

Original quantitative research

Improving smoking cessation support for Quebec's smokers: an evaluation of Quebec's telephone quitline

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Abstract

Introduction: Quitlines are an important and widespread intervention that support smokers in their efforts to quit smoking and engage them into treatment services. Quebec's quitline, called *la ligne J'ARRÊTE*, has been in operation since 2002. The objectives of this study were to evaluate treatment reach, provide a description of caller characteristics and to provide results on cessation outcome measures for Quebec's smoking cessation quitline.

Methods: We collected data at intake, assessing new caller volume, caller characteristics and treatment reach. We used a one-group quasi-experimental design to assess 30-day and six-month quit rates, at six-month follow-up. Intake data were collected for 1292 new quitline callers, 18 years of age and older, over a one-year period.

Results: Results indicated that the service reached 9 in 10 000 Quebec smokers. With respect to the total population of smokers in Quebec, the quitline reached proportionately higher numbers of smokers who were women, were 55 years of age and older and had a high school diploma or less. At follow-up, the 30-day point prevalence abstinence rate was 26.7%, while the six-month prolonged abstinence rate was 18.8%.

Conclusion: These results indicate that the quitline contributed to helping callers quit smoking. They are in line with findings for other quitlines in Canada and the United States. However, quitline reach is comparatively limited, suggesting that additional investment in promotional efforts and research into ways of recruiting underserved populations into the service would increase public health impact.

Keywords: smoking cessation, quitline, population health intervention, health promotion, program evaluation

Highlights

- Results of this study indicated a 26.7% smoking cessation rate at six-month follow-up for smokers that used Quebec's quitline service.
- Quebec's quitline reaches 9 out of 10 000 smokers (0.09%) in Quebec, putting it at the lower range of Canadian quitlines, where reach ranges from 0.07% to 1.45%.
- While the quitline reaches proportionately more callers with a high school education or less, men, younger adults and those with higher education are subgroups of smokers for whom improved promotion of quitline services appears necessary.

Introduction

Cigarette smoking remains one of the leading causes of preventable illness and death in Canada and throughout the world.¹⁻³ Quitlines are an important and widespread evidence-based smoking cessation intervention that support smokers in their efforts to quit and engage them into treatment services.^{4,5} Smokers can use quitlines by calling (i.e. reactive) or by signing up to receive a call (i.e. proactive) from a smoking cessation counsellor. Supports include information, advice and help to quit smoking.

Around the globe, quitlines have become part of national tobacco control infrastructures that provide population-based cessation treatment to smokers.^{6,7} Considerable evidence shows that quitlines are an effective intervention strategy.⁵

Owen⁸ found that at one-year follow-up, 22% of smokers reported having quit smoking (95% CI: 18.4%–25.6%; quit rate adjusted for an estimated 20% failed biomedical validation and refusals: 15.6%), 41% of ex-smokers reported that they were still not smoking (95% CI: 34.3%–47.7%; adjusted quit rate: 29%) and that

of those who had resumed smoking, 28% were smoking less than before. Comparing proactive and reactive components of the Swedish National Tobacco Quitline, Nohlert and colleagues found that both services were similarly effective. Point prevalence was 27% and continuous abstinence was 21% when treating nonresponders as smokers, and 47% and 35%, respectively, in responder-only analyses.⁹

The most recent Cochrane review on the topic, which included 104 trials with 111 653 participants, found moderate-quality evidence that proactive telephone counselling helps smokers who seek help from quitlines.⁵ According to grades of evidence from the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group, moderate-quality evidence implies that further research is likely to have an

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important impact on the estimate of effect.¹⁰ The review further found that proactive telephone counselling increased quit rates in smokers, independent of their motivation to quit or whether they received other quit support. Overall, those who received telephone calls increased their chances of quitting between 11% and 14%. Compared to other cessation supports, telephone quitlines have been found to be more effective than minimal interventions such as self-help leaflets and as effective as receiving brief cessation advice.⁵

Quitlines have also been shown to be cost-effective interventions.¹¹ In a one-year randomized trial that evaluated the cost-effectiveness of the American Cancer Society's telephone quitline service, McAlister and colleagues¹² reported that counselling nearly doubled smokers' odds of quitting and maintaining cessation over a one-year period. The direct cost for each case of maintained smoking cessation attributable to the quitline was approximately CAD \$1300.¹²

Across the US, average treatment reach has ranged from a high of 1.19% in 2009 to a low of 0.87% in 2017.¹³ In Canada, quitlines tend to have lower reach and consequently lower relative impact. The latest available numbers indicate that the 10 of 12 Canadian quitlines that responded to the survey reached and provided treatment to 0.30% of the adult smoking population, with reach levels ranging from 0.07% to 1.45% over individual provincial quitlines in 2011.¹⁴

This study reports on the results of the first evaluation of Quebec's quitline since its inception. Evaluation goals were to (a) evaluate treatment reach, (b) provide a description of caller characteristics and (c) provide results on cessation outcome measures.

Methods

Intervention description

Quebec's quitline, *la ligne J'ARRÊTE* (I QUIT NOW helpline), in operation since 2002, is a free, bilingual and confidential telephone service that offers information and personalized smoking cessation support. The quitline service was developed based on the transtheoretical model of change.¹⁵ This model suggests that smokers move through a series of motivational stages before they make changes to their smoking

behaviours. These stages are precontemplation (no thought of quitting), contemplation (thinking about quitting), preparation (planning to quit in the next 30 days) and action (quitting successfully for up to six months).¹⁶ Quitline personnel of *la ligne J'ARRÊTE* use motivational interview techniques¹⁷ to support callers who wish to quit smoking, posing a multitude of questions related to caller cigarette consumption (e.g. negative health effects, withdrawal symptoms, pharmacotherapy, second-hand smoke exposure). Additionally, the quitline offers information packages containing information on cigarette consumption, interactive tools to support cessation efforts, and information on Quebec's quit-and-win contest, a yearly initiative providing the opportunity to win three prizes for those who quit smoking and stay quit for six weeks. Finally, the quitline refers callers to other smoking cessation services offered within the Quebec tobacco control strategy, such as the in-person support offered by Quebec's local community service centres. The quitline service is offered on weekdays for a total of 64 hours per week. It is funded by the Quebec Ministry of Health and Social Services and administered by the Canadian Cancer Society (CCS).

Study design

Following the North American Quitline Consortium (NAQC) protocol for quitline evaluation,¹⁸ we used a one-group quasi-experimental, pre-post intervention design to evaluate the effectiveness of Quebec's quitline service. We collected data at two time points: (1) intake data were collected by quitline staff when smokers first called the quitline; and (2) computer assisted telephone interviews (CATI) were conducted at six-month follow-up. The latter permits assessment of the six-month quit rates, a metric that is commonly used in clinical trials of smoking cessation.¹⁹ CATI data were collected seven months after a person's initial call to the quitline. This allows for a one-month treatment period followed by a six-month follow-up survey with respect to the approximate end of treatment.²⁰ To reach a critical number of callers at follow-up, up to 20 call attempts were made to reach callers who had consented to participate in follow-up interviews. Intake data, collected between October 2014 and October 2015, were used to calculate reach and to provide a description of the quitline's caller profile. The six-month follow-up data were collected between June 2015 and May 2016 and used

to evaluate service outcomes. Interviews lasted on average 7.5 minutes and were conducted in French only.

Measures

We collected data using the 2012 version of the Minimal Data Set (MDS) for evaluating quitline intake and follow-up provided by the NAQC.²¹ The MDS for quitlines was developed to provide a standardized instrument and protocol that allow for comparisons and polling of data across quitlines.^{22,23} The MDS is a "best practice" in quitline evaluation^{22,23} and is revised and expanded based on evidence and experience on a regular basis.^{22,24}

Demographics

Age, sex and education data were collected at intake for new callers.

Smoking and promotion measures

Smoking status (daily or occasional), cigarette consumption and quit intention data were collected at intake for new callers.^{22,25} To assess which promotional methods worked best, we asked callers how they had learned about the quitline. Smoking status and cigarette consumption data were used to calculate Heaviness of Smoking Index (HSI)²⁶ scores for smokers.

At time of evaluation, the quitline defined smokers as individuals who smoked cigarettes. Other tobacco products and vaping devices such as electronic cigarettes were identified as "other tobacco products" and not directly addressed through the interventions. In the present study, smoking is consequently defined as cigarette use only, and excludes other tobacco products and vaping devices.

Study eligibility

In addition to age, smoking status and intention to quit at intake, questions used to determine eligibility for study participation asked the following: "How can I help you?"; "Is this your first call to the quitline in the past 12 months?"; and "Are you calling for yourself, or calling on behalf of or to help someone else?" Administrative data from the CCS were used to determine if callers had in fact received evidence-based treatment from the quitline, defined as having received any level of counselling.

Smoking cessation abstinence measures

For the quitline to be considered effective in helping smokers quit, quitlines users would have to quit smoking at a higher

rate than that of the population of Quebec smokers (from 2015–2016 in Quebec, adult current smokers quit smoking at a rate of 8.9%²⁷). In addition, 30-day point prevalence abstinence rates would have to be comparable to those of other quitlines. As a point of reference, the 30-day point prevalence abstinence rates for US quitlines have been shown to be 28.5%.¹⁴

To assess smoking cessation abstinence at follow-up, we used three questions to assess smoking cessation rate, our main outcome measure. It was first measured by asking participants whether they currently smoked “every day,” “occasionally” or “never.” To assess 30-day point prevalence abstinence rate, we asked those who indicated they were nonsmokers at follow-up if they had smoked a cigarette, even a puff, within the past 30 days. Finally, to assess six-month prolonged abstinence rate, we asked participants who indicated they had not smoked within the past 30 days if they had smoked a cigarette, even a puff, within the past six months. All three measures have demonstrated some degree of concurrent validity and have established predictive validity with respect to long-term health benefits.²⁸

Cessation supports and methods used

We asked quitline users at follow-up what services or cessation supports, other than the quitline, they had used to quit smoking since they first called the quitline. Response options for nonpharmaceutical support included self-help materials, support group with animation, hypnosis/acupuncture, audio materials, Internet, self-help group, laser treatment, videos and others. Response options for items related to pharmacotherapy included nicotine inhaler, nicotine gums, nicotine patch, e-cigarette and Zyban.

Treatment reach

To determine the extent to which the telephone quitline was accessed by Quebec smokers to help them quit smoking, we calculated treatment reach, defined as the number of new incoming eligible callers over the 12-month period who received evidence-based treatment, divided by the total number of smokers in the Quebec population.¹⁸ The prevalence of smoking in Quebec was based on the Canadian Community Health Survey (CCHS)²⁷ data for current smokers aged 18 years and older for the 2015–2016 cycle. While the CDC estimates that quitlines should be able to treat 6% of all adult smokers,²⁹ the

latest data for Canadian quitlines indicate that in 2012, quitlines reached between 0.07% and 1.45% of smokers.¹⁴ We expected Quebec’s quitline treatment reach would fall into the range of other Canadian quitlines, though higher treatment reach would be desirable.

Inclusion criteria

In line with NAQC recommendations,³⁰ data collected at intake were analyzed for all new quitline callers who (1) were aged 18 years and over; (2) smoked cigarettes daily or occasionally and intended to quit within the next six months or had not been quit at intake for more than 30 days; (3) were seeking smoking cessation help; and (4) had received evidence-based treatment from the quitline. Additionally, only callers who consented to participation were included in the follow-up surveys.

Statistical analyses

In line with NAQC recommendations,³⁰ the 30-day point prevalence abstinence rate was calculated as the number of respondents who said they had not smoked a cigarette, even a puff, within the past 30 days at six-month follow-up divided by the number of participants reached at follow-up, as the primary outcome measure. The point prevalence rate was calculated by dividing the number of respondents who said that they were nonsmokers at follow-up by the number of participants reached at follow-up. Finally, the six-month prolonged abstinence rate was calculated by dividing the number of respondents who said that they had not smoked a cigarette, not even a puff, within six months of follow-up by the number of participants reached at follow-up. Both latter measures are reported as secondary outcome measures.

To assess the impact of dropout on the estimated rates in this study, we calculated intention-to-treat (ITT) rates that assume all nonrespondents did not quit smoking³⁰ for all abstinence measures. The ITT rates represent conservative lower limits on the different quit rates.³¹ In addition, we calculated imputed rates, taking into account a host of service, health and sociodemographic variables measured at baseline. The imputed rates account for the effect of differences in characteristics between respondents and dropouts; they were calculated using the *mice* (Multiple Imputation by Chained

Equations) package in R.³² The ITT and imputed rates represent possible limits on the values of the quit rates and provide insight into the potential magnitude of selection bias effects.^{31,33}

We used the following criteria to select covariates or caller characteristics for the imputation model: (1) a statistically significant association (chi-square test) with dropout (i.e. missing data or nonresponse at follow-up); (2) a statistically significant correlation (Pearson r^2) with the probability of abstinence; (3) a perceived association with abstinence based on a priori knowledge and the scientific literature (the latter resulted in the addition of three covariates).

The following variables were retained for the imputation model: gender, age, education, whether or not the caller received a referral, past use of smoking cessation methods or pharmacological tools, current use of smoking cessation methods or pharmacological tools, number of withdrawal symptoms, having at least one supportive person in personal network, number of medical conditions, number of mental health conditions, experience of situations that induce restarting of smoking, receipt of promotional cessation materials, number of cessation support elements received, whether the quitline fulfilled expectations, and smoking status at intake.

The R function *mice* was used to calculate 20 multiple imputations of the outcome (abstinence) variables; 25 iterations were specified, and the R function *stripplot* was used to verify convergence.³²

Results

Over the one-year evaluation period, quitline staff collected intake data from 1292 new callers. Of those, 1030 agreed to participate in the six-month follow-up survey and 494 actually participated, for a response rate of 48%.

Treatment reach for *la ligne J'ARRÊTE* for the reported year of evaluation was 0.09%, indicating that the service provided evidence-based cessation treatment for 9 in 10 000 Quebec smokers. An analysis of the ways in which callers accessed the service showed that 29.3% of callers had been referred to the quitline by health professionals through service agreements

with hospitals, clinics, health centres or collective agreements, or electronically by Quebec's text-to-quit program, the *Service de Messagerie texte pour Arrêter le Tabac* (SMAT). The majority of referrals (57.8%) came from settings within Montréal. Other regions contributed from 0.8% to 5.8% of quitline referrals.

Those who had not been referred to the service predominantly indicated having learned about it through the quitline number being printed on their cigarette packages (47.2%), a measure the federal government introduced across Canada in 2012. Other means through which callers had learned about the quitline include the *J'ARRÊTE* website (10.3%), their physician's office (4.8%), family and friends (4.1%), Quebec's quit and win contest (2.8%), cessation centres (2.8%), pharmacies (2.6%) and the quit and win contest's website (2.4%).

Caller characteristics

Table 1 presents caller characteristics at baseline in comparison with Quebec adult smokers and recent ex-smokers who quit smoking in the last year. As shown in the table, results indicate that compared to current smokers aged 18 years and older in Quebec, quitline callers were more often women (56.7% vs. 46.2% in the population). Callers within the age groups of 18 to 24 and 25 to 34 years were under-represented and callers in the age groups of 55 to 64 and 65 and older were over-represented. Callers with a high school education or less were also over-represented among quitline callers (53.4% vs. 41.8%). Quitline callers also showed a higher level of nicotine dependency compared to Quebec's population of daily smokers²⁷ (high HSI: 52.3% vs. 28.8% in the population). Of the 1292 callers, 1272 indicated they spoke French. A comparison of caller characteristics between participants at intake and six-month follow-up did not yield statistically significant differences in any of the demographic variables.

Smoking cessation

Quit rates

At six-month follow-up, the 30-day point prevalence abstinence rate was 26.7%. The point prevalence abstinence rate (i.e. callers who said that they were nonsmokers) was 29.8%. Finally, the six-month prolonged abstinence rate (i.e. callers who said that they had not smoked a cigarette,

TABLE 1
Characteristics of new incoming callers to smoking cessation quitline, October 2014 to October 2015, at baseline (intake) compared to Quebec adult (aged 18 years and older) smokers and recent ex-smokers, CCHS 2015-2016

Caller characteristics	Quitline callers at baseline (N = 1292) % (n)	Quebec adult smokers and recent ex-smokers (CCHS 2015-2016) % (95% CI)
Sex		
Men	43.1 (557)	53.8 (51.9–55.8)
Women	56.7 (733)	46.2 (44.2–48.1)
Age (years)		
18–24	5.6 (72)	11.4 (9.9–12.8)
25–34	13.1 (169)	21.9 (20.2–23.7)
35–54	35.2 (455)	36.6 (34.7–38.6)
55–64	28.2 (364)	18.7 (17.1–20.2)
65+	18.0 (232)	11.4 (10.4–12.5)
Level of education		
High school not completed	27.2 (351)	20.2 (18.5–21.8)
High school diploma	26.2 (339)	21.6 (19.9–23.4)
Postsecondary education	43.4 (561)	58.2 (56.1–60.3)
Smoking status		
Daily smokers	65.8 (850)	65.8 (63.6–68.0)
Occasional smokers	0.5 (7)	25.3 (23.3–27.2)
Recent ex-smokers	33.7 (435)	8.9 (7.6–10.3)
HSI (daily smokers)		
0–1 (low)	11.2 (92)	32.8 (30.3–35.3)
2–3	36.4 (298)	38.3 (35.9–40.8)
4–6 (high)	52.3 (428)	28.8 (26.4–31.3)
Number of cigarettes smoked (daily smokers)	20.6 (SD = 14.2)	15.1 (SD = 8.5)

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; HSI, Heaviness of Smoking Index; SD, standard deviation.

Note: Percentages may not total to 100% due to missing data (nonresponse).

not even a puff, in the past six months) was 18.8%. These directly calculated rates, as well as their ITT and imputed values, are presented in Table 2.

Other cessation supports and methods used

A little more than 3 out of 4 callers (76.9%) reported having used at least one pharmacological cessation aid to help them quit smoking or to refrain from smoking again after having quit. The most frequently used pharmacological cessation aids were nicotine patches (47.4%),

followed by electronic cigarettes with nicotine (30.2%) and nicotine gums (28.3%). Other cessation aids reported were nicotine lozenges (16.4%), varenicline (7.3%), nicotine inhalers (4.3%), nicotine aerosols (3.6%), and bupropion (3.2%). Nearly four out of five callers (79.4%) indicated having used at least one other support to help them quit, such as information materials (55.5%), support from a health professional (48.2%) or other cessation services provided through Quebec's *Tobacco Control Act* (52.8%).

TABLE 2
Direct quit rates, ITT rates and imputed rates for point prevalence, 30-day point prevalence and six-month prolonged abstinence rate at six-month follow-up for 1292 callers to Quebec's smoking quitline, October 2014 to October 2015

	Direct rate	ITT rate	Imputed rate
Point prevalence	29.8%	11.4%	28.4%
30-day point prevalence abstinence rate	26.7%	10.2%	26.0%
Six-month prolonged abstinence rate	18.8%	7.2%	19.7%

Abbreviation: ITT, intention to treat.

Discussion

This paper reports results of the first evaluation of Quebec's quitline since its inception. Evaluation results showed that Quebec's quitline reached 9 in 10 000 Quebec smokers over a one-year period in 2014-15. Compared to the overall population of smokers in Quebec, smokers reached by the service are predominantly women, older adults (55 years of age and older) and individuals with a high school education or less. Smoking cessation outcomes, as measured by the six-month prolonged abstinence rate, indicate that 18.8% (direct rate) of Quebec smokers successfully quit after having accessed the quitline. This number decreases to 7.2% Quebec smokers if using the ITT rate and increases to 19.7% if using the imputed rate.

Treatment reach is an important measure because it can provide a sense of how well an intervention and its promotional campaigns are doing in reaching their population of interest.¹⁸ The latest data for Canadian quitlines indicate that in 2012 quitlines reached between 0.07% and 1.45% of smokers.¹⁴ Thus, at 0.09%, Quebec's quitline treatment reach during the year of evaluation lies within the range of other Canadian quitlines. However, quitline use in Canada is not as high as in the United States, where quitline use ranged from 0.16% to 4.41% in 2012,¹⁴ and it is far below CDC estimates that quitlines should be able to treat 6% of all adult smokers.²⁹ Various factors might explain the increased reach of quitlines in the US. These include offering free cessation medication and increased spending on promotion and outreach (in the US spending is over 10 times higher per smoker compared to Canada). Finally, in many US states, quitlines represent a key component of government funded tobacco cessation programs, giving them a central place in comprehensive tobacco control strategies.³⁴

Researchers have examined various ways to increase quitline reach over the years. In Canada, the introduction of a quitline toll-free number on cigarette packages in 2012 increased reach in the year of its inception, though this increase declined somewhat in each following year.³⁴ Other strategies that have been shown to increase reach of telephone quitlines are running media campaigns, providing nicotine replacement therapy without requiring enrollment in telephone counselling, adding text messaging programs, offering online cessation programs and adding email support programs.³⁵

In fact, due to the rise and diffusion of Internet- and mobile-based technology, an increasing number of new and innovative approaches for promoting tobacco cessation have recently been developed. These include cell phone text messaging, mentioned above, as well as Internet-based behavioural support services. These are promising approaches, due to their broad reach and accessibility.¹¹ Some of these services have been developed and are implemented by quitlines around the world,¹¹ including in Quebec, for example, the SMAT program that has been added to existing cessation services.

A comparison of caller characteristics between our study and the most recent data provided by the NAQC for quitlines in the US and Canada¹⁴ shows that women are overrepresented among users not only in Quebec (56.7%) but across North American quitlines (58% in the US and 55% in Canada). The mean age for Quebec's quitline users was 50.6 years of age, which is higher than the mean age for callers to US quitlines (44.2 years; $n = 52$) and similar to the mean age for callers to other Canadian quitlines (51.1 years; $n = 10$).¹⁴

The fact that Quebec's quitline reaches fewer smokers with postsecondary education than the general population of adult smokers in Quebec (43.4% vs. 58.2%)

also seems to be typical for quitlines across North America. In the US, quitline callers with some level of postsecondary education represent approximately 45% of callers, while they represent 39.7% of callers to other Canadian quitlines.¹⁴ These results indicate that quitlines do reach at least one of the groups that experiences a disproportionate share of the tobacco health burden, namely those with a high school diploma or less (53.4% vs. 41.8% in the population of Quebec smokers) relatively well. Overall, however, these results stress that efforts need to be made to reach certain segments of the population where smoking rates are alarmingly high, including young adult men.

In terms of smoking cessation outcomes, Quebec's quitline callers fared better than the overall population of smokers in the province, with a six-month prolonged abstinence rate of 18.8% as compared to 8.9% in Quebec adult current smokers.²⁷ Furthermore, a comparison of the 30-day point prevalence abstinence rates shows that the 26.7% rate for Quebec's quitline is comparable to the 28.5% rate measured for US quitlines.¹⁴ Thus, while the magnitude of abstinence rates for Quebec's quitline are moderate, they are comparable to those found for quitline users across North America.

The combination of poor reach and moderate quit rates indicate that the number of Quebec smokers that benefit from the quitline is, overall, small. Quitline services are thus underused in Quebec (as in other provinces and across North America) and significant improvements need to be made to reach more smokers. Furthermore, the demographics of quitline participants indicate a mixed level of use among priority populations.

Evidence suggests that providing quality outreach and treatment to smokers in priority populations is paramount.³⁶ Strategies to reach specific populations include offering quitline services in various languages, initiating mass-reach health communications that include a quitline number, offering free cessation medications and creating referral systems for health care systems and providers. Examples of tailored promotional campaigns that target outreach efforts to specific populations include the use of trusted messengers such as faith-based organizations, community and social service organizations, community leaders

or elders, health care providers and clinics and community health workers among priority populations. Partnerships that engage new allies may also improve quitline reach.³⁶

Finally, to improve services, quitlines can offer training specific to the population (e.g. people experiencing mental health issues, chronic health conditions, disability, poverty or homelessness; those with low education level or belonging to specific ethnic or sexual identity groups, etc.) and training in culturally responsive counselling techniques to quitline staff.³⁶ Ongoing research on the effectiveness of new and innovative approaches to cessation, such as cell phone text messaging and Internet-based behavioural support services, will shed light on their potential to reach underserved, high risk populations.

Strengths and limitations

The most notable strength of our work is that it is the first evaluation study of Quebec's quitline since its inception. By following NAQC guidelines for reach and effectiveness of quitlines, we ensured methodological rigour to meet our objectives as well as comparability with other quitline studies done elsewhere. Another strength of our study is that we conducted a multiple imputation procedure to estimate limits on plausible quit rates.

However, a number of limitations should be considered. First, to identify the proportion of the quit rate attributable to quitline use would require a randomized control study or the inclusion of a comparison group. However, rigorous evaluations of quitline services are difficult because service providers remain reluctant to conduct randomized controlled trials that imply refusing callers who contact the quitline for support.⁷ Thus, one-group quasi-experimental designs are frequently used to evaluate quitlines across North America and follow NAQC guidelines.¹⁸ The absence of a comparison group in the quasi-experimental design implies threats to internal validity including self-selection, history and maturation bias.

Second, the proportion of individuals lost to follow-up was 52%. Even though this presents a high percentage of loss to follow-up, it is typical of quitline studies^{37,38} and in line with the NAQC's recommended threshold of 50%.³⁰

Third, although Quebec's quitline offers services both in English and French, follow-up surveys were conducted in French only. This may limit generalization, though the effect is likely small, as only 20 out of 1292 smokers measured at intake did not speak French.

Conclusion

Over the past four decades, increasing evidence has supported the effectiveness of public health tobacco control interventions such as taxation, smoke-free laws, restrictive marketing of tobacco products, mass media campaigns and cessation support.¹¹ This includes evidence that supports the effectiveness of quitlines for smoking cessation,⁵ which have become an integral part of provincial and national tobacco control strategies in North America and around the world.^{6,7} The fact that relatively few smokers utilize available smoking cessation resources such as tobacco quitlines means that service promotion needs to be improved, in particular for segments of the population with higher prevalence rates. Quitlines also should be tailored to match the specific needs of these populations and to expand their services to include new and innovative approaches to cessation, using web and mobile technologies (e.g. Internet-based counselling, text messaging programs). Ultimately, the success of cessation supports is intimately related to spending, reinforcing the need to increase quitline funding to levels commensurate with provincial cessation goals,³⁹ and for their integration into a comprehensive tobacco control strategy.

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Conflicts of interest

The authors were all employed by the Institut national de santé publique du Québec at the time of the data collection. They have no conflicts of interest to declare.

Authors' contributions and statement

CS's contributions to this work included the study design, project administration,

data acquisition, analysis and interpretation and writing of the original draft of the publication. BL's contributions included data analysis, interpretation and writing of the original draft. EL contributed to data analysis, interpretation and review and editing of the initial draft.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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