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Nicotine replacement therapy 'gift cards' for hospital inpatients who smoke: a prospective before-and-after controlled pilot evaluation

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ABSTRACT

Introduction A common barrier identified by individuals trying to quit smoking is the cost of cessation pharmacotherapies. The purpose of this evaluation was to: (1) Assess the feasibility of offering nicotine replacement therapy (NRT) 'gift cards' to hospitalised smokers for use posthospitalisation; and, (2) Estimate the effect of providing NRT gift cards on 6-month smoking abstinence.

Methods A prospective, quasi-experimental, before-and-after controlled cohort design with random sampling was used to compare patients who had received the Ottawa Model for Smoking Cessation (OMSC) intervention ('control') with patients who received the OMSC plus a $C300 Quit Card ('QCI'), which they could use to purchase any brand or form of NRT from any Canadian pharmacy.

Results 750 Quit Cards were distributed to the three participating hospitals of which 707 (94.3%) were distributed to patients. Of the cards received by patients, 532 (75.2%) were used to purchase NRT. A total of 272 participants completed evaluation surveys (148 control; 124 QCI).

Point prevalence abstinence rates adjusted for misreporting among survey responders were 15.3% higher in the QCI group, compared with controls (44.4% vs 29.1%; OR 1.95, 1.18–3.21; p=0.009). Satisfaction was high among participants in both groups, and among staff delivering the QCI. QCI participants rated the intervention as high in terms of motivation, ease of use and helpfulness.

Conclusions The NRT gift card appears to be a feasible and effective smoking cessation tool that removes a primary barrier to the use of evidence-based smoking cessation pharmacotherapies, while motivating both patients and health providers.

INTRODUCTION

Tobacco smoking causes multiple preventable chronic conditions, including cardiovascular and respiratory diseases and cancer[1 2] and is a leading avoidable cause of death in Canada.[3] Direct annual costs to the Canadian healthcare system due to smoking are estimated at $C6.5 billion, and smoking-attributable healthcare use will cost approximately $C80 billion over the next 20 years.[4] Quitting smoking before the age of 40 years eliminates 90% of an individual's risk of smoking-associated premature morbidity and mortality.[5]

While progress has been made over the past four decades in reducing current smoking prevalence in Canada to under 15%, recent evidence suggests that the steady decline may be reversing for the first time.[6] Increased cessation efforts will be necessary if we are to reach Canada's goal of 5% prevalence by 2035.[7] Smoking rates have been found to be between 5% and 8% higher among patients admitted to hospitals, compared with the general population.[8 9] In Canada, individuals who smoke are hospitalised, on average, 12 years earlier than non-smokers.[8] Delivery of cessation interventions to patients in hospital settings can lead to significant improvements in long-term smoking abstinence, mortality and hospitalisations.[8] There is a need and opportunity to enhance the implementation of proactive smoking cessation interventions in all clinical settings.

The use of nicotine replacement therapy (NRT) during a smoking cessation attempt increases the odds of quitting by >50%.[10] NRT helps reduce nicotine withdrawal symptoms (eg, urges to smoke, irritability, feelings of anxiety), easing the transition from cigarette smoking to sustained smoking abstinence.[11] A common barrier identified by individuals trying to quit smoking is the cost of cessation pharmacotherapies. A growing body of evidence demonstrates the effectiveness of financial incentives for increasing quit attempts and smoking cessation in non-clinical populations.[12 13]

The purpose of this evaluation was to: (1) Assess the feasibility of offering NRT 'gift cards' to hospitalised smokers for use posthospitalisation; and, (2) Estimate the effect of providing NRT gift cards on 6-month smoking abstinence.

METHODS

Design and settings

A prospective, quasi-experimental, controlled cohort design with random sampling was used to compare patients who had received the Ottawa Model for Smoking Cessation (OMSC) intervention ('control') with patients who received the OMSC plus a $C300 NRT gift card ('Quit Card'), which they could use to purchase any brand or form of NRT from any Canadian pharmacy. This amount ($C300) was chosen based on budget, target number of patients and the desire to cover at least 1 month's worth of daily combination NRT (one patch plus one form of short-acting NRT per day) during the study period. Participants were recruited from three hospitals in Ontario, Canada: the University of Ottawa Heart Institute, a tertiary care cardiac hospital; the Ottawa Hospital Civic Site, an urban

general hospital; and, Cornwall Community Hospital, a small-town general hospital.

Participants

Control

The control group consisted of a random sample of participants who had received the standard OMSC in-hospital intervention[14] between November 2017 and April 2018, the 5-month period immediately following the Quit Card pilot. Using standardised consultation and order forms, the control group was offered brief bedside advice regarding quitting smoking, NRT while in hospital to help manage nicotine withdrawal symptoms and enrolment in posthospitalisation automated telephone follow-up support (TelASK Technologies) monitored by smoking cessation nurse specialists for up to 6 months.[15] No free medication or Quit Card was provided to control participants on hospital discharge.

Quit Card intervention

The Quit Card intervention (QCI) group received the same standard OMSC in-hospital intervention as did the control group between July 2017 and October 2017; in addition they received a Quit Card (STI Technologies Inc., Halifax, NS, Canada) worth $C300 valid only for the purchase of NRT. Participants could take the Quit Card to any pharmacy and use it to purchase any form or brand of NRT (Natural Product Number was specified and programmed on the card). The card included instructions for pharmacists to process the card in the same manner they do other medication-insurance cards. STI Technologies reimbursed the pharmacy and provided tracking of individual card use, including date, location, NRT type, dose and cost. Three batches of Quit Cards were distributed, each batch with a 2-month expiration date to encourage participants to redeem the card within that period. As a result, some patients had up to 2 months to redeem their cards, whereas others had only a few days.

Randomisation and recruitment

Patients were eligible to be contacted for this evaluation if they had received an OMSC intervention while in hospital during either the control or QCI time periods. Random subsamples of eligible control and QCI participants were selected to be contacted 6 months following their hospitalisation. Randomisation was stratified by site to account for differences in size and population. Block randomisation was used for the two larger hospitals; participants were sorted into 2-week blocks based on their hospital discharge date. Using an online random number generator, half of the participants in each block were selected to be contacted. For the smaller hospital, the participants were sorted by discharge date, and sequentially assigned to either A or B. Using a coin toss, the participants assigned to group B were selected to be contacted. Those selected to be contacted were called no more than five times, leaving up to three voicemails. A total of 548 participants were randomly selected; 274 from each group.

Variables, outcomes and data sources

Participants were contacted by telephone to complete a survey that collected sociodemographic (age, sex, education, income), smoking-related (cigarettes smoked per day, other smokers in the home) and health-related (history of depression and/or anxiety, alcohol use, cannabis use) variables.

Feasibility outcomes included: number of Quit Cards distributed to participating hospitals; number of Quit Cards distributed to patients (calculated as number of cards sent to participating hospital minus the number of unused cards returned at the end of the programme); number of Quit Cards redeemed by patients (reported on the STI Technologies platform); dollar amount used to purchase NRT (reported on the STI Technologies platform); type of NRT purchased (brand, type and amount reported on the STI Technologies platform); and, type and amount of NRT used (participant self-report). Using Likert Scales of 1 (not very) to 5 (extremely), all participants were asked to rate their satisfaction with the support they received, and QCI participants were asked to rate the extent to which they found the Quit Cards to be motivating, easy to use and helpful. Given QCI participants had different amounts of time to redeem their Quit Cards depending on when they received the card and the expiration date, we tracked the median number and range of days participants had to redeem their Quit Cards and assessed whether redemption rates, amount of NRT purchased and quit rates differed depending on how much time they had to use their card.

To estimate the effect of QCI on quitting, self-reported 7-day point prevalence smoking abstinence ('Have you smoked any form of tobacco in the past 7 days?') was gathered at 6 months. A random subsample of participants (representing approximately 10% of participants from each group) was asked to complete an expired carbon monoxide (CO) test. A CO reading of ≤4 ppm was considered confirmation of smoking abstinence. Abstinence rates were adjusted based on the observed misreporting rates.

To determine the perceived benefits and challenges of the intervention from hospital staff, a postprogramme survey (Appendix A: online supplemental material 1; pp. 2–13 (figures B–F, tables A,B)) was sent to staff involved in coordinating and/or delivering the QCI at their site. Each staff member surveyed had experienced offering the OMSC intervention to patients with and without Quit Cards.

Statistical methods

Feasibility outcomes and staff survey data were summarised using descriptive statistics. Binary logistic regression was used to assess smoking abstinence by group (control vs QCI) and in subgroup analyses. Our primary analysis of cessation compared the outcomes of survey responders only. A sensitivity analysis of cessation outcomes using intention-to-treat principles (the Russell standard)[16] was also completed, whereby patients who had died, had a wrong number, had a language barrier, did not smoke cigarettes, had moved to long-term care or hospice, or for other reasons were deemed ineligible (eg, denied receiving the intervention) were removed from the analysis, and patients who did not answer or refused to complete the survey were assumed to be smoking. Several subgroups were identified by the evaluation team a priori to determine which variables would be important to consider in future trials. These included: sex, education, income, community size, cigarettes per day, living with other smokers, history of depression, history of anxiety, alcohol-use and cannabis-use. Little's missing completely at random (MCAR) test was used. If data were found to be missing at random, multiple imputation would have been completed using the regression method. If missing data were found to be MCAR or missing not at random, only observed data would have been used.[17] All assumptions of binary logistic regression were confirmed (linear relationship between the logit of the outcome variable and each selected predictor variable; no extreme values or outliers in continuous predictor variables; no high intercorrelations among the predictors). Analyses were carried out using IBM SPSS Statistics V.26.

Bias

While this evaluation involved a real-world quality-improvement pilot programme using a before and after cohort design, efforts were made to reduce potential biases. To limit selection bias, random subsamples of control and QCI participants were selected to be contacted for this evaluation. To increase generalisability of the results, the evaluation took place at three locations—two major urban institutions and one small town hospital. To limit observer bias, outcome assessors were at arm's length to the OMSC programme and were not informed of the evaluation's objectives and hypotheses. To limit history bias and to avoid potential contamination/cross-over, the two cohorts were selected within a few months of each other and with the controls being recruited after expiration of the Quit Card programme. To limit response bias, smoking abstinence outcomes were adjusted using the CO test results.

Power

Power was calculated a priori to determine the number of participants to randomly select. We randomly selected 548 participants (274 control, 274 QCI), assuming a response rate of 68% (372 completed surveys) would be achieved, based on the 6-month response rate observed in a previous programme study.[15] Using logistic regression, with 186 in each group, we would have 80% power (two-sided test; $\alpha=0.05$) to detect an OR of 1.84 for QCI versus control, assuming the QCI odds were similar to studies of NRT versus control.[18]

RESULTS

Participants

We reached 73.1% of our 372 target, with 272 completed surveys (148 control; 124 QCI). Figure 1 displays the participant flow and reasons for exclusion. Results of Little's MCAR test identified that missing data were MCAR ($\chi^2=1.236$, $p=0.266$), therefore, only observed data were used. Groups were similar in terms of baseline characteristics (table 1).

Feasibility

The feasibility outcomes are summarised by hospital in table 2. A total of 750 Quit Cards were distributed to the three participating hospitals of which 707 (94.3%) were distributed to patients. Of the cards received by patients, 532 (75.2%) were used to purchase NRT. The average amount redeemed per card was $C246 (±$C74.1, 82%) of a possible $C300. QCI participants had a median of 29 days (range: 2–60 days) to redeem their Quit Card. Redemption rates were similar between those who had <1 month (n=60) and those who had >1 month (n=59) to redeem their card (73.3% vs 76.3%, respectively). There was no significant difference in the mean dollar amount spent on NRT per card for those who had <1 month and those who had >1 month to redeem their card ($C252±$C67.9 vs $C241±$C79.6, respectively; p=0.483). Despite the short amount of time, 100% of participants who had <1 week to redeem their quit card (n=16) did so, and they purchased an average of $C234 (±$C78.6, 78%) worth of NRT.

Online supplemental appendix A, figure A (pg.1) summarises self-reported smoking cessation pharmacotherapy use in the 6 months following hospitalisation by group and demonstrates a doubling or tripling of NRT product use among QCI participants. Patient satisfaction and motivation results are summarised in figure 2. Among QCI participants, 62.8% reported the Quit Card being the main reason they attempted to quit, and that they may not have otherwise attempted.

Smoking abstinence

The self-reported, unadjusted, 7-day point prevalence abstinence rate among survey responders gathered at 6 months was an absolute 12.0% higher in the QCI group, compared with the control group (53.2% vs 41.2%; OR 1.62, 1.00–2.63; p=0.048). A total of 12 participants from each group (24 total) were randomly selected to complete a CO test, of whom 11 completed from the QCI group, and 9 from the control group. Misreporting (ie, CO value >4 ppm) was observed in 9.1% of the QCI participants and

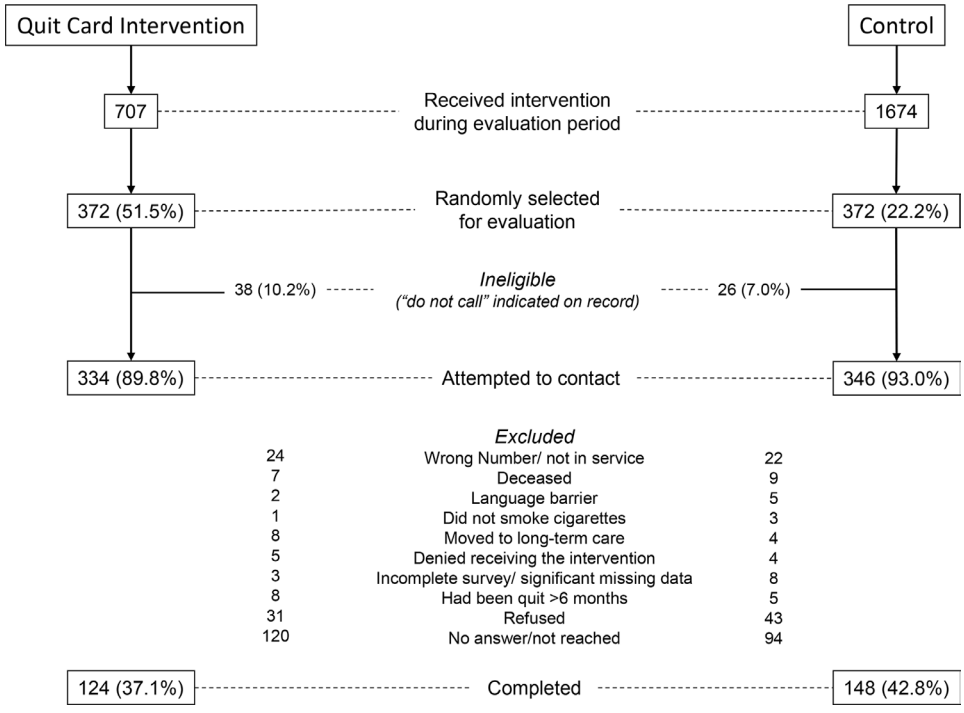

Figure 1 Participant flow.

Table 1 Participant characteristics

	QCI (n=124)	Control (n=148)	Overall (n=272)	P value
Age, mean (SD)	60.1 (10.4)	59.4 (13.6)	59.7 (12.2)	0.652*
Sex, n (%)				0.901†
Male	76 (61.3)	89 (60.1)	165 (60.7)	
Female	48 (38.7)	59 (39.9)	107 (39.3)	
Community population size, n (%)				0.716†
Large (>100 000)	65 (52.4)	81 (54.7)	146 (53.7)	
Medium (30 000–99 000)	55 (44.4)	64 (43.2)	119 (43.8)	
Small (<30 000)	4 (3.2)	3 (2.0)	7 (2.6)	
Cigarettes smoked per day at baseline, mean (SD)	20.7 (11.5)	18.5 (9.8)	19.5 (10.7)	0.100*
Missing, n (%)	2 (1.6)	10 (6.7)	12 (4.6)	
Lives with other smokers, n (%)				0.235†
Yes	40 (34.2)	54 (41.5)	94 (38.1)	
No	77 (65.8)	76 (58.5)	153 (61.9)	
Missing	7 (5.6)	18 (12.2)	25 (10.1)	
History of mood disorder, n (%)				0.240†
Yes	29 (23.8)	28 (18.9)	57 (21.2)	
No	93 (75.0)	119 (80.9)	212 (78.8)	
Missing	2 (1.6)	1 (0.7)	3 (1.1)	
History of anxiety disorder, n (%)				0.101†
Yes	21 (17.2)	17 (11.5)	38 (14.1)	
No	101 (82.7)	130 (88.4)	231 (85.9)	
Missing	2 (1.6)	1 (0.7)	3 (1.1)	
Education, n (%)				0.180†
Elementary school or less	8 (6.5)	10 (6.8)	18 (6.6)	
Some high school	30 (24.2)	32 (21.6)	62 (22.8)	
High school diploma	36 (29.0)	34 (23.0)	70 (25.7)	
Some postsecondary	9 (7.3)	21 (14.2)	30 (11.0)	
College or trade certificate	26 (21.0)	34 (23.0)	60 (22.1)	
University degree	15 (12.1)	17 (11.5)	32 (11.8)	
Income‡, n (%) <$C25 000	28 (22.6)	21 (14.2)	49 (18.0)	0.496†
$C25 000–$C50 000	43 (34.7)	59 (39.9)	102 (37.5)	
$C50 000–$C75 000	15 (12.1)	20 (13.5)	35 (12.9)	
>$C75 000	21 (16.9)	25 (16.9)	46 (16.9)	
Prefer not to answer	17 (13.7)	23 (15.5)	40 (14.7)	
Cannabis use in past 6 months, n (%)				0.948†
Yes	23 (18.5)	26 (18.1)	49 (18.3)	
No	101 (81.5)	118 (81.9)	219 (81.7)	
Missing		4 (2.8)	4 (1.5)	
Alcohol drinks per week, n (%)				0.952†
Does not drink alcohol	58 (47.9)	71 (48.6)	129 (48.3)	
< 1	14 (11.6)	14 (9.6)	28 (10.5)	
1–5 (female); 1–8 (male)	26 (21.5)	35 (24.0)	61 (22.8)	
6–10 (female); 9–15 (male)	13 (10.7)	13 (8.9)	26 (9.7)	
≥11 (female); ≥16 (male)	10 (8.3)	13 (8.9)	23 (8.6)	
Missing	3 (2.4)	2 (1.4)	5 (1.9)	

*Independent samples t-test
†Pearson χ^2 test
‡$C, 2017–1
QCI, Quit Card Intervention.

12.5% of the control participants. The difference in misreporting between groups was not statistically significant (χ^2=0.057; p=0.811). Point prevalence abstinence rates adjusted for misreporting were 15.3% higher in the QCI group, compared with controls (OR 1.95, 1.18–3.21; p=0.009) (figure 3). Results of the intention-to-treat analysis (assuming non-responders were smoking) found point prevalence abstinence to be 3.0% higher in the QCI group, compared with the control group (23.8% vs 20.8%; OR 1.53, 1.03–2.28; p=0.038).

Table 2 Feasibility outcomes of programme distribution and redemption, by site

	Quit Cards distributed to hospital, n	Quit Cards distributed to patients by hospital staff, n (%)	Quit Cards redeemed by patients, n (%)
Hospital A	350	333 (95.1)	236 (70.9)
Hospital B	275	255 (92.7)	201 (78.8)
Hospital C	125	119 (95.2)	95 (79.8)
Total	750	707 (94.3)	532 (75.2)

In looking at QCI participants only, those who had <1 month to redeem their Quit Card had a higher abstinence rate than those who had >1 month to redeem, although this was not statistically significant (56.3% vs 47.5%, respectively; χ^2=1.88, p=0.170).

Among those who had not quit, 75.8% (50/66) of QCI participants and 63.2% (55/87) of control participants reported having made at least one quit attempt during the evaluation period.

Subgroup analyses

Not having used cannabis in the past 6 months, having an annual income of ≥$C75 000, and not living with other smokers were positively associated with smoking abstinence. Non-cannabis users had nearly a 28% higher cessation rate, compared with co-users (51.8% vs 24.0%; OR 3.40, 95% CI 1.69 to 6.86). Those with an annual income of over $C75 000 had a 30.7% higher cessation rate, compared with those with an income of <$C25 000 (67.4% vs 36.7%; OR 3.56, 95% CI 1.53 to 8.30). Participants who did not live with other smokers had a 12.5% higher cessation rate than those who did live with other smokers (51.5% vs 39.0%; OR 1.73, 95% CI 1.03 to 2.89). Quit Card remained a statistically significant predictor of quitting after adjusting for cannabis use, income and living with other smokers (OR, 1.75, 1.05–2.93; p=0.03). Participants who did not have a history of anxiety or depression had quit rates ≥8% higher than their counterparts; these differences were not statistically significant.

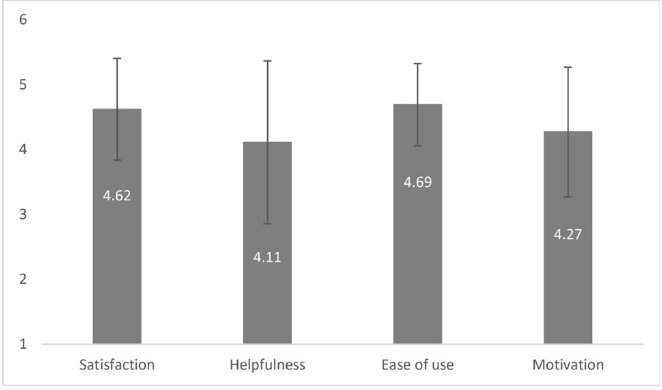

Figure 2 Programme satisfaction ratings for the Quit card intervention (QCI) group; mean scores out of 5. SD shown as error bars. Satisfaction: *'How satisfied are you with the support you've received from the programme?'* Helpfulness: *'How helpful was the Quit Card in helping you quit or reduce smoking?'* Ease of use: *'How easy was it to use the Quit Card to purchase your nicotine replacement therapy?'* Motivation: *'How much did the Quit Card motivate you to attempt to quit smoking?'*

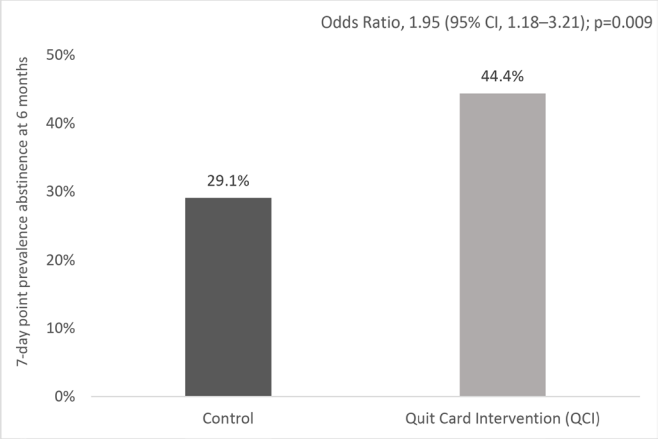

Figure 3 Seven-day point prevalence abstinence rates among survey responders, gathered at 6 months and adjusted for misreporting.

Staff surveys

A total of 19 staff members involved in coordinating or delivering the smoking cessation interventions at their site completed the postprogramme staff survey. A full summary of the results can be found in online supplemental appendix A (pp. 2–13). The majority (58%) ranked their satisfaction with the programme as 10/10, with 84% ranking their satisfaction between 8 and 10. The majority (94%) felt that having Quit Cards to offer made it easier to intervene with patients who smoke. Seventy-eight per cent felt the Quit Card increased the motivation of staff to intervene with patients who smoke, and 100% felt that Quit Cards increased the motivation of patients to quit smoking. Nearly 80% (15/19) of those surveyed responded to the open-text question regarding the benefits of the programme. The most common themes surrounding the benefits of the Quit Card programme were: (1) Removing the barrier of cost of cessation pharmacotherapy for patients, particularly for lower income patients; (2) The card as an effective cessation tool for staff that facilitated their smoking cessation conversation with patients, (3) The card increasing motivation of patients to quit, (4) The card being convenient, flexible and providing continuity of care, and (5) Feelings of gratitude from patients towards staff. All staff surveyed responded to the open-text question regarding the challenges of the programme. Six (31.6%) responded that there were no challenges. The most common themes surrounding challenges were: (1) Pharmacies not initially knowing how to process the cards, charging dispensing fees and not always having enough NRT stock; and, (2) Expiry dates presenting a challenge and pressure for patients to redeem their cards quickly.

DISCUSSION

Our pilot evaluation found NRT gift cards ('Quit Cards') to be a feasible, simple to deliver and promising intervention for hospitalised patients who smoke. Uptake, delivery and satisfaction of the QCI was high among participating hospitals, and redemption and satisfaction rates were high among patients. Point prevalence abstinence at 6-month follow-up was higher for those who received the QCI, compared with controls. Not only was the increase statistically significant, but also higher than the minimal clinically important difference of 5% commonly used in smoking cessation trials. Hospitalisation has been shown to increase one's motivation to quit smoking.[19] All staff surveyed as part of this evaluation perceived that the Quit Card enhanced the motivation of patients to quit smoking.

Not using cannabis was an independent predictor of smoking abstinence in this evaluation. Recreational use of cannabis was legalised in Canada in October 2018. In 2017, prior to legalisation and within the same timeframe of this evaluation, 7.4% of Canadians ≥age 40 years reported cannabis use in the past year.[20] This is much lower than the 18.4% prevalence observed among our sample of hospitalised patients who smoke tobacco. Participants who had not used cannabis in the past 6 months had higher odds of quitting smoking. A recent meta-analysis and narrative review of 20 studies (12 randomised controlled trials (RCTs) and 8 uncontrolled trials) found single and multisubstance interventions that addressed tobacco and/or cannabis showed weak evidence for an effect on either tobacco or cannabis cessation among co-users.[21] Though dual-substance interventions targeting tobacco and cannabis appear to be feasible and acceptable, cannabis use will be an important variable to collect and assess in future tobacco-cessation trials, and more high-quality evidence is needed to determine what interventions may be most effective at helping co-users. Higher income (>$C75 000 per year) was associated with quitting among participants in both groups, although abstinence rates were an absolute 13.9% higher among lower-income Quit Card participants, compared with lower-income control participants. As this intervention was designed, in part, to remove the barrier of cost of cessation therapies, participant income may be an important consideration in the design of future trials.

Our study adds to the growing evidence base examining the utility of financial incentives for smoking cessation in clinical and non-clinical populations. A systematic review and meta-analysis found that covering the cost of NRT increases the odds of: making a quit attempt (OR 1.11, 95% CI 1.04 to 1.17; four trials); using NRT (OR 1.79, 95%CI 1.54 to 2.09); and smoking abstinence (OR 1.77, 95%CI 1.37 to 2.28; six trials).[13] Partial coverage also leads to greater quitting, compared with no coverage (OR 1.27, 95%CI 1.02 to 1.59; five trials). A systematic review examining the use of incentives (eg, cash payments, gift cards) aimed at prompting or reinforcing smoking cessation in non-clinical populations found that smokers who received incentives were more likely than controls to be abstinent at ≥6 months (OR 1.42, 95%CI 1.19 to 1.69; 17 trials).[12] A recent RCT evaluating the effect of paying low-income hospitalised smokers for participating in smoking cessation counselling, using cessation pharmacotherapies, and for being smoke-free found a non-statistically significant, although minimally clinically important, difference of 10.7% in 6-month cessation rates favouring the incentive group, compared with controls (OR 2.56; 95% CI 0.84 to 7.83, p=0.10).[22] A 2×2 factorial RCT found a 4.5% difference in intention-to-treat smoking abstinence at 6 months among patients discharged from hospital who received NRT patches compared with those who did not receive NRT patches, although the difference was not statistically significant (22.8% vs 18.3%, respectively; p=0.051).[23] A three-site RCT found no difference in 6-month biochemically confirmed smoking abstinence between patients who received posthospitalisation automated telephone calls plus a 3-month supply of their cessation medication of choice (single form or combination of nicotine patch, nicotine gum, nicotine lozenge, bupropion or varenicline) and patients who received medication and counselling recommendations only (16.6% vs 15.5%, respectively; RR 1.07 (0.84–1.37)).[24]

As a patient incentive and promising medication-distribution mechanism, the Quit Card affords numerous advantages: the intervention is easy to deliver and takes minimal time to administer to participants; it requires little storage space; card redemption is tracked in real time, which facilitates distribution and financial management; the programme is only charged for the product purchased, potentially reducing waste and unused or expired product; and, participants

can purchase the product at their own pharmacy, affording another opportunity for intervention with a health provider.

This was a quasi-experimental evaluation of a pilot programme implemented under real-world conditions; however, several efforts were taken to minimise potential biases. An RCT is warranted to study the impact of the QCI using a more rigorous design. While we did randomly select participants from both the control and QCI groups, we did not reach our completed survey target. We estimated that we would reach 68% of participants randomly selected to complete the evaluation; however, this estimate was taken from clinical trial data and did not reflect the response rate observed in this real-world evaluation where patients were not necessarily expecting the call. Nonetheless, we intend to use this randomisation approach in future programme evaluations, where appropriate, and will apply oversampling to increase the likelihood of reaching the recruitment target. While both major urban and small-town hospital sites were used to conduct the evaluation, this multisite evaluation took place in only one region of Ontario, Canada. At the time of the evaluation, the Ontario provincial formulary provided coverage for varenicline and bupropion, but not NRT. This type of incentive programme might yield different results in jurisdictions that have more comprehensive smoking-cessation pharmacotherapy coverage. That said, given the simplicity of Quit Card distribution and management and the potential utility of the card as an incentive or motivational tool, future studies comparing such tools to other medication coverage and distribution mechanisms should be considered. The OMSC programme has previously implemented Quit Card programmes that covered all smoking-cessation pharmacotherapies (ie, NRT, varenicline and bupropion); they may be of further benefit in terms of individualising the intervention for patients. Nearly half of the participants in this evaluation were hospitalised with a cardiac condition. This may have contributed to the relatively high cessation rates observed in both groups. This evaluation only tested results among an inpatient population. The QCI may be useful in other fast-paced, acute care settings given the relative ease with which it can be delivered.

CONCLUSION

The NRT 'gift card' appears to be a feasible and effective smoking cessation tool that removes one of the main barriers to the use of evidence-based smoking-cessation pharmacotherapies, while potentially motivating both patients and health providers. Future studies should consider randomised controlled designs to further evaluate the effect of Quit Cards in a variety of populations and settings.

What this paper adds

- ⇒ The cost of cessation medications is a common barrier identified by individuals wanting to stop smoking. Covering the cost of quit smoking pharmacotherapies, including nicotine replacement therapy (NRT) products, and using incentives to assist people in quitting smoking have been found to increase quit attempts and cessation rates.
- ⇒ The feasibility and effectiveness of distributing gift cards, valid only for the purchase of NRT, have not been evaluated.
- ⇒ This study found that distributing NRT gift cards worth $C300 to hospitalised patients who smoke was highly feasible and led to increased smoking abstinence at 6 months.
- ⇒ The NRT gift card intervention led to high satisfaction and was perceived to enhance motivation among patients and the hospital staff who were delivering the intervention.

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Contributors KAM, KLW, SN, GP and NM conceived and designed the evaluation. KAM, KLW, GP and AG analysed the data. KAM wrote the majority of the first draft. KLW, GP, AG, ALP and RDR wrote sections of the first draft. All authors critically revised the manuscript and gave final approval of the article to be published. KAM is the guarantor and accepts full responsibility for the work and the conduct of the evaluation, had access to the data, and controlled the decision to publish.

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Competing interests KAM, RDR and ALP are named inventors of the Ottawa Model for Smoking Cessation, a registered trademark and intellectual property of the University of Ottawa Heart Institute. As such, the UOHI and the inventors have potential financial interest should the programme be licensed to a for-profit or private organisation.

Patient consent for publication Not applicable.

Ethics approval This project was reviewed by the Ottawa Health Science Network Research Ethics Board (OHSN-REB) and approved as a quality improvement program evaluation. After initial review of our pilot study proposal by the OHSN-REB, it was deemed that this project fell within the context of quality initiative, quality improvement, quality assurance, and/or program evaluation. Consequently, they determined that the study was not 'human subject research'; therefore, full review by the OHSN-REB was not required.

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