



# Smoking Cessation Pharmacotherapy Utilization and Costs to a Medicaid Managed Care Plan

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## Abstract

**Background** Medicaid coverage for smoking cessation medications has expanded; however, little research has been conducted to evaluate patient-level changes in medication use over time and its associated economic impact on health plans.

**Objective** The aim of this study was to characterize trends in smoking cessation medication utilization between 2006 and 2017 within a Medicaid population and estimate per-member per-month (PMPM) costs to the health plan.

**Methods** This study was a retrospective longitudinal analysis conducted among adult members of a Medicaid managed care plan in California. Pharmacy claims data from January 1, 2006 to December 31, 2017 were analyzed to estimate utilization and cost of smoking cessation medications. Additionally, data from 3164 members who filled prescription(s) for cessation medication(s) in 2017 were evaluated to quantify quit attempts and use of combination therapy. For members who had been prescribed bupropion SR, varenicline, or the nicotine patch, the extent to which the durations of therapy were consistent with the manufacturers' recommended minimum duration of therapy were also assessed.

**Results** The average PMPM expenditures for smoking cessation medications were approximately US\$0.15 in 2017, compared with US\$0.01–US\$0.03 between 2006 and 2013. In 2017, a total of 3164 members initiated an estimated 3850 quit attempts, most commonly using the nicotine patch (57.5%) or varenicline (32.8%). Combination therapy accounted for 2.9% of quit attempts. The median therapy duration for the nicotine patch, varenicline, and bupropion SR was 28, 30, and 33 days, respectively, and for each of these medications, fewer than half of members filled prescriptions for the minimum recommended duration of therapy.

**Conclusions** Pharmacy claims data suggest that despite comprehensive coverage, most beneficiaries are underutilizing smoking cessation agents and are not completing the recommended treatment durations.

## Key Points for Decision Makers

In a Medicaid managed care population, the nicotine patch was the most commonly used medication for smoking cessation, followed by varenicline and nicotine gum. Combination therapy was used infrequently.

Fewer than half of members who utilized the nicotine patch, sustained-release bupropion, or varenicline filled prescriptions for the manufacturers' recommended minimum duration of therapy.

Comprehensive coverage for tobacco cessation medications likely has minimal impact on overall health plan pharmacy expenditures and should be an essential benefit for Medicaid recipients.

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## 1 Introduction

As the leading known preventable cause of disease and death, tobacco use significantly impacts health outcomes, with smoking-attributable conditions accounting for an estimated 8% of all healthcare expenditures in the US [1]. Decades of research provide clear and compelling evidence that tobacco cessation treatments are cost effective, and a 2020 US Surgeon General's report strongly recommended that cessation interventions be embedded throughout the healthcare system in tandem with population-level tobacco control measures (e.g., smoke-free policies, increased tobacco taxation, anti-tobacco media campaigns, national quitline) [2]. Additionally, because reducing out-of-pocket costs for counseling and medications plays a key role in helping people to quit using tobacco, comprehensive coverage for cessation should be integrated into private and public health insurance plans [2, 3].

Smoking significantly increases costs incurred by state Medicaid programs, which provide healthcare for low-income families [1, 4]. While Medicaid coverage for smoking cessation medications has expanded in most states in the US [5], and utilization has increased at the population level [6–8], self-reported use of pharmacotherapy for cessation is low overall (29.0%) [9]. Use is similar among government (Medicaid, 32.2%; Medicare, 28.5%) and privately (29.9%) insured populations [9]. Thus far, limited research has examined patient-level changes in medication use over time and its associated economic impact on Medicaid plans [10, 11]. To inform future policy decisions regarding smoking cessation benefits for Medicaid beneficiaries, this study characterized trends in cessation medication utilization between 2006 and 2017 and estimated associated per-member per-month (PMPM) costs.

## 2 Methods

### 2.1 Design

This retrospective, longitudinal analysis of smoking cessation pharmacotherapy claims was conducted among adult members (ages 18 years or older) enrolled in a Medicaid managed care plan in California, USA. Beneficiaries had full coverage, with no co-payment, for all seven FDA-approved smoking cessation medications.

Pharmacy claims data from January 1, 2006 to December 31, 2017 were accessed to determine cost and to estimate utilization of nicotine replacement therapy (gum, lozenge, patch, inhaler, nasal spray), bupropion SR, and varenicline. Anonymized data included age, gender,

medication name, strength, dosage form, prescription fill date, and days' supply dispensed. For bupropion SR, which is also used to treat depression, only paid claims for the trade name product (Zyban) and the generic equivalent were included. The study was deemed exempt by the University of California, San Francisco Institutional Review Board.

### 2.2 Measures of Medication Utilization

The utilization of each smoking cessation medication was assessed according to an a priori classification protocol. To determine whether multiple claims comprised a single quit attempt, the calculated days' supply was examined for each medication. A 28-day grace period was allowed after the first fill date (permitting leniency between the fill date and quit date), and a 7-day grace period was granted between refills. When one or more claims occurred within the calculated time window based on fill dates and grace periods, these sequential claims were considered to be part of the same quit attempt.

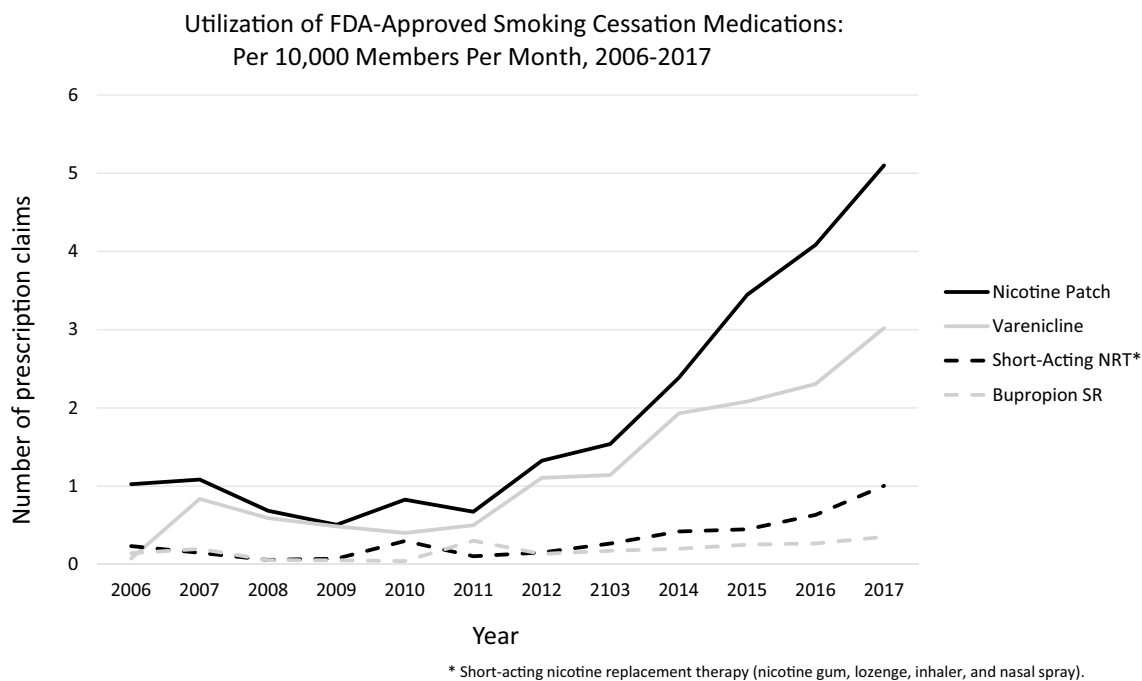
The duration of therapy, defined as the consecutive number of days' supply of medication(s) provided for a given quit attempt, was calculated for the medications with definitive once- or twice-daily dosing schedules (nicotine patch, varenicline, and bupropion SR). Each quit attempt was deemed consistent with the minimum manufacturers' treatment duration when it was at least 56 days for the nicotine patch, 49 days for bupropion SR, and 84 days for varenicline. The duration of therapy was not estimated for short-acting nicotine replacement products (gum, lozenge, inhaler, and nasal spray) due to variable dosing regimens. Use of combination therapy within the same quit attempt was defined as (a) filling prescriptions for more than one medication on the same day or (b) filling a prescription for one medication in between two prescription fills of another medication within the same quit attempt.

### 2.3 Statistical Analysis

Data analysis involved computation of summary statistics. The average annual PMPM expenditures for the plan were computed as the total amount of paid claims for smoking cessation medications per year, divided by the average number of members during that respective year.

## 3 Results

A total of 8293 members filled one or more prescriptions for a smoking cessation medication during the 12-year study period; of these, 47.7% were female, and the mean age was



**Fig. 1** Utilization of FDA-approved smoking cessation medications: per 10,000 members per month, 2006–2017

48.5 years (standard deviation, 10.8 years). Utilization of smoking cessation medications increased after 2012, with more dramatic increases since 2014 (Fig. 1). The average annual PMPM expenditures for the plan were relatively constant between 2006 and 2013 (US\$0.01–US\$0.03), increasing to a high of US\$0.15 in 2017 (Table 1).

Of an average monthly plan membership of 658,712 in 2017, a total of 3164 members initiated an estimated 3850 medication-assisted quit attempts. The most frequently prescribed medications were the nicotine patch (57.5%) and varenicline (32.8%). Nicotine gum (6.5%), bupropion SR (3.6%), nicotine lozenge (1.8%), nicotine inhaler (0.6%), and nicotine nasal spray (0.2%) were less commonly used. Combination therapy was prescribed in 2.9% of all quit attempts.

The median duration of therapy provided per quit attempt for the nicotine patch, varenicline, and bupropion SR was 28, 30, and 33 days, respectively. The proportion of members filling prescriptions that were consistent with the manufacturers' minimum recommended duration of therapy was 35.8% for the nicotine patch, 22.9% for varenicline, and 46.9% for bupropion SR.

## 4 Discussion

This study characterized utilization of smoking cessation medications in a Medicaid managed care plan in California over a period of 12 years. Beneficiaries were eligible for all FDA-approved smoking cessation medications without

barriers to treatment (i.e., no copayments, prior authorization, step-care therapy requirements, limits on duration of therapy, or annual or lifetime limits on the number of quit attempts). Despite this comprehensive benefit, the data revealed underutilization of cessation medications in general, including combination pharmacotherapy, and notable insufficiencies with respect to manufacturers' recommended durations of therapy. Specifically, in 2017 the Medicaid plan had 658,712 enrolled beneficiaries, of which 325,400 were adults. Extrapolating from a smoking prevalence of 16.2% among the adult Medicaid population in California [12], an estimated 52,700 members would have been eligible for smoking cessation services in 2017. Of these, 3164 members (6.0%) made a quit attempt using one or more smoking cessation medications. This utilization is lower than the 12–22% estimate reported for smokers in New York Medicaid managed care plans [11] and fee-for-service Medicaid beneficiaries in 37 US states (9.4%) [13], but higher than reported for Medicaid enrollees in Arkansas (4%) [10].

Effective 1 January 2014, the Affordable Care Act [14] mandated coverage for all FDA-approved smoking cessation medications, with no cost-sharing or prior authorization required for Medicaid beneficiaries. Concurrently, prescriptions for smoking cessation medications and paid claims markedly increased, with expenditures more than doubling from 2013 to 2014 and increasing annually (43.5–60.3%) thereafter. Some of the increases can be attributed to pharmaceutical industry pricing practices for branded medications (nicotine inhaler, nicotine nasal spray, varenicline)

**Table 1** Medicaid managed care plan membership and utilization information for smoking cessation medication claims (2006–2017)

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average no. of adult members	127,812	122,162	120,791	128,330	131,845	130,437	119,455	125,238	294,199	343,408	338,390	325,461
Total member months	2,690,638	2,627,157	2,784,029	3,019,786	3,312,052	3,478,734	3,525,307	4,239,315	6,016,673	7,406,051	7,996,231	7,904,547
Total paid (US\$)	37,220	50,061	33,784	27,661	36,699	45,681	89,892	131,975	347,847	557,800	795,877	1,195,731
Paid PMPM (US\$)	0.01	0.02	0.01	0.01	0.01	0.01	0.03	0.03	0.06	0.08	0.10	0.15

PMPM per member per month

with an approximate 8.1% increase in the average wholesale price for each of these medications every 6 months from 2016 to 2017 [15]. Overall expenditures and PMPM costs will likely decline substantially in the near future when generic formulations of varenicline become available. It is important to note that cost-benefit analyses reported in the literature show a favorable return on investment, with an estimated savings of US\$2.50 per dollar spent on smoking cessation medications within Medicaid populations [16]. Furthermore, the PMPM costs incurred by the health plan in 2017 for smoking cessation medications (US\$0.15) were substantially less than PMPM expenditures for medications used in the management of diabetes (US\$7.91), asthma/chronic obstructive pulmonary disease (US\$4.08), and hyperlipidemia (US\$0.57).

This study examined real-world utilization of smoking cessation therapy through the lens of pharmacy claims data. Due to the inherent limitations of claims data, predetermined assumptions were made to define quit attempts, and actual medication adherence was unobservable. Consequently, this study approximates the therapy duration with the assumption that members are adherent to all the medication(s) filled. Days' supply and duration of therapy were not quantifiable for short-acting nicotine replacement products (gum, lozenge, inhaler, and nasal spray). Furthermore, the claims data did not capture use of non-prescription nicotine replacement therapy medications that were not filled under the Medicaid benefit, although the proportion of Medicaid beneficiaries paying out-of-pocket for these medications is likely to be low.

## 5 Conclusion

Pharmacy claims data from a Medicaid managed care plan in California suggest that smoking cessation medications are underutilized among beneficiaries. Furthermore, despite comprehensive coverage, most patients do not obtain a supply of medications that is consistent with the manufacturers' recommended duration of therapy.

Smoking is a leading preventable cause of morbidity and mortality, disproportionately impacting vulnerable and underserved populations. Inclusion of comprehensive coverage for smoking cessation medications minimally impacts pharmacy expenditures, results in a positive return on investment, and should be incorporated as an essential benefit for all Medicaid health plans.

## Declarations

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