

Including Smoking Status as a New Vital Sign: It Works!

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Background. Despite the adverse health consequences of smoking, many physicians still neglect to counsel smokers to quit. This study evaluated the effect of including smoking status as a vital sign on the frequency of physician discussions with patients about smoking and physician advice to quit smoking.

Methods. A consecutive sample of adult ambulatory patients in our metropolitan family practice residency program completed exit surveys on physician and nurse counseling about smoking. Control group data were collected for 1 month before the change was made to include smoking status as a vital sign on patient charts. Charts were then marked with a stamp as a chart prompt in the vital signs section. Data were collected for 2 months after smoking status was added to the stamp.

Results. There were 637 individuals surveyed, of whom 179 were current smokers; 95 in the "prestamp" group

and 84 in the "poststamp" group. The percentage of patient-physician encounters during which smoking was discussed increased from 47% to 86% ($P<.001$). Physician advice to quit increased from 50% to 80% ($P<.001$). Physician discussion of smoking with patients increased across all of the five stages of change but most dramatically (53% to 95%) in the "preparation" stage. Physicians were much less likely to counsel patients in the "precontemplation" stage to quit smoking.

Conclusions. Including smoking as a new vital sign significantly increased the likelihood of smoking-related discussions between patients and their physicians. The stamp is inexpensive and easy to use, and because it is a one-time office system change, it is more likely to be implemented and maintained in busy practices.

Key words. Smoking; family practice; counseling; reminder systems; preventive health services. (*J Fam Pract* 1995; 40:556-561)

Although cigarette smoking is the number 1 preventable cause of death in the United States, physicians often neglect to counsel smokers about quitting. Frank et al¹ identified 2710 smokers in a large, population-based survey beginning in 1979 and ending in 1990. Only 49% reported that their physicians had ever advised them to stop smoking. In the large 1991 National Health Interview Survey (N=43,732), 70% reported at least one outpatient visit, but only 37% of smokers reported having been ad-

vised by a health care professional to quit smoking during the preceding year.²

The suffering imposed by the tobacco epidemic merits more effective proactive preventive efforts by physicians. In 1991, Richards³ proposed measuring smoking status as a vital sign at each office visit. He underscored that asking "Do you use tobacco?" is a simple, cost-effective screening tool to identify patients at risk for cancer and cardiovascular disease. In a subsequent commentary in *The Journal of the American Medical Association*, Fiore⁴ stated that "adding smoking status as a new vital sign will provide the institutional framework by which the epidemic of tobacco use can be universally confronted."

Chart reminders are one well-documented method of enabling physicians to incorporate smoking status screening into office practice. Although chart reminders have demonstrated a robust effect on physician smoking-related counseling⁵ and patient quit rates, they have not proved successful in all settings. Cohen et al^{5,6} found that

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chart reminders increased the rate of physician inquiries about smoking from 41% to 75% and the rate of 1-year patient quit rates from 1.5% to 7.9%. By contrast, Cummings et al⁷ found that chart reminders did not significantly increase physician inquiries about smoking (50% with stickers vs 45% without) and produced only minimally increased quit rates ranging from 2.0% to 3.4%. Because of staff turnover and time constraints, only 31% of the clinics in the study by Cummings and associates⁷ regularly used the chart stickers, whereas Cohen et al^{5,6} used research assistants to maintain the chart-reminder system. For typically staffed, busy ambulatory practices, chart reminders are cumbersome. By contrast, adding smoking status to the vital signs stamp used on patient charts is a simple, one-time office system change that is more likely to be implemented and maintained in busy practices.

Another potential benefit of elevating smoking status to the level of a vital sign is that it may help physicians advance smokers through the stages of change⁸ and to identify patients who are most ready to quit. The Stages of Change model, outlined by Prochaska and DiClemente,⁸ portrays behavior change as a progression through five well-defined stages: precontemplation, contemplation, preparation, action, and maintenance. As smokers advance through the stages of change, they are more likely to consider, attempt, and succeed at smoking cessation.⁹ Repeatedly addressing smoking may help patients advance through the stages and increase opportunities for counseling patients about smoking.¹⁰ Adding smoking status to the vital sign process could promote this repetitive, specific intervention.

This paper examines how adding one question about smoking status to the vital signs stamp affects the rate at which physicians discuss smoking with patients, advise smokers to quit, and counsel smokers in the various stages of change.

Methods

This was a prospective before-after trial of physicians providing ambulatory primary care at a family practice center that serves as a training site for an 18-resident, metropolitan, university-affiliated family practice residency program. In this program, a large percentage of patients are seen by second- and third-year family practice residents rotating through the center on a 3-month family practice experience. During the months this study was performed, the three physicians on family practice rotation accounted for 43% of the total patient visits. The remaining patients were seen by full-time family physician faculty members or by other family practice residents. This study was de-

signed so that all data would be collected within one 3-month family practice rotation. Before the stamp reminder to include smoking as a vital sign was used on patient charts, no chart identification or reminder systems for patient smoking status were being used.

The target patient population consisted of all patients over the age of 18 who presented to our billing clerk as they left the family practice center. Eligible patients were asked to describe their current smoking status as "current," "former," or "never." Current smokers were defined as all respondents who reported smoking as little as a puff in the previous 7 days. No attempt was made to biochemically verify the smoking status of responders. Patients who identified themselves as current tobacco users were asked to complete an 11-item questionnaire that included questions about age of onset of regular smoking, number of cigarettes smoked per day, future quitting plans, number of 24-hour quit attempts in the previous year, whether their physician or nurse had talked to them about smoking, and whether their physician had advised them to quit.

Stage of Change

Using reported smoking history data, investigators determined each patient's stage of change. Each stage represents a period of time and a set of tasks to be completed in the behavior change process.^{8,9} In the earliest stage, *precontemplation*, smokers are not yet convinced that the adverse effects of smoking outweigh the benefits of quitting and are not considering stopping in the next 6 months. In the next stage, *contemplation*, smokers are evaluating the losses and rewards associated with quitting and are considering quitting within the next 6 months. The third stage, *preparation*, is characterized by a readiness to take action demonstrated by plans to quit within the next 30 days and having made at least one 24-hour quit attempt in the most recent year. Preparation stage smokers are most receptive to physician cessation advice, self-help materials, group referral, and pharmacologic aids, such as nicotine replacement therapy. Smokers currently in the midst of a quit attempt are considered to be in the *action* stage, and those who have been successful for 6 months are classified in the *maintenance* stage.

Data Collection and Group Assignments

Data were collected for 1 month before and 2 months after introducing the new vital sign stamp (Figure 1). Patients completing surveys before the new stamp was implemented constituted the "prestamp" group; those surveyed after the stamp was initiated served as the "post-

WT ____ HT ____ BP ____ TEMP ____ PULSE ____

CC: _____

Smoking Status: Current Former Never
(Circle)

Figure 1. The new vital sign stamp that includes patient smoking status. Data were collected 1 month before and 2 months after introducing the new vital sign stamp.

stamp" group. Patients making multiple visits were asked to complete only one survey. If patients completed more than one survey, only the first was analyzed. No attempt was made to contact nonresponders.

Old vital sign stamps were removed from the office on the date the stamp was changed, and the new stamp was used for all subsequent patient visits. The only difference between the new and old stamps was the addition of smoking status information. Members of the nursing staff were given a 10-minute inservice session on the new stamp, during which they were instructed to ask patients to indicate their smoking status each time they took vital signs and then to circle the appropriate response on the chart (Figure 1). Nurses and physicians were informed that the rationale behind the stamp change was to encourage smoking-cessation counseling based on expert recommendations.^{3,4,11,12} No group training or formal smoking-cessation training was conducted. Participating physicians were not informed of the exit survey, which was discreetly administered in our billing alcove. No other attempt was made to blind physicians to the study design.

Controlling for Smoking-Related Illness

Previous research has shown that the presence of a smoking-related illness increases the likelihood that physicians address smoking.^{1,2} To control for this potential confounder, the computerized medical problem list of each respondent was reviewed to ascertain whether the patient had an established smoking-related illness. The following disease categories were considered smoking-related: cancer, ischemic heart disease, congestive heart failure, cardiac arrhythmias, peripheral vascular disease, cerebrovascular disease, sinusitis, acute and chronic bronchitis, reactive airways disease, chronic obstructive pulmonary disease, dyspepsia with or without ulcer, and cervical dysplasia.

To determine whether physician and nurse behavior changes persisted after the novelty of the new stamp waned, a follow-up survey using the same method and instrument was initiated 3 months after the stamp was originally implemented.

Statistics

Patient demographics and health professional behaviors were reported by means of descriptive statistics. Pre- and poststamp comparisons were made using two-tailed *t* tests for continuous variables and chi-square analysis for categorical variables. The Wilcoxon rank-sum test was used when the data were not normally distributed. A *P* value of $<.05$ was considered statistically significant. Multiple logistic regression was used to examine the relationship between the study period, potential confounding variables, and the outcome of physician discussion about smoking behavior with the patient. A *P* value of $<.05$ was required for the variable to be included and retained in the model.

A power analysis was performed based on anticipated response to the question, "Did the doctor talk to you today about smoking?" Assuming a 50% prestamp "yes" response, a 90% poststamp "yes" response, an 80% power, and an alpha level of .05, the required sample size was 31 smokers for each study group.

Results

In this study, 637 patients were surveyed, beginning April 1, 1993, and ending June 25, 1993. The prestamp group included 398 patients; the poststamp group, 239. The two groups were similar in age (44.5 years \pm 16.8 vs 44.3 \pm 16.2) and sex (79% vs 74% women), but were significantly different in smoking status ($P<.01$). The prestamp group had fewer current smokers (24% vs 35%) and a greater number of former smokers than did the poststamp group (12% vs 5%, respectively).

The Table shows smoking characteristics of current smokers included in the study. There were no significant differences in age smoking began, number of cigarettes smoked per day, or presence of a smoking-related illness. Prestamp smokers had a greater number of previous quit attempts than did the poststamp group ($P<.01$). The significant stage of change difference between groups was primarily the result of a larger proportion of poststamp smokers in the preparation stage and fewer in the precontemplation and contemplation stages.

Fourteen residents, three faculty, and one fellow, all nonsmokers, saw at least one surveyed smoker before and after the new stamp was implemented, for a total of 172 of the 179 (96%) smokers surveyed. The 7 smokers excluded from this analysis were cared for by providers who did not see at least one smoker in both study periods. After the new vital sign was introduced, the likelihood of physicians counseling about smoking increased from 47% to 86% ($P<.001$).

Table. Smoking characteristics of Current Smokers, by Study Group

Characteristic	Prestamp Group (n=95)	Poststamp Group (n=84)	P Value
Mean age smoking began, $y \pm SD^*$	18.1 \pm 5.5	17.5 \pm 3.7	NS
Mean no. of cigarettes smoked per day, $\pm SD^*$	15.0 \pm 12.0	13.3 \pm 8.5	NS
Mean no. of times attempted to quit, $\pm SD^*$	4.3 \pm 11.1	2.0 \pm 4.8	<.01†
Smoking-related illnesses, %	31	29	NS
Stage of change, %‡			
Precontemplation	23	17	
Contemplation	46	27	<.01
Preparation	28	52	
Action	2	4	

*Not all individuals completed the entire smoking data section.

†Wilcoxon rank-sum used to determine significant difference.

‡Based on Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. In: Hersen M, Eisler RM, Miller PM, eds. *Progress in behavior modification*. Sycamore, Ill: Sycamore Publishing Co, 1992:184-214.

SD denotes standard deviation; NS, not significant.

The percentage of smokers reporting that their physician discussed smoking with them during the office visit nearly doubled from 47% before the stamp to 86% after the stamp ($P < .001$). The percentage of smokers reporting that their physician advised them to quit increased from 50% before to 80% following the institution of smoking status as a vital sign ($P < .001$). The percentage of smokers reporting that a nurse had discussed smoking with them increased from 23% before the new stamp to 77% afterward ($P < .001$).

Stage of Change Interaction

Figure 2 compares the percentage of pre- and poststamp smokers reporting that their physician discussed smoking with them according to the individual smoker's stage of change. Counseling rates increased to a greater degree among smokers in the preparation and action stages of

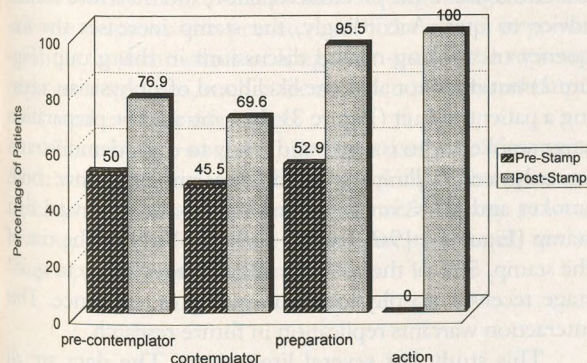


Figure 2. Physician counseling rates, by stage of change and study group.

change; however, action stage data should be interpreted cautiously, as there were only five smokers in this stage. Figure 3 presents the same analysis for percentage of smokers advised by their physician to quit. The new vital sign stamp progressively increased the percentage of smokers in the contemplation, preparation, and action stages who were advised to quit, but it had no effect on precontemplators.

Multiple logistic regression was used to examine the association between the study group period, potential confounding variables, and outcome of whether the physician discussed smoking with the patient. The potential confounders used in the stepwise procedure were: sex, age, presence of a smoking-related illness, number of cigarettes currently being smoked daily, the age at which the patient started smoking, number of previous quit attempts, and stage of change. The only variables that contributed significantly to predicting whether the physician would talk with a smoker about smoking was placement of the patient in the poststamp period rather than the

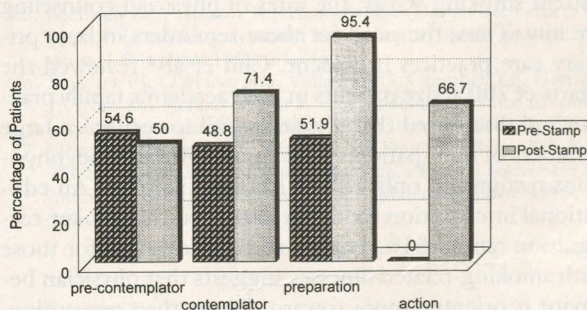


Figure 3. Percentage of patients advised to quit smoking, by study group and stage of change.

prestamp period (odds ratio [OR]=5.3; 95% confidence interval [CI]=2.5 to 11.2) and patient status in the preparation stage of change (OR=2.3; 95% CI=1.1 to 4.9). A similar analysis of physician advice to quit yielded identical results.

There were 62 patients in the 3-month follow-up group surveyed to test the persistence of the stamp effect: 12 smokers, 41 patients who had never smoked, and 9 former smokers. Among the patients who smoked, 92% reported that their physicians had discussed smoking with them, and 83% reported that their physician had talked with them about quitting.

Discussion

At our family practice center, we have added smoking status as a vital sign equivalent to blood pressure, weight, and temperature, which is routinely assessed at the beginning of every ambulatory patient visit. During the prestamp period, 50% of smokers reported that their physician had advised them to quit smoking. This rate is consistent with the 49% noted by Frank et al¹ and suggests that, without a chart prompt, the odds of smoking-related discussions occurring in a busy office practice are equal to that of a coin toss. After the institution of the new vital sign stamp, 86% of smoking patients were counseled by their physicians regarding their smoking habits, and 80% of smoking patients reported that their physician advised them to quit. This simple, inexpensive (approximately \$10 per stamp) intervention dramatically increased the likelihood that physicians would address smoking behavior with patients. The 3-month follow-up survey revealed a persistent, positive effect on physician behavior even after the novelty of the stamp had worn off.

In one survey, 99% of recently trained family physicians reported that counseling about smoking was a physician's responsibility and should be done regardless of whether a smoking-related illness was present.¹³ However, our study confirms that without reminders about patient smoking status, the rates of physician counseling are low. Thus, the need for these reminders in busy primary care practices is evident. Chu et al¹⁴ reviewed the charts of 700 active patients in their academic family practice and discovered that physicians fail to recognize large numbers of their patients who smoke. At baseline, physicians recognized only 18% of smoking patients. An educational intervention modestly improved the smoker-recognition rate to 51%. Higher recognition rates for those with smoking-related illnesses suggests that physician behavior is oriented more toward disease than prevention. Compared with chart reminders, educational interventions have yielded only modest effects on counseling rates.

McIlvain and colleagues¹⁵ found that a training program in smoking-cessation counseling did not result in lasting change in resident physician behavior. However, compared with clinics without chart reminders, those that utilized them yielded higher counseling rates at 3 months (76% vs 50%) and at 6 months (56% vs 33%) following the training.

Our stage-of-change analysis showed improvement in the percentage of patients who engaged in discussions about smoking with their physicians across all the stages (Figure 2). In the prestamp period, the likelihood of physician-patient discussion of smoking behaviors was approximately 50% for each stage of change. This rate increased to as high as 96% in the poststamp period for patients in the preparation stage. However, the percentage of patients reporting having received advice to quit from physicians in the poststamp period did not improve for all stages of change. Only 50% of patients classified as precontemplators reported receiving advice to quit from their physicians.

Several explanations for this trend are possible. In some cases, physicians may have sensed a smoker's lack of readiness to consider quitting (precontemplation stage) and elected not to broach the subject, or patient resistance to the suggestion about quitting could have resulted in a failure to recall physician advice when asked about it in the survey. After the new stamp was initiated, patients in the preparation stage reported a 95% rate of receiving advice to quit. These patients seemed to be more receptive to physician advice based on the lower rates of counseling in the contemplation and precontemplation stages following initiation of the new stamp (Figures 2 and 3). We believe this is the first demonstration of this interaction between smoker stage of change and primary care physician counseling rates. Our results suggest a interactive "dance" between smoker and physician. Considering the precontemplators first, we theorize that the physician, cued by the new vital sign to address smoking, does so, and in the process, is quickly able to assess the denial and resistance of the precontemplator, and therefore curtails advice to quit. Accordingly, the stamp increases the frequency of smoking-related discussions in this group (Figure 2) but does not alter the likelihood of a physician advising a patient to quit (Figure 3). In contrast, the preparation stage smoker, who is eager and ready to quit, demonstrates an enhanced willingness to discuss smoking once both smoker and physician are prompted by the new vital sign stamp (Figures 2 [96%] and 3 [95%]). Without the cue of the stamp, 50% of the smokers in this "most ready to quit" stage received no physician counseling or assistance. This interaction warrants replication in future research.

This study has several limitations. The data are all self-reported by patients, and therefore subject to problems inherent in patient recall. However, patients were

surveyed in a timely fashion as they exited the family practice center, and there was no reason that this recall bias should have differed according to group placement. Accordingly, this nondifferential bias would not affect the study findings. There was no objective measure of smoking status, such as cotinine levels, and there were no data collected on exiting patients who declined to complete the survey instrument. As with the recall bias, the investigators had no reason to believe that any of these potential measurement errors would have differed by study group. This study did not allow investigators to determine the type of smoking-cessation counseling that took place during the visit, such as negotiated quit dates, the offering of self-help materials, discussions about barriers and resources for quitting, smoking group (eg, American Lung Association) referral, or arranged follow-up support. Strecher and colleagues¹⁶ have demonstrated that chart prompts increased the rate of resident physician advice to quit smoking but did not increase resident use of specific minimal-contact smoking-cessation interventions. Residency programs must continue to supplement the new vital sign with training on how to effectively counsel smokers. In addition, further research on how to counsel precontemplation stage smokers seems warranted.

Our findings are substantiated by similar research recently published by Fiore and colleagues.¹⁷ Using the same smoking status vital sign, smoking discussions increased from 49% to 70% ($P < .01$) among 245 smokers attending their academic general internal medicine clinic.

In this prospective study of this simple intervention, we received no complaints from patients, physicians, or staff regarding the institution of the new stamp, which remains a part of our daily practice. The data show a dramatic and significant increase in physician intervention with smokers and a newly discovered interaction between smoker stage of change and physician counseling rates. Future research on the inclusion of smoking status as a new vital sign should address the following: replication of these results in a nonacademic setting, long-term follow-up to prove the persistence of the effects beyond 3 months, and the effect of long-term use of the new vital sign on outcomes, such as cessation rates, quit attempts, and smoker stage of change.

The stamp successfully increases the frequency with which physicians address smoking, is inexpensive, is easy to use, and is easily adaptable to any practice setting. We recommend its consideration by all ambulatory practices caring for smokers.

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Finding time for smoking cessation counseling is a challenge in a busy office practice. We have developed a strategy for physicians to use in assisting their patients' smoking cessation efforts. Figure 1, Smoking Cessation and Relapse Prevention Guidelines, includes six steps physicians can follow in helping their patients quit smoking. These guidelines are based on the four A's, Asks, Advice, Assist, and Arrange follow-up, of the National Cancer Institute's manual "How to Help Your Patients Stop Smoking,"¹ and two additional A's of the Doctors Ought to Care (DOC) model of medical activism: Assess readiness and motivation to quit and Activate.² The Smoking Cessation Strategic Planning Chart (Figure 2) prompts a comprehensive approach to smoking cessation and decreases charting time.

Integrating this guide into practice is simple. When taking a patient's vital signs, ask if the patient smokes.³ If the answer is yes, the planning chart is placed with the patient's medical chart to be completed by the physician and patient. Asking about health problems reinforces the benefits of quitting. Information about the patient's household is useful for discussing passive smoking and obtaining social support to quit. Identifying triggers, such as stress, alcohol, and socializing, can be useful in planning alternative activities. Choosing a specific quit date is important. Quitting "cold turkey" is better than tapering. Encourage a quit date within a week or 2, unless a significant date, such as a birthday, anniversary, or July 4th, is close.

Nicotine replacement may be beneficial in carefully selected individuals. Patients should understand that it

(1) is not a miracle cure, (2) is not a long-term medication, (3) must be used correctly, (4) should not be used while continuing to smoke, and (5) should not be shared with others. Follow-up appointments also increase quit rates.⁴ Follow-up contact is as essential for treating tobacco addiction as for treating hypertension and other chronic conditions.

Using DOC strategies in the office to "activate" patient anger at the tobacco industry is very useful.⁵ Often, when patients see they have been "duped," they will work harder to gain back the control they have lost to tobacco.

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Smoking Cessation and Relapse Prevention Guidelines

- I. **ASK** all patients about tobacco use. Document on the chart.
- II. **ADVISE** all patients to quit *now*.
- III. **ASSESS** readiness and motivation to quit.
 1. Identify individual **reasons for quitting**. Personalize risks, create and use teachable moments, frame in terms of looks, money, and health.
 2. Obtain tobacco use history. "What **brand** do you buy? How much do you **spend**?" Reframe previous quit attempts as positive experiences; preparation for ultimate success.
 3. Set a **quit date**. Try within 1 to 2 weeks. Explain the importance of quitting "cold turkey." Use a contract. Place one copy with the patient's medical chart and give one to the patient.
 4. Discuss nicotine **addiction**. Cover withdrawal symptoms, including their transient nature. When appropriate, offer nicotine replacement therapy.
- IV. **ASSIST** patient in quitting.
 1. Identify **trigger factors**. Explain how they work and formulate specific plans to overcome them. Use alternative activities, eg, walking after eating, avoiding alcohol, changing routines.
 2. Discuss fear of **weight gain** and diet.
 3. Discuss **stress management** and relaxation techniques.
 4. Discuss importance of **support** from friends and family, even a "buddy" to quit with.
 5. Write an **exercise** prescription that fits patient's lifestyle.
- V. **ARRANGE** follow-up telephone calls (staff or physician) and visits for cessation reinforcement and relapse prevention.
- VI. **ACTIVATE** the patient and the community. Direct anger and frustration toward the tobacco industry for its dishonesty, deception, and calculated efforts to profit by addicting adults and their children. Be an activist in your office and community to promote smoke-free air and to counter the forces that not only promote smoking initiation but also reinforce continuation of this behavior.

Figure 1. Six steps physicians can follow to help patients stop smoking and avoid relapse.

SMOKING CESSATION STRATEGIC PLANNING CHART

NAME: _____ CHART NO. _____

DATE: _____ DAYTIME PHONE: _____ AGE: _____ SEX: _____

BP _____ WT _____ HT _____ EDUCATION: _____

SMOKING HISTORY: PPD: _____ # YEARS: _____ # PACK YEARS: _____

BRAND BOUGHT: _____ AMOUNT SPENT: _____ / pack

\$/D: _____ \$/YEAR: _____ \$/DECADE: _____

QUILTS: _____ LONGEST: _____ LATEST: _____

REASONS FOR STARTING AGAIN:

REASONS FOR STOPPING THIS TIME:

1. _____
2. _____
3. _____

DISEASES: (circle) EMPHYSEMA BRONCHITIS ASTHMA COUGH HEART DISEASE

DIABETES ALCOHOLISM SINUSITIS CANCER _____

PHARYNGITIS HYPERTENSION OTHER _____

HOUSEHOLD: LIVES ALONE? Y N SPOUSE OR OTHER: SMOKER/NONSMOKER

OTHER SMOKERS _____ # NONSMOKERS _____ AGES OF CHILDREN _____

MAJOR TRIGGERS: (circle)

EATING ANGER ALCOHOL COFFEE TV ANXIETY DEPRESSION

STRESS DRIVING SOCIALIZING OTHER: _____

PLAN: QUIT DATE: _____ WHY CHOSEN? _____

RELAXATION TECHNIQUES GIVEN? Y N

DIET/WEIGHT CONTROL DISCUSSED? Y N

ANGER AT TOBACCO INDUSTRY DISCUSSED? Y N

EXERCISE PRESCRIPTION? Y N

NICOTINE REPLACEMENT GIVEN Y N

TELEPHONE FOLLOW-UP ARRANGED? Y N

F/U CALL IN _____ DAYS F/U DONE: Y N

RETURN APPOINTMENT: _____ DATE: _____ BY: _____

(PLACE ADDITIONAL NOTES HERE AND ON BACK:)

Figure 2. Patient information form that is placed in the medical chart and used to guide patient's efforts to stop smoking.