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Re-engagement of Low-Income Smokers in Quitline Services: Effects of Incentives and Method of Contact.

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**Title:** Re-engagement of Low-Income Smokers in Quitline Services: Effects of Incentives and Method of Contact

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## ABSTRACT

**Introduction:** Financial incentives have been shown to improve recruitment of low-income smokers into tobacco quitline services and to improve cessation outcomes. The present study evaluated their use to re-engage low-income smokers who had already used a quitline.

**Methods:** Randomly selected Medicaid smokers ( $N=5,200$ ) who had previously enrolled in a quitline were stratified by time since enrollment (3, 6, 9, or 12 months) and randomly assigned in a 2x4 factorial design to receive, by mail or telephone, an invitation to re-engage, with an offer of no financial incentive or \$10, \$20, or \$40. The primary outcome measure was re-engagement, defined as use of an additional evidence based quitline service within 90 days. Data were collected from May 2014 to October 2015 and analyzed in 2022.

**Results:** Of 5,200 participants invited to re-engage in quitline services, 9.3% did so within 90 days, compared to 6.3% of a randomly selected comparison group ( $n=22,614$ ,  $p<0.0001$ ). Letters resulted in greater re-engagement than calls (10.9% vs. 7.8%, respectively,  $p=0.0001$ ). Among letters, there was a dose-response relationship between incentive level and re-engagement rates ( $p=0.003$ ). Re-engagement decreased as time since enrollment increased, from 13.7% at 3 months to 5.7% at 12 months (all  $p$ 's  $<0.0001$ ).

**Conclusions:** Low-income smokers who previously used quitline services can be motivated to re-engage in treatment. Mailed letters and automated calls are effective re-engagement strategies. Financial incentives can increase the effectiveness of re-engagement letters. Inviting Medicaid

smokers to re-engage with quitline treatment may help to address socioeconomic health disparities and should be standard practice.

## **IMPLICATIONS**

Nicotine addiction is a chronic relapsing disorder, yet most cessation services are designed to help smokers through only one quit attempt. Smoking is increasingly concentrated in populations with physical and psychological co-morbidities, which can make quitting more difficult and impact whether smokers reach out for additional help following relapse. This study examined whether the timing, method, and content of an offer for further assistance influenced re-engagement rates for a vulnerable population of smokers—Medicaid beneficiaries. Relapsing smokers are responsive to re-engagement offers as early as three months, but there is a closing window of opportunity to reach them.

## INTRODUCTION

The Medicaid Incentives for Prevention of Chronic Diseases program, created by the Affordable Care Act, awarded grants to ten state Medicaid programs to study the effects of financial incentives and preventive services on the health behaviors of low-income insureds.<sup>1,2</sup> California's Medicaid program, known as Medi-Cal, used its grant to establish the Medi-Cal Incentives to Quit Smoking (MIQS) project to study members' engagement with the state's tobacco quitline, the California Smokers' Helpline.<sup>3</sup> MIQS studies found that providing nicotine patches and financial incentives as adjuncts to telephone counseling significantly improved cessation outcomes,<sup>4</sup> and that offering patches or an incentive quadrupled the likelihood of Medicaid members calling the quitline.<sup>5</sup> The present study investigated strategies for re-engaging Medicaid members who had already used the quitline.

The idea of re-engaging quitline participants stems from two main considerations. First, nicotine addiction is a chronic relapsing disorder,<sup>6-8</sup> which means that most smokers must make many quit attempts to reach the goal of quitting permanently.<sup>9,10</sup> Second, evidence based services such as telephone counseling and medications can help smokers reach that goal sooner.<sup>11,12</sup> Given these considerations, it seems logical to provide cessation services for more than one quit attempt per smoker.

Yet most cessation treatment programs, including quitlines, are designed to help smokers through only one quit attempt. A 2014 study found that fewer than 20% of North American quitlines proactively recontact relapsed participants for re-enrollment.<sup>13</sup> This is despite evidence that smokers who relapse after receiving treatment are open to making a new quit attempt.<sup>14-17</sup> Indeed, a study with the Arizona quitline found that 9.6% of participants spontaneously re-

enrolled in services, and that those with higher nicotine dependence, a chronic health or mental health condition, or lower levels of social support were more likely to re-enroll.<sup>18</sup> Likewise, a study with the Oklahoma quitline found that 10.3% of eligible participants re-enrolled within 6 months, and that those with higher dependence, lower income, or no health insurance were more likely to re-enroll.<sup>19</sup> The fact that so many quitline participants spontaneously re-engage suggests a need for assistance beyond a single quit attempt.

This need may be particularly acute in the Medicaid population. While smoking prevalence among the privately insured has decreased dramatically in recent decades, there has been only a negligible decrease among Medicaid members.<sup>20</sup> Smokers have become increasingly concentrated in Medicaid, especially those with co-morbid conditions that are caused or aggravated by smoking or that can make it more difficult to quit. For example, in California in 2016 over half of adult smokers with chronic disease conditions or severe psychological distress were covered by Medicaid.<sup>21</sup> Nationally, Medicaid members represent a third (33.4%) of all quitline participants.<sup>22</sup> It is incumbent on publicly supported state quitlines to find the best ways to engage and re-engage this vulnerable population.

Several studies of interventions to re-engage quitline participants have shown promising results. A study with the New York quitline found a 7-fold increase in re-enrollment following live calls by quitline staff, but no effect from mailers.<sup>23</sup> Subsequent New York studies found comparable increases in re-enrollment following interactive voice response (IVR) calls or IVR calls plus postcards, emails, and texts, respectively.<sup>24,25</sup> A study with the Minnesota quitline found that 14.7% of participants receiving proactive outreach by their preferred medium (telephone, e-mail, and/or text) re-engaged in service, compared to 3.4% of participants in usual

care.<sup>26</sup> These studies showed that proactive outreach can improve upon the spontaneous re-engagement rates of quitlines.

The current study examined the effectiveness of offering financial incentives to re-engage Medicaid members in quitline services using a randomized 2x4 design. We stratified participants by time since initial enrollment (3, 6, 9, and 12 months) and tested two methods of invitation (mailed letters and automated calls) and four levels of incentive (no incentive, \$10, \$20, and \$40). Our hypotheses were that financial incentives would increase re-engagement rates, that letters and calls would be equally effective means of inviting re-engagement, and that inviting participants sooner rather than later would result in higher rates of re-engagement.

## **METHODS**

### **Study Sample**

Participants ( $N=5,200$ ) were Medicaid members who had enrolled in the quitline between May 2014 and April 2015 and had previously participated in the MIQS project (though not in a randomized trial). We predicted that 5,200 participants would be sufficient to detect meaningful differences in re-engagement rates among the four incentive levels and among the four time cohorts, and to find differences above and beyond the spontaneous re-engagement rate. To be eligible for the study, participants had (at the point of enrollment) to be a smoker, to be at least 18 years old, to speak English, to provide a valid address and telephone number, and not to be involved in another study at the quitline. Since the purpose of the intervention was to re-engage previous participants who were no longer receiving service, those with upcoming counseling appointments or who were otherwise designated for proactive contact were excluded. No attempt

was made to exclude participants who had successfully quit smoking as of their most recent contact with the quitline, as it was assumed that many of these would have relapsed by the time they were recontacted.

Medicaid members who had enrolled in the quitline during the same time period and met the criteria listed above but were not randomly selected for the trial served as a usual care comparison group ( $n=22,614$ ). Usual care included the possibility of receiving proactive live calls to re-engage in treatment, and a small percentage of this group, 3.9%, did indeed receive such a call. The comparison group was also stratified into four cohorts by time since enrollment. Due to an error during stratification, 41 participants in the 12-month cohort were initially misidentified as belonging to another cohort, leading to unequal group sizes in the four cohorts. Analyses were weighted to adjust for these unequal group sizes.

### **Randomization and Intervention**

Over a rolling three-month period from May 2015 to July 2015, participants were randomly selected from among those who met the eligibility criteria and were stratified by when they previously enrolled in the quitline: 3, 6, 9, or 12 months earlier. They were then randomly assigned by computer to one of eight cells in a 2x4 factorial design, with two methods of invitation and four levels of incentive. All participants received an invitation to re-engage with the quitline and receive additional free services, including telephone counseling and nicotine patches mailed directly to their home. Invitations differed in the method of delivery: mailed letters or automated calls. They also differed in the level of financial incentive offered: no incentive, \$10, \$20, or \$40. The mailed letter condition consisted of a single letter sent to participants' last known address. Letters were addressed to the intended recipient but were not



otherwise personalized or tailored. They included a statement offering congratulations if no longer smoking and an invitation to call back if smoking; a reminder that trained counselors could help the recipient quit for good and that all quitline services were free; a statement that the recipient may be eligible for free patches mailed directly to their home; the specific incentive offer, if any; the phone number to call; and the reminder, “We’re here to help!” In the calls condition, up to five automated call attempts were made at participants’ last known primary number until a call was answered or went to voice mail, at which point a pre-recorded message was played. The content of calls was similar to that of letters, but did not include the intended recipient’s name. Participants could press a button during the call to be connected to a live counselor. The study protocol was approved by the Human Research Protections Program of the University of California, San Diego (#141537) and the state’s Committee for the Protection of Human Subjects (#12-06-0436).

Counseling followed a structured protocol previously proven effective.<sup>27</sup> Nicotine patches were over-the-counter and sent directly to participants via express mail. Participants could receive four weeks of patches at a time with up to seven refills. Financial incentives, if any, consisted of a gift card worth \$10, \$20, or \$40 redeemable at widely available retail stores. Gift cards were mailed when participants completed a counseling call. Participants could continue receiving counseling after that, but no further financial incentives were provided.

## **Measures**

The primary outcome measure was the rate of re-engagement in evidence based treatment, defined as the number of participants who called back and received at least one additional counseling session, patch shipment, or both, within 90 days of being invited, divided by the

number of participants so invited. Standard measures of gender, age, education, race/ethnicity, and cigarettes smoked per day were recorded at the point of initial enrollment.

### **Data Management and Statistical Analysis**

Baseline data were collected from May 2014 to April 2015. Intervention data were collected from May 2015, when the first re-engagement invitations were delivered, to October 2015, three months after the last invitations were delivered, to ensure that each recipient had 90 days to respond.

Baseline characteristics were compared using a chi-square test. The Proc Means procedure with 95% confidence intervals was used to compare mean ages among time cohorts. The Cochran-Armitage trend test was used to test for dose-response relationships between incentive amount and re-engagement rates. Analyses were conducted in 2022 using SAS, version 9.4.

## **RESULTS**

A total of 5,200 randomly selected participants who had enrolled in the MIQS project 3, 6, 9, or 12 months prior to the study was stratified by time since enrollment and randomly assigned to one of 8 conditions (2 invitation methods x 4 incentive levels).

Table 1 shows the demographic breakdown of participants overall and by time cohort. Over half (56.4%) were female. The mean age was 48.1 years. About three quarters (76.7%) had a high school education or higher and about three fifths (58.8%) were non-Hispanic white. The mean number of cigarettes smoked per day was 17.0. There were no significant differences among the four cohorts at baseline, except that those who had enrolled 9 or 12 months earlier

were slightly older at the time of randomization than those who had enrolled 3 months earlier ( $p<0.05$ ). Nor were there significant differences in baseline characteristics by randomized condition (data not shown in table). Finally, there were no significant differences between the comparison group and study participants, except that the latter were slightly more likely to be white ( $p=0.01$ ) and less likely to be Hispanic ( $p=0.006$ ; data not shown).

Overall, 9.3% of trial participants re-engaged with the quitline within 90 days of being invited to do so, significantly higher than the 6.3% of participants in the comparison group who re-engaged in the same time frame ( $p<0.0001$ ). The interaction between the two randomization factors (invitation method and incentive level) was not significant ( $p=0.06$ ). Therefore, we examined main effects, displayed in Table 2. Invitation method had a significant effect overall, with letters leading to significantly more re-engagement than calls (10.9% vs 7.8%, respectively;  $p=0.0001$ ); the odds ratio for letters vs. calls was 1.45 (95% CI 1.20–1.76). In contrast, incentive level did not have a significant effect overall ( $p=0.07$ ); odds ratios for the \$10, \$20, and \$40 incentives relative to no incentive were 1.01 (0.77-1.33), 1.17 (0.90-1.54), and 1.23 (0.90-1.63), respectively. However, within the letter condition there was a dose-response relationship between incentive level and re-engagement ( $p=0.003$ ). Re-engagement rates ranged from a low of 8.8% for the letter with no incentive offer to a high of 13.8% for the letter offering \$40.

In the subset of participants ( $n=2,277$ , or 43.8%) who completed two or more counseling calls, which is how long it would normally take for participants to start reporting that they had quit, smoking at most recent contact predicted re-engagement ( $p<0.0001$ ) and there is a significant interaction between smoking status and invitation method ( $p<0.01$ ), suggesting smoking status moderates the effect. However, a substantial proportion (15.3%) of participants

who were not smoking at last contact did re-engage, suggesting that they had relapsed and now needed additional help to quit.

Most of those who re-engaged, 76.5%, did so within 30 days. Another 14.0% called within 60 days and 9.5% called within 90 days. On average, it took 19.5 days and 21.4 days for participants in the calls and letter conditions, respectively, to re-engage. Given the additional time it took for letters to reach participants, the difference between the two conditions does not seem meaningful.

Table 3 shows the effects of time since enrollment, the stratification variable. There was a strong negative correlation between time since enrollment and re-engagement rates. I.e., the more time had passed before participants were invited to re-engage, the lower their re-engagement rates were ( $p < 0.0001$ ). Overall, rates ranged from a low of 5.7% in the 12-month cohort to a high of 13.7% in the 3-month cohort. Following the same pattern, rates for letters and calls ranged from 6.8% to 15.9% and from 4.6% to 11.5%, respectively. In the comparison group (not shown in table), re-engagement rates were lower than those of trial participants, ranging from 2.9% in the 12-month cohort to 10.9% in the 3-month cohort, but also followed the same pattern of declining rates over time ( $p < 0.0001$ ). Re-engagement rates for both letters and calls exceeded those of the comparison group for all time cohorts.

Promotional costs for the re-engagement strategies in this study are shown in Table 4. The overall promotional cost per re-engaged participant was \$32.74, or \$40.86 for those who received letters and \$21.36 for those who received automated calls. Promotional costs ranged from \$22.70 to \$57.49 for letters and from \$2.42 to \$45.95 for calls. By time cohort, promotional costs ranged from \$28.96 at 3 months to \$40.42 at 12 months (not shown in table). Excluding the

6.3% of callers who may have re-engaged without an invitation, the overall cost per re-engaged participant was \$100.88, or \$96.91 for letters and \$113.32 for calls (not shown in table).

## **DISCUSSION**

This study found that a simple invitation to re-engage in tobacco cessation treatment motivated 9.3% of Medicaid smokers who had previously enrolled in a quitline to receive additional evidence based services including telephone counseling and nicotine patches. This compares to 6.3% of a randomly derived usual care group who re-engaged with the quitline during the same time frame (some with live calls from the quitline).

Of the two methods tested for inviting participants to re-engage in service, mailed letters were more effective than automated calls. Offering a financial incentive enhanced the effectiveness of letters, but not that of calls, suggesting that participants were more likely to read the letters than to listen to the calls. In the letters, the incentive offer was printed in bold typeface and may have immediately drawn readers' attention, whereas in the calls the incentive offer was not mentioned until 20 seconds into an approximately 40-second recording. It is also possible that participants viewed letters as more credible or less intrusive than so-called "robo-calls." Unsurprisingly, those who were smoking at their most recent contact with the quitline were more likely to re-engage than those who had quit at last contact. However, many who had quit during the first round of service did re-engage, suggesting that they had relapsed and now needed additional help to quit, which is consistent with the idea that most smokers must make multiple quit attempts before they permanently.<sup>9,10</sup>

Both methods of inviting re-engagement were cost-effective, both overall and at each time point in the 12-month re-engagement period. Once the initial programming was completed, the marginal cost per re-engagement was only about \$41 for letters and about half that for calls. Under the most conservative analysis including all promotional costs but excluding the 6.3% of callers who may have re-engaged without an invitation, the cost per re-engagement was still under \$100 for letters and slightly more than that for calls. These costs are competitive with traditional paid media costs. For example, the first national TIPS media campaign generated quitline calls at an estimated cost of \$260 per caller.<sup>28</sup>

This study did not test email or text messages because not all participants had an email address or a telephone capable of receiving texts. However, given their low marginal costs, it is likely that email and text messages would also be cost-effective ways to re-engage quitline participants, especially those who said they prefer to be reached in these ways. In the Minnesota study, quitline participants were recontacted by telephone, email, and/or text messages, according to their recorded preferences, at an estimated at-scale cost of about \$101 per re-engagement.<sup>26</sup> In the Oklahoma study, quitline participants were given a choice of services at initial enrollment ; those who chose services that were less intensive than the quitline's multi-session counseling program, such as a 2-week NRT starter kit or a text-based program, were more than 5 times more likely to receive another service later.<sup>19</sup> Employing multiple communication channels, reaching out in participants' preferred ways, and giving participants a choice of services at initial enrollment and in invitations to re-enroll could all potentially increase the re-engagement rates observed in this study.

The study showed that the timing of the interventions mattered greatly. Re-engagement rates were highest at the shortest time interval, 3 months post-enrollment. After that, there were

diminishing returns the longer the quitline waited to re-engage participants, up to 12 months post-enrollment. Whether this was due to participants becoming less likely to smoke, less interested in using the quitline, or simply harder to reach over time is impossible to determine from this study. The Minnesota study also stratified participants by time, using intervals of 1, 2, and 3 months post-enrollment, and found no significant differences over that relatively brief period. In the current study there was a clear decay in re-engagement rates over time.

In the broader cessation literature, the best time for relapsed smokers to make a new quit attempt is unclear. A number of studies have examined the relationship between the timing of quit attempts and their success and generally found that recency and number of attempts are associated with relapse.<sup>29-31</sup> A more recent prospective study found that relapsed smokers who wait 12–18 months to begin their next quit attempt are 2.5 times more likely to quit successfully than those who quit again within 3 months.<sup>32</sup> Cessation fatigue has been proposed as an explanation for why recent relapsers are less likely to succeed in their next attempt.<sup>33</sup> However, studies have also found that while longer latency is associated with greater quitting success, many who relapse and try again within a year do achieve success.<sup>9,34</sup> It has been suggested that smokers have more to lose from delaying quitting than from quitting too soon,<sup>32,35</sup> and that treatment providers can help relapsed smokers address deficits in their preparedness so they can quit again as soon as possible.<sup>32,33</sup> The current study does not indicate when is the best time to help relapsed smokers quit again, but does suggest that in the year after initial enrollment there is a slowly closing window of opportunity to re-engage them in treatment.

The rates of re-engagement observed in this study were more modest than the 6- to 8-fold increases found by Carlini and colleagues using similar strategies.<sup>23-25</sup> However, rates were still significantly higher for trial participants than for similarly situated participants outside the trial;

and, while Carlini et al. (2008) found that letters alone were ineffective, the current study found that letters were not only effective but were more effective than calls. Differences in how the interventions were designed and delivered may account for differences in their effects. Efforts to improve the user experience of these interventions could conceivably boost their effectiveness.

This study has limitations. First, because the current smoking status of participants was not known when the invitations to re-engage were delivered, some who were no longer smoking may have been included among those receiving invitations. Therefore the reported re-engagement rates represent a conservative estimate of effects on the target population of relapsed smokers. Second, differences among the four time cohorts may have affected their likelihood of responding to the interventions. However, there were few demographic differences among them, suggesting that the cohorts were roughly equivalent. Third, the comparison group was drawn from a real-world sample of participants, some of whom were also invited to re-engage with the quitline, decreasing the study's ability to detect differences in re-engagement rates between trial participants and the comparison group. Finally, the study only measured re-engagement in services, not whether participants were more successful in quitting. Further research is needed to assess the long-term effects on cessation outcomes of these re-engagement strategies.

## **Conclusions**

This study provides evidence that low-income smokers who previously enrolled in quitline services can be motivated to engage in treatment again, especially within a few months of the original course of treatment. The high rates of re-engagement in this study suggest that a substantial proportion of former quitline enrollees are willing to participate a second time if invited to do so. The study shows that both mailed letters and automated calls are effective re-



engagement strategies, with letters significantly more effective than calls. It also shows that financial incentives can increase the effectiveness of re-engagement letters. Inviting Medicaid smokers to re-engage in treatment may help to address socioeconomic health disparities and should be routine quitline practice.

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Study sponsors had no role in study design; collection, analysis, or interpretation of data; writing the report; or the decision to submit the report for publication. The study was approved by the Human Research Protections Program of the University of California, San Diego (#141537) and the state's Committee for the Protection of Human Subjects (#12-06-0436).

## **DATA AVAILABILITY STATEMENT**

Due to privacy constraints, identifiable data will not be made available. Please contact the authors with your data request.

## **DECLARATION OF INTERESTS**

All authors declare no conflicts of interest for this paper.

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SHZ was Principal Investigator and designed the study. SEC supervised implementation. CAK was the study's project manager. SW performed data analysis. CMA wrote the final draft.

## **DATA AVAILABILITY STATEMENT**

Due to privacy constraints, identifiable data will not be made available. Please contact the authors with your data request.

## REFERENCES

1. Hoerger TJ, Perry R, Farrell K, Teixeira-Poit S. Can incentives improve Medicaid patient engagement and prevent chronic diseases? *N C Med J*. 2015;76(3):180–184.  
doi:10.18043/ncm.76.3.180
2. Hoerger TJ, Boland E, Acquah J, et al. *Medicaid Incentives for Prevention of Chronic Disease Final Evaluation Report*. Published April 2017. Accessed April 12, 2022.  
<https://downloads.cms.gov/files/cmimi/mipcd-finalevalrpt.pdf>
3. Schroeder SA. California promotes smoking cessation for Medicaid enrollees: lessons for the nation? *Am J Prev Med*. 2018;55(6 Suppl 2):S123–S125. doi:10.1016/j.amepre.2018.08.009
4. Anderson CM, Cummins SE, Kohatsu ND, Gamst AC, Zhu SH. Incentives and patches for Medicaid smokers: an RCT. *Am J Prev Med*. 2018;55(6 Suppl 2):S138–S147.  
doi:10.1016/j.amepre.2018.07.015
5. Anderson CM, Kirby CA, Tong EK, Kohatsu ND, Zhu SH. Effects of offering nicotine patches, incentives, or both on quitline demand. *Am J Prev Med*. 2018;55(6 Suppl 2):S170–S177. doi:10.1016/j.amepre.2018.07.007
6. Fiore MC, Jaén CR, Baker TB, et al. *Treating Tobacco Use and Dependence: 2008 Update*. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services; 2008.
7. Steinberg MB, Schmelzer AC, Richardson DL, Foulds J. The case for treating tobacco dependence as a chronic disease. *Ann Intern Med*. 2008;148(7):554–556. doi:10.7326/0003-4819-148-7-200804010-00012

8. Rigotti NA. Strategies to help a smoker who is struggling to quit. *JAMA*. 2012;308(15):1573–1580. doi:10.1001/jama.2012.13043
9. Borland R, Partos TR, Yong HH, Cummings KM, Hyland A. How much unsuccessful quitting activity is going on among adult smokers? Data from the International Tobacco Control Four Country cohort survey. *Addiction*. 2012;107(3):673–682. doi:10.1111/j.1360-0443.2011.03685.x
10. Chaiton M, Diemert L, Cohen JE, et al. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. *BMJ Open*. 2016;6(6). doi:10.1136/bmjopen-2016-011045
11. Matkin W, Ordóñez-Mena JM, Hartmann-Boyce J. Telephone counselling for smoking cessation. *Cochrane Database Syst Rev*. 2019;5:CD002850. doi:10.1002/14651858.CD002850.pub4
12. Cahill K, Stevens S, Perera R, Lancaster T. Pharmacological interventions for smoking cessation: an overview and network meta-analysis. *Cochrane Database Syst Rev*. 2013;5:CD009329. doi:10.1002/14651858.CD009329.pub2
13. Saul JE, Bonito JA, Provan K, Ruppel E, Leischow SJ. Implementation of tobacco cessation quitline practices in the United States and Canada. *Am J Public Health*. 2014;104(10):e98–e105. doi:10.2105/AJPH.2014.302074
14. Joseph AM, Rice K, An LC, Mohiuddin A, Lando H. Recent quitters' interest in recycling and harm reduction. *Nicotine Tob Res*. 2004;6(6):1075–1077. doi:10.1080/14622200412331324893

15. Fu SS, Partin MR, Snyder A, et al. Promoting repeat tobacco dependence treatment: are relapsed smokers interested? *Am J Manag Care*. 2006;12(4):235–243.  
<https://www.ajmc.com/view/apr06-2285p235-243>
16. Partin MR, An LC, Nelson DB, et al. Randomized trial of an intervention to facilitate recycling for relapsed smokers. *Am J Prev Med*. 2006;31(4):293–299.  
doi:10.1016/j.amepre.2006.06.021
17. Ellerbeck EF, Mahnken JD, Cupertino AP, et al. Effect of varying levels of disease management on smoking cessation: a randomized trial. *Ann Intern Med*. 2009;150(7):437–446. doi:10.7326/0003-4819-150-7-200904070-00003
18. Nair US, Brady BR, O’Connor PA, Bell ML. Factors predicting client re-enrollment in tobacco cessation services in a state quitline. *Prev Chronic Dis*. 2018;15:E126. doi:10.5888/pcd15.180144
19. Beebe LA, Boeckman LM, Klein PG, Saul JE, Gillaspay SR. They came, but will they come back? an observational study of re-enrollment predictors for the Oklahoma Tobacco Helpline. *Am J Health Promot*. 2020;34(3):261–268. doi:10.1177/0890117119890789
20. Zhu SH, Anderson CM, Zhuang YL, Gamst AC, Kohatsu ND. Smoking prevalence in Medicaid has been declining at a negligible rate. *PLoS ONE*. 2017;12(5):e0178279.  
doi:10.1371/journal.pone.0178279
21. Zhu SH, Anderson CM, Wong S, Kohatsu ND. The growing proportion of smokers in Medicaid and implications for public policy. *Am J Prev Med*. 2018; 55(6 Suppl 2):S130–S137.
22. North American Quitline Consortium. Results from the 2018 NAQC Annual Survey of Quitlines. Published 2019. Accessed June 8, 2022.

[https://cdn.ymaws.com/www.naquitline.org/resource/resmgr/2018\\_survey/](https://cdn.ymaws.com/www.naquitline.org/resource/resmgr/2018_survey/)

[NAQC FY2018 Annual Survey Da.pdf](#)

23. Carlini BH, Zbikowski SM, Javitz HS, Deprey TM, Cummins SE, Zhu SH. Telephone-based tobacco-cessation treatment: re-enrollment among diverse groups. *Am J Prev Med*. 2008;35(1):73–76. doi:10.1016/j.amepre.2008.03.025
24. Carlini BH, McDaniel AM, Weaver MT, et al. Reaching out, inviting back: using interactive voice response (IVR) technology to recycle relapsed smokers back to quitline treatment--a randomized controlled trial. *BMC Public Health*. 2012;12:507. doi:10.1186/1471-2458-12-507
25. Carlini B, Miles L, Doyle S, Celestino P, Koutsky J. Using diverse communication strategies to re-engage relapsed tobacco quitline users in treatment, New York State, 2014. *Prev Chronic Dis*. 2015;12:E179. doi:10.5888/pcd12.150191
26. Vickerman KA, Keller PA, Deprey M, Lachter RB, Jenssen J, Dreher M. Never quit trying: reengaging tobacco users in statewide cessation services. *J Public Health Manag Pract*. 2018;24(3):e25–e33. doi:10.1097/PHH.0000000000000635
27. Zhu SH, Anderson CM, Tedeschi GJ, et al. Evidence of real-world effectiveness of a telephone quitline for smokers. *N Engl J Med*. 2002;347(14):1087–1093. doi:10.1056/NEJMSa020660
28. Centers for Disease Control and Prevention (CDC). Increases in quitline calls and smoking cessation website visitors during a national tobacco education campaign--March 19–June 10, 2012. *MMWR Morb Mortal Wkly Rep*. 2012;61(34):667–670. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6134a2.htm>

29. Partos TR, Borland R, Yong HH, Hyland A, Cummings KM. The quitting rollercoaster: how recent quitting history affects future cessation outcomes (data from the International Tobacco Control 4-country cohort study). *Nicotine Tob Res.* 2013;15(9):1578–1587.  
doi:10.1093/ntr/ntt025
30. Hyland A, Borland R, Li Q, et al. Individual-level predictors of cessation behaviours among participants in the International Tobacco Control (ITC) Four Country Survey. *Tob Control.* 2006;15 Suppl 3:iii83–iii94. doi:10.1136/tc.2005.013516
31. Zhou X, Nonnemaker J, Sherrill B, Gilsean AW, Coste F, West R. Attempts to quit smoking and relapse: factors associated with success or failure from the ATTEMPT cohort study. *Addict Behav.* 2009;34(4):365–373. doi:10.1016/j.addbeh.2008.11.013
32. Jackson SE, West R, Brown J. If at first you don't succeed, when should you try again? A prospective study of failed quit attempts and subsequent smoking cessation. *Addict Behav.* 2020;106:106366. doi:10.1016/j.addbeh.2020.106366
33. Mathew AR, Heckman BW, Meier E, Carpenter MJ. Development and initial validation of a cessation fatigue scale. *Drug Alcohol Depend.* 2017;176:102–108.  
doi:10.1016/j.drugalcdep.2017.01.047
34. Bold KW, Rasheed AS, McCarthy DE, Jackson TC, Fiore MC, Baker TB. Rates and predictors of renewed quitting after relapse during a one-year follow-up among primary care patients. *Ann Behav Med.* 2015;49(1):128–140. doi:10.1007/s12160-014-9627-6
35. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ.* 2004;328(7455):1519.  
doi:10.1136/bmj.38142.554479.AE



**Table 1. Baseline Characteristics of Trial Participants by Time Since Enrollment**

Characteristic	Time since enrollment				Total (N=5,200) % (95% CI)
	3 months (n=1,285) % (95% CI)	6 months (n=1,285) % (95% CI)	9 months (n=1,289) % (95% CI)	12 months (n=1,341) % (95% CI)	
Gender					
Female	57.0 (54.3–59.8)	56.7 (53.9–59.4)	56.9 (54.2–59.6)	55.1 (52.5–57.8)	56.4 (55.1–57.8)
Male	43.0 (40.2–45.7)	43.3 (40.6–46.1)	43.1 (40.4–45.8)	44.9 (42.2–47.5)	43.6 (42.2–44.9)
Age (yrs)					
18–24	4.8 (3.6–5.9)	3.3 (2.3–4.2)	2.9 (2.0–3.8)	3.8 (2.8–4.8)	3.7 (3.2–4.2)
25–44	34.0 (31.4–36.6)	33.2 (30.6–35.8)	29.2 (26.7–31.7)	27.2 (24.8–29.6)	30.9 (29.6–32.1)
45–64	55.8 (53.1–58.5)	56.9 (54.1–59.6)	62.2 (59.5–64.8)	60.1 (57.5–62.7)	58.8 (57.4–60.1)
65+	5.5 (4.2–6.7)	6.7 (5.3–8.1)	5.8 (4.5–7.0)	8.9 (7.4–10.4)	6.7 (6.0–7.4)
Mean age	46.8 (46.1–47.5)	47.8 (47.1–48.5)	48.7 (48.0–49.3)	49.1 (48.4–49.7)	48.1 (47.8–48.4)
Education (yrs)					
<12	23.8 (21.4–26.1)	22.4 (20.1–24.7)	23.9 (21.5–26.3)	23.5 (21.1–25.8)	23.4 (22.2–24.5)
12	30.8 (28.3–33.4)	32.4 (29.8–35.0)	31.1 (28.5–33.6)	30.8 (28.3–33.3)	31.3 (30.0–32.5)
>12	45.4 (42.6–48.2)	45.2 (42.5–48.0)	45.0 (42.3–47.8)	45.8 (43.0–48.5)	45.4 (44.0–46.7)
Race/ethnicity					
White	57.0 (54.2–59.7)	58.5 (55.8–61.3)	59.0 (56.3–61.7)	60.7 (58.1–63.3)	58.8 (57.5–60.2)
Black	17.3 (15.2–19.4)	18.4 (16.3–20.6)	16.6 (14.5–18.6)	17.5 (15.4–19.5)	17.5 (16.4–18.5)
Hispanic	15.7 (13.6–17.7)	14.2 (12.3–16.1)	14.9 (12.9–16.9)	12.1 (10.4–13.9)	14.2 (13.2–15.2)
Asian/Pacific Islander	1.9 (1.2–2.7)	2.7 (1.8–3.6)	2.9 (1.9–3.8)	2.6 (1.7–3.4)	2.5 (2.1–2.9)
American Indian	2.1 (1.3–2.9)	1.8 (1.1–2.6)	2.0 (1.2–2.8)	1.7 (1.0–2.4)	1.9 (1.5–2.3)
Multi-racial	4.9 (3.7–6.0)	3.8 (2.8–4.9)	3.6 (2.5–4.6)	4.2 (3.2–5.3)	4.1 (3.6–4.7)
Other	1.2 (0.6–1.8)	0.5 (0.1–0.9)	1.1 (0.5–1.7)	1.1 (0.6–1.7)	1.0 (0.7–1.3)

Cigarettes per day	17.5 (16.9–18.1)	16.5 (15.9–17.0)	17.1 (16.6–17.7)	16.8 (16.2–17.3)	17.0 (16.7–17.2)
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**Table 2. Re-engagement Rates by Randomized Condition**

Condition	Incentive level				Total (N=5,200) % (95% CI)
	\$0 (n=1,300) % (95% CI)	\$10 (n=1,300) % (95% CI)	\$20 (n=1,300) % (95% CI)	\$40 (n=1,300) % (95% CI)	
	Mailed letter	8.8 (6.6–11.0)	9.7 (7.4–12.0)	11.2 (8.8–13.7)	
Automated calls	8.3 (6.2–10.4)	7.5 (5.5–9.6)	8.5 (6.3–10.6)	6.8 (4.9–8.7)	7.8 (6.7–8.8)
Total	8.5 (7.0–10.1)	8.6 (7.1–10.1)	9.9 (8.2–11.5)	10.3 (8.7–12.0)	9.3 (8.5–10.1)

**Table 3. Re-engagement Rates by Time Since Enrollment**

<b>Condition</b>	<b>Time since enrollment</b>				<b>Total (N=5,200)</b>
	<b>3 months (n=1,285)</b>	<b>6 months (n=1,285)</b>	<b>9 months (n=1,289)</b>	<b>12 months (n=1,341)</b>	
	<b>% (95% CI)</b>	<b>% (95% CI)</b>	<b>% (95% CI)</b>	<b>% (95% CI)</b>	<b>% (95% CI)</b>
Mailed letter	15.9 (13.1–18.7)	11.7 (9.2–14.1)	9.4 (7.2–11.7)	6.8 (4.9–8.7)	10.9 (9.7–12.1)
Automated calls	11.5 (9.0–14.0)	9.4 (7.1–11.6)	5.8 (4.0–7.6)	4.6 (3.0–6.2)	7.8 (6.7–8.8)
Study total	13.7 (11.8–15.6)	10.5 (8.8–12.2)	7.6 (6.2–9.1)	5.7 (4.4–6.9)	9.3 (8.5–10.1)

**Table 4. Promotional Cost per Re-engagement by Randomized Condition**

Condition	Incentive level				Total (N=5,200) \$ (95% CI)
	\$0 (n=1,300) \$ (95% CI)	\$10 (n=1,300) \$ (95% CI)	\$20 (n=1,300) \$ (95% CI)	\$40 (n=1,300) \$ (95% CI)	
Mailed letter	22.70 (18.2–30.3)	33.60 (29.7–39.9)	40.81 (37.7–45.1)	57.49 (55.2–60.9)	40.86 (39.0–43.1)
Automated calls	2.42 (1.9–3.2)	15.66 (15.1–16.6)	25.36 (24.9–26.6)	45.95 (45.3–47.1)	21.36 (21.1–21.8)
Total	12.83 (10.9–15.7)	25.75 (23.9–28.5)	34.17 (32.6–36.4)	53.70 (52.2–55.7)	32.74 (31.8–33.9)

Notes: promotional costs of re-engagement include \$2.00 per mailed letter for printing and sending letters; \$0.20 per recipient of automated calls for placing calls; \$3.00 per gift card for shipping and handling cards; and the face values of cards themselves (\$10, \$20, or \$40).