An Examination of the Relationship Between Municipal Smoke-free Bylaw Strength and the Odds of Being a Former Smoker

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ABSTRACT

Objective: The purpose of this study was to examine the relationship between municipal no-smoking bylaw strength and the odds of being a former smoker.

Methods: Data from Statistics Canada's Canadian Community Health Survey (Cycle 1.1, 2001) and a validated bylaw scoring scheme (2001) were linked and analyzed to determine whether the odds of being a former smoker were related to the strength of no-smoking bylaws in municipalities that had been matched for potentially confounding factors. The sample consisted of ever smokers (current and former smokers) from Ontario municipalities that did not have a no-smoking bylaw, or had a fully implemented no-smoking bylaw before September 2000. Data were analyzed using a Mantel-Haenszel Chi-square test and a logistic regression.

Results: The results from the Mantel-Haenszel (OR = 0.94, 95% CI 0.80-1.12) and logistic regression analyses (OR = 0.95, 95% CI 0.82-1.11) did not find support for the hypothesis that living in a municipality with a strong no-smoking bylaw would increase the odds of being a former smoker.

Discussion: Findings were inconsistent with previous studies that have found no-smoking restrictions in homes, workplaces and public places increase the odds that smokers attempt and succeed in quitting smoking. However, results from this study must be interpreted with caution because of the cross-sectional design and limited control of potentially important covariates.

MeSH terms: bylaws; smoking; public policy; community

RESUME

Objectif : La présente étude porte sur le lien entre le poids de la réglementation municipale antitabac et la probabilité d'être un ancien fumeur.

Méthode : Les données tirées de l'Enquête sur la santé dans les collectivités canadiennes de Statistique Canada (Cycle 1.1, 2001) et un schéma validé de notation de la réglementation (2001) ont été liés et analysés afin de déterminer si la probabilité d'être un ancien fumeur est liée au poids de la réglementation antitabac dans des municipalités appariées pour réduire les facteurs de confusion possibles. L'échantillon se composait de gros fumeurs (anciens et actuels) vivant dans des municipalités ontariennes qui n'ont pas adopté de réglementation antitabac ou qui ont mis en œuvre intégralement une réglementation antitabac avant septembre 2000. Les données ont été analysées à l'aide du test du khi-carré de Mantel-Haenszel et d'analyses de régression logistique.

Résultats : Les résultats du test de Mantel-Haenszel (RC = 0,94, IC de 95 % = 0,80-1,12) et des analyses de régression logistique (RC = 0,95, IC de 95 % = 0,82-1,11) ne confirment pas l'hypothèse selon laquelle le fait de demeurer dans une municipalité qui a adopté une réglementation antitabac vigoureuse accroît la probabilité d'être un ancien fumeur.

Discussion : Nos constatations contredisent des études antérieures selon lesquelles l'application d'une réglementation antitabac dans les maisons, les lieux de travail et les endroits publics augmente la possibilité que les fumeurs tentent de renoncer au tabac et y parviennent. Cependant, il faut interpréter les résultats de la présente étude avec prudence en raison de la conception transversale de covariables difficiles à contrôler, mais possiblement importantes.

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Helping smokers to quit is the fastest way to reduce the excess health burden associated with tobacco use.¹ Recent literature reviews suggest that individuals who work or live in smoke-free settings are significantly more likely to quit and remain abstinent than individuals exposed to tobacco smoke.² However, in contrast to what is known about their protective and preventive effects, little is known about the impact of municipal no-smoking bylaws on current smokers. One of the few studies conducted suggested that municipal no-smoking bylaws may help Canadian women to remain non-smokers (OR = 1.02; 95% CI 1.00-1.04), but not men.³ One explanation for the modest effect is that research to date has tended to examine the presence or absence of a bylaw and has not accounted for the comprehensiveness of these policies or whether they were enforced. This research explored whether the strength of municipal no-smoking bylaws helps smokers to quit smoking.

METHOD

Design

The postal codes of current and former smokers from Cycle 1.1 (2000-2001) of the Canadian Community Health Survey (CCHS) were used to link cases with data from Campbell and colleagues (2002) who assessed the relative strength of no-smoking bylaws in Ontario municipalities (with population >5,000) in the summer of 2001.⁴

Municipality selection

Municipalities were included if they had more than 80 adult respondents to the CCHS and a total population >5,000. Municipalities that underwent amalgamation immediately prior to September 2000 were excluded if bylaw data were conflicting as a result of the amalgamation.

Participant selection

The sample consisted of former and current smokers (as defined by the CCHS) in the designated Ontario municipalities who were 18 years and over.

Analysis and municipal matching

To control for potentially confounding variables, Ontario municipalities with a "strong" no-smoking bylaw (i.e., in the top

tertile of scores) were matched with a community in the same Statistics Canada Health Region Peer Group that either did not have a bylaw or had a "weak" bylaw (i.e., in the bottom tertile of scores). Health Region Peer Groups represent clusters of health regions with "similar social and economic health determinants".⁵ A Mantel-Haenszel statistic was used to make the comparison within each matched pair and to arrive at a weighted odds ratio across community pairs.

Several municipalities were excluded from the Mantel-Haenszel analysis because an appropriate match community could not be found. Therefore, a logistic regression analysis was conducted to make use of all eligible municipalities and to adjust for some additional community-level covariates, including the length of time that the bylaw had been implemented at full strength, provisions for signage and enforcement, and Health Region Peer Group membership.

Measures and control variables

Coding for Bylaw Strength, Signage/Enforcement, and Timing

Bylaw strength was based on assessments of how comprehensively the bylaw covered various public places⁴ (e.g., bars, restaurants, public auditoriums, etc.).

Provisions for signage and enforcement were scored separately from strength and addressed whether the policy contained provisions for both⁴ (i.e., specification of fines and personnel).

Although no evidence was found to specifically link the time that the policy had been in place to changes in smoking status, it was hypothesized to be an important variable to consider. The variable was calculated in months using data from the bylaw coding scheme according to the number of months between the implementation date of the bylaw at full strength (to account for phasing in) and the first month of CCHS data collection (September 2000).

RESULTS

Mantel-Haenszel analysis

The total sample of ever smokers in the 18 municipalities was 3,655. Table I presents the findings from the Mantel-Haenszel

TABLE I
Mantel-Haenszel Analysis by Pair*

Pair Number	Census Sub-division Name	Current Smokers (N=1585)		Former Smokers (N=2070)		Odds Ratio	95% CI
		N	%	N	%		
1	Stratford†	88	40.37	130	59.63	0.99	0.58-1.72
	Petawawa	29	40.28	43	59.72		
2	Hamilton†	259	51.90	240	48.10	0.92	0.55-1.57
	Kapuskasing	31	50.00	31	50.00		
3	Windsor†	208	47.17	233	52.83	0.83	0.52-1.34
	Delhi	35	42.68	47	57.32		
4	Fort Erie†	22	34.38	42	65.63	1.39	0.67-2.90
	Ingersoll	24	42.11	33	57.89		
5	Peterborough†	117	34.31	224	65.69	1.37	0.83-2.26
	Haldimand	33	41.77	46	58.23		
6	Kitchener†	166	44.62	206	55.38	0.75	0.44-1.30
	Kincardine	25	37.88	41	62.12		
7	Brantford†	191	44.63	237	55.37	0.87	0.53-1.44
	Tillsonburg	31	41.33	44	58.67		
8	Clarington†	67	43.51	87	56.49	0.91	0.51-1.59
	Collingwood	30	41.10	43	58.90		
9	Guelph†	171	40.91	247	59.09	0.87	0.60-1.38
	Barrie	58	37.66	96	62.34		

* Percentages presented in this table are the row percents from the Mantel-Haenszel Chi-square tables

† denotes the "strong bylaw" municipalities

test. The Breslow-Day Test was not significant [$X^2=(8, N=3,655)=4.46, p=0.8131$], suggesting that the odds ratios calculated in the individual tables were homogeneous and appropriate to combine in a Mantel-Haenszel statistic. When the tables were combined, the odds of being a former smoker in a municipality with a strong smoke-free bylaw compared to a weak or no smoke-free bylaw was 0.94 (0.80-1.12).

Logistic regression

A sample of 9,249 current and former smokers was available across all 49 eligible municipalities. Initial bivariate analyses (with an alpha of .015) indicated that none of the selected covariates were significantly associated with smoking status and were therefore dropped from the final model. In the final model, bylaw strength was not related to the odds of being a former smoker (OR = 0.95, 95% CI 0.82-1.11).

DISCUSSION

Unlike previous research showing that strong smoking restrictions in homes and workplaces facilitate quitting smoking, the present study did not find support for the notion that living in a municipality with a strong municipal bylaw enhances the odds of being a former smoker. There are several explanations for this inconsistency. First, smokers may be able to more easily adapt their behaviour in response to general public restrictions. Such adaptation may take the form of compensatory smoking or

adjusting where they smoke, with whom and under what conditions.^{6,7} Given that none of the municipalities studied had a complete smoking ban implemented before September 2000, it is possible that smokers in the sample may have changed their behaviour by patronizing settings that did not have smoking restrictions.

While attempts to control for community-level differences related to demographics, economics and smoking rates by forming matched pairs is necessary, it may not have been sufficient to account for the many other individual characteristics associated with smoking cessation.⁸ Unless individual differences in nicotine dependence, coping resources, and access to treatment services, as well as affective and cognitive differences are statistically controlled for, more subtle effects like those of public smoking restrictions, may not be discernable in our analyses. Multi-level modelling (hierarchical regression) would be a substantial aid in this respect.

Another substantial limitation of this study is that data were cross-sectional in nature. As such, interpretations are constrained by issues of temporal sequence related to the time of smoking cessation relative to the introduction of the no-smoking bylaw. It remains unknown whether ever smokers became former smokers after the introduction of the bylaw.

Another limitation relates to the fact that individuals were classified by the postal code of their residence rather than

by where they spend the majority of their time. Individuals may work or recreate in a different municipality than where they live. As such, their behaviour may be influenced by more than one municipal bylaw.

Although this study did not find support for the notion that strong municipal no-smoking bylaws can facilitate quitting smoking, other research suggests that such policies remain an essential tool for protecting non-smokers from tobacco smoke⁹ and preventing non-smokers from becoming established smokers.³

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Use of the Ecosystem Approach to Population Health

The Case of Mercury Contamination in Aquatic Environments and Riparian Populations, Andean Amazon, Napo River Valley, Ecuador

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ABSTRACT

Background: Driven by accelerating transformation of land use in the Amazon, studies addressing the impacts of deforestation and mercury (Hg) leaching on the geophysical, biological, social, health, economic and political systems of Amazonian countries are crucial to evaluate the population health risks of these rapid changes.

Methods: We used an ecosystem approach, integrating Hg measurements with socio-cultural and politico-economic elements, to provide an integral analysis and comprehensive solutions.

Results: Our interdisciplinary research in the Ecuadorian Andean Amazon has shown that comestible fish and riparian communities which rely on fish as a major protein source have mercury levels that could potentially cause subtle but deleterious population health alterations. A parallel study identified deforestation and soil erosion as a significant source of mercury to the aquatic ecosystem.

Interpretation: The analysis of these results in conjunction with the prevailing socio-cultural and politico-economic context allowed us to identify economic trends, and especially petroleum exploitation, as pivotal in the deforestation/mercury-exposure dynamic. In collaboration with public health authorities, we shared our results with local health stakeholders, including public health care staff, federal government agencies, researchers and local communities, in such a way as to promote sustainable land use practices and the nutritional benefits of fish eating while reducing toxic exposures.

MeSH terms: mercury; deforestation; Ecuador fisheries; neurotoxicity; human geography

RÉSUMÉ

Contexte : Dictées par la transformation de plus en plus rapide de l'utilisation des terres en Amazonie, des études relatives aux répercussions du déboisement et de la lixiviation du mercure (Hg) sur les systèmes géophysiques, biologiques, sociaux, sanitaires, économiques et politiques des pays de l'Amazonie jouent un rôle crucial dans l'évaluation des risques de tels changements pour la santé des populations.

Méthode : Nous avons suivi une démarche axée sur les écosystèmes consistant à intégrer les mesures de Hg à des éléments socio-culturels et politico-économiques, afin d'en arriver à une analyse intégrale et à des solutions globales.

Résultats : La recherche interdisciplinaire que nous avons menée dans la région de l'Amazonie andine de l'Équateur a montré que le poisson comestible, et les collectivités riveraines qui comptent sur le poisson comme principale source de protéines, présentent des concentrations de mercure qui pourraient causer des altérations subtiles mais nocives de la santé des populations. Une étude parallèle a déterminé que le déboisement et l'érosion du sol contribuaient de façon importante à la présence de mercure dans l'écosystème aquatique.

Interprétation : L'analyse de ces résultats, en fonction du contexte socio-culturel et politico-économique courant, nous a permis d'établir des tendances économiques, particulièrement dans le domaine de l'exploitation pétrolière, qui constituent l'essence de la dynamique déboisement-exposition au mercure. En collaboration avec des responsables de la santé publique, nous avons présenté nos résultats à des intervenants des milieux locaux de la santé, y compris des membres du personnel proposé à la santé publique, des organismes fédéraux, des chercheurs et des collectivités locales, de façon à promouvoir des pratiques d'utilisation durable des terres et les avantages nutritifs de la consommation du poisson, tout en réduisant l'exposition aux substances toxiques.

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