Brief Report

Use of a national quitline and variation in use by smoker characteristics: ITC Project New Zealand

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Received December 18, 2009; accepted June 14, 2010

Abstract

Introduction: We aimed to describe use of a national quitline service and the variation in its use by smoker characteristics (particularly ethnicity and deprivation). The setting was New Zealand (NZ), which takes proactive measures to attract disadvantaged smokers to this service.

Methods: The NZ arm of the International Tobacco Control Policy Evaluation Survey (ITC Project) utilizes the New Zealand Health Survey (a national sample) from which we surveyed adult smokers in two waves ($N = 1,376$ and $N = 923$) 1 year apart.

Results: Quitline use in the last 12 months rose from 8.1% (95% CI = 6.3%–9.8%) in Wave 1 to 11.2% (95% CI = 8.4%–14.0%) at Wave 2. Māori (the indigenous people of NZ) were significantly more likely to call the Quitline than were European/other smokers. Relatively higher call rates also occurred among those reporting higher deprivation, financial stress, a past mental health disorder, a past drug-related disorder, and higher psychological distress (Kessler 10-item index). Independent associations in the multivariate analyses of Quitline use were being Māori, reporting financial stress, and ever having been diagnosed with a mental health disorder.

Discussion: This national Quitline service is successfully stimulating disproportionately more calls by Māori smokers and those with some measures of disadvantage. It may therefore be contributing to reducing health inequalities. It appears possible to target quitlines to reach those smokers in greatest need.

Introduction

Quitlines are an effective smoking cessation intervention, as detailed in a systematic review (Stead, Perera, & Lancaster, 2006). There is some evidence around quitline usage by different ethnic and socioeconomic groups. For example, a Californian study

found overrepresentation by higher educated smokers and also Black callers but underrepresentation of Hispanic and Asian American and Pacific Islander callers (Zhu, Anderson, Johnson, Tedeschi, & Roeseler, 2000). Another study, in Washington state, reported that utilization did not appear to vary by educational level and by ethnicity except for lower use by the Asian/Pacific Islander population (Maher et al., 2007). A study in Maine reported that callers were more likely to be uninsured (Swartz, Cowan, Klayman, Welton, & Leonard, 2005). There is also favorable evidence around quitline use and Alaskan Native peoples (Boles et al., 2009) and Canadian aboriginal peoples (Hayward, Campbell, & Sutherland-Brown, 2007).

New Zealand (NZ) has a national toll-free quitting support service “Quitline” with evaluations of it showing that it is effective at achieving quitting (The Quit Group, 2009) and is relatively cost-effective (O’Dea, 2004). This service also makes attempts to attract Māori (the indigenous people of NZ) and socioeconomically disadvantaged smokers. Māori in particular have very high smoking prevalences and are specifically a priority audience in the national tobacco control plan for smoking cessation support (Ministry of Health, 2004). Special efforts to attract Māori and disadvantaged callers to the Quitline include advertising that targets these groups (including “Māori television” and Māori [“iwi”] radio stations), advertisement themes that feature Māori and low-income smokers/quitters, promotion of the service at relevant cultural events (Māori and Pacific peoples), partnering with Māori health providers, providing heavily subsidized nicotine replacement therapy, and having Māori Quit Advisers (25% of the total) responding to the telephone calls.

At least some of these approaches appear to have been effective in generating calls by Māori (Wilson, Grigg, Graham, & Cameron, 2005). Also a national survey (Ministry of Health, 2009a) reported that there were no significant differences “by gender, age group, ethnic group, or neighborhood deprivation” among smokers who used the Quitline for their last quit attempt. However, an analysis of the Quitline caller database found relatively higher call levels by females and reported that

doi: 10.1093/ntr/ntq111

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22% of callers in 2005 were Māori and 4% were Pacific people (Li & Grigg, 2007), which are actually underrepresentative of these populations given their smoking prevalence (45% and 31%, respectively; Ministry of Health, 2009b).

In this study, we aimed to describe use of the national Quitline service in NZ and the variation in its use by smoker characteristics (particularly ethnicity and deprivation).

Methods

The ITC Project

The International Tobacco Control Policy Evaluation Survey (ITC Project) involves multicountry cohort studies on tobacco use and policy evaluation (Fong et al., 2006). The NZ arm of the ITC Project survey derives its sample from New Zealand Health Survey (NZHS) participants. NZHS respondents were selected by a complex sample design, which included systematic boosted sampling of the Māori, Pacific, and Asian populations. Interviews were conducted face to face in respondents' homes by trained interviewers (on contract to the Ministry of Health) and resulted in a total of 11,924 interviews with respondents aged 18 years and over. The overall response rate was 67.9%. Other issues around the NZHS response rate as it relates to the ITC project are detailed in an online *Methods Report* (Wilson, 2009).

Participants

The NZHS sample provided a sample of 2,438 adult smokers who were 18+ years and indicated they were willing to participate in further (unspecified) health research when invited at the end of the NZHS interview (85.2% of those eligible). Out of these potential respondents, a total of 1,376 completed a telephone questionnaire giving a response rate of 56.4%. But when considering the NZHS response rate and willingness to further participate, then the overall response rate is reduced further to 32.6% (for details, see Wilson, 2009). Between-wave attrition of 32.9% occurred, resulting in 923 respondents in Wave 2.

Procedures

Data collection was carried out using a computer-assisted telephone survey between March 2007 and February 2008, 3–4 months after their NZHS interview. Wave 2 was conducted between March 2008 and February 2009. The study protocol was cleared by the Multi-Region Ethics Committee in NZ (MEC/06/07/071) and by the Office of Research Ethics, University of Waterloo, Canada (ORE #13547).

Measures

The question relating to Quitline use was taken from the questionnaire of the ITC four-country survey: "In the last 12 months, have you received advice or information about quitting smoking from . . . telephone or quitline services?" Most of the other questions asked came from this survey, though some specific sociodemographic and mental health-related questions were asked only in the NZHS (see Tables 1 and 2).

Statistical analyses

Given the NZHS sampling design and nonresponse for both the NZHS and the ITC Project survey, it was necessary to both consider the complex structure of the sample design and to weight

the results (so that the results were representative of all NZ smokers). Detailed descriptions of the weighting processes are available in online reports for Wave 1 (Clark, 2008) and Wave 2 (Clark, 2009). All analyses used Stata (version 10, StataCorp, College Station, TX).

The association of the demographic, sociodemographic, and various smoking-related variables with Quitline use was analyzed using both univariate and multivariate analyses (using NZHS and Wave 1 data). The multivariate logistic regression analyses drew on a conceptual framework that assumed hierarchical relationships between demographic and sociodemographic factors (Victora, Huttly, Fuchs, & Olinto, 1997) that would dominate smoking-related beliefs, intentions, and behaviors. The regression models all included age, gender, and ethnicity. Model 2 incorporated sociodemographic variables, including measures of small area deprivation (NZDep2006 based on census data at the census area unit level), individual deprivation (NZiDep), and two separate measures of financial stress (described in more detail in an online *Methods Report*; Wilson, 2009). To this, the "fully-adjusted" Model 3 added variables for a range of mental health indicators (those listed in Table 2) and smoking beliefs and behaviors. The latter included awareness of smoking harm (seven-item index), concern around smoking impact on health and quality of life in the future (two-item index), strength of intention of quitting, overall attitude to smoking, self-exempting beliefs (three-item index), awareness of social de-normalization of smoking (three-item index), heaviness of smoking index, type of tobacco used, and number of close friends who are smokers. For more details on these and the kappa scores for the indices, see an online *Methods Report* (Wilson).

Results

In Wave 1, Quitline use in the last 12 months was 8.1% (95% CI = 6.3%–9.8%) and in Wave 2, it was 11.2% (95% CI = 8.4%–14.0%). There was no significant variation in use of the Quitline by gender or age group (Table 1), but usage was higher by all non-European ethnic groups (statistically significantly higher for Māori [11.5% vs. 6.8%, $p = .02$]). There was higher usage with increasing small area deprivation ($p = .04$ for trend) and for higher ratings in one of the two measures of financial stress.

Mental health and smoking-related beliefs and behaviors

Callers to the Quitline were significantly more likely to report ever being diagnosed with a mental health disorder or ever being diagnosed with a drug-related disorder (Table 2). Furthermore, they reported a significantly higher level of psychological distress (Kessler 10-item index) and slightly poorer mental health on the Short Form Health Survey (SF-36) (though this was not at a statistically significant level).

In terms of smoking-related beliefs, Quitline callers had significantly higher awareness of such harm and also of harm associated with secondhand smoke (Table 2). They also had a significantly higher level of quitting intention.

Quitting assistance

The proportions of Quitline callers saying that the Quitline helped in their quit attempt were 45% and 50% in Waves 1 and

Table 1. Smoker use of the Quitline in the last 12 months by demographic, sociodemographic, and other characteristics (Wave 1 results, with all the results weighted to adjust for the complex sample design and nonresponse)

Variable	Used the Quitline (%)	Crude ORs for Quitline use relative to nonuse (95% CI)
Total	8.1 (95% CI = 6.3–9.8)	—
Age group (years) ^a		
18–24 (<i>n</i> = 147)	9.2	1.00 Referent
25–34 (<i>n</i> = 339)	7.1	0.75 (0.32–1.78)
35–44 (<i>n</i> = 353)	8.2	0.88 (0.37–2.09)
45–54 (<i>n</i> = 292)	7.9	0.84 (0.35–2.06)
55+ (<i>n</i> = 245)	8.3	0.89 (0.37–2.19)
Gender ^a		
Men (<i>n</i> = 529)	7.6	1.00 Referent
Women (<i>n</i> = 847)	8.6	1.15 (0.71–1.85)
Ethnicity ^b		
European (includes other; <i>n</i> = 620)	6.8	1.00 Referent
Māori (<i>n</i> = 607)	11.5	1.79 (1.10–2.90)
Pacific (<i>n</i> = 90)	7.4	1.11 (0.50–2.45)
Asian (<i>n</i> = 59)	10.1	1.54 (0.52–4.57)
Small area deprivation level (quintiles) ^c		
1 & 2 (least deprived; <i>n</i> = 121)	4.0	1.00 Referent
3 & 4 (<i>n</i> = 205)	6.8	1.76 (0.60–5.17)
5 & 6 (<i>n</i> = 238)	6.3	1.62 (0.59–4.46)
7 & 8 (<i>n</i> = 308)	11.6	3.19 (1.19–8.56)
9 & 10 (most deprived; <i>n</i> = 504)	8.7	2.32 (0.90–5.96)
Trend	chi square for linear trend = 4.185, <i>p</i> = .041	
Individual deprivation NZiDep scores ^c		
0 (least deprived; <i>n</i> = 627)	7.3	1.00 Referent
1 (<i>n</i> = 252)	6.3	0.85 (0.47–1.55)
2 (<i>n</i> = 173)	12.0	1.73 (0.89–3.36)
3–4 (<i>n</i> = 197)	5.4	0.73 (0.33–1.61)
5–8 (most deprived; <i>n</i> = 126)	16.3	2.46 (0.95–6.41)
1–8 (any deprivation; <i>n</i> = 748)	8.8	1.23 (0.77–1.97)
Financial stress ^d		
Unable to pay any important bills on time (<i>n</i> = 113)	13.4	1.88 (0.96–3.66)
Able to pay these bills (<i>n</i> = 1,263)	7.6	1.00 Referent
Not spending on household essentials (<i>n</i> = 374)	12.4	1.94 (1.16–3.26)
Able to spend on these essentials (<i>n</i> = 995)	6.8	1.00 Referent
Mental health, drug use and alcohol use ^e		
Ever been diagnosed with a mental health disorder (“yes” to any in a list of eight items in the NZHS; <i>n</i> = 274)	13.2	2.11 (1.21–3.68)
Never being diagnosed with such disorders (<i>n</i> = 1,102)	6.7	1.00 Referent
Ever been diagnosed with a “drug-related disorder” (<i>n</i> = 24)	27.8	4.57 (1.40–14.92)
Never being diagnosed with such a disorder (<i>n</i> = 1,352)	7.8	1.00 Referent
Ever been diagnosed with an “alcohol-related disorder” (<i>n</i> = 31)	9.5	1.21 (0.36–4.08)
Never being diagnosed with such a disorder (<i>n</i> = 1,345)	8.0	1.00 Referent
AUDIT score = 0 (no drinking; <i>n</i> = 159)	9.9	1.00 (Reference)
AUDIT score = 1–7 (<i>n</i> = 699)	7.9	0.78 (0.39–1.55)
AUDIT score ≥ 8 (hazardous alcohol use; <i>n</i> = 378)	7.7	0.76 (0.35–1.67)

Notes. AUDIT = Alcohol use disorders identification test; NZHS = New Zealand Health Survey; ORs = odds ratio.

^aBased on NZHS data.

^bEthnicity results are for prioritized ethnicity where all those with Māori or both Māori and other ethnic affiliations were classified as Māori and where all those with Pacific or both Pacific and other ethnic affiliations were classified as Pacific (unless Māori affiliation was also reported) etc. For more detail, see an online *Methods Report* (Wilson, 2009). The European grouping includes other (non-Māori, non-Pacific, and non-Asian) ethnic groups.

^cDeprivation level was based on a NZ-specific deprivation index for small areas (NZDep2006) and also an individual measure of deprivation (NZiDep) also designed for NZ (Wilson, 2009).

^dWe considered two measures of financial stress that are correlated with each other (and the small area deprivation measure; Wilson, 2009) but involve significant conceptual differences (Siahpush, Yong, Borland, Reid, & Hammond, 2009). The first question was “... because of a shortage of money, were you unable to pay any important bills on time, such as electricity, telephone or rent bills?” The second question was “In the last six months, have you spent money on cigarettes that you knew would be better spent on household essentials like food?” For more detail, see an online *Methods Report* (Wilson).

^eThis list was depression, bipolar disorder (manic depression), anxiety disorder (including panic, phobia, posttraumatic stress disorder, and obsessive compulsive disorder), eating disorder, alcohol-related disorder, drug-related disorder, schizophrenia, and “any other mental health condition (please specify).”

2, respectively (data not shown). Quitline callers were more likely to report being quit (for 30 or more days) at the time of the Wave 1 interview (i.e., several months after reporting that they were smokers in the NZHS) at 12% versus 9%. Similarly, they were more likely to report being quit at either the Wave 1 or the Wave 2 survey (12% vs. 10%). However, neither of these differences was statistically significant.

Multivariate analysis

Quitline usage was higher for Māori smokers compared with European smokers in the fully adjusted model (Model 3; i.e., for Māori: adjusted odds ratio (AOR) = 2.23, 95% CI = 1.22–4.08; Table 3). For Asians, the odds ratio was also raised but not significantly so (AOR = 2.27). Deprivation by two measures was not associated with Quitline usage, but smokers with financial stress were more likely to use the Quitline with this being statistically significant for the measure around “not spending on household essentials” in one model (i.e., for Model 2: AOR = 1.71, 95% CI = 1.00–2.92). The only other variable that was significantly associated with increased Quitline use was ever having been diagnosed with a mental health disorder in Model 3 (i.e., AOR = 2.33, 95% CI = 1.21–4.49).

Discussion

Main findings and interpretation

This study found that a significant minority of smokers (8% in Wave 1 and 11% in Wave 2) had used the Quitline in the last 12 months. Internationally, these NZ Quitline call levels appear to be substantially higher than in the eight developed and five developing countries where the same survey questions have been used (Borland, 2009). The higher usage in Wave 2 may reflect the introduction of new pictorial health warnings and a more clearly identifiable Quitline number on packs and related mass media campaigns (Li & Grigg, 2009). While the

overall call level is encouraging, it is still relatively low given that the great majority of these smokers regret ever starting smoking (83%; Wilson, Edwards, & Weerasekera, 2009) and most wish to quit (69% for Wave 1 data).

Comparisons of our results with actual Quitline utilization data are problematic since the latter has complex issues with numerator interpretation (i.e., there are callers who call but do not register with the service and those who use nontelephone components of the service, such as the Web site and the “Txt2Quit” service). Another problem is that the denominator of smokers has to be based on estimates from other surveys. Nevertheless, for the July 2007 to June 2008 period, the Quitline service had 46,786 registrations (The Quit Group, 2008), for an estimated population of 690,300 smokers (Ministry of Health, 2009b), giving an annual proportion of smokers registering at 6.8%. But if the total figure of 81,804 incoming calls is considered for this year (since not all calls result in smokers registering with the service), an upper estimate is 11.9%. Furthermore, a face-to-face national survey conducted by the Ministry of Health (Ministry of Health, 2009a) reported that 12.8% of smokers used the Quitline for their last quit attempt (but did not give this on a per year basis).

This study found significantly higher Quitline usage by Māori smokers compared with European/other smokers and also for those smokers under financial stress. Given that the Quitline marketing and service provision are particularly orientated toward attracting Māori smokers (so as to reduce health inequalities—see “Introduction” section), the finding for Māori usage indicates that this strategy is probably working. Of note is that our results differ from another national survey (Ministry of Health, 2009a), which did not find any variation in Quitline use by ethnicity or deprivation. One possible explanation for this is survey timing since there is variation throughout the year in which antismoking television advertising with the Quitline number occurs (including its placement on Māori television),

Table 2. Mental health and smoking-related beliefs and behaviors of Quitline callers in the last 12 months relative to other smokers (Wave 1 results, with all results weighted to adjust for the complex sample design and nonresponse)

Characteristic	Quitline users (mean score)	Nonusers of the Quitline (mean score)	Difference
Health and mental health measures ^a			
Mean SF-36 score (overall)	74.02 (70.93–77.10)	75.46 (74.59–76.32)	–1.44 (<i>p</i> = .378)
Mean SF-36 (mental health score)	79.51 (76.18–82.83)	80.68 (79.65–81.71)	–1.17 (<i>p</i> = .508)
Psychological distress Kessler 10-item index (K10)	5.97 (4.41–7.53)	4.37 (4.00–4.73)	1.60 (<i>p</i> = .049)
Smoking-related beliefs and behaviors ^b			
Heaviness of smoking index (alternate version)	1.56	1.00	0.56 (<i>p</i> = .153)
Awareness of smoking harm (seven-item index; α = .69)	0.63	0.49	0.14 (<i>p</i> = .012)
Awareness of secondhand smoke harm (two-item index; α = .62)	0.81	0.71	0.10 (<i>p</i> = .049)
Strength of intention of quitting (4-point scale)	1.49	1.08	0.41 (<i>p</i> = .006)
Self-efficacy for quitting (4-point scale)	2.92	2.72	0.20 (<i>p</i> = .166)
Average number of friends who are smokers	3.01	2.84	0.17 (<i>p</i> = .434)

Notes. SF-36 = Short form health survey.

^aValues in brackets are 95% CIs. For more detail on the particular questions in the New Zealand Health Survey, see elsewhere (Ministry of Health, 2008).

^bFor further specific details of these indexes, see an online *Methods Report* (Wilson, 2009).

Table 3. Logistic regression analysis for use of the Quitline by smokers in this cohort (all the results weighted and adjusted for the complex design)

Variables	AOR (95% CI) ^a		
	Model 1 (demographics)	Model 2 (+ sociodemographics)	Model 3 (+ mental health, smoking related beliefs, and behaviors)
	Hosmer–Lemeshow $\chi^2 = 6.53, df = 8 (p = .588)^b$	Hosmer–Lemeshow $\chi^2 = 8.56, df = 8 (p = .380)^b$	Hosmer–Lemeshow $\chi^2 = 4.72, df = 8 (p = .788)^b$
Demographic^c			
Age in years (35–49 vs. 50+)	0.88 (0.49–1.58)	0.85 (0.47–1.54)	0.65 (0.30–1.41)
Age in years (<35 vs. 50+)	0.83 (0.44–1.59)	0.79 (0.42–1.46)	0.69 (0.31–1.56)
Gender (women vs. men)	1.11 (0.69–1.80)	1.14 (0.68–1.89)	1.09 (0.56–2.12)
Māori vs. European/other (includes Asian)	1.83 (1.11–3.02)	1.54 (0.90–2.64)	2.23 (1.22–4.08)
Pacific vs. European	1.16 (0.51–2.64)	0.86 (0.34–2.16)	1.09 (0.32–3.72)
Asian vs. European	1.66 (0.54–5.06)	1.59 (0.49–5.17)	2.27 (0.65–7.96)
Sociodemographic^c			
Area deprivation deciles (increasing deprivation)	—	1.06 (0.97–1.15)	1.03 (0.92–1.14)
Individual deprivation using NZiDep (any deprivation vs. nil)	—	0.98 (0.61–1.58)	0.79 (0.45–1.41)
Financial stress: Unable to pay any important bills on time	—	1.59 (0.78–3.23)	1.42 (0.63–3.19)
Financial stress: Not spending on household essentials	—	1.71 (1.00–2.92)	1.55 (0.73–3.27)
Mental health, smoking-related beliefs and behaviors^c			
Ever been diagnosed with a mental health disorder	—	—	2.33 (1.21–4.49)
AUDIT score (hazardous alcohol use; continuous)	—	—	0.98 (0.92–1.04)
Psychological distress Kessler 10-item index (K10) score (continuous scale)	—	—	1.02 (0.97–1.07)
Heaviness of smoking index (alternate version)	—	—	1.12 (0.99–1.26)
Number of close friends who are smokers (continuous)	—	—	1.04 (0.85–1.27)
Awareness of smoking harm (seven-item index; $\alpha = .69$)	—	—	1.50 (0.59–3.85)
Concern around smoking impact on health and quality of life in the future (two-item index)	—	—	1.18 (0.71–1.95)
Strength of intention of quitting (4-point scale)	—	—	1.38 (0.97–1.97)
Self-efficacy for quitting (4-point scale)	—	—	1.14 (0.95–1.38)
Any use of RYO vs. smoking only factory-made cigarettes	—	—	0.92 (0.50–1.69)
Overall attitude to smoking (5-point scale, high score is more positive toward smoking)	—	—	1.00 (0.73–1.37)
Self-exempting beliefs (three-item index, high score means stronger such beliefs; $\alpha = .60$)	—	—	0.93 (0.67–1.30)
Awareness of social denormalisation of smoking (three-item index; $\alpha = .50$)	—	—	0.90 (0.76–1.07)

Notes. AORs = adjusted odds ratios; AUDIT = Alcohol use disorders identification test; RYO = roll-your-own tobacco.

^aThe AORs represent those odds for use of the Quitline in the past 12 months versus nonuse in this period. See the “Methods” section for discussion of the models.

^bGoodness of fit using the Hosmer–Lemeshow test was not adjusted for the complex sample design.

^cSee “Methods” section and an online *Methods Report* (Wilson, 2009) for further details on these measures.

and there is also variation in media coverage of smoking issues. Both surveys found no difference by the same small area deprivation measure (see Table 3), but only our survey examined financial stress (which remained significant in the multivariate analysis).

Also significant in the multivariate analysis for higher use of the Quitline was having ever been diagnosed with a mental health disorder. One possible explanation for this might be that these smokers' past experience with using health services could mean that they favor using a service rather than quitting without any support (since there is no special Quitline marketing to these smokers). There may therefore be value in further tailoring quitline services so that they address the needs of smokers with concurrent mental health issues.

Study strengths and limitations

A strength of this study was the nationally representative sample with boosted sampling of key ethnic groups. However, a potential weakness was that this study had a sample that could have become less representative of the national population of smokers (via nonresponse at various stages). The weighting process (although sophisticated) may not have fully adjusted for non-response bias, potentially affecting the generalizability of the findings to all NZ smokers. There was also a risk of social desirability bias with some responses, but this was probably mitigated by locating more sensitive questions (e.g., on mental health issues) within a large survey and by using show cards for these questions during the face-to-face interview in the NZHS.

Possible policy responses

There are a number of general strategies to further stimulate quitting behavior and Quitline calls, such as higher tobacco taxes and intensified mass media campaigns, for which there is much scope for improvement in NZ (Wilson, Thomson, & Edwards, 2008). Although the Quitline service appears to be reaching high-need populations, this could be enhanced by further intensifying the targeted nature of such campaigns and further developing automated Web site and text-messaging services (that are already in use by the NZ Quitline).

In summary, this study provides evidence that it is possible to position cessation services in ways that attract disproportionately higher use from disadvantaged groups in the community. This means that such services can play a positive role in reducing health-related disadvantages as these services are demonstrably effective (Stead et al., 2006). The NZ Quitline model is one that other countries could potentially learn from as they act to support population-level smoking cessation services.

Funding

Health Research Council of New Zealand (grant 06/453). Agencies that support the ITC Project internationally (particularly the Canadian Institutes of Health Research (79551); the Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC-P50 CA111236), funded by the U.S. National Institutes of Health; and many other funding agencies as detailed on the ITC Project Web site: <http://www.igloo.org/itcproject/>).

Declaration of Interests

One author (JL) has worked previously as a researcher for "The Quit Group," which is the nonprofit organization that runs the Quitline on contract to the NZ Ministry of Health. The other authors do not declare any competing interests.

Acknowledgments

The ITC Project (NZ) team thank the following for their support: the interviewees who kindly contributed their time to answer the survey questions, the NZ Ministry of Health that provides a wide range of support for the Project, particularly access to the NZHS data, and other members of our ITC Project (NZ) Team (see: <http://www.wnmeds.ac.nz/itcproject.html>); Roy Morgan Research for conducting the interviews; the Data Management Core at the University of Waterloo, Canada.

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