

UCSF

UC San Francisco Previously Published Works

Title

Evaluating the Impact of Eliminating Copayments for Tobacco Cessation Pharmacotherapy

Permalink

<https://escholarship.org/uc/item/8r99g1wg>

Journal

Medical Care, 56(11)

ISSN

0025-7079

Authors

Young-Wolff, Kelly C
Adams, Sara R
Klebaner, Daniella
[et al.](#)

Publication Date

2018-11-01

DOI

10.1097/mlr.0000000000000987

Peer reviewed



Published in final edited form as:

Med Care. 2018 November ; 56(11): 912–918. doi:10.1097/MLR.0000000000000987.

Evaluating the Impact of Eliminating Copayments for Tobacco Cessation Pharmacotherapy

Kelly C. Young-Wolff, PhD, MPH¹, Sara R. Adams, MPH¹, Daniella Klebaner, MPH¹, Alyce S. Adams, PhD¹, Cynthia I. Campbell, PhD, MPH¹, Derek D. Satre, PhD^{1,2}, and Judith J. Prochaska, PhD, MPH³

¹Division of Research, Kaiser Permanente Northern California, Oakland, CA, USA

²UCSF Weill Institute for Neurosciences, Department of Psychiatry, University of California, San Francisco, CA, USA

³Stanford Prevention Research Center, Stanford University, Stanford CA, USA

Abstract

Objectives: We examined the impact of the Affordable Care Act (ACA) mandated elimination of tobacco cessation pharmacotherapy (TCP) copayments on patient use of TCP, overall and by income.

Methods: Electronic health record data captured any and combination (e.g., nicotine gum plus patch) TCP use among adult smokers newly enrolled in Kaiser Permanente Northern California (KPNC). KPNC eliminated TCP copayments in 2015. We included current smokers newly enrolled in the first 6 months of 2014 (before copayment elimination; N=16,199) or 2015 (after elimination; N=16,469). Multivariable models estimated one-year changes in rates of any TCP fill, and of combination TCP fill, and tested for differences by income (<\$50K, \$50–75K, \$75K). Through telephone surveys in 2016 with a subset of smokers newly enrolled in 2014 (n = 306), we assessed barriers to TCP use, with results stratified by income.

Results: Smokers enrolled in KPNC in 2015 versus 2014 were more likely to have a TCP fill (9.1% vs. 8.2%; RR=1.19, 95%CI=1.11–1.27), and combination TCP fill, among those with any fill (42.3% vs. 37.9%; RR=1.12, 95%CI=1.02–1.23); findings were stronger for low-income smokers. Low-income patients (<\$50K) were less likely to report that clinicians discussed smoking treatments with them (58%) compared to higher income smokers (\$50–75K, 67%; \$75K, 83%), and were less aware that TCP was free (40% vs. 53% and 69%, respectively, ps<.05).

Conclusions: The ACA's copayment elimination was associated with a modest increase in TCP use and a greater effect among low-income smokers. Uptake may have been enhanced if promoted to patients directly and via providers.

Most smokers want to quit, about half make a 24-hour quit attempt each year, and fewer than 10% are successful in sustaining abstinence.¹ Tobacco cessation pharmacotherapy (TCP) more than doubles the likelihood of long-term abstinence by mitigating nicotine withdrawal

and the reinforcing effects of smoking,^{1,2} yet remains underutilized, in part due to financial costs.^{1,3-5} Low-income smokers are less likely than others to use TCP or receive cessation counseling.^{6,7} Prior research indicates that insurance coverage of tobacco cessation treatment increases treatment utilization, quit attempts, and smoking cessation,⁸⁻¹² while patient co-payments reduce treatment use^{8,13,14} and lowers the likelihood of quitting successfully.^{13,15}

The Patient Protection and Affordable Care Act (ACA)¹⁶ has great potential to reduce the disproportionate burden of tobacco-related disease among lower income people by improving access to tobacco treatment.¹⁷ In 2014, the ACA expanded healthcare coverage to previously uninsured populations through Medicaid expansion, health insurance exchanges, and the removal of coverage limits and pre-existing condition exclusions.¹⁶ Further, the ACA mandates comprehensive coverage for tobacco treatment¹⁷ by most private health plans and for newly eligible Medicaid beneficiaries. The ACA mandate covers at least four smoking cessation counseling sessions and 90 days of FDA-approved TCP. The law requires zero cost-sharing and forbids prior authorization restrictions for use of TCP beginning in 2014. The Departments of Health and Human Services, Labor, and the Treasury issued specific guidance to clarify implementation of the ACA mandate for tobacco cessation treatments on May 2, 2014.^{18,19} As a result, many health plans revised their rules regarding TCP coverage in January 2015.

For healthcare broadly, the ACA narrowed socioeconomic disparities in access in its first two years of full implementation.²⁰ California saw the largest declines in the uninsured rate of any state from 2013–2015, due primarily to Medicaid expansion and financial assistance for buying coverage through the California exchanges.²¹ Notably, low-income individuals were among the most likely to gain healthcare coverage through the ACA in California.^{22,23} Overall, smoking is the leading cause of preventable death in California,²⁴ and low-income individuals²⁵ have elevated smoking prevalence and face a disparate **disease** burden.^{1,25,26} Hence, increased access to tobacco cessation treatment via the ACA may help reduce tobacco-related health disparities.

The ACA mandate to eliminate TCP copayments has great potential to benefit low-income smokers by increasing the percentage of smokers who utilize TCP. It may also increase the percentage of smokers who use a combination of these medications (e.g., nicotine gum plus patch). However, improved policies may not lead directly to treatment adoption because barriers in addition to price may affect TCP use.²⁷ The current study is one of the first to examine whether eliminating cost-sharing increases TCP use among smokers, particularly low-income smokers, in the post-ACA era. We hypothesized that a greater percentage of smokers newly enrolled in Kaiser Permanente Northern California (KPNC) would utilize any TCP, and combination TCP, in 2015 than in 2014, and that this effect would be stronger among low-income smokers, who may be particularly price sensitive. Using a multi-methods approach, interpretations of quantitative study findings are enhanced by patient surveys examining barriers to treatment.

METHODS

Setting

The current data were drawn from KPNC a nonprofit, integrated healthcare delivery system providing comprehensive health services to more than 4 million members²⁸ and covering >40% of the region's commercially insured population.²⁹ KPNC provides integrated multi-specialty treatment and is a recognized leader in establishing tobacco quality-of-care standards.³⁰ KPNC membership is racially, ethnically and socio-economically diverse and representative of the population from its geographic area.³¹

Study Design

KPNC eliminated copayments for TCP for California exchange and non-exchange commercial plan members with ACA-compliant plans in 2015. In a retrospective cohort analysis of electronic health record (EHR) data, we examined the impact of TCP copayment elimination on TCP use among all adult smokers newly enrolled in KPNC in the first six months of either 2014 (pre-copayment elimination) or 2015 (post-copayment elimination), through the California exchange or nonexchange commercial plans. We anticipated that use of TCP would be greatest among newly enrolled patients in the post-ACA era, many of whom may have been previously uninsured with pent up demand for TCP. By including only current smokers newly enrolled in KPNC, this study design reduced potential differences in TCP use due to previous experience with TCP obtained through the healthcare system or due to quitting smoking and no longer needing TCP. We used an approach that included both EHR and patient survey data. KPNC did not do outreach to smokers or providers to inform them of ACA-mandated TCP copayment elimination. The patient surveys were designed to assess patient awareness of and experience with the mandated implementation to eliminate TCP copayments. The study procedures were approved by the KPNC Institutional Review Board.

Sample

Cohorts of Newly Enrolled Smokers.—The KPNC EHR and administrative databases were used to identify the study sample, which included adult smokers newly enrolled in KPNC (i.e., the patient had not been a KPNC member for a full year prior to the current enrollment, but could have been a member in the more distant past) in a California exchange or non-exchange commercial plan in the first six months of 2014 or 2015. KPNC members are routinely asked about their smoking status through standardized screening at outpatient appointments by medical assistants. Selected were “current smokers” (as opposed to “former smoker,” “never-smoker,” or missing smoking status) recorded in the EHR in the first six months of KPNC membership. KPNC Medicaid patients were excluded because they had zero cost-sharing for TCP in both 2014 and 2015. Patients with Medicare coverage, unknown coverage, missing birth date, enrollment for <60% of the first 6 membership months and enrollment gaps of >45 days in the first 6 months of membership were excluded.³² Patients without geocoded neighborhood income data (n=31, 0.09%) were excluded. The final sample was 16,199 smokers newly enrolled in KPNC in 2014 and 16,469 smokers newly enrolled in 2015.

Telephone Survey Sample—We conducted a telephone survey in 2016 to examine knowledge of TCP copayment elimination and barriers to TCP use with a sample of adult smokers enrolled in KPNC in the first six months of 2014. Although these patients joined prior to TCP copayment elimination in 2015, the telephone survey was conducted in 2016 and assessed their experiences since joining KPNC in 2014. The survey was conducted as part of a larger study on the impact of the ACA on smoking and tobacco treatment utilization.³² Inclusion criteria were English or Spanish language fluency, active KPNC membership in 2016, with enrollment in 2014 through a California exchange or nonexchange commercial plan, and no KPNC membership in the 12 months prior to the 2014 enrollment date. To increase statistical power with underrepresented groups, we oversampled smokers with California exchange plans and patients who designated Spanish as their primary language, given prior research indicating low use of TCP among Hispanic patients.³² We selected and contacted patients in batches, using simple random sampling within language-insurance strata to identify 7 Spanish-speakers with California exchange plans, 7 Spanish-speakers with non-exchange commercial plans, 27 English-speakers with California exchange plans, and 27 English-speakers with non-exchange commercial plans for each batch. Patients were assigned sample weights, which were inversely proportional to the probability of selection within their language-insurance strata. Eligible patients were sent invitation letters that included an explanation of the survey, a notice that they would be called in two weeks, and a toll-free number to contact the project staff for more information or to decline participation. Patients were called approximately two weeks later by a trained interviewer who further explained the project, obtained verbal consent, and completed the 20-minute telephone survey. Telephone surveys took place between 8/29/2016 and 12/30/2016. Of the 702 eligible patients, 56 (8%) could not be located due to incorrect address and phone number, 222 (30%) did not respond to telephone calls, 1 was too ill to participate, and 117 (17%) declined participation. The response rate among contacted patients was 47%, yielding 306 completed surveys. Spanish-speaking and Hispanic patients were more likely to complete the survey than English-speaking and non-Hispanic patients (χ^2 ps <.001); there were no differences in other demographic characteristics among eligible patients who did and did not complete the survey.

Measures

Tobacco Cessation Pharmacotherapy (TCP) Use.—Data on TCP use were extracted from the KPNC Pharmacy Information Management System (PIMS) and Enterprise Pharmacy Information Management System (ePIMS), which are part of the EHR and contain all data related to medications dispensed at a KPNC pharmacy. Use of TCP was determined by KPNC pharmacy dispensation of an FDA-approved tobacco cessation medication (i.e., nicotine replacement therapy [NRT] gum, lozenge, inhaler, patch, or nasal spray; varenicline; bupropion) from the patient's enrollment date in either 2014 or 2015 through December 31st of the same year. Bupropion is also used to treat depression, therefore we included bupropion prescriptions only if the patient had a nicotine dependence diagnosis the same year and the prescription label indicated use for smoking cessation. Of the newly enrolled patients with commercial or exchange plans who filled a TCP medication, a majority (93%) had a copay in 2014, while a minority (11%) had a copay in 2015. The small percentage of patients with a copay in 2015 likely reflects that some

healthcare plans were non-ACA compliant. In addition, for the TCP classified as over-the-counter (i.e., nicotine patch, gum, and lozenge) some patients may not have had a prescription, which is required for zero copayment. We examined (a) any TCP fill and (b) combination TCP fill (e.g., NRT patch plus gum; did not have to be filled on the same day) among those with any TCP fill.

Telephone Survey Questions.—Telephone surveys, conducted in 2016, assessed patients' experiences since joining KPNC in 2014. Specifically, respondents were asked whether their healthcare provider talked with them about quitting smoking (yes/no) and discussed cessation services available in KPNC (yes/no); whether they knew TCPs were free at KPNC pharmacies for most members (yes/no); whether the cost of programs or TCP had prevented them from trying to quit since joining KPNC (yes/no); and whether aspects of TCP discouraged their use (e.g., side effects, perceived low efficacy).

Patient Characteristics.: Data on the following patient characteristics were derived from the EHR and administrative databases: Age (18–24, 25–34, 35–44, 45–54, 55+); gender (male, female); race/ethnicity (Asian/Pacific Islander, Black, Hispanic, Multiracial/Native American, White, Other/unknown); median neighborhood household income from 2010 census data, categorized into tertiles (<\$50 000, \$50 000–\$74 999, or \$75 000 per year); language (English, Spanish, Other/Unknown); insurance (California exchange, non-exchange commercial); and comorbidity status. Comorbidities were identified via ICD-9 and ICD-10 codes from the EHR and included psychiatric disorders (depressive disorders, anxiety disorders, attention deficit hyperactivity disorder [ADHD], bipolar spectrum disorders, and psychotic disorders), substance use disorders (drug and alcohol use disorders), and medical conditions (arthritis, hypertension, chronic pain, diabetes, asthma, heart disease, and chronic obstructive pulmonary disease [COPD]). Length of enrollment for each patient was computed as the number of months between the patient's enrollment date in the first 6 months of 2014 or 2015 through December 31st of the same year (range 6–12 months, mean 10.4, SD=1.7).

Statistical Analyses

Pearson χ^2 tests of independence and t-tests were used to compare characteristics of the 2014 and 2015 patient cohorts. We generated the relative risks (RRs) of any TCP fill, and combination TCP fill, for 2015 versus 2014 using modified Poisson regression with robust error variance³³ adjusting for the patient characteristics in Table 1. We chose to present RRs instead of odds ratios (ORs) because the binary outcomes in our study were not rare events, and ORs are more likely to overestimate the effect of the exposure when the outcomes are common.³⁴ Next, we ran the adjusted Poisson models with an interaction term of year of enrollment by income category and reported the relative risks of any TCP fill, and combination TCP, in 2015 vs. 2014 separately by income category. We also report the measure of effect modification on a multiplicative scale by income category. Two-sided p-values were calculated, and significance was defined as $p < 0.05$. Analyses were performed using SAS software, version 9.3 (SAS Institute, Inc.).

Analyses of the telephone survey data accounted for the stratified sampling design and the sample weights, which were inversely proportional to the probability of selection. For the telephone survey results, we reported weighted proportions, weighted means with standard errors, and Rao-Scott³⁵ χ^2 tests of independence between income categories. Analyses of telephone survey data used SAS Survey Procedures.

RESULTS

Although differences were statistically significant, newly enrolled adult smokers in the 2014 and 2015 cohorts were generally similar on demographic characteristics (within two percentage points) and length of enrollment in KPNC (Table 1). Newly enrolled smokers in the 2015 cohort had a lower prevalence of psychiatric, substance use, and medical comorbidities than those in the 2014 cohort (Table 1).

Adjusting for demographic and clinical characteristics, patients who enrolled in KPNC in 2015 were significantly more likely to use TCP than those enrolled in 2014 (9.1% vs. 8.2%; RR=1.19, 95% CI=1.11–1.27; $p<.001$; Table 2). Income was found to modify the effect. In the multivariate model with the interaction of enrollment year by income, the lowest income category (<\$50K) was associated with greater TCP use compared to the highest income category (\$75K+) (interaction estimate RR=1.23, 95% CI=1.03–1.47, $p=.02$). From 2014 to 2015, TCP fills increased from 7.9% to 9.3% for smokers in the lowest income category (<\$50K), from 8.4% to 9.6% for smokers in the middle income category (\$50–75K), and stayed at 8.4% for 2014 and 2015 for smokers in the highest income category (>\$75K).

Among patients who had at least one TCP fill, the percentage with a combination TCP fill was significantly greater among 2015 enrollees (42.3%) compared with 2014 enrollees (37.9%; Table 3). Among patients who used combination TCP, the most common combinations were nicotine patch and gum (53%), bupropion with nicotine patch and gum (16%), and bupropion with nicotine patch (15%). The lowest income category (<\$50K) had the largest increase in combination TCP use (38.1% in 2014 to 45.1% in 2015, $p=.02$), compared to smokers in the middle (\$50–75K; 39.1% to 40.3%, $p=.64$) and upper income categories (>\$75K+; 36.3% vs. 41.1%, $p=.17$), although the interaction effect of time by income was not statistically significant (RR=1.06, 95% CI=0.84–1.33, $p=.48$).

Telephone Survey Results

The telephone survey sample (N=306) included current smokers and was 52% men; 45% White, 15% Asian/Hawaiian/Pacific Islander, 19% Hispanic, 14% Black, 3% Multiracial/ Native American, and 4% Other/unknown. Patients averaged 57 years of age (SD from weighted means = 0.01) and 42% had a median neighborhood household income <\$50K, 33% \$50–<\$75K, and 25% >\$75K. English was the primary language for most patients (93% English, 7% Spanish), and 27% of patients were insured through the California exchange, while 73% had coverage through non-exchange commercial plans.

Most respondents (80%) reported their KPNC healthcare provider had talked with them about quitting, and 67% said their provider discussed different KPNC smoking cessation services (Table 4). Fewer (52%) were aware that TCPs were free when filled at a KPNC

pharmacy and 23% reported that the cost of smoking cessation programs or medications prevented them from trying to quit. The most commonly reported patient concerns with TCPs were side effects (36%), low perceived need (28%) or efficacy (22%), and cost (12%).

Patients in the lowest income group stood out as facing special barriers to reducing their disease risk. They were significantly less likely to report that their KPNC healthcare provider discussed cessation services (58%) with them compared to patients in the middle (67%) and upper (83%) income categories ($p=.02$). Further, they were significantly less likely to know that TCP was free for most members through the KPNC pharmacy (40% versus 53% and 69%, respectively; $p=.008$).

DISCUSSION

Our study of the effects of the ACA's elimination of TCP copayments has three key findings. First, we found that fills for any TCP, and combination TCP, among newly enrolled smokers in KPNC increased modestly between 2014 and 2015. Second, TCP copayment elimination was associated with the largest increase in TCP fills among low-income smokers. Third, low-income smokers reported less awareness of the TCP benefit and were less likely to have had providers talk with them about quitting smoking. Collectively, these results suggest that although the ACA especially benefitted low income smokers, its impact in this priority population may have been muted by lack of effective communication and patient understanding regarding TCP availability.

Our finding that TCP use was higher after copayment elimination is consistent with prior research indicating that cost-sharing reduces the use of tobacco treatments.^{8,13,14} The largest increases in the percentage of smokers who filled any TCP, and combination TCP, were seen among low-income smokers, suggesting that cost-sharing requirements disproportionately impact low-income individuals and that shifting the financial burden to insurers or health plans may improve access to care for low-income smokers.

Nevertheless, utilization of TCP remained below 10% even in 2015, suggesting that copayment elimination on its own may not be enough to substantially increase TCP use. One contributing factor may be the lack of awareness of the ACA provision to eliminate copayments for TCP in the post-ACA era, particularly among low-income patients. Further, low use of TCP following copayment elimination may also be partly attributable to patients' lack of interest in quitting smoking or concerns about TCP use, as evidenced by data from patient surveys citing 'not needed', 'side effects', and 'doesn't work' as key disadvantages to TCP.

Improvement in the transmission of information on medication effectiveness and costs, and use of this information by healthcare providers, is fundamental to healthcare reform.³⁶ The finding that low-income smokers, who were expected to be most price sensitive, were the least likely to know that TCP was available at no cost is consistent with studies showing insufficient knowledge among low-income populations regarding the post-ACA availability of preventive care without copayments.³⁷ For example, although the ACA required that private health insurance plans cover contraceptive counseling and FDA-approved treatments

with zero cost-sharing, awareness of these mandates among insured patients remained low.³⁸ Increased clinician and patient awareness of the opportunities for smoking cessation afforded by the ACA may increase use of any TCP and combination TCP, contribute to successful quit attempts, and reduce tobacco-related health disparities.^{39,40} However, it may be unrealistic to expect clinicians to educate patients about benefit details, since providers also may be unclear about benefit provisions.⁴¹ Moreover, as seen here, a minority of patients may still have TCP copayments even in the post-ACA era, and KPNC clinicians are typically unaware of their patients' insurance policies.

To maximize the ACA's potential impact, healthcare systems should provide outreach to inform their patients about both the effectiveness and availability of tobacco cessation treatments and encourage them to use these treatments.^{39,40} The current findings indicate that low-income smokers may need more targeted outreach and information about their covered benefits to achieve equity in tobacco cessation.⁴² Tailored educational materials provided directly to smokers (e.g., via secure messaging or telephone calls) that highlight insurance coverage of TCP and counseling, with notification of zero-cost-sharing for eligible patients, may increase the public health impact of the ACA's smoking cessation provisions among low-income smokers. Further, as there is the potential to worsen existing tobacco-related health disparities if policies are not implemented equitably,⁴² it is critically important that healthcare providers tout the tobacco cessation benefits covered and discuss effective smoking cessation treatments with all smokers.

Limitations and Strengths

This study has several limitations. Although TCP cost-sharing was eliminated in KPNC in 2015 for the majority of smokers, a small percentage of smokers had no copayment in 2014, and a small percentage of smokers continued to have copayments in 2015. This would likely bias results toward the null. NRT is available over-the-counter, and we were limited to NRT from KPNC pharmacies, and TCP use may be underestimated. The prevalence of TCP use in the current study was lower than estimates of self-reported TCP among US smokers in 2015;⁴³ however, our window of TCP use among current smokers was more curtailed (6–12 months versus 12 months) and the national study included TCP use among former smokers who quit during the prior two years. Further, we did not have data on heaviness of smoking and were unable to assess the percentage of light smokers in our sample, for whom TCP would not be recommended. This study was limited to patients with a "current smoker" status in the EHR in the first 6 months of either 2014 or 2015; patients without a recorded smoking status in the first 6 months of enrollment were excluded and there were some differences in the populations of newly enrolled smokers in 2014 versus 2015. Medicaid smokers were excluded because the majority had no copay for TCP in both 2014 and 2015. Our prior work suggested that Medicaid smokers were significantly more likely than commercial plan smokers to use tobacco treatments, including TCP and counseling.³² Further, our study included newly enrolled smokers in KPNC and findings may not be generalizable to patients who have been in the healthcare system for longer periods of time. Finally, our survey was limited to self-reported data in 2016 among patients newly enrolled in KPNC in 2014 and had a response rate of 47%. However, while Spanish-speaking and

Hispanic patients were more likely to complete the survey than English-speaking and non-Hispanic patients, other demographic characteristics did not differ with survey completion.

The study has several strengths. KPNC offers a unique opportunity to use EHR data to examine the effects of cost-sharing elimination in a real-world healthcare setting employing widely used tobacco treatment models, resulting in strong external validity. Additional strengths include the large sample of newly enrolled smokers in the post-ACA era and the use of survey data. To our knowledge, this is the first study to assess whether the ACA mandate for the elimination of TCP copayments is associated with increases in TCP use and to assess patient awareness of copayment elimination.

Conclusions

Our results illustrate that ACA mandated elimination of TCP copayments is associated with greater TCP use, particularly among low-income smokers. Thus, there is potential to reduce disparities in smoking for low-income smokers through increased access to effective tobacco cessation treatments at no cost. However, TCP use remained low, even after copayment elimination, and many low-income patients were unaware that TCP was available for free. This suggests a missed opportunity. Outreach to members highlighting free TCP may increase utilization, particularly among low-income patients. To maximize the opportunity afforded by the ACA to improve health equity in California, it will be important to continue monitoring the association of insurance coverage and TCP copayment elimination with TCP use and subsequent success with smoking cessation.

ACKNOWLEDGMENTS AND DISCLOSURES

This study was supported by grants from the Tobacco-Related Disease Research Program (24XT-0008), the Kaiser Permanente Northern California Community Benefit Program, and the National Institute on Drug Abuse (R21/R33 DA035645). Dr. Prochaska has served as an expert witness in lawsuits against tobacco companies and has provided consultation to pharmaceutical and technology companies that make treatments for quitting smoking. All other authors have no conflicts of interest to declare.

REFERENCES

1. Clinical Practice Guideline Treating Tobacco Use and Dependence 2000 Update Panel, Liaisons, and Staff. A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report. *Am J Prev Med* 2008;35(2):158–176. [PubMed: 18617085]
2. Verbiest M, Brakema E, van der Kleij R, et al. National guidelines for smoking cessation in primary care: a literature review and evidence analysis. *NPJ Prim Care Respir Med* 2017;27(1):2. [PubMed: 28108747]
3. Bansal MA, Cummings KM, Hyland A, Giovino GA Stop-smoking medications: who uses them, who misuses them, and who is misinformed about them? *Nicotine Tob Res* 2004;6 Suppl 3:S303–310. [PubMed: 15799593]
4. Miller N, Frieden TR, Liu SY, et al. Effectiveness of a large-scale distribution programme of free nicotine patches: a prospective evaluation. *Lancet* 2005;365(9474):1849–1854. [PubMed: 15924980]
5. West R, DiMarino ME, Gitchell J, McNeill A Impact of UK policy initiatives on use of medicines to aid smoking cessation. *Tob Control* 2005;14(3):166–171. [PubMed: 15923466]
6. Connor SE, Cook RL, Herbert MI, Neal SM, Williams JT Smoking cessation in a homeless population: there is a will, but is there a way? *J Gen Intern Med* 2002;17(5):369–372. [PubMed: 12047734]

7. Murphy JM, Mahoney MC, Hyland AJ, Higbee C, Cummings KM Disparity in the use of smoking cessation pharmacotherapy among Medicaid and general population smokers. *J Public Health Manag Pract* 2005;11(4):341–345. [PubMed: 15958934]
8. Curry SJ, Grothaus LC, McAfee T, Pabiniak C Use and cost effectiveness of smoking-cessation services under four insurance plans in a health maintenance organization. *N Engl J Med* 1998;339(10):673–679. [PubMed: 9725926]
9. Kaper J, Wagena EJ, Severens JL, Van Schayck CP Healthcare financing systems for increasing the use of tobacco dependence treatment. *Cochrane Database Syst Rev* 2005(1):CD004305. [PubMed: 15674938]
10. Kaper J, Wagena EJ, Willemsen MC, van Schayck CP Reimbursement for smoking cessation treatment may double the abstinence rate: results of a randomized trial. *Addiction* 2005;100(7):1012–1020. [PubMed: 15955017]
11. Schauffler HH, McMenamin S, Olson K, Boyce-Smith G, Rideout JA, Kamil J Variations in treatment benefits influence smoking cessation: results of a randomised controlled trial. *Tob Control* 2001;10(2):175–180. [PubMed: 11387540]
12. Bailey SR, Hoopes MJ, Marino M, et al. Effect of gaining insurance coverage on smoking cessation in community health centers: A cohort study. *J Gen Intern Med* 2016;31(10):1198–1205. [PubMed: 27329121]
13. Hughes JR, Wadland WC, Fenwick JW, Lewis J, Bickel WK Effect of cost on the self-administration and efficacy of nicotine gum: a preliminary study. *Prev Med* 1991;20(4):486–496. [PubMed: 1908080]
14. Zeng F, Chen CI, Mastey V, Zou KH, Harnett J, Patel BV Utilization management for smoking cessation pharmacotherapy: varenicline rejected claims analysis. *Am J Manag Care* 2010;16(9):667–674. [PubMed: 20873954]
15. Cox JL, McKenna JP Nicotine gum: does providing it free in a smoking cessation program alter success rates? *J Fam Pract* 1990;31(3):278–280. [PubMed: 2391458]
16. U.S. Congress. Patient Protection and Affordable Care Act, 42 U.S.C. § 18001 Public Law 111–148. Washington, DC: U.S. Government Printing Office, 2010 <http://www.gpo.gov/fdsys/pkg/PLAW-111publ148/pdf/PLAW-111publ148.pdf>. Accessed March 7, 2018.
17. McAfee T, Babb S, McNabb S, Fiore MC Helping smokers quit—opportunities created by the Affordable Care Act. *N Engl J Med* 2015;372(1):5–7. [PubMed: 25409263]
18. Kofman M, Dunton K, Senkewicz MB Implementation of Tobacco Cessation Coverage Under the Affordable Care Act: Understanding How Private Health Insurance Policies Cover Tobacco Cessation Treatments. Washington, DC: Georgetown University Health Policy Institute; 11 26, 2012 <https://www.tobaccofreekids.org/assets/content/pressoffice/2012/georgetown/coveragereport.pdf>. Accessed March 19, 2018.
19. Departments of Labor, Health and Human Services, and Treasury. FAQs about Affordable Care Act implementation (Part XIX) 5 2, 2014 <https://www.dol.gov/sites/default/files/ebsa/about-ebsa/our-activities/resource-center/faqs/aca-part-xix.pdf>. Accessed March 19, 2018.
20. Griffith K, Evans L, Bor J The Affordable Care Act reduced socioeconomic disparities in health care access. *Health Aff (Millwood)* 2017.
21. Barnett JC, Vornovitsky MS Current Population Reports, P60–257(RV), *Health Insurance Coverage in the United States: 2015*. Washington, DC: U.S. Government Printing Office; 2016.
22. Reichard J Survey shows drop in California’s uninsured, but with new cost concerns Washington Health Policy Week in Review. New York: The Commonwealth Fund; 8 4, 2014 <http://www.commonwealthfund.org/publications/newsletters/washington-health-policy-in-review/2014/aug/aug-4-2014/survey-shows-drop-in-californias-uninsured>. Accessed March 28, 2018.
23. Satre DD, Altschuler A, Parthasarathy S, Silverberg MJ, Volberding P, Campbell CI Implementation and operational research: Affordable Care Act implementation in a California health care system leads to growth in HIV-positive patient enrollment and changes in patient characteristics. *J Acquir Immune Defic Syndr* 2016;73(5):e76–e82. [PubMed: 27749602]
24. Max W, Sung HY, Shi Y, Stark B The Cost of Smoking In California, 2009. San Francisco, CA: Institute for Health & Aging, School of Nursing, University of California, San Francisco; 2014.

25. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. California: current smoker status. BRFSS Prevalence and Trends Data [online], 2016 <https://www.cdc.gov/brfss/brfssprevalence/>. Accessed March 21, 2018.
26. Butler D, Aboelata M, Cohen L, Spilker S Advancing Health Equity in Tobacco Control: California Health Equity Summit Proceedings. Sacramento, CA: California Department of Public Health, California Tobacco Control Program;2013.
27. Boyle RG, Solberg LI, Magnan S, Davidson G, Alesci NL Does insurance coverage for drug therapy affect smoking cessation? *Health Aff (Millwood)* 2002;21(6):162–168. [PubMed: 12442851]
28. Permanente Kaiser. Fast facts about Kaiser Permanente. Kaiser Permanente *Share*; 5 25, 2016, 2011. <http://xnet.kp.org/newscenter/aboutkp/fastfacts.html>. Accessed March 21, 2018.
29. Terhune C Report: Kaiser tops state health insurance market with 40% share. *Los Angeles Times*; 1 29, 2013 <http://articles.latimes.com/2013/jan/29/business/la-fi-mo-health-insure-market-20130129>. Accessed February 16, 2018.
30. Goldstein A, Gee S, Mirkin R Tobacco dependence program: a multifaceted systems approach to reducing tobacco use among kaiser permanente members in northern california. *Perm J* 2005;9(2): 9–18.
31. Selby JV, Smith DH, Johnson ES, Raebel MA, Friedman GD, McFarland BH Kaiser Permanente Medical Care Program In: Strom BL, ed. *Pharmacoepidemiology*. 4th ed. New York: Wiley; 2005:241–259.
32. Young-Wolff KC, Klebaner D, Campbell CI, Weisner C, Satre DD, Adams AS Association of the Affordable Care Act with smoking and tobacco treatment utilization among adults newly enrolled in health care. *Med Care* 2017;55(5):535–541. [PubMed: 28288073]
33. Zou G A modified poisson regression approach to prospective studies with binary data. *Am J Epidemiol* 2004;159(7):702–706. [PubMed: 15033648]
34. Knol MJ, Le Cessie S, Algra A, Vandenbroucke JP, Groenwold RH Overestimation of risk ratios by odds ratios in trials and cohort studies: alternatives to logistic regression. *CMAJ* 2012;184(8): 895–899. [PubMed: 22158397]
35. Rao JNK, Scott AJ The analysis of categorical data from complex sample surveys: Chi-squared tests for goodness of fit and independence in two-way tables *J Am Stat Assoc* 1981;76(374):221–230.
36. Lavizzo-Mourey R Halfway there? Health reform starts now. *JAMA* 2016;315(13):1335–1336. [PubMed: 26940727]
37. Long SK, Goin D Most adults are not aware of Health Reform’s coverage provisions Health Reform Monitoring Survey. Washington, DC: Urban Institute; 2 6, 2014 <http://hrms.urban.org/briefs/awareness-of-provision.html>. Accessed March 28, 2018.
38. Hall KS, Kottke M, Dalton VK, Hogue CR Ongoing implementation challenges to the Patient Protection and Affordable Care Act’s contraceptive mandate. *Am J Prev Med* 2017;52(5):667–670. [PubMed: 27939235]
39. McAfee T, Babb S, McNabb S, Fiore MC Helping smokers quit—opportunities created by the Affordable Care Act. *New England Journal of Medicine* 2015;372(1):5–7. [PubMed: 25409263]
40. U.S. National Cancer Institute. A Socioecological Approach to Addressing Tobacco-Related Health Disparities. National Cancer Institute Tobacco Control Monograph 22 NIH Publication No. 17-CA-8035A. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute;2017.
41. Politi MC, Sonfield A, Madden T Addressing challenges to implementation of the contraceptive coverage guarantee of the Affordable Care Act. *JAMA* 2016;315(7):653–654. [PubMed: 26832953]
42. Garrett BE, Dube SR, Babb S, McAfee T Addressing the social determinants of health to reduce tobacco-related disparities. *Nicotine Tob Res* 2015;17(8):892–897. [PubMed: 25516538]
43. Babb S, Malarcher A, Schauer G, Asman K, Jamal A Quitting smoking among adults - United States, 2000–2015. *MMWR Morb Mortal Wkly Rep* 2017;65(52):1457–1464. [PubMed: 28056007]

Table 1.

Socio-Demographic Characteristics, Comorbidities, and Length of Enrollment of Smokers Newly Enrolled in KPNC in 2014 and 2015

	Smokers newly enrolled in 2014 (N=16,199) N (%)	Smokers newly enrolled in 2015 (N=16,469) N (%)	P value *
Gender			>.99
Male	9597 (59)	9756 (59)	
Female	6602 (41)	6713 (41)	
Age			.03
18–24	2040 (13)	2000 (12)	
25–34	5171 (32)	5532 (34)	
35–44	3420 (21)	3422 (21)	
45–54	3269 (20)	3259 (20)	
55+	2299 (14)	2256 (14)	
Race/ethnicity			<.001
Asian/Pacific Islander	2618 (16)	2727 (17)	
Black	1268 (8)	1367 (8)	
Hispanic	2971 (18)	3117 (19)	
Multiracial/Native Amer.	342 (2)	324 (2)	
White	7978 (49)	8070 (49)	
Other/unknown	1022 (6)	864 (5)	
Language			<.001
English	14321 (88)	14366 (87)	
Spanish	746 (5)	743 (5)	
Other/unknown	1132 (7)	1360 (8)	
Insurance			<.001
Exchange	5068 (31)	4711 (29)	
Commercial	11131 (69)	11758 (71)	
Median Neighborhood Household Income			.21
<\$50K	5888 (36)	6141 (37)	
\$50K-<75K	5480 (34)	5488 (33)	
\$75K+	4831 (30)	4840 (29)	
Comorbidities			
Psychiatric disorder [†]	4147 (26)	3332 (20)	<.001
Substance use disorder	1903 (12)	1417 (9)	<.001
Medical comorbidity [‡]	8514 (53)	7077 (43)	<.001
Length of enrollment (months), mean (SD)	10.2 (1.8)	10.5 (1.7)	<.001

Notes.

* Chi-square or t-test *p* value

[†] Depressive, anxiety, attention deficit hyperactivity disorder (ADHD), bipolar spectrum disorders, psychotic disorders

[‡] Arthritis, hypertension, chronic pain, diabetes, asthma, chronic heart disease, chronic obstructive pulmonary disease (COPD)

Table 2.

Relative Risk of Filling Tobacco Cessation Pharmacotherapy (TCP) among Patients Newly Enrolled in 2015 Versus 2014

	N	% with a TCP Fill	Relative Risk (95% CI) of a TCP Fill ^a	P value
Overall ^b				
2014	16,199	8.2%	Ref.	
2015	16,469	9.1%	1.19 (1.11, 1.27)	<.001
Median neighborhood household income ^c				
<\$50K				
2014	5,888	7.9%	Ref.	
2015	6,141	9.3%	1.28 (1.14, 1.44)	.001
\$50K-<\$75K				
2014	5,480	8.4%	Ref.	
2015	5,488	9.6%	1.22 (1.09, 1.38)	.001
>\$75K				
2014	4,831	8.4%	Ref.	
2015	4,840	8.4%	1.04 (0.91, 1.18)	.58

Notes.

^aAnalyses adjusted for income, gender, age, race/ethnicity, language, insurance type, any psychiatric disorder, alcohol or drug use disorder, any medical comorbidity, and length of enrollment.

^bOverall RR by enrollment year computed from model without an interaction term.

^cRR within income strata computed from a model with an interaction term of enrollment year by income. The estimate of the interaction on a multiplicative scale for <\$50K vs. \$75K+ was RR = 1.23 (1.03, 1.47), p =.02; the estimate of the interaction for \$50K-<75K vs. \$75K+ was RR= 1.18 (0.99, 1.41), p =.07.

Table 3.

Relative Risk of Filling Combination Tobacco Cessation Pharmacotherapy (TCP) among Patients Newly Enrolled in 2015 Versus 2014

	N ^a	% with Combination TCP	Relative Risk (95% CI) of Combination TCP ^b	P value
Overall ^c				
2014	1,325	37.9%	Ref.	
2015	1,501	42.3%	1.12 (1.02, 1.23)	.01
Median neighborhood household income ^d				
<\$50K				
2014	462	38.1%	Ref.	
2015	568	45.1%	1.20 (1.03, 1.39)	.02
\$50K–<\$75K				
2014	458	39.1%	Ref.	
2015	529	40.3%	1.04 (0.89, 1.21)	.64
>\$75K				
2014	405	36.3%	Ref.	
2015	404	41.1%	1.13 (0.95, 1.34)	.17

Notes.

^aAnalyses limited to patients with at least one TCP fill in the year.

^bAnalyses adjusted for income, gender, age, race/ethnicity, language, insurance type, any psychiatric disorder, alcohol or drug use disorder, any medical comorbidity, and length of enrollment.

^cOverall RR by enrollment year computed from model without an interaction term.

^dRR within income strata computed from model with interaction term of enrollment year by income. The estimate of the interaction on a multiplicative scale for <\$50K vs. \$75K+ was RR = 1.06 (0.84, 1.33), p =.61; the estimate of the interaction for \$50K-<75K vs. \$75K+ was RR= 0.91 (0.73, 1.16), p =.48.

Table 4.

Telephone Survey Responses Overall and Stratified by Median Neighborhood Household Income Category

Survey responses, n (weighted % yes)	Total (n=306)	Income categories			P value ^a
		<\$50K (n=114)	\$50K-<\$75K (n=119)	\$75K+ (n=73)	
Received provider counseling on quitting smoking	236 (80)	88 (81)	88 (73)	60 (86)	.24
Healthcare provider discussed cessation services	187 (67)	58 (58)	78 (67)	51 (83)	.02
Aware that TCPs are free from the KP pharmacy	142 (52)	45 (40)	56 (53)	41 (70)	.008
Costs are a barrier to cessation treatment access	67 (23)	32 (26)	24 (28)	11 (11)	.08
Perceived disadvantages of TCP ^b					
Don't know	137 (42)	52 (45)	55 (39)	30 (41)	.77
Side effects	74 (36)	28 (37)	22 (26)	24 (49)	.08
No disadvantage	117 (31)	39 (27)	48 (36)	30 (32)	.48
Not needed/Not dependent on nicotine	90 (28)	31 (26)	37 (30)	22 (29)	.86
Does not work/Maintains nicotine dependence	51 (22)	21 (20)	19 (24)	11 (21)	.85
Costs	36 (12)	13 (14)	16 (13)	7 (9)	.70
Avoid pharmaceutical	18 (7)	8 (9)	6 (6)	4 (6)	.75

Notes. Telephone interviews conducted in 2016 (post ACA TCP cost-sharing elimination) with patients who were newly enrolled in KPNC in 2014. KP = Kaiser Permanente. Percentages based on study weights.

^aRao-Scott χ^2 tests of independence.

^bCould select more than one disadvantage.