Quitting Smoking:

Reasons for Quitting and Predictors of Cessation among Medical Patients

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Objective: ***To describe why medical patients quit smoking and the methods they use.***

Design: ***Cross-sectional and prospective cohort design. Patient smokers were enrolled in a study of physician counseling about smoking. One year later, 2,581 of the patients were asked about quit attempts and methods used. Of those, 245 former smokers whose quitting had been biologically validated were interviewed about why and how they had quit.***

Setting: ***Offices of internists and family practitioners in private practice and a health maintenance organization.***

Subjects: ***Consecutive sample of ambulatory patients who smoked.***

Measurements and main results: ***Baseline questionnaires included demographic data, smoking history, and symptoms and diagnoses related to smoking. After one year, subjects were interviewed about smoking status and methods used in attempting to quit. Cessation was confirmed by biochemical testing. Those who had quit were asked about reasons for quitting. Seventy-seven percent of successful quitters gave health-related reasons for quitting and the quitters ranked "harmful to health" as the most important reason for quitting. In a multivariate analysis, those who had a college education, who had social pressures to quit, and who had greater confidence in being able to quit were more likely to have quit smoking one year later, while those who smoked their first cigarette within 15 minutes of awakening and who had more diagnoses related to smoking were less likely to have quit smoking one year later. Participation in a treatment program and having been counseled by a physician or nurse practitioner were positively related to successful quitting, while use of filters or mouthpieces was negatively related.***

Conclusions: ***Concerns about health are the most common reason patients give for quitting, and addiction is the most important barrier to quitting. Education, social pressure, provider advice, and formal programs, but not over-the-counter devices, appear to increase the chances that smokers will quit.***

Key words: ***smoking cessation; counseling.*** **J GEN INTERN MED 1992;7:398–404.**

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IN THE PAST 25 years 43 million Americans have quit smoking.[1] Those who have quit rate health as the most important reason.[2] Since 70% of all smokers see their physicians each year, physicians have the opportunity to reinforce a potentially powerful motivation for quitting.[3]

Familiarity with the characteristics, motivations, and methods associated with smoking cessation can guide physicians in their counseling efforts. Reasons for quitting given by self-reported quitters in a variety of settings have been described; however, reasons given by medical patients whose quitting has been biochemically validated have not been previously examined.[4-6] In a large-scale randomized trial in which we evaluated the effectiveness of a training program for providers in smoking cessation counseling, we gathered information from patient smokers about their smoking backgrounds, health status, attitudes toward quitting, and reasons for wanting to quit. One year later we asked the patients about quit attempts and methods used. We validated self-reported successful quit attempts and asked the successful quitters about their reasons for quitting. We report these results below, as well as the result of comparing the characteristics, motivations, and methods of successful quitters with those of continuing smokers.

SUBJECTS AND METHODS

Providers

We recruited 44 private practice internists and 81 internists and 12 registered nurse practitioners (RNPs) from Kaiser–Permanente Medical Centers in the San Francisco Bay Area. The recruitment procedure for the counseling intervention has been described in detail elsewhere.[7,8] We randomly assigned providers to an experimental group designated to receive training and office support and to provide counseling to patients, or to a usual-care control group designated to provide usual care only.

Patients

We enrolled 916 patients from private practices and 2,354 patients from four Kaiser sites. We enrolled

patient smokers before they saw their providers. A smoker was defined as anyone who had smoked a tobacco cigarette, even a puff, in the past seven days. All smokers who visited a participating provider were approached until either a maximum of 30 smokers per provider was enrolled or a minimum of 15 smokers was enrolled after more than six weeks. At the time of enrollment each patient completed a questionnaire that asked information about basic demographic characteristics, smoking background with symptoms that might be related to smoking, attitudes toward quitting, and reasons for wanting to quit. Each patient read a description of the study and was given the option not to participate. The research protocol was approved by the Committees on Human Research at both the University of California, San Francisco, and Kaiser–Permanente Medical Center of Northern California. A telephone interview within seven days of the patient's enrollment asked more information about smoking history and about diagnoses that might be related to smoking.

Procedures

Research staff called patients one year after their enrollment dates to determine their current smoking status. Interviewers asked subjects whether they had attempted to quit and, if so, what methods they had used. Those who reported not smoking a cigarette during the past seven days were defined as self-reported quitters.

Interviewers offered $25 to self-reported quitters for breath and saliva samples. Concentrations of carbon monoxide (CO) in expired air were analyzed using an Ecolyzer® Model 211 Carbon Monoxide Monitor (National Draeger, Pittsburgh, PA). Salivary nicotine concentrations were determined by a modification of Jacobs' method of gas chromatography.[9] The method was modified for simultaneous determinations of nicotine and cotinine using a capillary column. Patients whose saliva concentrations exceeded 30 ng/mL were classified as smokers unless they reported using nicotine gum. Those who were using nicotine gum were also classified as smokers if their partial pressure of expired CO exceed 16 parts per million.[10]

Those who provided samples for biochemical validation were asked to complete a questionnaire about their reasons for quitting. The first item instructed subjects to write in their own words why they had quit smoking. From a list of potentially smoking-related symptoms and diagnoses, subjects marked all those they had experienced during the past year. Subjects were asked to rate the importance of common reasons for quitting on a scale from 1 (not important) to 6 (very important). Likewise, they were asked to rate the importance of the symptoms and diagnoses they had experienced to their decisions to stop smoking.

Data Analysis

We found no significant difference between experimental group patients and control group patients in reasons for quitting or in rates of smoking cessation, so in subsequent analyses we included all validated quitters as a single study group.[7,8] Since randomization was performed at the provider level rather than at the patient level, we performed a logistic regression analysis taking clustering into consideration.[11] This analysis, however, did not reveal any clustering effect, hence we report the results of standard logistic regression analyses.

We first compared demographic characteristics, smoking histories, and motivational differences between smokers and those who had subsequently quit. Numbers of social pressures were accumulated from responses to five separate questions on the baseline questionnaire. Having a spouse who did not smoke, having family who wanted the smoker to quit, having no or few friends who smoked, having friends who wanted the smoker to quit, and having co-workers who objected to the smoker's smoking each counted as one social pressure. To test the significance of differences between the smoker and quitter groups for these baseline characteristics, we used the chi-square test for proportions and the t-test for means.[12]

We sorted validated quitters' reasons for quitting into 16 groups, then consolidated those with a common theme. We calculated frequencies by type of reason and by respondent. To compare rankings on the six-point importance scale we calculated means and 95% confidence intervals. Types of reasons and mean importance ratings were compared by gender, race, age, education, marital status, employment status, time off cigarettes, mean number of symptoms, and mean number of diagnoses. Because individuals tend to agree with questionnaire items to the extent that calculated mean scores do not accurately reflect true relative values, we adjusted for this tendency by computing each individual's mean response score and subtracting it from each rating that person had given. The resultant standardized ratings were compared between groups using the t-test.

Major significant differences found in baseline data by comparing quitters and smokers were entered into a multiple logistic regression analysis with validated smoking cessation as the dependent variable. Odds ratios and confidence intervals were calculated for each variable's contribution to smoking cessation. Methods used for quit attempts were compared by gender, race, age, and education. Finally, these methods were added to baseline differences in the multiple regression analysis with validated smoking cessation as the dependent variable. Odds ratios and confidence intervals were calculated for individual

TABLE 1

Baseline Characteristics of the Subjects*

	Validated Quitters (N = 245*)	Smokers (N = 2,652*)
Gender—female	59%	58%
Age—mean	43.7 years	44.7 years
Race		
White	69%	63%
Nonwhite	31%	37%
Education†		
High school graduate or less	27%	40%
Some college	38%	37%
College graduate or more	35%	23%
Number of cigarettes/day—mean†	16.3	18.6
Desire to quit smoking—mean, 10-point scale†	7.6	6.9
Confidence in quitting—mean, 10-point scale†	6.3	5.1
Number of diagnoses—mean†	0.82	1.08
Number of symptoms—mean†	1.47	1.68
Tried to quit before†	84%	76%
Smoke within 15 min of awakening†	25%	40%
Want to quit because smoking is harmful to health†	84%	76%
Want to quit because of dependence†	51%	44%
Number of social pressures to quit—mean†	2.70	2.35

*N ranges from 2,209 to 2,652 for smokers and from 220 to 245 for validated quitters due to missing data.

†$p < 0.05$ for comparison of smoker and quitter groups by t-test for continuous data and chi-square test for categorical data.

methods. Computations were done using the Statistical Analysis System (SAS)[12] running under CMS on an IBM 4341 computer.

RESULTS

Subject Characteristics

We contacted 2,581 (79%) participants one year after enrollment. Three hundred thirty-four (10%) of those enrolled said they had quit smoking. Two hundred forty-five (73%) of the 334 self-reported quitters consented to, and passed, our validation procedures. Those who had quit had been abstinent for a median of 129 days by self-report. A majority of subjects were women, although quitters did not differ significantly from smokers by gender (Table 1). Subjects were predominantly white. More quitters had completed college, smoked fewer cigarettes, had greater desire to quit smoking, and had greater confidence that they would quit than did continuing smokers. Those who had subsequently quit reported fewer smoking-related diagnoses and fewer symptoms than did those who continued to smoke, and quitters were no more likely to attribute their diagnoses and symptoms to smoking. More quitters than continuing smokers had attempted to quit before. However, the mean number of quit attempts did not differ significantly between the two groups. Fewer quitters than continuing smokers smoked their first cigarette within 15 minutes of awakening. This is consistent with the fact that quitters were less likely to say that they were "addicted to smoking" than were smokers (68% vs. 80%, $p = 0.023$). Subjects differed in reasons for wanting to quit in that those who went on to quit were more likely than those who did not to say they wanted to quit because smoking was harmful to their health and because they didn't like feeling dependent on cigarettes. Quitters also reported more social pressures to quit than did continuing smokers.

Reasons for Quitting

"Own-word" Reasons for Quitting. The 245 validated quitters gave 453 reasons for quitting. The numbers of reasons ranged from zero ("none") to four per person. Most reasons were health-related; 60% of reasons related to personal health and an additional 4% related to others' health. Of personal health reasons, 74% were connected with improving health, while 24% were about preventing ill health. The second largest category of reasons related to social concerns, such as family pressure to quit.

Since subjects gave different numbers of reasons, the number of respondents who gave each type of reason better describes group tendencies than does the number of reasons in each category. Seventy-seven percent gave at least one health reason for quitting (Table 2). The largest proportion of respondents, 25.7%, cited one or more symptoms as their reason for quitting. Over one-fifth cited diagnoses. Over one-fifth gave reasons related to general health, often by saying that smoking is "bad for my health," and 22% mentioned fear of illness.

Twenty-eight percent gave one or more social reasons for quitting. The next largest proportion, 16%, cited aesthetic reasons, most commonly, "bad smell." Slightly fewer subjects specified physician's or nurse practitioner's advice than mentioned social pressure. Fewer than 10% of subjects quit to relieve feelings of dependence.

Importance Ratings of Reasons. Ratings of the importance of common reasons for quitting are presented in Figure 1. "It's harmful to my health" had the highest rating; feeling dependent and reluctance to expose children/loved ones ranked second and third, respectively. Provider advice was in the mid-range of importance. "Smoking is no longer popular" was judged the least important reason.

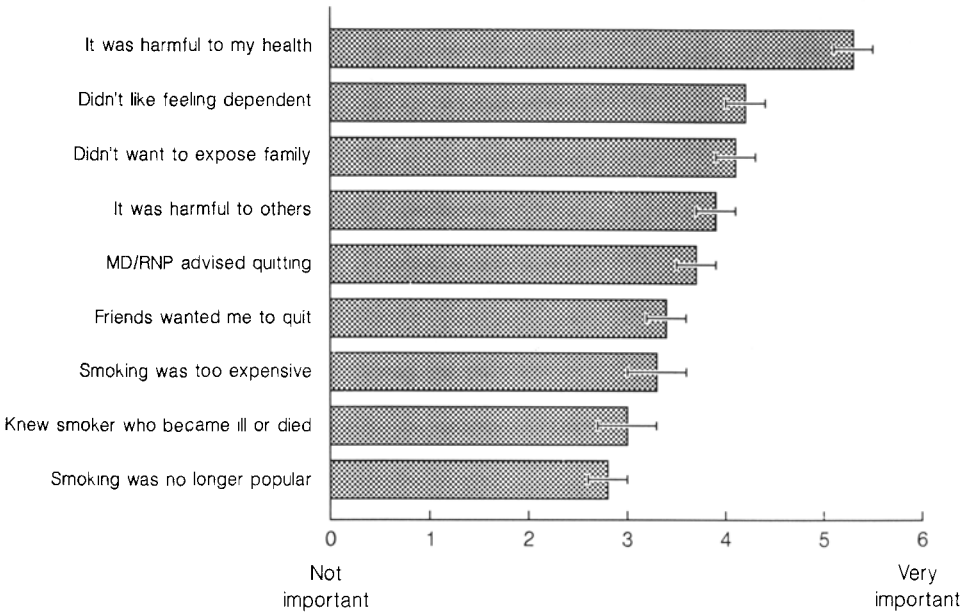

FIGURE 1. Mean ratings of importance of reasons for quitting on a scale from 1 (not important) to 6 (very important). Bars indicate 95% confidence intervals for the mean. RNP = registered nurse practitioner.

Symptoms and Diagnoses. Table 3 reports the prevalence of smoking-related symptoms and diagnoses among validated quitters. Ninety percent had one or more smoking-related symptom. Respiratory symptoms predominated; over half of quitters reported having experienced either a cough or shortness of breath during the previous year. Shortness of breath achieved the highest mean importance rating (4.6 on the six-point scale), followed by chest pain (3.8) and then cough (3.6). Most quitters tended to report more than one smoking-related symptom; a mean of 3.2 symptoms were reported by the 90% who had symptoms.

Almost half of quitters (47%) reported having one or more of the diagnoses in Table 3. Subjects rated diagnoses as more important than symptoms in their decisions to quit, although symptoms were more common. Angina had the highest rating among diagnoses, but only 6% of patients reported having angina.

TABLE 2

Reasons for Quitting*

	% of Respondents†	
Health	77.0	
Because of symptoms		25.7
Because of diagnoses		23.3
For better health; to feel better; because it's bad for my health		23.3
Fear of illness or desire to prevent illness in myself		22.0
To improve fitness		3.3
Social	28.0	
Social pressure		12.7
Family pressure		10.6
Health of family/friends (e.g., "my children's health")		7.3
Media influence		2.0
Aesthetic reasons (e.g., "Everything smelled of ashes.")	16.3	
Other (e.g., timing, expense, religion)	13.1	
Doctor/nurse practitioner's advice	12.0	
Didn't like feeling dependent	7.3	

*Responses to "In your own words, briefly explain why you quit smoking."

†$N = 453$ reasons given by 245 respondents. Percentages add to more than 100 because respondents gave from one to four responses.

TABLE 3

Importance of Smoking-related Symptoms and Diagnoses as Reasons for Quitting

	% Reporting System or Diagnosis*	Mean Importance—6-point Scale	95% Confidence Interval
Symptom			
Shortness of breath	53	4.6	4.3–4.9
Chest pain	29	3.8	3.3–4.3
Cough	62	3.6	3.3–3.9
Sore throat	49	3.3	2.9–3.7
Leg cramps	22	2.8	2.3–3.4
Heartburn	38	2.6	2.2–3.0
Facial wrinkles	21	2.5	2.0–3.0
Cold hands or feet	44	1.9	1.6–2.2
Diagnosis			
Angina	6	5.4	4.8–6.0
Asthma	6	5.2	4.5–5.9
Heart attack	1	5.0	†
Emphysema	5	4.9	4.0–5.8
Bronchitis	15	4.6	4.0–5.2
Cancer	5	3.0	1.4–4.6
Peptic ulcer	1	3.0	†
Osteoporosis	4	2.0	†

*$n = 245$.

†Number reporting diagnosis is too small for sample estimates to be meaningful.

TABLE 4
Predictors of Smoking Cessation*

	Odds Ratio†	95% Confidence Interval
Some college or higher education (yes/no)	1.52	1.10–2.10
Number of cigarettes/day (per 10 cigarettes)	1.01	0.97–1.04
Number of diagnoses (per diagnosis, 8 maximum)	0.80	0.69–0.93
Number of symptoms (per symptom, 8 maximum)	0.92	0.83–1.02
Desire to quit smoking (1 point on 10-point scale)	1.01	0.94–1.08
Confidence in quitting (1 point on 10-point scale)	1.12	1.06–1.19
Having tried to quit before (yes/no)	1.43	0.97–2.11
Smoking within 15 minutes of awakening (yes/no)	0.58	0.41–0.81
Wanted to quit because smoking is harmful to health (yes/no)	1.47	0.95–2.27
Wanted to quit because of dependence (yes/no)	1.11	0.82–1.50
Number of social pressure to quit (per pressure, 5 maximum)	1.13	1.02–1.27

*$N = 2,292$ in analysis.
†Odds ratio per unit change.

Demographic Differences. Men and women did not differ significantly in the types of reasons they gave for quitting. There was no significant difference between racial groups in reasons for quitting. However, the tendency for Hispanics to give expense a higher importance rating than did whites persisted when we controlled for differences in educational levels (mean importance = 4.1 vs. 2.8, $p = 0.003$).

Quitters older than the median age of 41 years rated their providers' advice as more important than did younger quitters (mean importance = 3.8 vs. 3.1, $p = 0.002$). On the other hand, younger quitters rated concern about exposing their children/loved ones to smoke more highly than did older quitters (mean importance = 4.2 vs. 3.5, $p = 0.001$). These differences also remained when we controlled for education. Those with some high school or less education gave significantly fewer health reasons for quitting than did more highly educated quitters (mean number = 0.86 vs. 1.1, $p = 0.025$).

Predictors of Smoking Cessation

When baseline differences between those who had subsequently quit and those who continued to smoke were entered into a multiple logistic regression model, college or higher education, greater confidence in being able to quit, and more social pressures to quit were all associated with a significantly greater chance of quitting. More diagnoses and smoking the first cigarette within 15 minutes of awakening (a sign of addiction) were associated with a significantly decreased chance of having quit one year later (Table 4). We also put age, race, and gender in the model and they were not significant and did not substantially change the other associations in the model.

Cessation Methods

Methods used for quit attempts are reported in Table 5. Choice of methods differed by race, age, and educational level. Nonwhites were less likely to have gotten a prescription for nicotine gum (15% vs. 21%, $p = 0.004$), to have tried books or pamphlets (14% vs. 28%, $p < 0.001$), and to have tried a group or program (3% vs. 12%, $p < 0.001$) than were whites. More older patients than younger ones had tried books or pamphlets (26% vs. 18%, $p = 0.006$), had relied on counseling from their providers (24% vs. 19%, $p = 0.036$), and had used filters or mouthpieces (11% vs. 6%, $p = 0.001$). These differences persisted after controlling for differences in educational levels. Patients with some college education were more likely to have gotten a prescription for nicotine gum (21% vs. 15%, $p = 0.019$), to have relied on help from family and friends (33% vs. 26%, $p = 0.005$), and to have tried a group or program (11% vs. 6%, $p = 0.003$) than were those who had not attended college.

Quitters differed from continuing smokers in that they had more often used a stop-smoking group or program and had less often used special filters or smoking devices. When methods were added to the multiple logistic regression with validated smoking cessation as the dependent variable, those who had used a group or program and those who had been counseled by their medical providers were more likely, while those who had used filters or devices were less likely, to have succeeded in quitting smoking.

DISCUSSION

Seventy-seven percent of smokers reported that they had quit, at least in part, because of concerns about the effects of smoking on health. They also gave health the highest importance rating among reasons for quitting. Studies in other populations have found health to be an important motivator of smoking cessation,[5, 6, 13]

and the larger majority of those who had quit for health reasons reported here is probably due to the fact that our subjects were medical patients. However, it is striking that in this medical setting only 12% of those who had quit smoking said that their providers' advice was important. More constant aspects of patients' lives, such as health concerns and the urging of family and friends, may be stronger motivating factors.

In an earlier review, Pederson concluded that the more severe the disease and the more imminent the danger from continued smoking, the more likely patients are to comply with advice to quit.[14] However, we found that patients with more smoking-related diagnoses were less likely to quit. Perhaps these patients did not perceive themselves to be in imminent danger, or perhaps having more than one smoking-related disease indicated that these patients were more severely addicted. Nicotine dependence is regarded as a major obstacle to quitting among the current population of smokers.[15,16] Our finding that those who smoked within 15 minutes of awakening were less likely to quit was consistent with this. In fact, smoking within 15 minutes of awakening was the strongest predictor of outcome among baseline variables. Patients with more diagnoses might also have been more depressed. Recent studies have presented evidence to suggest that a larger proportion of smokers than persons in the general population have a history of depression and that the depression itself makes quitting more difficult.[17,18] We were not able to study this possibility because we did not measure depression.

Those with some college were more likely to quit. This is consistent with current trends in smoking cessation among the population. National Health Interview data indicate that by the year 2000 major inequities in smoking prevalence will occur among educational categories, with three times as many smokers in the lower educational level.[19] Since better educated quitters gave more health reasons for smoking, it may be that education increases motivation to quit by increasing awareness of the health risks of smoking. The challenge to providers will be to use approaches that are more effective with patients who have lower educational levels.

A large body of literature suggests that personal self-efficacy increases chances for success in behavioral change,[20,21] and, accordingly, researchers have reported that smokers who believe they will be successful are more likely to succeed in quit attempts.[22-24] That our subjects who were more confident in being able to quit were more likely to quit adds to this evidence.

Several studies have found that social support is important in smoking cessation and maintenance,[25,26] and Cohen et al. have speculated that social norms in the environment may be the most important social determinant of smoking behavior.[26] We also found that the more social pressures our subjects had, the more likely they were to quit. These pressures included nonsmoking status of their spouses or partners, family members' desire that they quit, nonsmoking status of friends, friends' desire that they quit, and co-workers' objection to their smoking. Our results suggest that the

TABLE 5

Methods Used for Quit Attempts*

Predictors of Quitting	Quitters (%)	Smokers (%)	Odds Ratio† for Quitting	95% Confidence Interval
Help from family or friends	26.9	30.8	0.83	0.56–1.22
Counseling from physician or registered nurse practitioner	22.4	22.2	1.53	1.03–2.28
Educational books or pamphlets	21.6	24.0	0.85	0.55–1.31
Nicotine gum prescription‡	18.4	18.4	1.03	0.65–1.63
Stop-smoking group or program‡§	12.7	8.0	2.22	1.29–3.81
Sedatives	2.9	4.4	1.04	0.40–2.71
Special filters, smoking devices§	2.0	9.9	0.13	0.04–0.44
Clonidine	0.4	0.5	¶	
Other methods volunteered by respondents, such as chewing gum	23.7	24.5	1.08	0.71–1.63

*N ranges from 243 to 245 for validated quitters and from 949 to 1,003 for smokers who attempted to quit due to missing data. Percentages add to more than 100 because of multiple responses. All predictors are yes/no items.

†Odds ratios are from logistic regression analysis including these and all predictors from Table 4.

‡These items were based on a response to a direct inquiry (Did you fill the prescription?; Did you attend a group or program?), whereas the other items were identified from a list read to subjects.

§$p < 0.05$ for comparison of quitter and smoker groups by chi-square test.

¶Number reporting use of method is too small for sample estimates to be meaningful.

emphasis on smoke-free environments and the declining prevalence of smoking may increase quitting among smokers.

Chapman reported that smoking cessation programs contibuted little to the overall decline in smoking cessation in the United Kingdom.[27] Fiore et al. in the United States analyzed data from the 1986 Adult Use of Tobacca Survey to conclude that cessation programs serve a small, but important, population of smokers that includes heavier smokers.[28] We found that use of a smoking cessation group or program was related to a somewhat greater chance of quitting. This does not prove that such programs are effective; it is also possible that more motivated patients are more likely to join time-consuming programs. Nonwhite and less educated patients were less likely to have tried a group or program. Fiore has pointed out that such programs are likely to be less accessible to poor and minority groups because of cost or cultural biases.

We also found that counseling by their medical providers predicted smoking cessation in this patient population. Our providers were self-selected to participate in a test of the effectivness of training providers to counsel patients for smoking cessation. However, we controlled for treatment group in the mulitiple logistic regression, and treatment group was not in itself a significant predictor, nor did it affect the relationship between provider advice and successful quitting. This suggests that provider's advice was somewhat effective, while further training about smoking cessation did little to increase the effectiveness of that advice.[7,8] This supports the concept that simply giving advice to quit may be more important than how the counseling is done.[29]

We conclude that concerns about health are the most common reason patients give for quitting smoking and that addiction is the most important barrier to quitting. Education, social pressure, provider advice, and formal programs, but not over-the-counter devices, appear to increase the chances that smokers will quit.

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