ORIGINAL ARTICLES

Increasing the Efficacy of Physician-delivered Smoking Interventions:

A Randomized Clinical Trial

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Objective: *To assess the relative impacts of three physician-delivered smoking interventions in combination with follow-up contact from behavioral counselors.*
Design: *Randomized controlled trial with pre–post measures of smoking rates. This paper reports six-month outcome data.*
Setting: *Participants were recruited from among patients seen by 196 medical and family practice residents in five primary care clinics.*
Participants: *Participants were 1,286 patients out of 1,946 eligible smokers approached. The patient group was 57% female and 91% white, had an average age of 35 years, and smoked, on average, slightly over one pack per day.*
Intervention: *Physicians were trained to provide each of three interventions: advice only, brief patient-centered counseling, and counseling plus prescription of nicotine-containing gum (Nicorette™). Half the patients received follow-up in the form of telephone counseling at three-monthly intervals from behavioral counselors.*
Measurements and main results: *Changes in smoking behaviors were assessed by telephone interview six months after physician intervention. The differences in one-week point prevalence cessation rates among the physician interventions were significant ($p<0.01$): advice only, 9.1%; counseling, 11.9%; counseling plus gum, 17.4%; with no effect for telephone counseling. The time elapsed from physician encounter to initial quitting and the length of that period of abstinence also showed significant benefit of the counseling interventions. Patients receiving physician counseling were much more likely than those not receiving counseling to rate their physician as very helpful ($p<0.001$). Multiple regression analyses are also reported.*
Conclusion: *Smoking intervention counseling provided by physicians is well received by patients and significantly increases the likelihood of cessation at six months, an effect that is augmented by the prescription of nicotine-containing gum, when compared with physician-delivered advice. Follow-up telephone counseling does not contribute significantly to smoking behavior changes.*
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PHYSICIANS HAVE CONTACT with at least 70% of all smokers each year, including 60% of those smokers who consider themselves to be in "excellent" health.[1] Thus, approximately 38 million of the 50 million adult smokers in the United States could be reached by physicians during the course of ongoing medical care, making physicians a readily available intervention resource. This high contact rate, even if coupled with only a small absolute effect on smoking prevalence, could produce substantial changes in smoking behavior in the general population of smokers.

Earlier clinical trials[2, 3] demonstrated that simple physician advice to stop smoking, availability of follow-up and prescribing of nicotine-containing gum (NCG) increase quit rates in a general medical population. Recently the National Cancer Institute has supported five randomized clinical trials[4-8] to determine efficacious physician interventions. The present study was one of these trials.

Behavioral counseling has been demonstrated to be an effective smoking intervention modality when used by psychologists and health educators. However, to date, such an approach has not been adapted to the limited time and structure of the physician–patient encounter. The use of a counseling approach to facilitate patient involvement in the desired behavior change, although not generally familiar to physicians, is consistent with recent developments in the medical training of physicians in communication skills.[9, 10] A counseling approach can be an effective means of involving the less motivated smoker, whereas setting a quit date or prescribing NCG is limited to the smoker more ready to stop. Counseling concerning behavioral aspects of smoking has also been recommended as important to accompany the prescription of NCG.[11, 12]

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The brief counseling initiated by the physician might be strengthened if followed by more in-depth counseling provided by a health counselor. Such follow-up, delivered by telephone, could prove both cost-efficient and effective. Evaluation of such follow-up counseling has not occurred in any previously published investigations.

In this article we report six-month smoking cessation rates from the Physician-Delivered Smoking Intervention Project (PDSIP). This study was designed to test the efficacy of three physician-delivered smoking interventions in combination with either maximal or minimal telephone follow-up by health counselors.

METHODS

Overview

Internal medicine residents ($n = 150$) and family practice residents ($n = 46$) enrolled in the University of Massachusetts Medical School's (UMMS's) residency programs from July 1985 through June 1988, the period of recruitment, received training in all three physician intervention approaches. Two of the 198 eligible residents refused to participate. Patients were randomly assigned to a physician intervention condition, as well as either maximal or minimal follow-up. Maximal follow-up consisted of three counseling telephone calls and three follow-up letters of a supportive nature. Subjects in the minimal follow-up condition received neither counseling calls nor letters.

Patient Recruitment and Eligibility Criteria

Patients were recruited from two internal medicine and three family practice clinics affiliated with UMMS. All adult patients seen by participating residents at these clinics ($N = 12,368$) were screened for smoking status. Forty-six percent of patients had never smoked, 22% were ex-smokers, and 32% were currently smoking. To be eligible, patients had to be between the ages of 18 and 75 years and report having smoked at least a puff of a cigarette during the previous week. Patients were ineligible if they did not have a telephone, were planning to move out of the area within the next year, were already using NCG, or were participating in a smoking cessation program. Smokers medically ineligible for use of NCG were also excluded from participation. Of the initially identified smokers ($n = 4,005$), 51% ($n = 2,059$) were excluded due to medical or other exclusion criteria. Smokers were encouraged to participate regardless of their desire to stop smoking. Of the 1,946 remaining eligible smokers, 24% ($n = 469$) refused to participate.

After providing informed consent according to Institutional Review Board guidelines, patients were randomly assigned to the physician and follow-up conditions, and completed a baseline questionnaire. Physicians were informed of the intervention to be provided upon opening a packet containing the intervention materials, which they received at the beginning of the clinic encounter. Of the smokers who agreed to participate ($n = 1,477$), 12% ($n = 179$), after being randomized, were put "on hold" due to time limitations in the physicians' schedules and were not included in the study because they did not return to the clinic again. In addition, 12 randomized smokers failed to return a completed baseline survey.

Physician Training and Smoking Interventions

A two-and-one-half-hour training program including slides, videotapes, and role playing was used to teach residents the components of the three physician-delivered interventions, and is described in more depth elsewhere.[1, 13] At the completion of training each resident was videotaped doing patient-centered counseling with a patient simulator, and then reviewed the videotape with an instructor.

PHYSICIAN INTERVENTIONS

Advice Only (AO). Physicians paraphrased the following: "Smoking is harmful to your health. In many cases, the harmful effects can be reversed. As your doctor, I must advise you to stop smoking." They personalized the health-risk message by adding an individualized warning, such as "Stopping smoking is especially important for you because you also have high blood pressure." If the patient was interested, the physician provided a list of smoking cessation programs in the community. Only if a patient initiated discussion or requested specific help, such as a prescription for NCG, was the physician free to expand the interaction.

Counseling (CI). In addition to receiving advice as above, the counseling intervention consisted of a series of open-ended "patient-centered" questions, which explored five areas: motivation to change smoking behavior, past experiences with stopping, current concerns, resources available for change, and interest in developing a plan for cessation. Physicians also provided simple self-management recommendations and were instructed to be supportive of past cessation efforts. A written agreement to specify the plan for change was used and the patient received a copy. The patient was given a short self-help booklet[14] and a community resource list, and was instructed to schedule a follow-up visit, or telephone call (if the visit was not possible), with the physician within the next two weeks. This intervention was designed to be completed in 5 to 10 minutes. Approximately one week after the initial visit, patients received a letter signed by their physicians encouraging them in their efforts to change their smoking behaviors.

Counseling plus Nicotine-containing Gum (CI plus NCG). In addition to the components in the

counseling condition, patients were informed of the availability of NCG. Physicians had received information and practice in the proper instruction to patients in the use of NCG. Those patients interested in using the gum and willing to set a quit date were provided with prescriptions at no charge, refillable three times, and were seen for 3 to 5 minutes by the clinic assistant, who instructed them more fully in the use of the gum.

FOLLOW-UP COUNSELING

Maximal Follow-up. Patients received telephone calls from master's degree-level psychologists or health educators at approximately one, two, and three months after initial contact. One counselor made all calls to a given subject. Calls were designed to take about ten minutes, although they ranged from one to 20 minutes, depending on the receptivity of the subject. The counselor used open-ended questions similar to those used by the physician, provided behavioral recommendations, and negotiated a cessation or maintenance plan, if appropriate. Each patient in this condition received three supportive letters, one following each counseling call, keyed to the patient's smoking status at that time.

Minimal Follow-up. No further counseling contact was provided to the patients in this group; the only additional contact regarding smoking behavior was at the time of monitoring.

MEASUREMENTS

Patient Measures

Baseline. In addition to demographic information, questions were asked concerning the amount and type of tobacco used, length of time smoked and cessation history, addiction,[15] quality of social support, intention to quit smoking, confidence in remaining abstinent, and history of smoking-related medical symptoms and diagnoses.

Outcome. Monitoring telephone calls were planned for all subjects at six-month intervals for two years after study entry. At least six attempts to contact subjects by telephone were made before a letter and questionnaire were sent to determine smoking status. Outcome measures included smoking status, how soon the smoker stopped after the initial physician contact, date of last cigarette smoked, other changes in smoking behavior (i.e., maximum length of time abstinent, whether relapse occurred), further contact with the physician, and perceived helpfulness of the intervention.

Patients were considered to be nonsmokers at the time of the monitoring if they reported not having smoked even a puff of a cigarette or having used other tobacco products in the preceding week (point prevalence). A second definition of cessation was self-report of sustained abstinence for at least three months prior to the time of the six-month follow-up. Other patient outcome measures were the longest time off cigarettes during the six-month survey interval; how soon after the initial physician contact the smoker stopped smoking; and how helpful subjects perceived their physicians to have been in providing assistance.

Physician Compliance Measures

Compliance with the assigned intervention was assessed through exit interviews with a randomly selected group of patients and parallel interviews with the respective physicians regarding which components of the intervention had been carried out. Both physicians and patients were asked to estimate the length of time spent discussing smoking.

Statistical Analysis

Baseline characteristics across the intervention conditions were examined using chi-square and analysis of variance tests for discrete and continuous variables, respectively. Associations of the interventions with outcome measures (e.g., point prevalence quit rates) were examined through the use of chi-square tests. Multiple logistic regression was used to examine the association of smoking intervention with the outcome measures, while simultaneously controlling for the effect of potentially confounding baseline variables, which were entered into the model if they were related to outcome on univariate analyses, with $p<0.025$. Adjusted odds ratios using the recipients of the AO intervention as the referent group were computed from the logistic regression models, with accompanying 95% confidence intervals. For the outcome measures with ordered responses (e.g., how soon the patient quit), a proportional odds model was assumed.[16, 17]

RESULTS

Baseline Physician and Patient Characteristics

Of the 196 residents included in the study, 69% were male; 94% did not smoke cigarettes; 74% were being trained in internal medicine; and 33% were in their first postgraduate year (PGY1s), 35% were PGY2s, and 32% PGY3s. Physician characteristics were not related to outcome at six months.

As seen in Table 1, there was no significant difference in any of the baseline characteristics examined among the 1,286 smokers who participated in the PDSIP and were randomized to the three physician-delivered intervention groups, reflecting the success of randomization. A sample of study refusers ($n = 178$), compared with study participants, included more individuals who smoked less than one cigarette/day

TABLE 1

Patient Baseline Characteristics ($n = 1,286$)*

	Advice Only ($n = 464$)	Counseling ($n = 420$)	Counseling plus NCG† ($n = 402$)
Age ($\bar{x}$)	35.5 years	35.5 years	35.2 years
Sex — female	55.2%	59.0%	56.8%
Race — white	92.0%	91.6%	90.8%
Education ($\bar{x}$)	12.4 years	12.4 years	12.6 years
Marital status			
Single	34.4%	30.8%	28.5%
Married	49.0%	52.4%	44.6%
Other	21.0%	20.2%	19.0%
Cigarettes/day currently smoking ($\bar{x}$)	22.0	23.3	23.3
Most cigarettes/day ever smoked ($\bar{x}$)	31.7	33.8	32.4
Age started smoking ($\bar{x}$)	17.1 years	16.7 years	16.7 years
Number of quit attempts in past			
Never quit	15.3%	14.0%	17.5%
Quit once	16.2%	20.8%	19.8%
Quit 2–3 times	38.4%	37.8	34.5%
Quit 4+ times	30.2%	27.4%	28.3%
Last quit attempt			
Very difficult	32.5%	38.6%	39.1%
Difficult	36.9%	38.9%	36.4%
Easy or very easy	30.6%	22.6%	24.5%
Addiction score‡ ($\bar{x}$)	5.0	5.2	5.1
Desire to quit§ ($\bar{x}$)	7.4	7.4	7.8
Confidence in quitting in next six months¶ ($\bar{x}$)	5.4	5.4	5.8
People want me to quit‖ ($\bar{x}$)	6.9	7.3	7.2
Others would be helpful‖ ($\bar{x}$)	7.1	7.5	7.4
Amount smoked in past 2 years			
Decreased	23.3%	23.2%	18.2%
Remained the same	53.6%	52.9%	53.6%
Increased	23.1%	23.9%	28.0%

*None of the differences among groups is statistically significant.
†NCG = nicotine-containing gum.
‡Fagerstrom scale: 0 = low addiction, 9 = high addiction. An accurate indication of brand and type of cigarette was not available; therefore this score is based on the remaining 7 items.
§Scale of 1–10; 1 = low desire, 10 = high desire.
¶Scale of 1–10; 1 = low confidence, 10 = high confidence.
‖Scale of 1–10; 1 = not helpful, 10 = very helpful.

($p<0.05$), had either never quit in the past or had more quit attempts ($p<0.05$), and had less desire to quit (mean = 4.8, $p<0.05$). A post-hoc assessment also indicated that study refusers did not differ significantly from participants on their reasons for the visit with the physician.

Compliance to Protocol: Perceptions of Interventions Content

Very good agreement was observed regarding the use of selected smoking intervention practices as reported by 249 randomly selected patients and their physicians at the time of initial intervention contact: 99% agreed that they had discussed the patient's smoking habits, and 91% agreed that advice to stop smoking had been provided. There was 85% agreement in the setting of a quit date, 88% agreed that some form of written materials about smoking had been handed out and received, and over 90% agreed that NCG had been offered or a prescription written for its usage. Patients reported that 9.4 minutes were spent providing advice to stop smoking, with averages of 14.7 and 15.1 minutes spent on CI and CI plus NCG, respectively. Physicians' average reports of time spent were lower: 6.7, 12.3, and 13.9 minutes for AO, CI, and CI plus NCG, respectively. By patient report, one-week follow-up with the physician occurred in person for 34% of participants in the counseling conditions, and by telephone for an additional 34%.

Smoking Status Outcomes

The six-month self-report cessation rates include data for 1,224 participants. Due to initial logistic problems with the follow-up monitoring system, 58 participants were not called. In addition, four patients died after having entered the study. Thus, 62 persons were removed from the original pool; they did not differ significantly on any baseline characteristic from those remaining.

The participants who refused to provide information, had a disconnected telephone, had moved, or could not be reached for six-month follow-up were sent abbreviated questionnaires through the mail. Those who did not return mailed surveys or were unreachable ($n = 228$) (19% of the sample) were considered smokers for purposes of analysis. A significantly higher proportion of these 228 individuals were in the maximal follow-up condition (59%) as compared with the minimal follow-up condition (41%) ($p<0.005$); however, significant differences among the three physician intervention conditions were not observed.

One-week point prevalence self-reported abstinence rates differed significantly overall among the six treatment groups, with cessation rates generally increasing as the intensity of the intervention increased ($p<0.025$) (Table 2). Of patients randomized to the

TABLE 2

Six-month Self-reported Smoking Cessation* Rates by Intervention Group†‡

	Advice Only	Counseling	Counseling plus NCG§	Total¶
Minimal follow-up	7.9% ($n = 227$)	12.2% ($n = 230$)	15.4% ($n = 117$)	11.2%
Maximal follow-up	10.3% ($n = 214$)	11.6% ($n = 172$)	18.3% ($n = 263$)	13.9%
TOTAL‖	9.1%	11.9%	17.4%	

*Not smoking for at least seven days at the time of follow-up.

†Note: patients who could not be reached or refused to provide information were included as smokers.

‡Overall effect: $X^2 = 14.22$; $p < 0.025$.

§NCG = nicotine-containing gum.

¶$X^2 = 2.02$; $p = 0.156$, for six-month cessation rates collapsed across three MD conditions.

‖$X^2 = 13.03$; $p < 0.005$, for six-month cessation rates collapsed across two follow-up conditions.

AO group, 9.1% reported cessation, with this proportion increasing to 11.9% and 17.4% for the CI and CI plus NCG groups, respectively ($p < 0.005$). The cessation effect for type of follow-up (maximal vs. minimal), although in the expected direction, failed to reach statistical significance (minimal, 11.2%; maximal, 13.9%) ($p = 0.16$). Six-month outcomes did not differ by original reason for clinic visit nor by number of subsequent visits (for any reason) to the physician.

A similar pattern of quit rates increasing with intensity of physician intervention is seen for abstinence of greater than three months, as reported at the time of the six-month contact (Table 3). Of the AO patients, 5.9% had been entirely off cigarettes for at least three months at the time of the initial six-month follow-up; this rate increased to 9.2% and 13.2% for CI and CI plus NCG patients, respectively ($p < 0.002$). The length of time between the physician visit and initial cessation also demonstrates that the more intensive the physician intervention, the greater the likelihood for early cessation ($p < 0.001$): 15.4% of smokers in the CI plus NCG group reported having stopped within a day of their initial physician contact, compared with 10.5% of those in the CI group and 3.9% of those in the AO group.

Logistic Regression Analyses

Separate logistic regression analyses were carried out to examine the effect of the intervention condition on the primary outcome measure, cessation of cigarette smoking for at least one week, and on the related measure of three months of continuous abstinence. Patients in the CI plus NCG group showed twice the likelihood of reporting a one-week cessation as did those in the AO group (Table 4), whereas patients in the CI group showed 1.6 times the likelihood ($p < 0.05$). The maximal follow-up showed no substantial impact overall, compared with the minimal follow-up.

The result of regression analysis on three-month abstinence rates was virtually identical to that of point prevalence abstinence when the quitters were classified into two groups based on length of abstinence (less than or equal to three months and more than three months), with an adjusted odds ratio of 2.1 for CI plus NCG (95% CI = 1.2, 3.3), while the adjusted odds ratio for the CI group equaled 1.6 (95% CI = 1.0, 2.6). How soon someone quit after initial intervention showed a small but significant increase for the CI plus NCG group (adjusted odds ratio = 1.3; 95% CI = 1.0, 1.8) and a slightly smaller effect for the CI group (adjusted odds ratio = 1.2; 95% CI = 0.9, 1.6). Intervention group also affected the length of the longest abstinence reported. The effect for CI plus NCG was again doubled (adjusted odds ratio = 2.0; 95% CI = 1.5, 2.8); the effect for CI alone was somewhat less, but still statistically significant (adjusted odds ratio = 1.4; 95% CI = 1.1, 1.9). Of note, the relative increase of CI plus NCG over CI was statistically significant for length of initial quitting (adjusted odds ratio = 1.3; 95% CI = 1.1, 1.9).

TABLE 3

Length of Current Abstinence at Six-month Follow-up by Physician Intervention Group ($N = 1,224$)*

	Advice Only	Counseling	Counseling plus NCG†
Never quit‡	55.3%	49.1%	41.8%
Relapsed	35.6%	39.0%	40.8%
Quit < 3 months	3.2%	2.7%	4.2%
Quit > 3 months	5.9%	9.2%	13.2%

*Overall $p < 0.001$.

†NCG = nicotine-containing gum.

‡Patients who could not be reached or refused to provide information were placed in the "never quit" category.

TABLE 4

Logistic Regression Analysis for Self-reported Six-month Cessation Rates

	Coefficient	Adjusted Odds Ratio*	95% Confidence Interval
Counseling	0.47	1.6	1.00, 2.59
Counseling plus nicotine-containing gum	0.69	2.0	1.20, 3.2
Maximal follow-up	0.11	1.1	0.76, 1.6

*Adjusted for: confidence (6 months) ($p < 0.001$); most cigarettes ever smoked ($p < 0.01$); length of previous quittings ($p < 0.05$); age began smoking regularly; presence of minor ($p < 0.05$) or chronic medical symptoms (−); recent decrease in smoking. Note: (−) denotes a negative relationship.

TABLE 5

Extent of Physician Helpfulness by Physician Intervention Group*

	Advice Only ($n = 349$)		Counseling ($n = 329$)		Counseling plus NCG† ($n = 298$)	
	Continuing Smokers	Former Smokers	Continuing Smokers	Former Smokers	Continuing Smokers	Former Smokers
Very helpful	25.6%	20.0%	33.3%	51.1%	44.0%	54.6%
Of some help	48.5%	55.0%	50.0%	40.4%	43.1%	39.4%
Of no help	25.9%	25.0%	16.7%	8.5%	12.9%	6.1%

*Overall effect: $X^2 = 43.137$; $p < 0.001$. Note: patients who could not be reached or refused to provide information are not included in these data.
†NCG = nicotine-containing gum.

Use of Nicotine-containing Gum

During the three counseling telephone calls, patients in the CI plus NCG condition were asked whether they had accepted a prescription for NCG and for how long they had used it. Although these data could be collected only from those CI plus NCG patients in the maximal follow-up condition, it is believed that self-reported data collected within three months after prescription of NCG (when counseling calls took place) would be more valid than reports provided at six months. Of these subjects, 32.6% refused use of NCG entirely, 17.6% tried it for two days or less, 18.3% used it for up to four weeks, and 29% used it for one month or more.

Helpfulness of Physicians

Patients in the CI and CI plus NCG groups were significantly more likely to report that their physicians had been helpful in their efforts to alter their smoking behavior than were those in the AO group, whether they were still smoking or had quit. It is also notable that, whereas patients receiving counseling were more likely to rate their physicians as being more helpful if they had quit than if they were still smoking, former smokers in the AO group were less likely than current smokers in the other two groups to think that their physicians had been very helpful to their efforts (Table 5).

DISCUSSION

The American College of Physicians recommends that physicians intervene with all of their patients who smoke.[18] However, only 50–60% of patients report that they are receiving advice from their physicians to stop smoking[19, 20]; and only a very small percentage of physicians report that they actually go beyond providing simple advice when intervening.[21] Although the great majority of physicians express the attitude that it is important to intervene with smokers, most believe that they are poorly prepared to do so and that they are not even moderately effective.[19, 21-23]

This study confirms and extends our knowledge of the beneficial impact physicians can have on the smoking behaviors of their patients. It demonstrates that patients receiving brief patient-centered behavior-oriented counseling, with or without the prescription of nicotine-containing gum, were much more likely to change their smoking behaviors than were patients provided brief advice to stop smoking. The impact of these interventions was strong immediately after intervention and at six months.

The study was not designed to identify the specific impact of the use of NCG, although the results appear consistent with the benefits of NCG when combined with counseling, as found by other investigators.[12, 24] This was in spite of only about 50% of these patients' using NCG to a degree that might have been helpful (three or more days), and in spite of few patients' using the amount recommended for optimal effect, given a very limited number of refill requests. One can speculate that the availability of the gum, whether used or not, may have had a beneficial effect. Refusing a prescription by stating "I can quit on my own" may enhance commitment and self-efficacy, increasing the likelihood of success.

One concern raised by physicians regarding smoking intervention is that they will alienate patients who are not yet ready to quit, particularly if they do more than offer brief advice. However, we found that patients, whether they went on to quit or not, rated physicians as being more helpful when they had offered counseling. As most smokers go through several stages of readiness for change,[25] it is important that physicians feel confident in exploring smoking issues with smokers less motivated to quit. Patient-centered counseling is designed to minimize defensiveness; it can also be used repeatedly, taking advantage of another characteristic of usual health care, intermittent contact over extended periods of time. It is not surprising that those who refused to participate tended to be very light smokers or had much less interest in quitting.

Contrary to our expectations, provision of follow-up counseling by ancillary staff did not independently contribute to cessation. This result was surprising and is somewhat difficult to interpret. The counselors were

well trained and as skilled as one would expect from ancillary staff who might provide such intervention in a medical service. However, no face-to-face contact occurred and patients may have perceived the calls as impersonal or intrusive. That such a reaction occurred is supported by the disproportionate number of individuals receiving maximal follow-up who subsequently refused telephone monitoring. Alternatively, the greater number of patients unavailable for monitoring in the maximal group, given that these individuals were considered to be smokers for purposes of analysis, may have contributed to a lower calculated cessation rate in that condition than had actually occurred.

The quit rates in the AO group were higher than those found in the past for similar interventions.[2, 3] This impact of advice may be related to two factors: the high consistency of intervention due to the prompting of physicians to intervene with each patient; and a greater amount of input than is usually implied by the term "advice." Regarding the former, Cohen et al.[5] demonstrated that reminder stickers on charts increase the likelihood of intervention. These factors may limit the generalizability of the absolute quit rates achieved in this study. However, the high rates associated with advice make even more convincing the higher rates seen with counseling and prescription of NCG.

Contributing to generalizability is the fact that our patient population included a broad sample of patients seen in a primary care setting. In addition to those patients who had an ongoing relationship with the physician, it included those being seen for follow-up to an emergency room visit, "walk-ins," employment physicals, and other first-time visits. Of note, the reason for the visit did not relate to study outcome, suggesting that physicians need not be hesitant about intervening in regard to health-risk behaviors with patients whom they do not know well.

Another limiting aspect of the study is the use of self-reported information that was not validated by biochemical measures. We were concerned that such validation would interfere with patient recruitment and retention, leading to a non-representative patient sample and detracting from the public health perspective of the study. It is unlikely that in this "low-demand" study, patients were untruthful in their reporting. The physician intervention, for which the main effects were seen, occurred distant from the time of follow-up at six months, and therefore was unlikely to have produced excessive perceived demands on the patient. Furthermore, all patients received some intervention from their physicians, making it unlikely that patients' reporting of smoking status was dependent on the group assignment. Thus, even if some inflation of reported cessation exists, it is unlikely to be biased in favor of a particular physician intervention group. For this type of research protocol, with relatively low-intensity interventions and a general patient population, there is growing concurrence that the logistic and financial requirements of biochemical validation are not justified and may even lead to a biasing of results if there is selected loss due to annoyance with the intrusiveness of such measures.[26-28]

In spite of the promising results of this study, it leaves some questions unanswered and raises others. Is the effectiveness of patient-centered counseling due to the increased time spent or to the manner of counseling? Can these counseling techniques be readily taught in other settings and to physicians at other levels of professional development? Another major set of questions has to do with identifying effective follow-up. Cummings et al.[7] demonstrated that smokers who met repeatedly with their physicians had much higher quitting rates than did those who did not, but the number of follow-up visits was self-selected. Perhaps telephone follow-up would increase cessation if offered by someone known to the patient, or if the patient had a choice about whether or when to receive it. Finally, we do not know whether the differences in quit rates will hold up on a long-term basis, given the minimal intervention that actually occurred.

Substantial evidence is accruing to demonstrate that physicians are important sources of intervention for the large group of smokers who have annual contact with them during the course of ongoing health care. Given the approximate 30% prevalence of smoking in the adult U.S. population and a contact rate of 70% with physicians annually, the use of physician-delivered interventions that produce cessation rates of 8% to 16% could decrease the prevalence of smoking by 2.8 million to 5.6 million individuals per year in the United States.

Not only is the potential for physicians to have significant impact on the smoking prevalence in the United States high, but such brief counseling as was shown to be effective in this study can also be adapted to other behavioral risk factors, such as physical exercise[29] and cholesterol lowering.[30] New goals for medical education, house staff training, and continuing medical education are needed[31] that include the development of intervention skills to allow providers to effectively and efficiently facilitate health-promoting behaviors among their patients. Physician-delivered smoking intervention can perhaps have a stronger impact on the health of patients than can any other intervention provided in the outpatient setting.

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Correction

Internal Medicine Residencies

An error occurred in an editorial that appeared in the September/October issue, "Declining Interest in Internal Medicine Residencies: A Crisis or A Quirk?" (J Gen Intern Med. 1990;5:453). The fourth sentence in the second paragraph should read: "In 1985 there were 16,318 U.S. senior medical students and in 1989, 15,630, a 4% decrease." The reference for these data is the *Association of American Medical Colleges Data Book*, May 1990.