

## Smoking cessation care received by veterans with chronic obstructive pulmonary disease

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**Abstract**—Smoking is the main cause of chronic obstructive pulmonary disease (COPD), and smoking cessation is the only effective intervention to slow its progression. We examined whether smokers with COPD received more cessation services than smokers without COPD. Current smokers from 18 Veterans Health Administration primary care clinics completed baseline and 12 month follow-up surveys (baseline  $n = 1,941$ ; 12 month  $n = 1,080$ ), composed of validated questions on smoking habits, history, and attitudes; health/functional status; and sociodemographics. Both at baseline and 12 month follow-up, smokers with COPD were more likely to report that they had been advised to quit, prescribed nicotine patches, or referred to a smoking cessation program within the last year. However, the rate of quitting smoking was the same for smokers with COPD and smokers without COPD. The increase in cessation services received by smokers with COPD was noted primarily among smokers not interested in quitting. New approaches may be required, particularly to help smokers not interested in quitting.

**Key words:** chronic obstructive pulmonary disease, counseling, smoking cessation.

### INTRODUCTION

Chronic obstructive pulmonary disease (COPD), one of the top causes of morbidity and mortality in this country, is a particular problem for patients of the Veterans

Health Administration (VHA). Cigarette smoking causes the vast majority of COPD cases among VHA patients, and many of these patients continue to smoke. Since smoking cessation is the only intervention consistently shown to delay the progression of COPD, this should be a primary clinical goal for all smokers with COPD. We surveyed VHA smokers with COPD to determine whether they were receiving smoking cessation services and whether those services were effective in helping them quit smoking.

**Abbreviations:** AUDIT = Alcohol Use Disorders Identification Test, CATI = computer-assisted telephone interviewing, CES-D = Center for Epidemiologic Studies—Depression, CI = confidence interval, COPD = chronic obstructive pulmonary disease, HEDIS = Health Plan Employer Data and Information Set, IRB = Institutional Review Board, MCS = Mental Component Score, OR = odds ratio, PCS = Physical Component Score, QUITs = Quality Improvement Trial for Smoking Cessation, VHA = Veterans Health Administration.

**This material is based on work supported by the Department of Veterans Affairs Health Services Research and Development Service, grants CPG 97-002, ACDA 02907K, and HFP 94-028 (Center of Excellence for the Study of Healthcare Provider Behavior).**

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COPD is the fourth leading cause of death in the United States, responsible for approximately 122,000 deaths per year [1]. It is also responsible for a tremendous amount of morbidity, and its prevalence is increasing [2]. The total annual economic cost for COPD in the United States was estimated to be approximately \$24 billion in 1993 [3]. Worldwide, it is estimated that COPD will be the fifth leading cause of disability by the year 2020, behind ischemic heart disease, depression, traffic accidents, and cerebrovascular disease [4].

COPD is a particular problem among VHA patients, due in large part to the higher prevalence of smoking among VHA patients as compared to the general U.S. population. Based on a recent survey of approximately 880,000 users of VHA care, the rate of smoking was 33 percent in the VHA population and 23 percent in the general U.S. population [5]. COPD is one of the most common chronic conditions among VHA patients and one of the most costly [6].

Quitting smoking is the only intervention consistently effective in delaying the progression of COPD and is considered the key intervention for COPD management. In the Lung Health Study, patients with mild to moderate COPD who quit smoking had improved respiratory symptoms [7] and demonstrated a slower rate of decline in lung function as compared to smokers with no intervention [8]. The National Heart, Lung, and Blood Institute and the World Health Organization developed joint guidelines for the management of COPD. These guidelines, the Global Initiative for Chronic Obstructive Lung Disease, highlight smoking cessation as the most important intervention [9].

Current guidelines [10] recommend that all smokers be assisted in quitting. This assistance should include both smoking cessation counseling and medications. These recommendations are independent of whether the smoker is willing to attend an intensive smoking cessation program. Brief advice from the physician is effective in helping smokers to quit (odds ratio [OR] 1.69, 95% confidence interval [CI] 1.45–1.98) [11]. While intensive cessation programs may be more effective [10] and more cost-efficient [12] than counseling within primary care, many patients are unwilling to attend them [13]. In a systematic review of group programs for smoking cessation [14], Stead and Lancaster concluded that while group programs are effective, the main “drawback to group health programmes as a public health strategy is their limited reach to the smoking population. Participation

rates in a number of the studies...were low.” Furthermore, the medications are effective even with minimal or low-intensity counseling [15], with an OR of 1.7 for nicotine replacement therapy (95% CI 1.6–1.8). Therefore, in assisting smokers with quitting, brief advice and pharmacotherapy are both independently effective for smoking cessation. Health care facilities and systems need to ensure that smokers interested in quitting are counseled and offered medications [16], either by the primary care provider [11] or through an intensive cessation program [14,17]. This need is further reflected in the most recent smoking cessation quality of care measures used by the 2003 National Council for Quality Assurance’s Health Plan Employer Data and Information Set (HEDIS) [18], which assess the extent to which smokers were counseled about cessation and offered medications to help them quit.

Given its paramount role in COPD and its overall effect on mortality and other morbidity [19], helping smokers to quit should be a primary clinical goal in patients with COPD. We examined the care received by VHA smokers with COPD to determine (1) whether clinicians are effectively targeting more smoking cessation services to these patients than to smokers without COPD and (2) whether these patients are quitting smoking.

## METHODS

### Settings

To identify a population-based sample of smokers, we used an established cohort of smokers from a multi-site guideline implementation trial completed in December 2002. This group-randomized trial, the Quality Improvement Trial for Smoking Cessation (QUITS), involved participation of 18 VHA health care facilities in 5 states in the southwestern and western United States (New Mexico, Arizona, Nevada, Texas, and California). Participating facilities (including VHA medical centers and community-based outpatient clinics) were matched on size and academic affiliation and randomly assigned to serve as experimental ( $n = 9$ ) or control ( $n = 9$ ) sites in early 1999. All but one site had a smoking cessation program available on-site, and most used that as their preferred approach to helping smokers quit. An evidence-based quality improvement intervention—made up of physician and patient education, local priority setting with leadership and primary care providers, and local

adaptation of expert-designed protocols—was implemented at the experimental sites, while smoking cessation guidelines were provided to the primary care leadership at the control sites. This study was approved by the Institutional Review Board (IRB) at each participating site, as well as by each site's top administration.

### Sample Development

As part of the evaluation of the QUITs intervention, we identified a population-based sample of primary care users from each participating practice using outpatient clinic file data from the Veterans Affairs Austin Automation Center, a national data repository for all patient encounters in VHA health care facilities. Because of the system-level intent of the intervention, we identified the population of primary care patients with 1 or more visits in fiscal year 99 (1 October 1998 through 30 September 1999), the year prior to the start of the intervention. Patients with 10 or more psychiatric visits were excluded from the population of primary care users. From this total primary care practice population across all participating sites ( $n = 237,978$ ), we identified more frequent visitors (three or more visits) ( $n = 91,360$ ) as the target population for the intervention (i.e., the group of patients most likely to be exposed to a system-level intervention). We then drew random samples of patients from each site using a random number generator in SPSS for Windows and loaded the sampled patients into a telephone call database, eliminating duplicate telephone numbers, wrong time zones (e.g., East coast area codes), and wrong area codes ( $n = 36,458$ ).

Using computer-assisted telephone interviewing (CATI), we then initiated calls among the primary care patients in the telephone call database. CATI procedures randomly assigned patients from different sites to a team of 19 trained interviewers, accommodating time-zone differences across states, randomly changing call times, and tracking the disposition of each call attempt.

**Figure 1** shows the disposition of contacts based on the population screening effort to identify a representative cross-section of smokers. Among all attempted contacts ( $n = 36,458$ ), 17 percent were wrong numbers. Among successful contacts ( $n = 30,317$ ), 11 percent were ineligible (e.g., hearing-impaired, showing evidence of dementia, institutionalized, or no longer attending clinic, etc.), and 26 percent refused participation (e.g., refused consent or terminated during the survey). An additional 278 patients changed sites after the beginning of the intervention and were excluded post-hoc.

### Screening for Smoking Status

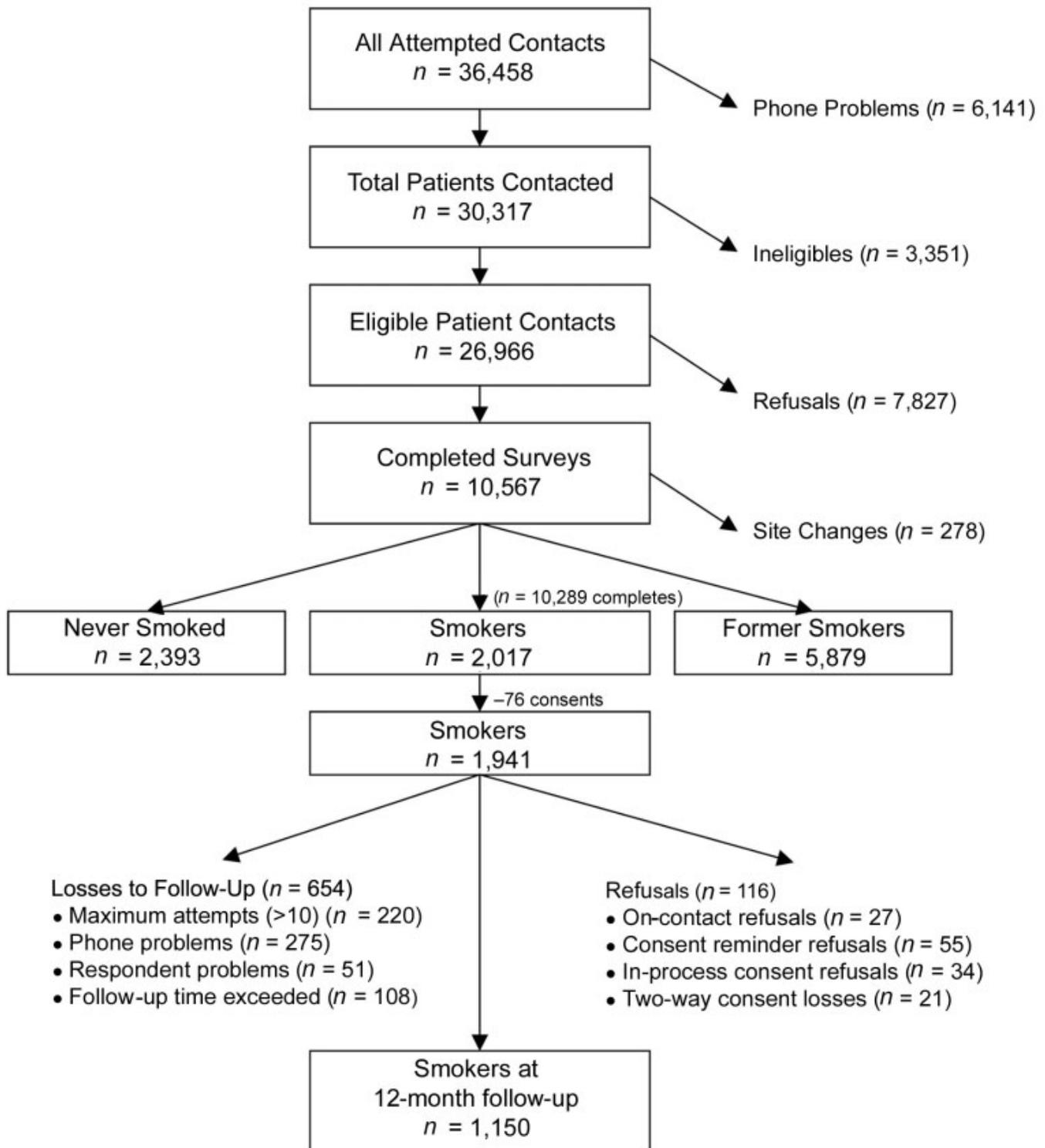
Screening questions were drawn from the California Tobacco Survey [20] and administered after a brief introductory description of the study and telephone-administered informed consent, with minor site-specific variations in language as required by each participating site's IRB. **Figure 2** shows the flow of the questions used to identify current smokers.

Among the population-based sample of primary care users, we identified 2,017 current smokers at baseline among 10,289 completed interviews (20% smokers, 57% former smokers, and 23% who had never smoked). Given the variations in consent requirements across sites (i.e., waiver of documentation, one-way mailed consent, and two-way signed consents documented in the medical record), additional cases were eliminated from the sample when signed consents were not returned even after survey completion ( $n = 76$  smokers), resulting in a final baseline cohort of 1,941 enrolled smokers.

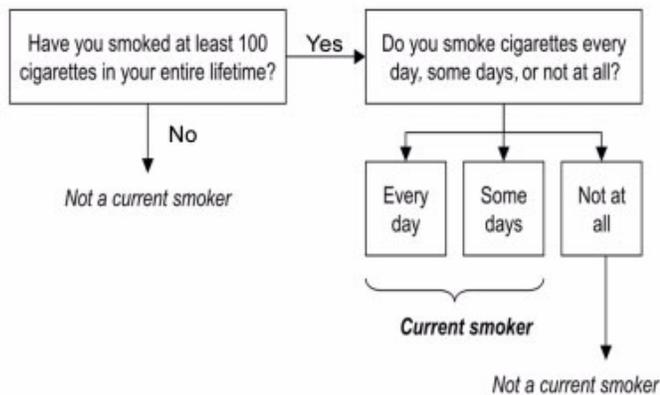
### Content of the QUITs Patient Health Questionnaire

Once a current smoker was screened positive and enrolled, interviewers administered the QUITs Patient Health Questionnaire [21]. This survey contains standardized questions in the following areas:

- Sociodemographic questions (e.g., age, gender, race-ethnicity, marital status, education, employment, income, and family/household size)
- Health and functional status (e.g., Veterans SF-12 for Physical and Mental Component Scores (PCS and MCS), Mental Health Index, Center for Epidemiologic Studies—Depression (CES-D) depression measure, restricted activity days, comorbid conditions) [22–25]
- Health insurance and use of VHA health care (e.g., receipt of public and/or private health insurance coverage, level of VHA vs. non-VHA health care use)
- Smoking history, behavior, and attitudes (e.g., age when started smoking, level of addiction, opinions about smoking's harm, stages of change—see below) [26–28]
- Health habits (e.g., Alcohol Use Disorders Identification Test (AUDIT)) [29]
- Processes of smoking cessation care (e.g., counseling, referral to smoking cessation program, receipt of pharmacological aides, self-help, etc.)



**Figure 1.**  
Establishment of cohort of smokers in VHA primary care practices.



**Figure 2.**  
Screening for smoking status.

For the purpose of these analyses, we broke patient responses into stages, as outlined by Prochaska and Diclemente [28]—precontemplation, contemplation, and preparation. Our definition of the different stages was as follows:

- Precontemplation—current smokers with no intent to quit within the next 6 months
- Contemplation—current smokers who intend to quit within the next 6 months
- Preparation—current smokers who intend to quit within the next month and who report quitting for at least 1 day within the last year

### Assessment of COPD Status

We assessed whether a smoker had COPD by asking respondents two questions: (1) whether they had ever had chronic bronchitis (yes/no) and (2) whether they had ever had emphysema (yes/no). Patients were considered to have COPD if they answered yes to either of the two questions.

### Follow-Up of Smoker Cohort (Patients with and without COPD)

Using a dynamic follow-up schedule at 12 months after the baseline interview (i.e., each patient is called on the 12 month anniversary date of their baseline participation), all enrolled smokers ( $n = 1,941$ ) were recontacted through the same CATI procedures. At the 12 month follow-up, we obtained completed surveys from 1,150 smokers (60% retention rate) (see **Figure 1**).

### Statistics

Statistical power analyses that adjust for potential cluster effects generated initial sample size estimates of 250 smokers per site for 80 percent power to detect a 10 percent difference in quit rates among experimental and control sites. However, our analysis of the true intra-class correlation coefficient using the first 3 months' survey data revealed a nonsignificant cluster effect, permitting a reduction of sample size needs to 75 patients per site to achieve the same level of statistical power.

We used multiple imputation with random hot-deck techniques [30] to impute missing values for both the baseline and follow-up survey waves. Historically, list-wise case deletion (i.e., the exclusion of a subject's entire survey) has been one of the most common methods for dealing with missing values. In complex multivariate analyses, however, this approach results in significant sample losses and statistical power, and can bias results. Multiple imputation methods address missing data issues by generating values for questions or data points for which an answer has been omitted. Preferred over mean imputation approaches (which compress the variation in survey responses), random hot-deck methods are the equivalent to a "coin flip," using random generation of an in-range response (e.g., 1–5 Likert scale range) for one or more independent variables. Multiple imputation refers to the repeated generation of imputed values in multiple data sets, followed by redundant analyses in each data set to confirm findings in a variant of a sensitivity analysis. The application of CATI methods for administering these patient surveys resulted in a very low missing data rate (1–2% across the enrolled smoker cohort); application of multiple imputation methods nonetheless assured that this low missing data rate did not in the aggregate result in further sample losses. While time-consuming and analytically intensive, multiple imputation is the standard for these types of patient surveys.

For bivariate comparisons among smokers with and without COPD, we used  $\chi^2$  tests for comparing discrete variables and analysis of variance for continuous variables. For multivariate analyses, we used logistic regression to examine the independent contribution of COPD status to smoking cessation processes of care, adjusting for other patient-level predictors, such as age, health status, level of addiction, and readiness-to-change. Specifically, we included the following variables in the regression model: COPD (yes/no), age (years), smoke within 30 minutes of awakening (yes/no), PCS on the SF-12V, MCS on

the SF-12V, duration of smoking (years), current depression (yes/no), and current alcohol abuse (yes/no). We then did another regression including the above variables plus general health (five categories) and level of exercise (four categories), to see if any effect of COPD was mediated by its effect on these two variables. ORs and 95 percent CIs for both logistic models are provided. All analyses were performed using SPSS for Windows.

## RESULTS

The demographic characteristics of VHA smokers with and without COPD are shown in **Table 1**. Smokers

with COPD were, in general, older and more sedentary. They were much more likely to report that their health was fair or poor and that it was deteriorating, and they were more likely to be depressed.

**Table 1** also includes patients' smoking history and attitudes. Smokers with COPD had a longer average duration of smoking. They were more often addicted to nicotine, based on their reporting having their first cigarette within 30 minutes of awakening. They were more likely to report that smoking was harming their own health.

In our baseline survey, we asked smokers what smoking cessation services they had received within the last 12 months (**Table 2**). Smokers with COPD were much more likely to report that a doctor or nurse had

**Table 1.**

Sociodemographic characteristics, health status, and smoking history and attitudes among smokers with and without COPD.

Characteristics of Smokers	Smokers with COPD ( <i>n</i> = 522)	Smokers without COPD ( <i>n</i> = 1,419)	<i>p</i> -Value
<b>Demographic Characteristics</b>			
Age (yr)	59.8 ± 10.8	56.2 ± 11.2	<0.001
Male	92%	94%	0.09
Caucasian	71%	62%	<0.001
High school or less education	49%	43%	0.03
<b>Health Status/Health Habits</b>			
Sedentary	48%	38%	<0.001
Body mass index	27.2 ± 6.3	27.5 ± 5.1	0.24
Health fair/poor	69%	45%	<0.001
Physical functioning* (0–100)	34 ± 12	39 ± 13	<0.001
Physical health worse than 1 year ago	44%	28%	<0.001
Short of breath when walking less than 1 block	57%	26%	<0.001
Mental functioning* (0–100)	47 ± 13	49 ± 13	0.003
Depressed (CES-D score ≥10)	47%	38%	<0.001
Emotional health worse than 1 year ago	20%	16%	0.02
Current alcohol abuse (AUDIT ≥8)	20%	16%	0.02
<b>Smoking History and Attitudes</b>			
Smoking duration (yr)	42	38	<0.001
First cigarette within 30 min of awakening	80%	68%	<0.001
Ever tried to quit smoking?	90%	86%	0.009
Quit for at least 1 day within last year	60%	58%	0.60
Smoking is harming my health	91%	84%	<0.001
Quitting smoking would be more difficult for me than for the average person	60%	43%	<0.001
Do you think you have problems caused by smoking?	86%	68%	<0.001

\*Physical and mental functioning were measured using the Physical and Mental Component Scores of the Veterans SF-12 [24]. The range for both is 0–100, with 50 representing average functioning

CES-D = Center for Epidemiologic Studies for Depression scale

AUDIT = Alcohol Use Disorders Identification Test

**Table 2.**  
Smoking cessation services received at baseline by smokers with and without COPD.

Smoking Cessation Services Received	Smokers with COPD (%) (n = 522)	Smokers without COPD (%) (n = 1,419)	Odds Ratio (95% Confidence Interval)
Doctor/nurse talked to me about quitting within last year	74	64	1.6 (1.3–2.0)
Doctor referred me to a smoking cessation program within last year	36	26	1.6 (1.3–2.0)
Attended smoking cessation program within last year	12	9	1.4 (1.01–1.9)
Doctor prescribed nicotine patches within last year	32	22	1.7 (1.4–2.1)
Doctor prescribed nicotine gum within last year	10	6	1.6 (1.1–2.3)

talked with them about smoking cessation, and that the doctor referred them to a smoking cessation clinic within the last year. Smokers with COPD were also much more likely to have received a prescription for nicotine patches or nicotine gum within the last year.

**Table 3** shows the results of the 12 month follow-up survey. They are quite similar to those at baseline, with smokers with COPD reporting more counseling, referral, and receipt of smoking cessation medications. Notably, the rate of quit attempts lasting at least 1 day was the same between the two groups, as was the actual rate of smoking cessation (9.2 vs. 9.0%). Among the 724 patients at follow-up who reported receiving smoking cessation counseling, more patients with COPD tried to quit (57 vs. 50%), but there was no difference between patients with or without COPD in quitting for at least 1 day (44 vs. 43%) or in actually quitting smoking (6.4 vs. 7.1%). A similar pattern was observed among the 277 patients who, at follow-up, reported having received nicotine patches. Patients with

COPD were slightly more likely to report having tried to quit (64 vs. 58%), but were no more likely to report quitting for a day (52 vs. 49%) or actually quitting (7.8 vs. 10.9%). The comparable rates among the 129 patients who attended a smoking cessation program were 88 versus 83 percent for trying to quit, 74 versus 73 percent for quitting for at least 1 day, and 11.9 versus 17.2 percent for actually quitting.

We also looked at how these smoking cessation services varied based upon the patient's level of interest in quitting (**Table 4**). Among smokers not interested in quitting smoking at baseline (precontemplation stage), those with COPD consistently reported receiving more smoking cessation services at follow-up than those without COPD. The same pattern was not observed for smokers in the contemplation or preparation stages.

We used logistic regression to determine which factors were independently associated at baseline with reporting having received smoking cessation services. Factors independently associated with reporting that a doctor or nurse

**Table 3.**  
12 month follow-up survey of smoking cessation services received by smokers with and without COPD at baseline.

Smoking Cessation Services Received	Smokers with COPD (%) (n = 306)	Smokers without COPD (%) (n = 774)	Odds Ratio (95% Confidence Interval)
Doctor or nurse talked to me about quitting smoking within last year	76	63	1.8 (1.4–2.5)
Doctor referred me to a smoking cessation program within last year	34	25	1.6 (1.2–2.1)
Attended smoking cessation program within last year	14	11	1.3 (0.8–1.9)
Doctor prescribed nicotine patches within last year	33	23	1.7 (1.3–2.3)
Doctor prescribed nicotine gum within last year	10	5	1.9 (1.1–3.1)
Tried to quit smoking within the last year	54	48	1.3 (0.97–1.7)
Quit for at least 1 day within the last year	43	41	1.06 (0.8–1.4)
Nonsmokers at 1-year follow-up*	9.2	9.0	1.01 (0.6–1.6)

\*Patients were considered nonsmokers at 1-year follow-up if they reported not smoking any cigarettes in the prior 30 days.

**Table 4.**

Smoking cessation services received at followup by smokers with and without COPD by level of interest in quitting at baseline.\*

Smoking Cessation Services Received	Smokers with COPD (%) ( <i>n</i> = 522)	Smokers without COPD (%) ( <i>n</i> =1,419)	<i>p</i> -Value
Doctor/nurse talked to me about quitting within last year			
Precontemplation	75	60	<0.001
Contemplation	77	70	0.29
Preparation	86	58	0.017
Doctor prescribed nicotine patches within last year			
Precontemplation	32	22	0.003
Contemplation	32	23	0.10
Preparation	46	28	0.14
Doctor referred me to a smoking cessation program within last year			
Precontemplation	33	21	0.001
Contemplation	35	31	0.47
Preparation	41	23	0.11
Attended smoking cessation program within last year			
Precontemplation	12	8	0.13
Contemplation	13	17	0.36
Preparation	36	9	0.003
Tried to quit smoking within last year			
Precontemplation	48	37	0.009
Contemplation	60	60	0.87
Preparation	91	84	0.44
Nonsmokers at 12 month follow-up			
Precontemplation	10	6	0.11
Contemplation	6	11	0.28
Preparation	14	25	0.29

\*Level of interest in quitting was assessed by two questions: intent to quit within the next 6 months and whether the smoker had tried to quit within the last year. The different stages (and sample sizes) are precontemplation (*n* = 660): no intent to quit within the next 6 months; contemplation (*n* = 341): intends to quit within the next 6 months; and preparation (*n* = 79): intends to quit within the next 30 days and has quit for at least 24 hours within the prior year.

had discussed smoking cessation were COPD (OR 1.5, 95% CI 1.2–1.9), nicotine addiction (OR 1.5, 95% CI 1.2–1.8), and better mental health as indicated by a higher MCS on the SF-12V (OR 1.01, 95% CI 1.00–1.02). For receiving a prescription for nicotine patches within the last year, comparable factors were COPD (OR 1.6, 95% CI 1.2–2.0), and nicotine addiction (OR 1.4, 95% CI 1.1–1.8). Factors independently associated with reporting referral to a smoking cessation program within the last year were COPD (OR 1.6, 95% CI 1.3–2.0) and nicotine addiction (OR 1.4, 95% CI 1.1–1.8).

## DISCUSSION

Smokers with COPD consistently reported receiving more smoking cessation services than smokers who did not

have COPD. This included (both at baseline and 12-month follow-up) being counseled about cessation, receiving nicotine replacement therapy, and being referred to a smoking cessation program. Among all smokers, factors that were independently associated with reporting receiving each of these services were COPD and nicotine addiction. In spite of receiving more smoking cessation services, smokers with COPD were no more likely to quit smoking than smokers without COPD.

These findings are both good news and bad news. The good news is that clinicians were effective at targeting smoking cessation services to smokers with COPD, whose disease gives them a particular need to quit. This is consistent with previous results we have reported [31], showing that clinicians do tend to target preventive care based on the patient's medical condition.

Unfortunately, there is also bad news. First, these extra smoking cessation services received had no impact on cessation, as quit rates at the 12-month follow-up were quite similar to those at baseline. Second, even though smokers with COPD reported receiving more smoking cessation services, there was much room for improvement. Turning the results around and examining what smokers with COPD did not report receiving, we find that 26 percent were not advised to quit, 65 to 70 percent did not receive nicotine replacement therapy, and about 65 percent were not referred to a smoking cessation program. While smoking cessation medications and referral may not be appropriate for patients in the precontemplation stage, these same patterns were seen in smokers in the contemplation and preparation stages, where such measures are recommended. It is possible that many smokers using the VHA may be trying to quit on their own, which would make assisting them considerably more difficult. National guidelines for smoking cessation [10] and quality of care measures [18] state that all patients who are trying to quit smoking should be offered medications to assist them. Among the approximately 880,000 patients surveyed in the VHA Large Health Survey of Enrollees [5], the overwhelming majority of smokers trying to quit reported that they did not receive the services from the VHA they needed to help them quit. Unfortunately, no data are available at this time to indicate what services these patients felt were missing, which makes it difficult to design interventions to address this need. Additional data are currently being collected to further elucidate this gap between desired services and actual care, and it is likely that a large component will be that these patients want medications to help them with smoking cessation.

The equal cessation rate among those with COPD and those without COPD bears further discussion. As mentioned above, we have previously found [31] that providers do target behavior modification counseling based on the patient's underlying medical conditions (including COPD), which should increase the cessation rate. On the other hand, patients with COPD were more likely to be depressed, were less educated, and were more likely to feel that quitting would be more difficult for them than for the average person. All these factors make them less likely to succeed at quitting smoking. Thus, the equal cessation rate between the two groups may well reflect these opposing influences. Helping smokers with COPD to quit may require even more attention to these factors that make cessation more difficult.

Our data have several limitations. First, our sample included only patients of the VHA in the southwestern and western United States and thus may not be generalizable to other parts of the country or other patient populations. VHA patients tend to be older and have more chronic diseases than most patient populations.

A second limitation is that we relied on patients to self-report on the smoking cessation services they received. It is possible that smokers with COPD, who are more likely to report that smoking is harming their health, are simply more likely to remember receiving these services. If the results were only for smoking cessation counseling, we would be more concerned about this recall bias. However, our clinical experience suggests that recall bias should be less important for reporting receiving nicotine replacement or being referred, both of which were more common among smokers with COPD.

Similarly, we also determined the presence or absence of COPD by patient self-report. It is likely that there is some misclassification, including both false negatives and false positives. This would tend to decrease the chance of finding a significant difference. Therefore, our positive findings probably underestimate the true difference between smokers with and without COPD. However, in actuality, the degree of misclassification is likely to be rather small, as Straus et al. [32] found that a self-reported history of COPD was very accurate (likelihood ratio 5.6).

A third limitation is response bias, as people who responded to the baseline survey may differ from those who declined to participate or could not be reached. The same potential for response bias exists with the follow-up survey. In order for a response bias to exist, smokers with COPD would have to respond at a different rate than smokers without COPD. For the baseline survey, the largest group of nonrespondents were those who could not be reached. It is unlikely that these patients would bias the results, as they knew nothing about the survey. About 29 percent of those eligible chose not to participate and so could potentially bias the results, but we know of no reason why patients with COPD should respond differentially. We also lost respondents between the baseline and follow-up surveys, but the fact that our baseline and follow-up results were so similar makes response bias seem less likely. In addition, we applied sampling weights to the members of the smoker cohort to adjust for potential biases due to sample enrollment and attrition at the 12-month follow-up. However, since sample weights made little difference in the comparisons under study, we opted to present the

unweighted data to facilitate understanding of the direct means and proportions represented by the data (as opposed to weighted means and proportions). Furthermore, because the intervention under study was at the level of the entire primary care practice, we designed the group-randomized trial to screen and draw from a random sample of the entire primary care population of users. The eligible contact population (as shown in **Figure 1**) ( $n = 26,966$ ) and subsequent refusal rate ( $n = 7,827$ , or 29%) represent refusals among the entire primary care user random sample and not a refusal rate among smokers. While we were able to discern eligibility at this stage of screening through the telephone contact and initial introduction to the study (e.g., patient was institutionalized, died, was too hard of hearing to participate, etc.), we could not discern their smoking status unless the entire screening instrument was completed. These refusals represent a preponderance of non- and former smokers based on the estimated prevalence of smoking in the VHA population [5]. While it is possible that they are sicker and thus unwilling to participate, their sickness and comorbidity may not be smoking related.

Finally, our results do not necessarily apply to all patient populations. We sampled patients with at least three primary care visits over the previous year and excluded patients with more than 10 mental health visits. Little is known about which, if any, smoking cessation services COPD patients receive outside the primary care setting and whether they are any more or less effective. Including patients with frequent mental health visits would have decreased a chance of finding a difference in quit rate between the two groups, as these patients are less likely to successfully quit smoking [33]. In addition, over 90 percent of our sample was male, which limits our ability to draw conclusions about the extent to which these results may differ between men and women.

Our results suggest several opportunities for improving the care we deliver to smokers with COPD. First, we can increase the number of smoking cessation services received by smokers both with and without COPD. For instance, only about half of the smokers who tried to quit within the prior 12 months received a prescription for nicotine replacement therapy, and the remaining subjects might have benefited from such a prescription. While sampling differences preclude a direct comparison between the baseline and follow-up surveys, there does not appear to have been an improvement in the rate of providing medications or other smoking cessation services. A second opportunity is that the extra care received

by COPD patients tended to go to those in the precontemplation stage. Additional care should be targeted also to those in the contemplation and preparation stages, as they are already interested in quitting. Third, new programs need to be developed to help smokers (both with and without COPD) in the precontemplation stage become interested in quitting.

## CONCLUSION

Clinicians effectively target additional smoking cessation services to smokers with COPD, but it does not appear to yield any additional benefit with respect to smoking cessation. This information can help to characterize the care being delivered to these patients and thereby present opportunities to develop new approaches to help them quit smoking.

## ACKNOWLEDGMENTS

The authors would like to acknowledge Maria Gutierrez-Najar for her work in typing this manuscript and conducting the telephone interviews; Barbara Simon, MA, for survey expertise; Sharron Reynolds, RN, for supervising the Telephone Call Center and ensuring a high response rate; and Rebecca Saia, Cynthia Gamage, Tierney Caldwell, and Deborah Contreras and the other Telephone Call Center staff members for conducting thousands of telephone interviews.

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Submitted for publication January 18, 2003. Accepted in revised form May 14, 2003.