



# SCHS Studies

A Special Report Series by the State Center for Health Statistics  
1908 Mail Service Center, Raleigh, N.C. 27699-1908  
[www.schs.state.nc.us/SCHS/](http://www.schs.state.nc.us/SCHS/)

No. 119

January 2000

## Quit-Smoking Attempts Among Adult Daily Smokers in North Carolina: Results from the 1993-1998 NC Behavioral Risk Factor Surveillance System (BRFSS)

by

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### ABSTRACT

**Objective:** The purpose of this study is to evaluate trends in daily smoking among adult North Carolinians and identify factors that predict quit-smoking attempts among male and female daily smokers. For many smokers, multiple quit-smoking attempts are a precursor to quitting successfully.

**Methods:** Telephone interview data from the NC Behavioral Risk Factor Surveillance System (BRFSS) were used to measure the prevalence of daily smoking (1990-1998) by age, race, sex, and education. Data from the BRFSS were used to investigate the likelihood of quit-smoking attempts for male and female daily smokers with respect to education, health status, and use of medical services for routine check-ups.

**Results:** From 1990 to 1998, the percentage of daily smokers declined across all demographic groups except for young adults and those with less than 12 years of education. Among young adults (18-24 year olds), the proportion of daily smokers increased from an estimated 21 percent in 1990 to 24 percent in 1998. For adults with less than 12 years of education, the proportion of daily smokers increased from 29 percent in 1990 to 31 percent in 1998.

Female daily smokers who reported being in poor health were almost twice as likely as females in better health to report a quit attempt. Health status was not a predictor of quit attempts for male daily smokers. There was, however, a strong tendency for male daily smokers who reported a routine health check-up in the past 12 months to also report quitting smoking for one day or longer. Education was not a significant predictor of quit attempts for male or female daily smokers.

**Conclusion:** Enhanced medical and behavioral intervention strategies are needed to help heavy smokers increase the number and effectiveness of quit-smoking attempts.



## Introduction

For many smokers, multiple quit-smoking attempts are often required before quitting successfully. The likelihood of quit attempts or quitting successfully is lowest among those who begin smoking early in life and continue to maintain high levels of daily smoking.

Multi-state data from the 1997 Youth Risk Behavior Survey (YRBS) showed that, among high school students who ever tried smoking, 35.8 percent went on to become daily smokers. Seventy-three percent of those who had ever smoked had tried to quit at least once, but only 13.5 percent were reported to be former smokers<sup>1</sup>. Results from the National Cancer Institute's Community Intervention Trial for Smoking Cessation (COMMIT) showed that, among a group of adult smokers 25-64 years old, about two-thirds reported at least one serious quit attempt during the study period (1988-1993). Among those who attempted to quit, 33 percent were classified at the end of the study as former smokers. Significant predictors of quitting smoking included lower levels of daily cigarette consumption (light-to-moderate smokers), a history of past quit attempts, and initiation of smoking after age 20<sup>2</sup>.

In this study, we examine factors associated with self-reported quit-smoking attempts among adult daily smokers in North Carolina. Descriptive data are presented on trends in daily smoking in North Carolina and on factors associated with quit-smoking attempts. Based on previous research<sup>3-4</sup>, we investigate whether or not quit-smoking attempts will occur most often among those with more education, in poor health, or with a recent visit (for routine check-up) to a doctor or health professional, while controlling for the intensity of daily smoking and age\*.

The data for this study were obtained from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS). BRFSS data are collected on a monthly basis through random-digit-dialed telephone interviews of non-institutionalized adults ages 18 and older. Approximately 200 interviews are completed each month. Funding for the NC BRFSS is provided, in part, by the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta.

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\*Both light smokers and young adult smokers (ages 18-24) are significantly more likely to report quit attempts than heavy smokers or older smokers; thus, these characteristics are controlled for when assessing the effect of the other factors on quit-smoking attempts.

## Methods

Trends in the prevalence of daily smoking were evaluated from 1990 to 1998. The study of quit-smoking attempts was limited to interview data from 1993 to 1998. Respondent perception of overall health was first assessed in North Carolina in 1993, and annually thereafter with the question, "Would you say that in general your health is excellent, very good, good, fair, or poor?" Thus, the study of quit attempts contained 3,613 daily smokers: 1,727 male smokers and 1,886 female smokers.

All study variables were obtained from the Core Section of the BRFSS questionnaire. The core contains a set of standardized questions (introduced by the CDC) that are asked every year and may be used to evaluate change in selected health risk behaviors over time.

Daily smokers were defined as those who answered yes to both of the following questions: (1) "Have you smoked at least 100 cigarettes in your entire life?" and (2) "Do you now smoke cigarettes every day ... ?" Daily smokers were defined to have made a quit-smoking attempt if they responded affirmatively to: "During the past 12 months, have you quit smoking for 1 day or longer?" The intensity of smoking was categorized as heavy ( $\geq 20$  cigarettes/day) and light ( $< 20$  cigarettes/day) daily cigarette consumption.

Logistic regression was used to measure the degree of association between the predictors (education, health, clinic visit) and quit-smoking attempts. For the regression analyses, dichotomous (0,1) variables were constructed. Separate analyses were conducted for men and women to determine gender-specific differences, which have been identified in the research<sup>5</sup>.

## Results

### *Prevalence of daily smoking, 1990-1998*

The total proportion of adult daily smokers in North Carolina declined from an estimated 28 percent in 1990 to 20 percent in 1998, representing a 29 percent decline in the percentage of daily smokers (Table 1).

**Table 1**  
**Percentage of Adult\* Daily Smokers in North Carolina**  
**by Age, Sex, Race and Education**  
**North Carolina Behavioral Risk Factor**  
**Surveillance System (BRFSS) Survey**  
**Selected Years – 1990-1998**

	1990	1992	1994	1996	1998	Percent change (1990-98)
<b>Age</b>						
18-24	21%	24%	26%	23%	24%	+ 14%
25-34	40%	33%	28%	24%	23%	- 43%
35-44	29%	33%	31%	28%	27%	- 7%
45-54	31%	28%	29%	25%	18%	- 42%
55-64	28%	20%	22%	20%	21%	- 25%
65+	13%	13%	11%	10%	10%	- 23%
<b>Sex</b>						
Male	30%	31%	28%	25%	24%	- 20%
Female	26%	22%	21%	19%	17%	- 35%
<b>Race</b>						
White	30%	26%	25%	22%	21%	- 30%
Black	22%	27%	25%	22%	16%	- 27%
<b>Education</b>						
<12 years	29%	37%	31%	28%	31%	+ 7%
≥12 years	28%	24%	23%	21%	18%	- 36%
<b>Total</b>	28%	26%	25%	22%	20%	- 29%
* Age 18 and older.						

For 25-34 year olds and 45-54 year olds, the daily smoking rates declined 43 percent and 42 percent respectively from 1990 to 1998. Furthermore, both age groups experienced a steady decline in smoking rates across all study years. Year-to-year declines in daily smoking rates also occurred for females, for whites, and for those with 12 or more years of education.

The percentage change in daily smoking rates from 1990 to 1998 was about the same for blacks and whites. However, in 1998 a substantially smaller percentage of blacks were daily smokers (16%) compared to whites (21%).

In contrast, young adults (18-24 year olds) reported that they were *more likely* to smoke daily in 1998 (24%) than in 1990 (21%), representing a 14 percent increase over this time period. Similarly, for adults with less than 12 years of education, daily smoking rates increased from 29 percent in 1990 to 31 percent in 1998.

***Descriptive analysis of study factors***

Among daily smokers, Table 2 shows the percentage who had quit-smoking attempts for each of the study variables. More than two-thirds of smokers (68.5%) under the age of 25 reported at least one quit attempt during

**Table 2**  
**Quit-smoking Attempts by Study Factors**  
**Behavioral Risk Factor**  
**Surveillance System (BRFSS)**  
**North Carolina, 1993-1998**

<b>Study Factors</b>	<b>%-Yes</b>	<b>95% CI*</b>
<b>Sex</b>		
Males	50.3	(47.5, 53.0)
Females	47.7	(45.0, 50.4)
<b>Race</b>		
Blacks	57.8	(53.1, 62.5)
Whites	46.8	(44.6, 49.0)
<b>Age</b>		
Under age 25	68.5	(63.7, 73.3)
Age 25 and older	45.7	(43.7, 47.7)
<b>Education</b>		
Less than 12 years	46.5	(42.7, 50.3)
12 or more years	50.1	(47.8, 52.4)
<b>Smoking intensity</b>		
Light smokers (<20 cig/day)	64.5	(61.6, 67.4)
Heavy smokers (≥20 cig/day)	38.9	(36.5, 41.3)
<b>Self-reported health</b>		
Poor health	52.6	(44.4, 60.8)
Fair or better health	48.9	(46.9, 50.9)
<b>Routine medical check-up</b>		
Past year (1-12 months)	50.5	(48.0, 53.0)
1 to 5 years ago (or never)	46.3	(43.1, 49.5)

\*95 percent confidence interval.

the study period (1993-1998), as compared to less than half (45.7%) of those ages 25 and older. Black daily smokers were also more likely to report a quit attempt (57.8%) than white daily smokers (46.8%). By contrast, few differences were observed with respect to sex or education.

Light smokers (64.5%) were significantly more likely than heavy smokers (38.9%) to report a quit attempt over the course of the study period. The quit attempt rates, however, varied by less than 5 percentage points between those in poor or better health, and between those with or without a recent medical visit.

***Quit-smoking attempts among male and female daily smokers, 1993-1998***

The results of the logistic regression analyses are presented in Tables 3a (males) and 3b (females). Odds ratios and their 95% confidence intervals are presented.

When controlling for all other factors in the model (that is, adjusting for factors' effect upon quit-smoking attempts), the odds of male daily smokers under the age of 25 reporting a quit attempt was 2.8 times that of male daily smokers ages 25 and older. The odds of light smokers reporting a quit attempt was 2.6 times that of heavy smokers.

Among males, quit-smoking attempts did not differ significantly by health status, education, or race. However, the odds of male daily smokers with a recent health care visit reporting a quit-smoking attempt was 1.3 times that of male daily smokers without a recent visit, controlling for all other factors in the model.

Health status was a significant predictor of quit-smoking attempts among female daily smokers (Table 3b). The odds of females who reported being in poor health reporting a quit attempt was 1.9 times that of females in better health. A recent health care visit, however, was not associated with a reported quit-smoking attempt among female smokers. Better-educated females were somewhat more likely to attempt to quit smoking than those with less education.

Consistent with the findings for males, the odds of female daily smokers under the age of 25 and those who smoked fewer than 20 cigarettes a day reporting a quit attempt were substantially higher than those of older smokers and those who smoked more heavily. In addition, black women who smoked daily were somewhat more likely than white women to report a quit attempt, though the difference was not statistically significant (Table 3b).

**Comments**

- The increase from 1990 to 1998 in the proportion of North Carolina young adults (18-24 yrs.) who smoke daily may be related to the corresponding increase in the prevalence of smoking among North Carolina teens. A recent report from the CDC<sup>6</sup>, using state-based YRBS data, showed that the 1997 smoking rate

**Table 3a**  
**Characteristics Associated with Quit-smoking Attempts among Male Daily Smokers**  
**(Adjusted Odds Ratios with 95% Confidence Intervals)**  
**Behavioral Risk Factor Surveillance System (BRFSS) Survey**  
**North Carolina, 1993-1998**

Characteristics	Males ( ≥18 yrs.)		Referent Group
	Odds Ratio	(95% CI* )	
under age 25	2.79	(1.83, 4.27)	age 25 and older
light smoker ( <20 cigarettes per day)	2.62	(2.03, 3.39)	heavy smoker ( ≥20 cigarettes per day)
routine check-up within past year (1-12 months)	1.26	(1.00, 1.60)	routine check-up 1 to 5 years ago, or never
poor health	1.02	(0.59, 1.77)	fair or better health
≥12 years education	1.12	(0.88, 1.43)	<12 years education
Black	1.19	(0.86, 1.65)	White

\*95 percent confidence interval.  
Based on data for 1,727 male smokers.

**Table 3b**  
**Characteristics Associated with Quit-smoking Attempts among Female Daily Smokers**  
**(Adjusted Odds Ratios with 95% Confidence Intervals)**  
**Behavioral Risk Factor Surveillance System (BRFSS) Survey**  
**North Carolina, 1993-1998**

Characteristics	Females ( ≥18 yrs.)		Referent Group
	Odds Ratio	(95% CI* )	
under age 25	1.79	(1.22, 2.63)	age 25 and older
light smoker ( <20 cigarettes per day)	2.67	(2.11, 3.38)	heavy smoker ( ≥20 cigarettes per day)
routine check-up within past year (1-12 months)	1.05	(0.82, 1.35)	routine check-up 1 to 5 years ago, or never
poor health	1.93	(1.23, 3.03)	fair or better health
≥12 years education	1.24	(0.98, 1.57)	<12 years education
Black	1.24	(0.90, 1.71)	White

\*95 percent confidence interval.  
Based on data for 1,886 female smokers.

for North Carolina high school students climbed to 35.8 percent, about 22 percent higher than the comparable rate (29.3%) for 1993. Similarly, findings from the National Household Survey on Drug Abuse<sup>7</sup> revealed that, from 1988 to 1996, the incidence of first daily smoking among persons ages 12-17 years increased by 50 percent. Thus, for young adults in North Carolina (and perhaps in much of the United States), it is clear that the risk of becoming a daily smoker is greater now than it was 8-10 years ago.

- For both males and females, smokers under the age of 25 were much more likely than older smokers to report at least one quit attempt, and light smokers were much more likely than heavy smokers to report a quit attempt. The higher probability of a quit attempt among these groups is presumably due to the fact that these groups also experience lower levels of nicotine addiction than that experienced among their counterparts.
- This investigation of the independent effects of health, education, and recent clinic visits on quit-smoking attempts revealed differences by sex. Among females who smoked daily, only self-reported poor health was associated with quit-smoking attempts. Among males, only a recent visit to a doctor's office was related to quit-smoking attempts. These results suggest other areas of inquiry. For instance, do male and female daily smokers attach different levels of importance to advice from physicians or other health professionals to quit smoking? Are the sources of pressure (or motivation) to quit smoking different for male and female daily smokers? The answers to these questions may encourage the design of sex-specific treatment or media interventions to better help male and female smokers quit smoking.
- For the population of older adult heavy smokers, we can expect the poorest health consequences and highest medical costs for treatment of smoking-related diseases. Therefore, developing effective cessation strategies, specifically targeted for heavy smokers, should become a priority in the fight against smoking-related

diseases. For instance, there is evidence to suggest that short-term smoking cessation rates can be improved among high nicotine-dependent smokers with higher doses of nicotine replacement therapies<sup>8</sup>. More research is needed to determine how best to tailor nicotine doses and other therapeutic and behavioral treatments to increase the number and effectiveness of quit attempts among heavy smokers.

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*Acknowledgments*

A special thanks to Drs. Paul Buescher (SCHS) and Laura Linnan (UNC School of Public Health) for their constructive edits on earlier versions of this study.



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