

Predictors of Smoking Cessation and Relapse in Older Adults

ABSTRACT

We examined longitudinal changes in smoking behavior among older adults in three community cohorts of the Established Populations for Epidemiologic Studies of the Elderly. Smoking prevalence declined from 15% at baseline to 9% during 6 years of follow-up. Annual smoking cessation and relapse rates were 10% and less than 1%, respectively. Interval diagnosis of myocardial infarction, stroke, or cancer increased subsequent smoking cessation but not relapse. Although smoking cessation around diagnosis is increased, primary prevention could yield greater benefits. (*Am J Public Health*. 1992; 82:1268-1271)

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Introduction

Cigarette smoking is the leading cause of premature mortality among older persons, primarily due to cancer and cardiovascular disease.¹⁻⁴ Smoking cessation has health benefits, largely cardiovascular, before and after age 65 years.³⁻⁶ Although 4.5 million older adults continue to smoke regularly, 10 million have quit.⁷ Older smokers are more likely to quit than younger smokers,⁸⁻¹² possibly as a result of disease events, severity of illness, or hospitalization.^{6,7,12-13}

Previous reports from the Established Populations for the Epidemiologic Studies of the Elderly (EPESE) compared current, former, and never smokers at baseline¹⁴ and their 5-year mortality during follow-up.⁴ This study examined smoking cessation and relapse during follow-up and their predictors, particularly chronic disease events, in three community cohorts. We examined heart attack, stroke, and cancer because they are associated with smoking and increase with age.

Methods

The data were taken from the East Boston, New Haven, and Iowa and Washington counties EPESE communities, which enrolled approximately 10 300 participants 65 years of age or older beginning in 1981. Details of the methods have been published.^{4,14-16} Trained interviewers conducted baseline household surveys and six annual follow-up interviews (telephone and in person) that included information on demographics, medical history, and health-related behaviors. Of eligible community residents, 80% to 84% completed initial interviews, and annual follow-up rates were above 95% in each community.

This analysis followed baseline current and former cigarette smokers to determine smoking status 3 and 6 years later. Smoking status, determined by two questions ("Do you smoke cigarettes [regularly] now?" and "On the average, how many cigarettes per day do you [usually] smoke?"), was unavailable in less than 1% of completed in-home interviews. Cessation and relapse were defined as a change in smoking status at follow-up among current and former smokers, respectively. Additional baseline questions included prior smoking ("Did you ever smoke cigarettes [regularly]?"), and age of initiation or cessation, if applicable. Number of years of smoking was computed.

All interviews included questions about the diagnosis of myocardial infarction, stroke, and cancer by a physician (or,

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in East Boston, another health care provider). Exertional chest and leg pain were assessed at baseline.¹⁷

Cessation and relapse rates were age adjusted by the direct method using the combined baseline population. The communities were grouped to examine factors associated with smoking cessation and relapse using categorical methods. Logistic regression models¹⁸ used either smoking cessation or relapse as the dependent variable in multivariate analysis to adjust for demographics and smoking intensity.

Results

Smoking prevalence declined from 15% at baseline to 12% and 9% at years 3 and 6, respectively. After 3 years, 357 (28%) of 1259 baseline smokers had quit. By 6 years, the cessation rate increased to 46%; 433 of 944 baseline smokers had quit. Age-adjusted cessation and relapse rates differed little by gender and site (Table 1). Eighty-seven percent of surviving 3-year quitters remained nonsmokers at the final follow-up.

Smoking cessation in 3 years (Table 2) was independently and significantly ($P < .05$) associated with older age; never having been married; smoking fewer cigarettes per day; fewer years of smoking; no history of myocardial infarction, stroke, cancer, or report of angina or intermittent claudication at baseline; and interval diagnosis of myocardial infarction, stroke, or cancer. Smokers in Iowa were more likely to quit than those in New Haven (relative odds = 1.5, 95% CI = 1.0, 2.3), adjusting for variables in Table 2. Smoking cessation in 6 years was independently and significantly associated with non-Black race, smoking fewer cigarettes per day, and interval diagnosis of myocardial infarction, stroke, or cancer (Table 3).

Among former smokers, the relapse rate was 3%: 68 of 2050 baseline former smokers relapsed by 3 years and 44 of 1515 relapsed by 6 years, respectively. Three-year smoking relapse was predicted by younger age, heavier smoking history, and quitting smoking later in life (Table 4). Two fifths of former smokers who relapsed by year 3 had quit again by year 6, thus yielding too few persons for multivariate analysis.

Discussion

Older adults in these community-based samples had annual smoking cessation and relapse rates of 10% and less than 1%, respectively. Interval diagnosis of

TABLE 1—Three- and Six-Year Age-Adjusted Rates (Percentage during the Interval) of Smoking Cessation and Relapse, by Site and Gender

	Site		
	East Boston	New Haven	Iowa
Cessation rate ^a			
Men			
3-year	34	28	33
6-year	47	47	61
Women			
3-year	35	26	43
6-year	41	44	46
Relapse rate ^b			
Men			
3-year	3.6	2.6	2.3
6-year	1.9	3.4	2.2
Women			
3-year	3.7	3.3	3.5
6-year	2.6	3.2	3.0

^aCessation rate = quitters/baseline smokers.
^bRelapse rate = relapsers/baseline former smokers.

TABLE 2—Three-Year Smoking Cessation Rates and Adjusted Relative Odds of Cessation According to Selected Characteristics

	Smokers, No.	Cessation Rate, %	Odds Ratio ^a of Quitting	95% CI
Age at baseline, y				
65-69	618	23	1.0	...
70-74	381	30	1.5	1.1, 2.0
75-84	239	36	1.9	1.3, 2.8
≥ 85	21	52	3.5	1.2, 10.0
Race				
Black	86	22	0.7	0.4, 1.2
Non-Black	1173	29	1.0	...
Marital status				
Ever married	1159	28	1.0	...
Never married	98	36	1.6	1.0, 2.5
Cigarettes smoked, no./d				
<10	228	40	1.0	...
10-19	327	30	0.7	0.5, 1.0
20-24	445	25	0.5	0.4, 0.8
≥ 25	224	17	0.3	0.2, 0.6
Conditions reported at baseline ^b				
No	935	29	1.0	...
Yes	324	25	0.7	0.5, 1.0
Interval diagnosis of myocardial infarction, stroke, or cancer				
No	1060	25	1.0	...
Yes	199	44	2.4	1.7, 3.4

^aOdds ratios were derived from logistic regression models including all main effects listed plus gender, education, years of smoking, alcohol consumption, and site.
^bMyocardial infarction, stroke, cancer, angina, intermittent claudication.

myocardial infarction, stroke, or cancer was associated with smoking cessation but not relapse. The oldest old were more likely to quit smoking and less likely to relapse than those 65 to 69 years of age. The association of age and intensity of smoking with quitting and relapse is similar to that in younger populations,^{7,9,12} as

is lower cessation among Blacks.¹² Our sample included an adequate number of smokers through age 84 but few at older ages as a result of lower smoking prevalence¹⁴ and high mortality.^{14,19}

Several limitations of the data merit consideration. We lacked data on the number of quit attempts, the method of

TABLE 3—Three-Year Smoking Cessation Rates and Adjusted Relative Odds of Cessation According to Selected Characteristics

	Smokers, No.	Cessation Rate, %	Odds Ratio ^a of Quitting	95% CI
Age at baseline, y				
65–69	492	44	1.0	...
70–74	285	45	0.9	0.7, 1.3
75–84	159	53	1.1	0.7, 1.6
≥ 85	8	88	6.4	0.7, 60.5
Race				
Black	60	33	0.5	0.2, 0.9
Non-Black	884	47	1.0	...
Cigarettes smoked, no./d				
<10	167	58	1.0	...
10–19	257	49	0.6	0.4, 1.0
20–24	335	44	0.5	0.3, 0.8
≥ 25	156	33	0.3	0.2, 0.5
Conditions reported at baseline ^b				
No	721	46	1.0	...
Yes	223	45	0.8	0.6, 1.1
Diagnosis of myocardial infarction, stroke, or cancer between baseline and year 3				
No	836	44	1.0	...
Yes	108	60	1.7	1.1, 2.7
Diagnosis of myocardial infarction, stroke, or cancer between years 3 and 6				
No	782	43	1.0	...
Yes	162	61	2.3	1.6, 3.4

^aOdds ratios were derived from logistic regression models including all main effects listed plus gender, education, marital status, years of smoking, alcohol consumption, and site.
^bMyocardial infarction, stroke, cancer, angina, intermittent claudication.

TABLE 4—Three-Year Relapse Rates and Adjusted Relative Odds of Relapse According to Selected Characteristics

	Former Smokers, No.	Relapse Rate, %	Odds Ratio ^a of Relapse	95% CI
Age at baseline, y				
65–69	739	5.1	1.0	...
70–74	619	2.8	0.4	0.2, 0.7
75–84	588	1.9	0.2	0.1, 0.4
≥ 85	104	1.9	0.2	0.04, 0.9
Race				
Black	90	3.3	1.3	0.3, 5.1
Non-Black	1913	3.3	1.0	...
Cigarettes smoked per day when smoking, no.				
<10	370	1.4	1.0	...
10–19	302	3.3	2.2	0.7, 6.7
20–24	550	4.9	3.3	1.2, 9.2
≥ 25	702	3.3	1.9	0.7, 5.4
Age when last smoked regularly, y				
<65	1327	1.4	1.0	...
≥ 65	550	8.4	8.4	4.0, 17.4
Conditions reported at baseline ^b				
No	1420	2.9	1.0	...
Yes	630	4.3	1.3	0.8, 2.3
Diagnosis of myocardial infarction, stroke, or cancer between baseline and year 3				
No	1745	3.4	1.0	...
Yes	305	3.0	0.9	0.4, 1.9

^aOdds ratios were derived from logistic regression models including all main effects listed plus gender, education, marital status, duration of smoking, alcohol consumption, and site.
^bMyocardial infarction, stroke, cancer, angina, intermittent claudication.

cessation, and the validity of self-reported smoking status. Self-reported smoking status is usually valid, and many adults successfully quit on their own.^{5,10,20} The dates of quitting and disease diagnosis are unknown in some cases. Dynamic patterns were not accounted for because we had limited information about earlier non-smoking intervals and the length of cessation afterward. The use of baseline and follow-up smoking information misclassified a few quitters but did not affect the significant predictors or our conclusions.

Methodological differences limit comparison of this study with prior work. Prior surveys were cross-sectional^{2,5,7,8,10,19,21} or defined cessation differently.^{7,10–12} Period differences in cessation rates have been reported.²² Nevertheless, in younger populations only 33% to 40% quit smoking in a decade.^{9,12}

We found, as suggested in middle age,^{6,7,12–13} that older adults diagnosed with chronic disease have twofold higher odds of smoking cessation. About 25% of the quitters had a diagnosis of myocardial infarction, stroke, or cancer during the follow-up. The majority who quit do so before or without the onset of these smoking-related illnesses, related in part to demographics, smoking intensity, and possibly to unmeasured factors such as attitudes or other smoking-related chronic conditions or symptoms. Prevalent disease in a baseline smoker, which was inversely related to cessation, may be most common among “hard-core” smokers who did not quit despite their illness. Analysis by duration of illness was not possible.

These findings have important clinical implications for health professionals caring for older smokers. While patients may be highly amenable to smoking cessation around the time of diagnosis of smoking-related illnesses such as atherosclerosis or cancer, primary prevention efforts would have a far greater impact. We join the call for improved cessation initiatives by physicians and other health professionals.^{23–25} Given the aging of the US population, which includes younger cohorts with higher smoking prevalence,^{19,21} concerted attention to smoking cessation is needed at all ages, including the elderly. □

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The Tobacco Institute's "It's the Law" Campaign: Has It Halted Illegal Sales of Tobacco to Children?

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Introduction

Nationwide, three out of four tobacco retailers illegally sell tobacco to children.^{1,2} Consequently, the tobacco industry has been criticized for profiting from the use of a distribution system that results in the illegal sale of \$1.5 billion of its products to children each year.^{3,4} The easy access to tobacco provided by this distribution system has been identified as an important preventable factor in adolescent tobacco use.⁵

In an attempt to reduce children's access to tobacco, a number of communities have solicited voluntary merchant compli-

ance with laws prohibiting the sale of tobacco to minors.^{6–9} Unfortunately, despite

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ABSTRACT

A survey of tobacco retailers was conducted to evaluate the efficacy of the Tobacco Institute's "It's the Law" program, which has the goal of eliminating the illegal sale of tobacco to minors. Only 4.5% (7) of the 156 retailers surveyed were participating in the "It's the Law" program. Eighty-six percent of the retailers who were participating in the program were willing to illegally sell cigarettes to children, compared with 88% (131/149) of the retailers who were not participating. (*Am J Public Health*. 1992;82:1271–1273)