

The Impact of Cigarette Warning Labels and Smoke-free Bylaws on Smoking Cessation

Evidence from Former Smokers

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ABSTRACT

Background: To effectively address the health burden of tobacco use, tobacco control programs must find ways of motivating smokers to quit. The present study examined the extent to which former smokers' motivation to quit was influenced by two tobacco control policies recently introduced in the Waterloo Region: a local smoke-free bylaw and graphic cigarette warning labels.

Methods: A random digit-dial telephone survey was conducted with 191 former smokers in southwestern Ontario, Canada in October 2001. Former smokers who had quit in the previous three years rated the factors that influenced their decision to quit and helped them to remain abstinent.

Results: Thirty-six percent of former smokers cited smoke-free policies as a motivation to quit smoking. Former smokers who quit following the introduction of a total smoke-free bylaw were 3.06 ($CI_{95}=1.02-9.19$) times more likely to cite smoking bylaws as a motivation to quit, compared to former smokers who quit prior to the bylaw. A total of 31% participants also reported that cigarette warning labels had motivated them to quit. Former smokers who quit following the introduction of the new graphic warning labels were 2.78 ($CI_{95}=1.20-5.94$) times more likely to cite the warnings as a quitting influence than former smokers who quit prior to their introduction. Finally, 38% of all former smokers surveyed reported that smoke-free policies helped them remain abstinent and 27% reported that warning labels helped them do so.

Conclusion: More stringent smoke-free and labelling policies were associated with a greater impact upon motivations to quit.

La traduction du résumé se trouve à la fin de l'article.

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Helping individuals to quit smoking or decrease their tobacco consumption is the most effective means of reducing the health burden from tobacco use over the next 50 years.¹ At present, approximately 30% of North American smokers report no desire to quit, while less than half make a serious quit attempt each year.^{2,3} Accordingly, tobacco control programs must find ways to enhance smokers' motivation to quit and promote long-term abstinence.

Two new tobacco control policies were recently introduced in the Waterloo Region in Ontario, Canada. A local bylaw implemented on January 1, 2000 required all indoor public places to be smoke-free, including restaurants, nightclubs, and recreational facilities. The total smoke-free bylaw was an extension of a partial ban introduced in 1996 that required restaurants to be 50% smoke-free, while bars and nightclubs faced no restrictions. The total smoke-free bylaw was widely regarded as the most comprehensive of its type in Canada, and compliance has been strictly enforced by a large contingent of public health inspectors, police, and by-law enforcement staff.⁴

In December 2000, approximately 12 months following the bylaw, new graphic cigarette warning labels were introduced in Canada. The labels feature 16 different warnings with graphic colour images that occupy over 50% of the front and back of packages. More detailed health risk messages and information on how to quit smoking appear on the inside of packages. The previous generation of warnings, implemented in 1994, included 8 black and white text warnings, covering 35% of the package.

A growing body of evidence suggests that both smoke-free and cigarette labelling policies promote smoking cessation.⁵ Workplace smoking bans have been shown to reduce the prevalence and intensity of smoking,⁶ while warning labels may prompt cessation behaviours such as cutting back or quit attempts.^{7,8} However, the evidence on smoke-free policies derives mainly from workplace rather than community-wide restrictions, and to date, there are no studies on cigarette warnings and long-term cessation. More generally, there is lack of research examining the influence of policy interventions on motivations to quit smoking.

As successful quitters, former smokers serve as a valuable benchmark for population-based cessation interventions. The present study examined the extent to which former smokers' motivation to quit changed following the introduction of a more comprehensive local smoke-free policy and more comprehensive cigarette warning labels. The study also evaluated to what extent these policies helped former smokers to remain abstinent.

METHODS

Participants

Participants were 18 years of age or older and lived within the Waterloo Region of Ontario, Canada. They were former smokers who had quit between 1999 (prior to both the total smoke-free bylaw and graphic warnings) and 2001 (following the bylaw and the graphic warnings). Former smokers were defined as individuals who had quit smoking for at least two weeks and who smoked at least one cigarette per day prior to quitting. This study received ethics clearance from the University of Waterloo Office of Research.

Procedure

Telephone calls were made to randomly selected telephone numbers from a list of households in the Waterloo Region using a modified Mitofsky-Waksburg technique.⁹ The "most recent birthday" method¹⁰ was used to select participants from households that included more than one eligible smoker. Each telephone number was attempted 12 times, at different times of the day and on different days of the week, before being classified as "no answer." The present research was part of a larger study and, due to the sequence of the questionnaire, former smokers were surveyed only if no other adult smokers lived in the household. A total of 5,348 numbers were tried. After eliminating ineligible numbers, including businesses and non-working numbers ($n=209$) and households not containing a former smoker ($n=4,867$), 19% ($n=52$) of eligible participants refused or failed to complete the survey and 11% ($n=29$) were not reached, resulting in a response rate of 70%.¹¹

Measures

Participants responded to a 15-minute survey of smoking and tobacco control policy.

TABLE I

Motivations to Quit Smoking (n=191)

Motivation	At Least Some Influence (% of former smokers)	Very/Extremely Influential (% of former smokers)
Personal health	93.5%	67.9%
Health of others	75.2%	45.5%
Costs of smoking	51.7%	10.2%
Smoking bans or bylaws	35.2%	3.2%
Warning labels	30.6%	2.1%



Figure 1. One of 16 warnings on the outside of Canadian cigarette packages

Validated measures of smoking history were assessed, including cigarettes per day, number of years as a smoker, and quit date.³ Participants were also asked to rate the influence of five factors on their decision to quit: the cost of cigarettes, smoking bans and bylaws, cigarette warning labels, personal health risks, and the health risks to others (e.g., friends and family) via environmental tobacco smoke (ETS). Participants were also asked to what extent each of these five factors helped them to remain abstinent. Responses were given on a 5-point Likert scale, where 1=no influence/no help and 5=main influence/extremely helpful.

Analysis

Logistic regression was used to examine whether the influence of smoke-free bylaws and warning labels varied by quit year (i.e., before or after implementation of the more stringent bylaw and the new warnings). The influences of both the bylaw and warning labels as motivations to quit were analyzed as dichotomous variables, where 0= no influence and 1= at least some influence. All odds ratios (ORs) are adjusted for age, gender, cigarettes per day prior to quitting, and the number of years as a smoker. All analyses were conducted using SPSS software (Version 10.0).

RESULTS

A total of 191 former smokers completed the survey (103 females (54%), 88 males (46%)). Participants were an average of 38.7 (SD=13.7) years old, with 13.5

(SD=2.2) years of education. Prior to quitting, participants had smoked an average of 16.7 (SD=11.5) cigarettes per day for 17.8 (SD=12.5) years. There were no significant differences between the current sample and a representative sample of Canadian former smokers for age, education level, or cigarettes per day prior to quitting.³ Sixty-nine percent of participants ($n=132$) had quit smoking after the introduction of the total smoke-free bylaw in 2000 and 46.2% ($n=88$) of participants quit smoking after the introduction of the graphic labels in 2001.

Motivations for quitting

Former smokers endorsed an average of 2.9 (SD=1.2) out of the 5 motivations to quit listed in the survey. Table I shows that virtually all former smokers were motivated to quit by personal health risks, while approximately one third of participants were motivated by smoking restrictions and warning labels. There was no association between the total number of influences listed and the length of abstinence ($r= -.06$, $p=0.42$).

Smoking bans/bylaw

A logistic regression was conducted to determine which factors were associated with citing smoke-free bylaws as a motivation to quit. Education (OR=1.58, CI₉₅=1.25-2.00) and being female (OR=2.64, CI₉₅=1.05-6.63) were positively associated with citing smoke-free bylaws as a motivation to quit. More importantly, participants who quit after the total smoke-free bylaw were more than three

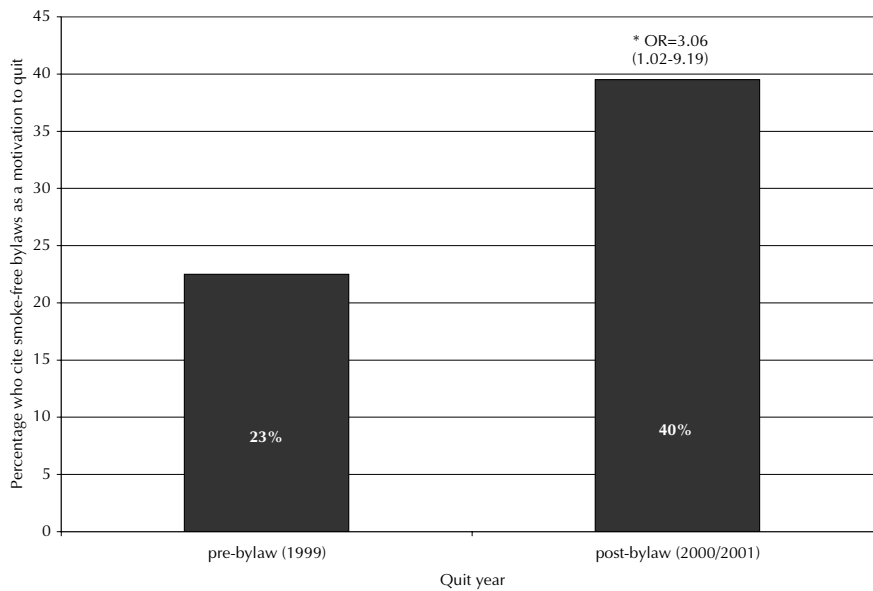


Figure 2. Regional smoking bylaw as a motivation to quit smoking (n=191)
* Adjusted for number of years smoking, gender, education, and cigarettes per day prior to quitting

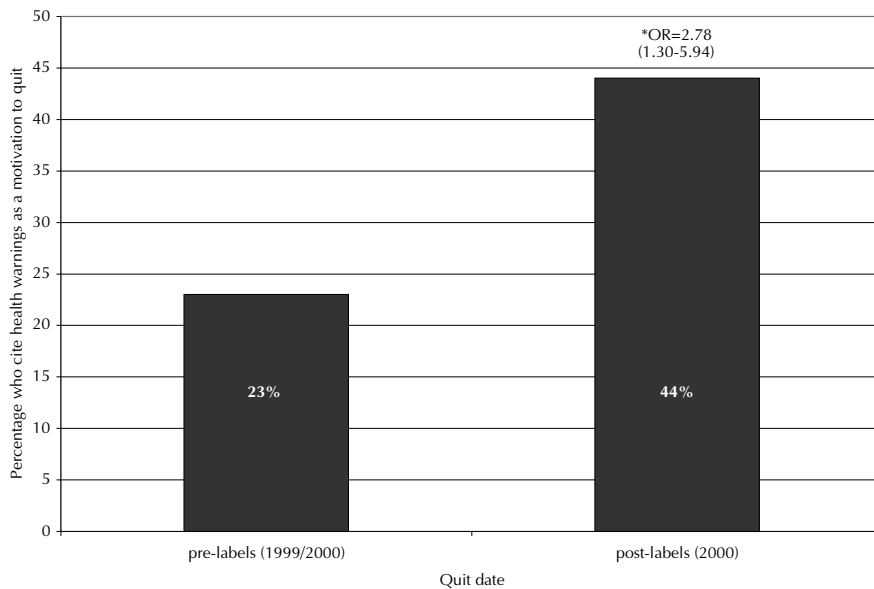


Figure 3. Cigarette warning labels as a motivation to quit smoking (n=191)
* Adjusted for number of years smoking, gender, education, and cigarettes per day prior to quitting

times more likely to cite smoking bylaws as a motivation to quit than were participants who quit prior to the new bylaw (OR=3.06, CI₉₅=1.02-9.19) (see Figure 2).

Separate regression analyses were conducted to determine whether former smokers who quit in 1999 were also more likely to cite personal health, cost, warning labels, or other motivations to quit. Compared to those who quit prior to the bylaw in 1999, participants who quit in 2000/2001 were no more likely to cite any motivation to quit, other than smoke-free bylaws.

Finally, 38.7% of participants reported that the bylaw helped them to remain abstinent; of these, 16.6% found smoke-free bylaws to be “very” or “extremely” helpful in remaining abstinent.

Warning labels

A logistic regression was conducted to determine which factors were associated with citing warning labels as motivation to quit. Cigarettes per day was negatively associated with citing the warning labels as a motivation to quit (OR=0.94, CI₉₅=0.90-

0.99). More importantly, participants who quit after the new warning labels were 2.78 (CI₉₅=1.20-5.94) times more likely to list the warnings as a motivation to quit than former smokers who quit in 1999 and 2000, prior to the graphic warnings (see Figure 3).

Separate regression analyses were conducted to determine whether former smokers who quit following the new warnings were also more likely to cite personal health, cost, bylaws, or other motivations to quit. Compared to those who quit in 1999 and 2000, participants who quit after the warnings were no more likely to cite any motivation to quit, other than cigarette warning labels.

A total of 26.5% of former smokers indicated that the warning labels had helped them to remain abstinent; of these 4.9% found them to be “very” or “extremely” helpful. In addition, 4.8% of all smokers reported that warning labels served as a source of information on how to quit. Although smokers who quit after the new warnings were 2.96 (CI₉₅ 0.54-16.18) times more likely to list warning labels as a source of cessation information, this relationship did not reach statistical significance after adjusting for demographic variables and measures of smoking status (p=0.21).

DISCUSSION

This research provides evidence that smoke-free and cigarette labelling policies can enhance individuals’ motivation to quit smoking and can promote continued abstinence. Approximately one third of all former smokers indicated that warnings labels and smoke-free policies had influenced their decision to quit, while similar proportions reported that these policies helped them to remain abstinent after quitting. Further, the introduction of more stringent policies was associated with increases in their influence: former smokers who quit after the introduction of a total smoke-free bylaw and graphic warnings were approximately three times more likely to endorse these policies as a motivation to quit, compared with participants who quit during the partial smoke-free policy or with text-only warning labels.

As population-based interventions, these policies may succeed in promoting cessation, in part, because of their extraordinary

reach. All smokers in the Waterloo Region are subject to the bylaw, and pack-a-day smokers are potentially exposed to the warning labels over 7,300 times per year. Smoke-free bylaws and labelling policies may also motivate smokers to quit by strengthening both intrinsic and extrinsic reasons for quitting. For example, both policies reinforce the health risks of smoking – the most common motivation to quit cited in the current study and the best predictor of long-term abstinence among reasons for quitting.¹² Bylaws and graphic warnings also help to “denormalize” smoking and may render extrinsic factors such as subjective norms and social approval more salient.¹³

Community-wide smoke-free policies may also introduce practical barriers to smoking. Smoke-free bylaws make smoking in social and work settings more inconvenient and may reduce “social smoking cues” in high-relapse situations, such as bars and nightclubs, for those trying to quit.¹⁴ Finally, the new Canadian warning labels may encourage cessation by convincing smokers of the benefits of stopping smoking and by increasing their self-efficacy for quitting through the cessation skills and quit-tips included on packages.

The study has several limitations common to retrospective research. First, participants with an earlier quit date represent a more stable group of former smokers, less susceptible to relapse: participants who had quit prior to the smoking ban had been abstinent for an average of 29 months compared to an average of 9 months for those who quit following the ban. Although it is plausible that former smokers’ reasons for quitting and beliefs about tobacco control policies may change over time, there was no association between quit date and the total number of influences listed. Perhaps most important, former smokers who quit following the bylaw were no more likely to cite any other motivations to quit, as was the case for those who quit following the new warnings. Second, the findings are subject to hindsight bias: in making retrospective evaluations of the warnings, former smokers may have been differentially influenced by the media coverage and any changes in public opinion towards these policies. Third, the study only included former smokers in households without a current smoker. The absence of other smokers in the home may

have systematically altered respondents’ attitudes towards quitting and tobacco control policies, however, study participants did not differ significantly from a representative sample of former smokers in 2001 on any critical variable.

This research suggests that, beyond communicating the health risks of smoking and protecting non-smokers from the harmful effects of ETS, cigarette warning labels and smoke-free bylaws encourage smokers to quit. The findings also support what both common sense and the available evidence suggest: more comprehensive tobacco control policies are more effective policies.^{5,15} Along with the growing public support for tobacco control initiatives among both smokers and non-smokers, the current study provides additional justification for health advocates and policy bodies to pursue more comprehensive smoke-free and tobacco labelling policies.

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RÉSUMÉ

Contexte : Pour réussir à alléger le fardeau que représente le tabagisme pour la santé, les programmes antitabac doivent trouver des moyens de motiver les fumeurs à cesser de fumer. Nous avons examiné la mesure dans laquelle la motivation d'anciens fumeurs à cesser de fumer a été influencée par deux politiques de lutte contre le tabagisme instaurées récemment par la Région de Waterloo : un règlement municipal pour un environnement sans fumée et des étiquettes de mise en garde très crues sur les paquets de cigarettes.

Méthode : Une enquête téléphonique à composition aléatoire a été menée auprès de 191 anciens fumeurs du sud-ouest de l'Ontario en octobre 2001. D'anciens fumeurs qui avaient cessé de fumer au cours des trois années précédentes ont évalué les facteurs qui ont influencé leur décision et qui les ont aidés à ne pas recommencer à fumer.

Résultats : Trente-six p. cent des anciens fumeurs ont indiqué que les politiques sans fumée les avaient motivés à cesser de fumer. Ceux qui avaient cessé de fumer après l'instauration d'un règlement municipal interdisant totalement la cigarette étaient 3,06 fois (IC de 95 % = 1,02-9,19) plus susceptibles d'attribuer leur décision au règlement antitabac que ceux qui avaient cessé de fumer avant l'instauration du règlement municipal. En tout, 31 % des participants ont aussi déclaré que les étiquettes de mise en garde sur les paquets de cigarette avaient motivé leur décision de cesser de fumer. Ceux qui avaient cessé de fumer après l'instauration des nouvelles étiquettes de mise en garde étaient 2,78 fois (IC de 95 % = 1,20-5,94) plus susceptibles d'attribuer leur décision aux mises en garde que ceux qui avaient cessé de fumer avant l'instauration de ces étiquettes. Enfin, 38 % des anciens fumeurs interrogés ont déclaré que les politiques sans fumée les avaient aidés à ne pas recommencer à fumer, et 27 % ont déclaré que les étiquettes de mise en garde les avaient aidés à cet égard.

Conclusion : Des politiques antitabac et un étiquetage plus stricts étaient associés à une plus grande motivation à cesser de fumer.