

Predictors of smoking cessation among elderly smokers treated for nicotine dependence

Lowell C Dale, Debra A Olsen, Christi A Patten, Darrell R Schroeder, Ivana T Croghan, Richard D Hurt, Kenneth P Offord, Troy D Wolter

Abstract

Objective—To examine outcomes and predictors of smoking cessation among elderly patients treated for nicotine dependence.

Design—Retrospective analysis of patients aged 65–82 who received a nicotine dependence consultation at the Mayo Medical Center between 1 April 1988 and 30 May 1992. Patients were contacted by telephone by a trained interviewer six months after the consultation and were sent a follow-up survey in August 1993.

Setting—Mayo Medical Center, Rochester, Minnesota, United States.

Subjects—A total of 613 patients (310 men, 303 women) with a mean age of 69.0 (SD 3.5) years were seen during the study period.

Main outcome measures—Point prevalence self-reported smoking status. Patients were considered abstinent if they self-reported not smoking (not even a puff) during the seven days before contact.

Results—At six-month follow up, 24.8% of the 613 patients reported abstinence from smoking. On multivariate analysis, smoking abstinence was more likely if patients were hospitalised at the time of the consultation, married to a non-smoking spouse, very motivated to stop smoking, and reported their longest time of previous abstinence to be less than a day or more than a month. The response rate to the mailed follow-up survey was 69.9% (429 of 613). The mean duration of follow up was 40.0±13.2 months following the consultation. Of the 429 patients, 103 (24.0%) reported abstinence from smoking and 326 (76.0%) were smoking at six-month follow up. Patients who reported abstinence at six months had a higher cessation rate at the last follow up (76.0%) compared with patients who were smoking at six-month follow up (33.0%, $P<0.001$). For patients who were not smoking at six months, no factors were found to significantly predict abstinence at last follow up. For patients who were smoking at six months, factors associated with smoking cessation at last follow up were: more than a year as the longest time off cigarettes before the consultation; counsellor rating of less severe nicotine dependence; and older age at first regular smoking.

Conclusions—Several predictors of smoking cessation were identified in this study which may be useful for tailoring smoking interventions for the elderly.

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Introduction

Increasing attention has been called to the importance of developing nicotine dependence interventions for the elderly.¹⁻³ Cigarette smoking is the leading cause of premature death among older persons, primarily due to cardiovascular disease and cancer.^{4,5} The National Institutes of Health's Established Populations for Epidemiologic Studies of the Elderly (EPESE), involving 7178 adults aged 65 and older without a history of myocardial infarction, stroke, or cancer, found the rates of total mortality over a five-year period to be twice as high among current smokers as among those who had never smoked.⁶ In 1990, the prevalence of smoking among adults aged 65–74 was 18.3% for men and 15.6% for women.⁷ The population of the United States is projected to increase to a greater extent at older rather than younger ages.⁸ Thus, the public health burden due to cancer and other tobacco-related diseases in the elderly will become even greater.⁹ Smoking cessation has health benefits in younger as well as older age groups.^{10,11} The EPESE study found that former smokers had rates of cardiovascular mortality similar to those who had never smoked, regardless of the number of years since stopping or the age at cessation.⁶

Recent population-based data indicate that older age is not a barrier to stopping smoking.¹² A community-based, longitudinal study of 1259 current smokers aged 65 and older found the annual cessation rate to be 10.0% over a six-year follow-up period.¹³ Orleans *et al*¹⁴ assessed smoking outcomes in a sample of 1070 smokers aged 65–74 who were prescribed transdermal nicotine therapy by their physician. The six-month cessation rate was 28.5%. More advice, counselling, and materials from physicians or pharmacists regarding use of the nicotine patch was associated with higher smoking cessation outcomes.

Physicians and other healthcare providers can play a prominent role in smoking cessation among older adults.^{15,16} A randomised trial of smokers aged 65 and older showed the effectiveness of a single physician visit, which included brief advice to stop smoking

Division of
Community Internal
Medicine, Mayo Clinic
and Mayo Foundation,
Rochester, Minnesota,
USA

L C Dale
R D Hurt

Nicotine Research
Center, Mayo Clinic
D A Olsen
C A Patten
I T Croghan

Section of
Biostatistics, Mayo
Clinic
D R Schroeder
K P Offord
T D Wolter

Correspondence to Dr CA
Patten, Mayo Clinic, 200
First Street SW, Rochester,
Minnesota 55905, USA;
email:
patten.christi@mayo.edu

combined with intervention at six months by a nurse practitioner.¹⁷ The intervention was associated with a significantly higher stop rate at six-month follow up (14% of 237) than the control condition (9% of 234).

The study of characteristics associated with smoking cessation in the elderly is important for tailoring interventions to enhance outcome. Predictors of smoking cessation among older adults previously identified are: fewer cigarettes smoked per day¹³; fewer years of smoking¹⁴; fewer smoking-related symptoms¹⁵; absence of a history of cardiovascular disease¹³; never having been married¹³; higher self-efficacy scores¹⁸; and fewer depressive symptoms.¹⁹ Further work is needed to identify factors that contribute to cessation as well as maintenance of smoking abstinence in the elderly.

The purpose of this retrospective study was to examine outcomes and predictors of smoking cessation among adults aged 65–82 who were treated for nicotine dependence at the Mayo Medical Center in Rochester, Minnesota.

Methods

All cigarette smokers aged 65 years or older who used the services of the Nicotine Dependence Center (NDC) at the Mayo Medical Center between 1 April 1988 and 30 May 1992 were included in this study. Eighty-five per cent of all patients seen at the Mayo Clinic live within a 500 mile (805 km) radius. A small percentage of patients (<15.0%) are self-referred and seen as outpatients in the NDC. Most patients are referred to the NDC by a physician, and are seen in the physician's office or in the patient's hospital room. The referring physician assesses the smoking status but does not screen for other factors such as motivation to stop smoking. In our study, information on the reason for referral or medical diagnosis was not obtained. We could not collect data on demographic characteristics of elderly smokers who did not use the services of the NDC and, therefore, are unknown. Thus, we were unable to include a suitable control group of patients who were referred for nicotine dependence intervention but not seen by a counsellor. A previous study²⁰ of smokers aged 29–70 referred to the NDC by their physician did, however, find that those who were not seen for counselling—for example, did not show up for their appointment—were more likely to be younger, had less formal education, and were heavier smokers.

The treatment model used by the Nicotine Dependence Center is a comprehensive intervention which combines behavioural, addiction, and pharmacological approaches.²¹ Before seeing a counsellor, the patient completes an extensive smoking history and demographic questionnaire which includes the Fagerström Tolerance Questionnaire.²² The counsellor then provides a 45–60-minute consultation during which the severity of nicotine dependence is assessed according to the DSM-IV criteria.²³ A treatment plan individu-

alised to the patient's specific needs is then developed.

Follow up consists of telephone calls by a trained interviewer at one, three, and six months following the consultation. The patient's self-reported smoking status is obtained at each contact. No advice or counselling is provided, although the patients may be encouraged to contact their counsellor if questions or concerns are raised. In this study, we use the six-month self-reported point prevalence smoking status as the primary end-point. Thus, we did not assess or analyse relapse rates during the six-month follow-up period. At the six-month follow up, patients were considered abstinent if they self-reported not smoking (not even a puff) in the seven days before the interview. This definition of abstinence is based on the consensus statements from the National Heart, Lung, and Blood Institute²⁴ and the National Cancer Institute,²⁵ which recommend using a seven-day period for point prevalence estimates of smoking cessation. For analysis purposes, those who could not be contacted or who refused to cooperate were considered to be smoking. To obtain information on smoking status after the six-month follow up, a survey was mailed to all patients in August 1993. Only one mailing was attempted.

STATISTICAL METHODS

Univariate analyses were performed to identify factors associated with smoking abstinence at six-month follow up using the χ^2 and rank sum test for discrete and continuous variables, respectively. In all cases, two-sided tests were used with $P < 0.05$ used to denote statistical significance. Multivariate logistic regression²⁶ was used to identify independent predictors of smoking abstinence at six-month follow up. A stepwise backward elimination algorithm was employed with all variables entered in the model at the first step. The most non-significant variable was removed, with the remaining variables entered in the model at the second step. This procedure was repeated until all variables remaining in the model contributed significantly ($P < 0.05$) to the prediction of six-month smoking abstinence. To summarise and simplify interpretation of the multivariate results, the predictor variables and estimated regression coefficients from the final logistic regression model were used to calculate a cessation predictor score. A patient's cessation predictor score was calculated as the sum of the patient's predictor variables multiplied by the corresponding regression coefficients rounded to the nearest 0.5. To identify factors associated with smoking status among the subset of patients on whom we obtained information at the last follow up, we again used logistic regression and performed separate analyses for patients who were smoking and for those who were not smoking at the six-month follow up.

Results

There were 310 men and 303 women with an average age of 69.0 (SD 3.5) years. The

Table 1 Univariate association between baseline characteristics and six-month smoking status in 613 elderly patients

	Total n	Not smoking		χ^2 P
		n	%	
Overall	613	152	24.8	
<i>Demographics</i>				
Age at consultation (years)				>0.10
65-69	386	93	24.1	
70-74	176	47	26.7	
≥ 75	51	12	23.5	
Gender				>0.10
Male	310	85	27.4	
Female	303	67	22.1	
Marital status				0.039
Married				
Spouse does not smoke	305	89	29.2	
Spouse smokes	113	20	17.7	
Widowed	119	28	23.5	
Divorced	38	10	26.3	
Never married	25	2	8.0	
Education				>0.10
Less than high school	107	29	27.1	
High school degree	187	50	26.7	
Some college or above	271	60	22.1	
Patient type				<0.001*
Physician-referred				
Hospitalised patient	114	45	39.5	
Outpatient	490	103	21.0	
Self-referred outpatient	4	2	50.0	
<i>Smoking history</i>				
Average number of cigarettes/day over six months before consultation				>0.10
≤ 20	389	98	25.2	
21-39	136	35	25.7	
≥ 40	88	19	21.6	
Number of prior attempts to stop smoking				>0.10
0	43	15	34.9	
1-2	141	38	27.0	
3-4	107	22	20.6	
≥ 5	205	53	25.8	
Longest period of previous abstinence				0.004
<1 day or not at all	76	25	32.9	
1 day to <1 month	213	38	17.8	
1 month to <1 year	177	44	24.9	
≥ 1 year	98	34	34.7	
Fagerström Tolerance Questionnaire score				>0.10
1-4	183	53	29.0	
5-6	179	38	21.2	
≥ 7	143	30	21.0	
Counsellor's rating of patient's degree of nicotine dependence				>0.10
Mild	44	8	18.2	
Moderate	173	36	20.8	
Severe	388	103	26.6	
<i>Responses to baseline questionnaire</i>				
Past disease worsened by smoking†				>0.10
"Yes"	295	75	25.4	
"No"	307	75	24.4	
Current disease worsened by smoking‡				>0.10
"Yes"	358	93	26.0	
"No"	243	57	23.5	
How motivated about stopping smoking‡				0.005§
Not at all motivated	11	2	18.2	
Not too motivated	31	5	16.1	
Neutral	41	8	19.5	
Somewhat motivated	242	52	21.5	
Very motivated	220	72	32.7	

*Physician-referred outpatients and self-referred outpatients are combined for χ^2 comparison.
 †"Have you in the past had symptoms, a disease or illness you believe was caused or made worse by your smoking?" "Do you now have symptoms, a disease or illness you believe is caused by or made worse by your smoking?" ‡"How motivated are you to stop smoking completely?" §P value associated with Mantel-Haenszel χ^2 test for trend.

average number of cigarettes smoked per day during the six months before the consultation was 22.9 (SD 11.4). Of the 613 patients, 79.9% were seen at Mayo in an outpatient physician-referred setting, 18.6% were physician-referred patients hospitalised at one of two Mayo affiliated hospitals, and 1.5% were self-referred outpatients seen at the Nicotine Dependence Center. Table 1 summarises baseline characteristics of the 613 elderly patients and compares smokers versus non-smokers at six-month follow up with

respect to these characteristics. Mean age at first regular smoking (not shown) was 20.9 (SD 7.1) years and average number of cigarettes smoked per day during the period of heaviest smoking was 33.4 (SD 14.7).

SIX-MONTH SMOKING STATUS

Smoking status at the six-month follow up (median = 7.0, range = 5-10 months) was obtained for 96.7% of the sample. At the six-month follow up, 24.8% (95% confidence interval = 21.4% to 28.4%) of the patients reported abstinence from smoking. Table 1 summarises the results of the univariate analysis of factors associated with six-month smoking status. Mean age at first regular smoking and number of cigarettes smoked per day during the period of heaviest smoking (not shown) did not differ significantly between smokers and non-smokers (21.0 \pm 7.0 vs 20.9 \pm 7.3 years; 33.9 \pm 15.5 vs 32.1 \pm 11.9 cigarettes per day, respectively). Patients who were hospitalised at the time of the consultation had a significantly higher stop rate (39.5%) compared with outpatients (21.0%, $P < 0.001$). Abstinence from smoking was significantly associated with marital status ($P = 0.039$), with patients married to a non-smoking spouse having a better stop rate (29.2%). Self-reported motivation level for stopping smoking was also significantly associated with smoking abstinence ($P = 0.005$). Patients who reported being very motivated to stop smoking achieved a higher stop rate (32.7%).

Factors considered as potential predictor variables in the multivariate analysis were baseline characteristics listed in table 1, age at first regular smoking, and number of cigarettes smoked during the period of heaviest smoking. Age at the time of consultation, age of first regular smoking, average smoking level six months before the consultation, and mean number of cigarettes smoked during the period of heaviest smoking were treated as continuous variables, whereas other factors were categorised as shown in table 1. Using logistic regression, after elimination of non-significant factors, four factors were found to be multivariately predictive of smoking cessation at six-month follow up: being hospitalised at the time of the consultation, married to a non-smoking spouse, very motivated to stop smoking, and longest time off cigarettes of less than a day or more than a month. Table 2 displays the odds ratios and 95% confidence intervals for these variables in relation to six-month smoking status.

Because there are 32 potential combinations of the levels of these four factors, we created a scoring algorithm to simplify this multivariate relationship. For each patient, a cessation predictor score (CPS) was calculated using the following algorithm: CPS = 1.0 (if the longest time off cigarettes before the consultation was less than a day) or 0.0 (if the longest time off cigarettes before the consultation was from a day to less than a month) or 0.5 (if the longest time off cigarettes before the consultation was from a month to less than a year) or 1.0 (if the

Table 2 Multivariate predictors of smoking cessation at six months*

Predictor	Parameter estimate	P	Odds ratio	95% CI
Hospitalised at the time of consultation				
Yes	0.80	0.002	2.2	1.3-3.7
No			1.0	
Married to a non-smoking spouse				
Yes	0.62	0.004	1.9	1.2-2.8
No			1.0	
Very motivated to stop smoking†				
Yes	0.57	0.008	1.8	1.2-2.7
No			1.0	
Longest period of previous abstinence		<0.001‡		
<1 day	1.12		3.1	1.6-5.8
1 day to <1 month	0.00		1.0	
1 month to <1 year	0.60		1.8	1.1-3.1
≥1 year	1.15		3.2	1.7-5.7

*From multivariate logistic regression model with six-month smoking status as the dependent variable and dichotomous indicator variables for: hospitalised at the time of consultation, married to a non-smoking spouse, very motivated to stop smoking, and three dichotomous indicator variables defining the four categories of longest period of previous abstinence, as independent variables.

†Patient response to: "How motivated are you to stop smoking completely?"

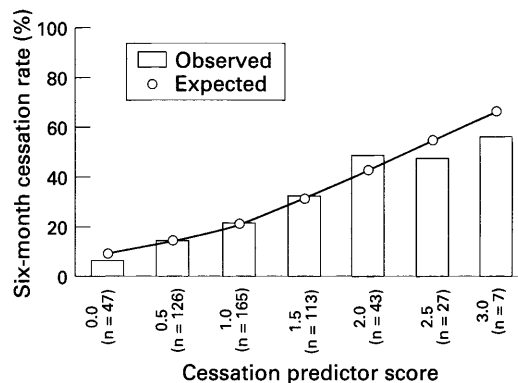
‡P value associated with the three degrees of freedom χ^2 statistic determined by the difference between the score statistics from the logistic regression model, which included all six independent variables and the model which included only three independent variables: hospitalised at the time of consultation, married to a non-smoking spouse, and very motivated to stop smoking.

CI = confidence intervals.

longest time off cigarettes before the consultation was a year or more)+1.0 (if the patient was hospitalised at the time of the consultation)+0.5 (if the patient was married to a non-smoking spouse)+0.5 (if the patient reported being very motivated to stop smoking). CPS has a total of seven possible values ranging from 0 (for patients whose longest time off cigarettes before the consultation was at least a day but less than a month, were not hospitalised at the time of the consultation, not married to a non-smoking spouse, and not very motivated to stop smoking) to 3 (for patients whose longest time off cigarettes before the consultation was less than a day or greater than a year, were hospitalised at the time of the consultation, married to a non-smoking spouse, and very motivated to stop smoking). Figure 1 displays the observed smoking cessation rate at six months according to the cessation predictor score. Also included is the predicted rate from the logistic regression model. Patients with a CPS of zero had an observed six-month cessation rate of 6.0% and a predicted cessation rate of 9.0%, whereas patients with a CPS of 3 had an observed six-month cessation rate of 57.0% and a predicted cessation rate of 68.0%.

SMOKING STATUS AT LAST FOLLOW UP

Of the 613 patients who received a nicotine dependence consultation, 429 returned the mailed follow-up survey, resulting in a response rate of 69.9%. Of the 184 non-respondents, 78 had died, 71 refused to participate, nine were unable to respond, and 26 could not be contacted. We compared the baseline characteristics and six-month smoking status of those who responded to the follow-up survey with non-respondents. Respondents did not differ significantly from non-respondents with respect to six-month smoking status (24.0% vs 27.0% abstinent, respectively). Respondents were more likely than non-respondents to have more than a high school education ($P = 0.009$), were more likely to be rated by the counsellor as mildly or mod-



Six-month cessation rate according to the cessation predictor score. The cessation score has a total of seven possible values ranging from 0 (for patients whose longest time off cigarettes before the consultation was at least a day but less than a month, were not hospitalised at the time of the consultation, not married to a non-smoking spouse, and not very motivated to stop smoking) to 3 (for patients whose longest time off cigarettes before the consultation was less than a day or more than a year, were hospitalised at the time of the consultation, married to a non-smoking spouse, and very motivated to stop smoking).

erately nicotine dependent ($P = 0.010$), and were more likely to be seen for a consultation during the latter period of the study ($P = 0.005$). These findings should thus be considered when interpreting the following results.

The mean duration of follow up, defined as the interval between the time of the consultation and return of the mailed follow-up survey, was 40.0 ± 13.2 months (range = 16-66 months). Because of the wide range of follow up on our patients, we also considered duration of follow up in the analyses predicting smoking status. The overall smoking cessation rate at last follow up was 43.0% (185 of 429). When non-respondents were considered as smokers, the cessation rate was 30.0% (185 of 613). If we excluded patients who had died ($n = 78$) and classified all other non-respondents as smokers, the cessation rate was 34.6% (185 of 535).

Of the 429 respondents, 103 (24.0%) had reported abstinence from smoking at six-month follow up and 326 reported smoking. Patients who reported abstinence at six months had a higher cessation rate at the last follow up (76.0%) compared with patients who were smoking at six-month follow up (33.0%, $P < 0.001$). Of the 103 patients who were abstinent at six months, no factors were found that significantly predicted abstinence at last follow up. Of the 326 patients who were smoking at the six-month follow up, univariate factors significantly associated with smoking cessation at last follow up were: longest time off cigarettes before the consultation of less than a day or more than a year ($P = 0.027$), fewer quit attempts ($P = 0.026$), counsellor rating of mild or moderate nicotine dependence ($P = 0.023$), older age at first regular smoking ($P = 0.015$), and fewer cigarettes smoked per day at the time when smoking the heaviest ($P = 0.017$). Multivariate analyses revealed three independently significant factors associated with smoking cessation: more than a year as the longest time off cigarettes before the consultation ($P = 0.011$),

counsellor rating of less severe dependence ($P = 0.026$), and older age at first regular smoking (0.046).

Discussion

Our results show that almost 25% of the elderly patients reported having stopped smoking six months following intervention for nicotine dependence. A major limitation of this study is the lack of a control group to compare patients who participated in our clinical programme with those who did not. It is thus possible that a similar rate of smoking cessation would be obtained without treatment. However, the cessation rate found in this study is substantially greater than the natural history of smoking cessation of 10.0% observed in a population-based sample of 1259 men and women aged 65 and older.¹³ In addition, a controlled trial of intervention delivered by physicians and nurses to elderly smokers found higher stop rates associated with the intervention compared with an untreated control group.¹⁷

Nicotine dependence intervention delivered in a medical centre may be a cost-effective means of reaching a large number of elderly smokers.^{27, 28} Community-based studies indicate that smokers aged 65 and older are least likely to use a smoking cessation programme.²⁹ Moreover, the elderly have more frequent contact with healthcare providers.³ However, we recognise that older patients attending a medical centre may differ from the general population in terms of socio-demographic characteristics.¹⁴ For example, the patients in our study were primarily white and 81.0% had at least a high-school education. In addition, 18.6% of the patients were hospitalised at the time of the consultation, which may further limit the generalisability of the sample. Nevertheless, our patients reported a range of motivation to stop smoking (table 1) which should be comparable with other elderly smokers.^{2, 3} A related issue is that our medical centre has a well-developed nicotine dependence and referral centre; thus the extent to which our findings can be applied to other medical centres with fewer resources is not known.

One of the strengths of this study is the inclusion of a large cohort of adults aged 65 and older, which allowed for the identification of several factors related to successful smoking cessation. When we looked at the combined findings of the four highly significant, independently important predictors of six-month cessation, we found that patients who were hospitalised at the time of the consultation, very motivated to stop smoking, married to a non-smoker, and who had made a quit attempt of less than a day or greater than a year had the highest cessation rate (57.0%). The lowest stop rate (6.0%) was for the patients who were not hospitalised at the time of the consultation, not very motivated to stop smoking, not married to a non-smoking spouse, and whose longest quit attempt was at least a day but less than a month. The ninefold range of stop rates with these four variables is a

remarkable finding and has several implications for tailoring clinical interventions.

The association of hospitalisation at the time of the consultation with increased success at stopping smoking suggests the period of hospitalisation represents a "teachable moment" or important opportunity for health professionals to encourage smoking cessation in the elderly.³⁰ One factor that may account for this observation is that patients were hospitalised in a smoke-free environment, which provided for a limited period of forced abstinence.³¹ Standards issued by the Joint Commission on Accreditation of Healthcare Organisations (JCAHO) require its accredited hospitals to be smoke-free.³² Recent surveys have found that most hospitals are in compliance with these standards.^{33, 34}

It is also possible that hospitalisation contributed to cessation by emphasising a disease related to smoking. A drawback of this study is that we did not determine the medical diagnosis or presence of co-morbid psychopathology among our patients. Moreover, we were not able to assess medical diagnosis or co-morbid psychopathology as potential predictors of smoking cessation. In the general population, alcohol dependence and a history of major depression have predicted poor smoking treatment outcomes.³⁵ Of note, the patient's perception of a disease made worse by smoking did not predict cessation.

High levels of motivation to stop smoking were related to successful cessation outcomes in our elderly patients. This finding is consistent with studies of younger smokers,^{30, 36} but motivation to quit has not been previously studied as a predictor of cessation in the elderly. A potential method of enhancing motivation in elderly smokers is the motivational interview developed by Miller and colleagues.³⁷ This interview is designed to increase patient motivation and personal responsibility for change.

We observed that patients who were married to a non-smoking spouse were more successful in stopping smoking. Salive *et al.*¹³ compared elderly smokers who had never been married with those who had ever been married, and found the latter to have poorer smoking cessation outcomes. However, their study did not assess the smoking status of the spouse. An important role of the non-smoking spouse in the treatment of the elderly smoker may exist. For instance, non-smoking spouses could be instructed in behavioural change strategies to enhance the generalisation of treatment gains made by the patient.

An additional factor associated with successful smoking cessation was the duration of previous stop attempts. The ability to stop smoking for longer than a year may have led to enhanced self-efficacy or confidence¹⁷ or provided for an opportunity to learn skills that were useful in later efforts toward cessation. Among older adults, higher levels of self-efficacy predicted cessation following a behavioural smoking intervention.¹⁸ On the other hand, it is likely that a quit attempt of less than a day is not of sufficient duration to be

considered as a demoralising failed attempt. These findings point to the need to assess previous experiences at quitting smoking in the elderly person as a treatment plan is developed.

Our study also examined factors associated with smoking status after the six-month follow up. Most studies of the elderly have focused on only short-term cessation—for example, less than six months.^{12 14 16} However, our findings at both the six-month and last follow-up period are limited by our reliance on self-reported smoking status and the lack of biochemical verification. Velicer *et al.*³⁸ found the rates of misreporting to be higher for clinic or intervention studies and for high-risk or medical patients. However, the rate of misreporting is less for situations in which smoking status is collected over time as part of a regular follow-up programme, which is comparable to the methods used in our study.¹¹ We also recognise that reporting of smoking status at follow up may differ as a function of the data collection procedure—for example, telephone *vs* mailed survey. In this study, we did not assess the comparability of the two methods of reporting; however, excluding patients who had died at last follow up ($n = 78$), the response rate to the telephone follow up was higher (97.0%) than to the mailed survey (79.8%). In a previous long-term follow-up study of a community-based smoking intervention, we found that those who returned a mailed questionnaire indicated a much higher rate of cessation than those who failed to return a questionnaire and were subsequently contacted by telephone.³⁹ A further issue is that generalisability of the findings on smoking cessation at the last follow up are limited by the characteristics of those who responded to the survey (higher levels of education, less severe levels of nicotine dependence). Another drawback is the wide range in duration of follow up on our patients, which limits our ability to make definitive conclusions about smoking outcome at a particular time point.³⁹

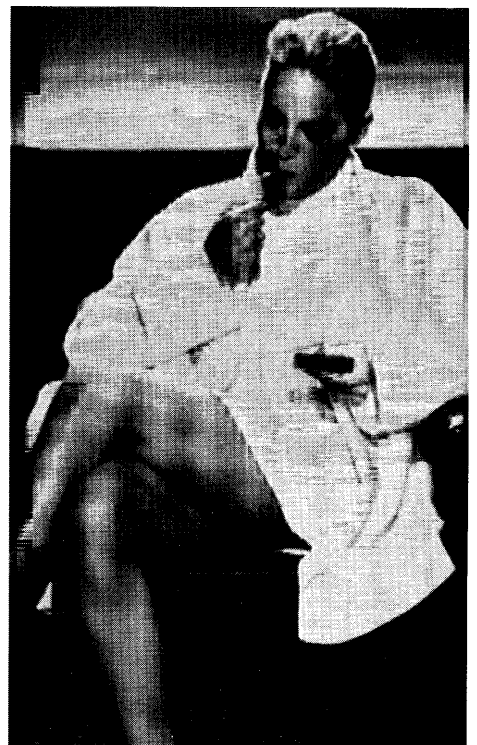
Our results do indicate that a considerable proportion (75.7%) of the 103 patients who were non-smokers at the six-month assessment were abstinent from smoking at the last follow up. This is encouraging given the high rate of relapse to smoking and other addictive disorders after initial abstinence.⁴⁰ Of concern are the elderly patients who continued to smoke at both assessment periods; 66.9% of the 326 who were smoking at the six-month time point reported smoking at the last follow up. Multivariate analyses revealed that starting to smoke at a younger age, a previous quit attempt of less than a year, and counsellor rating of severe nicotine dependence were factors significantly associated with continued smoking. In general, severe nicotine dependence has been related to diminished success at smoking cessation.⁴¹ In recent trials, we have demonstrated the effectiveness of pharmacological adjuncts such as high-dose nicotine patch therapy,⁴² which need to be tested for their efficacy and safety in severely nicotine dependent elderly smokers. In addition, more

intensive treatment options need to be made available to these elderly smokers,⁴³ who have been unable to stop with conventional treatments.

Despite the limitations of our study, we have determined several factors to be associated with smoking cessation in the elderly. Clearly, identifying elderly patients most likely to stop as well as those most likely to continue smoking should be useful for tailoring smoking interventions to achieve a successful outcome. In particular, a cessation predictor score may prove to be a useful stratification factor for future smoking treatment studies of the elderly.

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Smokes in the movies. Sharon Stone (right) lights up in *Basic Instinct* (1992); Marisa Tomei (with cigarette) and Gena Rowlands in *Unhook the Stars* (1996) (left).