0.017** (0.007)	-0.060** (0.025)	0.014 (0.016)	0.011 (0.019)	0.289** (0.133)
Public-Place Bans × Indigenous	0.000 (0.013)	0.016 (0.040)	-0.030 (0.022)	-0.049*** (0.018)	-0.302 (0.197)
Indigenous	0.058** (0.027)	0.020 (0.039)	0.132*** (0.036)	0.193*** (0.036)	0.403*** (0.125)
Pseudo R-Squared	0.159	0.021	0.054	0.080	0.028
Number of Observations	32,055	29,586	29,586	29,586	5,896

We report marginal effects from probit models of smoking and exposure to second-hand smoke in public places, vehicles and home, respectively. We also report coefficients from a zero-truncated negative binomial model of number of people who smoke in home. We include a full set of covariates in each model. Cluster-robust standard errors are reported in parentheses. Statistical significance is given by: \* ten percent; \*\* five percent; and \*\*\* one percent.

# Findings by Indigenous Identity

## Smoking and Exposure

	Daily or Occasional Smoker	Exposed in Public Places	Exposed in Vehicles	Exposed in Home	Number of People
Baseline Probability	0.037	0.191	0.134	0.139	–
Public-Place Bans	-0.023*** (0.008)	-0.051** (0.025)	0.012 (0.016)	0.007 (0.018)	0.331*** (0.120)
Public-Place Bans × First Nations	0.004 (0.021)	0.055 (0.071)	-0.036 (0.061)	-0.027 (0.059)	0.058 (0.293)
Public-Place Bans × Métis	0.062 (0.064)	-0.015 (0.073)	-0.042 (0.034)	-0.088*** (0.026)	-0.566** (0.307)
Public-Place Bans × Inuit	-0.024 (0.017)	0.185 (0.214)	0.312* (0.188)	0.090 (0.226)	0.566 (0.350)
First Nations	0.053 (0.036)	-0.023 (0.049)	0.152 (0.120)	0.189* (0.112)	0.033 (0.290)
Métis	-0.001 (0.030)	0.066 (0.079)	0.141*** (0.048)	0.240*** (0.076)	0.798*** (0.188)
Inuit	0.031 (0.044)	-0.103 (0.069)	-0.087*** (0.032)	0.068 (0.199)	-0.333** (0.147)
Pseudo R-Squared	0.157	0.018	0.056	0.079	0.029
Number of Observations	25,385	23,550	23,550	23,550	4,268

We report marginal effects from probit models of smoking and exposure to second-hand smoke in public places, vehicles and home, respectively. We also report coefficients from a zero-truncated negative binomial model of number of people who smoke in home. We include a full set of covariates in each model. Cluster-robust standard errors are reported in parentheses. Statistical significance is given by: \* ten percent; \*\* five percent; and \*\*\* one percent.

# Findings

## Health and Well-Being

	Excellent or Very Good Health	Life Satisfaction				
		Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Baseline Probability	0.701	0.001	0.007	0.039	0.494	0.460
Public-Place Bans	0.050 (0.032)	0.000 (0.000)	0.002* (0.001)	0.009* (0.005)	0.036* (0.021)	-0.048* (0.027)
Public-Place Bans × Indigenous	0.082** (0.035)	-0.001** (0.000)	-0.004*** (0.001)	-0.021*** (0.006)	-0.115*** (0.042)	0.141*** (0.049)
Indigenous	-0.167*** (0.045)	0.001* (0.000)	0.008*** (0.003)	0.030*** (0.008)	0.084*** (0.014)	-0.124*** (0.025)
Pseudo R-Squared	0.013	0.016	0.016	0.016	0.016	0.016
Number of Observations	31,671	18,399	18,399	18,399	18,399	18,399

We report marginal effects from a probit model of self-assessed health and ordered probit model of life satisfaction. We include a full set of covariates in each model. Cluster-robust standard errors are reported in parentheses. Statistical significance is given by: \* ten percent; \*\* five percent; and \*\*\* one percent.



# Findings by Indigenous Identity

## Health and Well-Being

	Excellent or Very Good Health	Life Satisfaction				
		Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Baseline Probability	0.704	0.001	0.006	0.038	0.484	0.471
Public-Place Bans	0.062* (0.035)	0.000 (0.000)	0.002 (0.001)	0.007 (0.006)	0.030 (0.023)	-0.039 (0.030)
Public-Place Bans × First Nations	0.043 (0.067)	-0.000 (0.000)	-0.004*** (0.001)	-0.022** (0.009)	-0.123* (0.068)	0.149* (0.079)
Public-Place Bans × Métis	0.116*** (0.044)	-0.000** (0.000)	-0.003** (0.001)	-0.017** (0.008)	-0.087* (0.050)	0.108* (0.059)
Public-Place Bans × Inuit	-0.204 (0.335)	0.000 (0.002)	0.003 (0.011)	0.014 (0.049)	0.047 (0.136)	-0.065 (0.199)
First Nations	-0.143* (0.083)	0.001 (0.001)	0.009*** (0.003)	0.035*** (0.012)	0.093*** (0.019)	-0.138*** (0.035)
Métis	-0.177*** (0.061)	0.001 (0.001)	0.005 (0.003)	0.021* (0.012)	0.065** (0.027)	-0.092** (0.043)
Inuit	0.041 (0.248)	-0.001** (0.000)	-0.005*** (0.001)	-0.026*** (0.008)	-0.163** (0.073)	0.194** (0.082)
Pseudo R-squared	0.014	0.020	0.020	0.020	0.020	0.020
Number of Observations	25,078	11,806	11,806	11,806	11,806	11,806

We report marginal effects from a probit model of self-assessed health and ordered probit model of life satisfaction. We include a full set of covariates in each model. Cluster-robust standard errors are reported in parentheses. Statistical significance is given by: \* ten percent; \*\* five percent; and \*\*\* one percent.

# Conclusions

- The bans reduced smoking and exposure to second-hand smoke in public places among Canadian youth.
- There was no displacement on the extensive margin. However, public-place bans increased the intensity of exposure in home, on average.
- For Indigenous youth, there was a reduction in exposure to second-hand smoke in home on the extensive margin. This was driven by Métis youth, who also experienced a reduction in the intensity of exposure in home.

# Conclusions

- Public-place smoking bans improved self-assessed health and subjective well-being for Indigenous youth. Again, this seems to be driven by Métis. However, First Nations youth also experienced gains in life satisfaction.

***Public-place smoking bans may reduce inequalities.***

# Limitations

- We do not observe First Nations youth living on reserve.
- We do not account for municipal legislation that was implemented before provincial/territorial bans.
- We do not control for anti-smoking sentiment, which could affect the dependent variables and whether youth were impacted by public-place bans.
- Likewise, there may be issues related to enforcement, access to and normalization of tobacco.

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