



Literature on Incentives for Tobacco Cessation

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Notley C, Gentry S, Livingstone-Banks J, Bauld L, Perera R, Hartmann-Boyce J. **Incentives for smoking cessation**. *Cochrane Database Syst Rev*. 2019;7(7):CD004307. Published 2019 Jul 17. doi:10.1002/14651858.CD004307.pub6

Background: Financial incentives, monetary or vouchers, are widely used in an attempt to precipitate, reinforce and sustain behaviour change, including smoking cessation. They have been used in workplaces, in clinics and hospitals, and within community programmes.

Objectives: To determine the long-term effect of incentives and contingency management programmes for smoking cessation.

Search methods: For this update, we searched the Cochrane Tobacco Addiction Group Specialised Register, clinicaltrials.gov, and the International Clinical Trials Registry Platform (ICTRP). The most recent searches were conducted in July 2018.

Selection criteria: We considered only randomised controlled trials, allocating individuals, workplaces, groups within workplaces, or communities to smoking cessation incentive schemes or control conditions. We included studies in a mixed-population setting (e.g. community, work-, clinic- or institution-based), and also studies in pregnant smokers.

Data collection and analysis: We used standard Cochrane methods. The primary outcome measure in the mixed-population studies was abstinence from smoking at longest follow-up (at least six months from the start of the intervention). In the trials of pregnant women we used abstinence measured at the longest follow-up, and at least to the end of the pregnancy. Where available, we pooled outcome data using a Mantel-Haenzel random-effects model, with results reported as risk ratios (RRs) and 95% confidence intervals (CIs), using adjusted estimates for cluster-randomised trials. We analysed studies carried out in mixed populations separately from those carried out in pregnant populations.

Main results: Thirty-three mixed-population studies met our inclusion criteria, covering more than 21,600 participants; 16 of these are new to this version of the review. Studies were set in varying locations, including community settings, clinics or health centres, workplaces, and outpatient drug clinics. We judged eight studies to be at low risk of bias, and 10 to be at high risk of bias, with the rest at unclear risk. Twenty-four of the trials were run in the USA, two in Thailand and one in the Philippines. The rest were European. Incentives offered included cash payments or vouchers for goods and groceries, offered directly or collected and redeemable online. The pooled RR for quitting with incentives at longest follow-up (six months or more) compared with controls was 1.49 (95% CI 1.28 to 1.73; 31 RCTs, adjusted N = 20,097; $I^2 = 33\%$). Results were not sensitive to the exclusion of six studies where an incentive for cessation was offered at long-term follow up (result excluding those studies: RR

1.40, 95% CI 1.16 to 1.69; 25 RCTs; adjusted N = 17,058; $I^2 = 36\%$), suggesting the impact of incentives continues for at least some time after incentives cease. Although not always clearly reported, the total financial amount of incentives varied considerably between trials, from zero (self-deposits), to a range of between USD 45 and USD 1185. There was no clear direction of effect between trials offering low or high total value of incentives, nor those encouraging redeemable self-deposits. We included 10 studies of 2571 pregnant women. We judged two studies to be at low risk of bias, one at high risk of bias, and seven at unclear risk. When pooled, the nine trials with usable data (eight conducted in the USA and one in the UK), delivered an RR at longest follow-up (up to 24 weeks post-partum) of 2.38 (95% CI 1.54 to 3.69; N = 2273; $I^2 = 41\%$), in favour of incentives.

Authors' conclusions: Overall there is high-certainty evidence that incentives improve smoking cessation rates at long-term follow-up in mixed population studies. The effectiveness of incentives appears to be sustained even when the last follow-up occurs after the withdrawal of incentives. There is also moderate-certainty evidence, limited by some concerns about risks of bias, that incentive schemes conducted among pregnant smokers improve smoking cessation rates, both at the end of pregnancy and post-partum. Current and future research might explore more precisely differences between trials offering low or high cash incentives and self-incentives (deposits), within a variety of smoking populations.

Cummins SE, Kirby CA, Wong S, Anderson CM, Zhu SH. **Re-engagement of low-income smokers in quitline services: Effects of incentives and method of contact** [published online ahead of print, 2022 Oct 22]. *Nicotine Tob Res.* 2022;ntac246. doi:10.1093/ntr/ntac246

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.

Polinski KJ, Wolfe R, Peterson A, et al. Impact of an incentive-based prenatal smoking cessation program for low-income women in Colorado. *Public Health Nurs.* 2020;37(1):39-49. doi:10.1111/phn.12682

Objective: To assess birth outcomes and cost-savings of an incentive-based prenatal smoking cessation program targeting low-income women in Colorado.

Design: Prospective observational cohort with nonequivalent population control groups.

Sample: Program participants (n = 2,231) linked to the birth certificate to ascertain birth outcomes compared to two reference populations from Pregnancy Risk Assessment Monitoring System (PRAMS) and Colorado live births based on the birth certificate.

Measurements: Tobacco cessation metrics in the third trimester of pregnancy, neonatal low birth weight (<2,500 g), preterm birth (birth at <37 weeks gestation), neonatal intensive care unit (NICU) admission and maternal gestational hypertension. Cost-savings and return on investment (ROI) were projected using average Medicaid reimbursement.

Results: Infants of mothers enrolled in the program had a lower risk of low birthweight (RR = 0.86; 95% CI = 0.75, 0.97), preterm birth (PTB) (RR = 0.76; 95% CI = 0.65, 0.88) and neonatal intensive care unit (NICU) admission (RR = 0.76; 95% CI = 0.66, 0.88) compared to the birth certificate population, corresponding to a ROI of \$7.73 and an individual cost savings of \$6,040. Compared to PRAMS, infants of enrolled mothers had a lower risk of PTB (RR = 0.72; 95% CI = 0.53, 0.99) and NICU admission (RR = 0.45; 95% CI = 0.32, 0.62), corresponding to an ROI of \$2.79 and an individual cost savings of \$2,182.

Conclusions: We found a reduction of adverse birth outcomes, and cost savings.

Note: The incentives in this study were diaper vouchers.

Vijayaraghavan M, Dove MS, Stewart SL, et al. **Racial/ethnic differences in the response to incentives for quitline engagement.** *Am J Prev Med.* 2018;55(6 Suppl 2):S186-S195.
doi:10.1016/j.amepre.2018.07.018

Introduction: Certain racial and ethnic minorities have lower utilization of tobacco cessation services, such as Helpline counseling and cessation medications. The goal of the California Medicaid (Medi-Cal) Incentives to Quit Smoking Program was to facilitate successful cessation by promoting modest financial and cessation medication-related incentives to increase engagement with the California Smokers' Helpline counseling services. Differences in the response to incentives and outreach on engagement with Helpline services among racial/ethnic groups within the Medi-Cal population were examined.

Study design: Analysis of Helpline caller data.

Setting/participants: African American (n=18,656); English-speaking Latinx (n=12,792); Spanish-speaking Latinx (n=3,254); and white (n=45,907) Medi-Cal callers.

Intervention: The Medi-Cal Incentives to Quit Smoking team conducted statewide and community-based outreach and facilitated direct-to-member all-household mailings about the Medi-Cal Incentives to Quit Smoking program to engage with Medi-Cal callers and promote Helpline services between March 2012 and July 2015 (analyzed 2017/2018). Medi-Cal callers could ask for a \$20 gift card incentive after having completed a counseling session; in September 2013, callers were offered free nicotine replacement therapy.

Main outcome measures: Three behavioral outcomes are reported that reflect activated callers and callers who engaged in treatment that is proven to improve chances of quitting smoking: receipt of the \$20 incentive, receipt of nicotine replacement therapy, and receipt of counseling.

Results: African Americans and English-speaking Latinx had higher engagement with the financial incentive than whites (African American APR=1.66, 95% CI=1.59, 1.73, English-speaking Latinx APR=1.29, 95% CI=1.22, 1.36). Spanish-speaking Latinx had lower initial engagement with the financial incentive (APR=0.75, 95% CI=0.66, 0.85), but higher engagement with Medi-Cal's all-household mailing (Spanish-speaking Latinx 30.6% vs whites 18.2%, $p<0.001$). Although African Americans and English-speaking Latinx had similar rates of completing counseling and receiving nicotine replacement therapy as whites, Spanish-speaking Latinx had higher rates than whites.

Conclusions: The promotion of modest financial and cessation medication incentives through multiple outreach channels increased callers' engagement with the Helpline and appeared to promote ethnic and linguistic equity with respect to the receipt of counseling and nicotine replacement therapy. Targeted community-based outreach may resonate particularly for African Americans, and language-concordant Medi-Cal insurance plan mailings may have reached newly covered Spanish-speaking Latinx.

Supplement information: This article is part of a supplement entitled Advancing Smoking Cessation in California's Medicaid Population, which is sponsored by the California Department of Public Health.

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

Introduction: Most successful trials of financial incentives for smoking cessation have offered large rewards contingent on outcomes. This study examines whether more modest incentives to encourage engagement, non-contingent on outcomes, also increase cessation; whether sending medications directly to participants boosts quitting; and whether these strategies are effective in Medicaid.

Study design: Three-group RCT of usual care (UC); nicotine patch (NP); and NP and financial incentive (NP+FI).

Setting/participants: Medicaid beneficiaries calling the California Smokers' Helpline, 2012-2013 (N=3,816). Data were analyzed in 2017.

Intervention: All participants enrolled in evidence-based, multisession telephone counseling. All received proof of enrollment with which they could obtain free quitting aids at their pharmacy. NP and NP+FI also received nicotine patches sent to their homes. NP+FI received up to \$60 for completing counseling calls.

Main outcome measures: Quit attempt rate, 7-day and 30-day abstinence at 2 and 7 months, and 6-month prolonged abstinence (primary outcome).

Results: In both complete-case and intention-to-treat analyses, outcomes trended upward from UC to NP to NP+FI. Differences between NP and UC were generally nonsignificant. By contrast, the NP+FI group significantly outperformed the other groups on all measures. In intention-to-treat analysis, compared with UC, NP+FI was more likely to make a quit attempt (68.4% vs 54.3%, $p<0.001$); be abstinent for 7 days at 2 months (36.1% vs 25.5%, $p<0.001$) and 7 months (21.2% vs 16.1%, $p=0.002$); be abstinent for 30 days at 2 months (30.0% vs 18.9%, $p<0.001$) and 7 months (21.5% vs 16.7%, $p=0.004$); and achieve 6-month prolonged abstinence (13.2% vs 9.0%, $p=0.001$).

Conclusions: Financial incentives increased treatment engagement and short- and long-term smoking cessation, despite being modest and non-contingent on outcomes. The study found that incentives can be effective in a Medicaid population, and can feasibly be integrated into existing quitline services.

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

Introduction: Previous studies found that offering free nicotine patches significantly increases calls to quitlines, although most used pre-post designs and did not directly compare the effects of patches and other incentives. The current study with California Medicaid members used a 2 × 2 design to directly assess the effects of offering free patches and incentives on calls to a quitline. The hypotheses were that offering either would make members more likely to call, and that offering both would increase demand even further.

Methods: Flyers were inserted into a mailing sent to 4,268,696 Medicaid households, with one of four offers: (1) free counseling; (2) counseling plus patches; (3) counseling plus a \$20 gift card; and (4) counseling plus patches and gift card. Ninety percent received the first offer and 10% received one of the other three offers, in equal proportions. The mailers shipped late 2013 to early 2014. Data were collected 2013-2015 and analyzed 2018.

Results: Response rates were 0.029% for counseling, 0.115% for counseling plus patches, 0.122% for counseling plus gift card, and 0.200% for counseling, patches, and gift card. Both patches and gift cards had statistically significant effects (both $p < 0.001$). Promotional costs were 59%-75% lower with an incentive. Non-whites responded more strongly than whites to a gift card offer.

Conclusions: Offering either free patches or a \$20 gift card quadrupled the likelihood of Medicaid smokers calling a quitline; offering both had a nearly additive effect. Incentive offers dramatically increased the cost-effectiveness of promotions. Piggybacking on existing Medicaid communications to promote cessation proved very successful.

Supplement information: This article is part of a supplement entitled Advancing Smoking Cessation in California's Medicaid Population, which is sponsored by the California Department of Public Health.

Sung HY, Penko J, Cummins SE, et al. **Economic impact of financial incentives and mailing nicotine patches to help Medicaid smokers quit smoking: A cost-benefit analysis.** *Am J Prev Med.* 2018;55(6 Suppl 2):S148-S158. doi:10.1016/j.amepre.2018.08.007

An RCT designed to increase Medicaid smokers' quitting success was conducted in California during 2012-2013. In the trial, alternative cessation treatment strategies were embedded in the state's ongoing quitline services. It found that modest financial incentives of up to \$60 per participant and sending nicotine patches induced significantly higher cessation rates compared with usual care alone and usual care plus nicotine patches. Building upon that study, this study assessed potential population-level costs and benefits of integrating financial incentives and nicotine patches in a quitline setting for Medicaid smokers. A cost-benefit analysis was undertaken from the Medicaid program's perspective. The Cardiovascular Disease Policy Model was used to simulate future healthcare expenditures over a 10-year horizon for each treatment strategy for a study cohort of California Medicaid enrollees who were aged 35-64 years in 2014 (n=2,452,000). To simulate potential population-level benefits under each treatment strategy, each treatment was applied to all active smokers in the study cohort (n=478,300). Sensitivity analyses were conducted by varying key parameters, such as cessation costs, discount rate, relapse rates, and time horizon. Adding both financial incentives and nicotine patches to usual quitline care would result in \$15 million net savings over 10 years, with a benefit-cost ratio of 1.30 compared with the usual care plus nicotine patches strategy. It would yield \$44 million net savings, with a benefit-cost ratio of 1.90 compared with usual care alone. The strategy of providing financial incentives and mailing nicotine patches directly to Medicaid smokers who call the quitline is cost saving. SUPPLEMENT INFORMATION: This article is part of a supplement entitled Advancing Smoking Cessation in California's Medicaid Population, which is sponsored by the California Department of Public Health.