APPENDIX A

TRENDS IN TOBACCO USE IN THE UNITED STATES

CONTENTS

Introduction

The focus of this Appendix is on trends in the prevalence and demographic correlates of tobacco use. Findings from selected data sources (US DHHS 1986b; USDA 1986; US FTC 1981, 1986; US DHHS 1988) will be reported as well as findings from analyses of trend data found in these sources.

Prevalence of Smoking in the United States

Several surveys using different methodologies have reported the prevalence of current cigarette smoking in the United States. The reported prevalence of smoking between 1944 and 1986 is shown in Table 1. However, different methodologies can lead to variations in the estimation of prevalence. The same general survey methodology has been used throughout the National Health Interview Surveys (NHIS 1965 to 1985). These surveys have indicated a steady decline in smoking prevalence beginning in the late 1960s to 30.4 percent of adults 20 years of age and older in 1985. These data parallel the per capita consumption of cigarettes in the United States, which has declined each year since 1973 (Table 2). Based on population estimates and the NHIS, the total number of adult smokers (aged 20 years and older) in the United States declined from approximately 52,400,000 in 1976 to approximately 51,100,000 in 1985. The total number of former smokers increased from approximately 29,500,000 to 40,900,000 within this time period.

Trends in Cigarettes Consumed

In the United States, cigarettes are taxed at the wholesale level, in advance of retail sales. Tax data may not reflect retail sales in any particular year insofar as different inventory levels are held over time. However, the number of cigarettes taxed is a standard index used to estimate the number of cigarettes consumed over time. Total cigarette consumption as estimated by this index in the United States increased steadily from 1920 until 1981 when an estimated total of 640 billion cigarettes were smoked (Table 2). Since 1981, there has been a steady decline in consumption and the number of cigarettes smoked in 1987 is estimated at 574 billion.

These data are frequently divided by the population of adults 18 years of age and older to give a per capita estimate of consumption. It should be noted that this per capita estimate could be biased if there is a trend over time for more people to start smoking regularly under 18 years of age.

Since 1973, there has been a decline of 23 percent in the number of cigarettes smoked on a per capita basis. Although there has been a

TABLE 1.—Percentage of current cigarette smokers among adults, by year and survey, United States, 1944–1986

Year	Survey	Age (≥ years)	Current cigarette smokers (percentage)		
			Men	Women	Total
1944	GP	18	48.0	36.0	41.0
1949	GP	18	54.0	33.0	44.0
1955	CPS	18	54.2	24.5	37.6
1964	NCSH	21	52.9	31.5	40.3
1965	NHIS	17	51.1	33.3	41.7
1966	CPS	17	50.0	32.3	40.6
	NCSH	21	51.9	33.7	42.2
1967	CPS	17	49.1	32.1	40.1
1968	CPS	17	47.0	31.2	38.6
1970	NHIS	17	43.5	31.1	36.9
	NCHS	21	42.3	30.5	36.2
1974	NHIS	17	42.7	31.9	37.0
1975	NCSH	21	39.3	28.9	33.8
1976	NHIS	20	41.9	32.0	36.7
1978	NHIS	17	37.5	29.6	33.2
1980	NHIS	20	38.3	29.4	33.6
1983	NHIS	20	35.7	29.4	32.4
1985	CPS	16	31.8	25.4	28.4
	NHIS	20	33.2	27.9	30.4
1986	OSH	17	29.5	23.8	26.5

NOTE: GP, Gallup Poll; CPS, Current Population Survey (Supplement); NCSH, National Clearinghouse for Smoking and Health (Adult Use of Tobacco Survey); NHIS, National Health Interview Survey; OSH, Office on Smoking and Health (Adult Use of Tobacco Survey). NHIS data are not age adjusted.

SOURCE: US DHHS (1987c).

decline in every one of these 15 years, the rate of decline has varied from 0.2 to 7.2 percent with a mean of 1.9 percent per year (Table 2).

Trends in the Tar and Nicotine Content of Cigarettes Consumed

Data on the market share of cigarettes of different smoking machine determined tar and nicotine yield have been published by the Federal Trade Commission (FTC) from information supplied to the agency by cigarette companies. The FTC is no longer generating these data. Trends in the sales-weighted average yield of tar and nicotine for cigarettes sold are shown in Figure 1. The sales-weighted average represents the tar and nicotine content found in specific brands averaged by the quantity of sales for that specific brand.

Throughout the 1970s there was a steady decline in the sales-weighted average. This decline may have occurred because of consumer beliefs that lower-yield brands are less hazardous. The impression that low-yield brands may be less hazardous may have resulted in part from cigarette advertising implying that low-yield brands are less hazardous or safe (Davis 1987).

TABLE 2.--Total cigarette consumption and consumption per capita 18 years of age and older, 1973 to 1987, United States

Year	Total consumption (billions)	Per capita consumption (18 years old)	Per capita consumption change from previous year (percentage)
1973	589.7	4,148	
1974	599.0	4,141	-0.2
1975	607.2	4,123	-0.4
1976	613.5	4,092	-0.8
1977	617.0	4,051	-1.0
1978	616.0	3,967	-2.1
1979	621.5	3,861	-2.7
1980	631.5	3,844	-0.4
1981	640.0	3,636	-0.2
1982	634.0	3,739	-2.6
1983	600.0	3,488	-7.2
1984	600.4	3,446	-1.2
1985	594.0	3,370	-2.3
1986	583.8	3,274	-2.9
1987 (est.)	574.0	3,196	-2.4

SOURCE: USDA (1986)

From 1982 to 1985, the declining sales-weighted tar and nicotine yield leveled off. This change may be related to one or a combination of the following factors: (1) a persistent brand loyalty of some smokers to moderate- or high-yield brands because of brand image; (2) a diminishing perception that low-yield brands are less hazardous; (3) some smokers are now smoking cigarettes of such low tar and nicotine yields that further reductions in those yields may be unacceptable; i.e., the "lower boundary" of comfortable cigarette use has been reached (Kozlowski 1987; Chapter IV). The 1981 Surgeon General's Report (US DHHS 1981) cautioned that the health benefits of switching to low-yield brands are minimal compared with giving up cigarettes entirely.

Surveys of Self-Reported Cigarette Smoking In Adults

General Considerations

The validity of self-reported smoking status from community surveys affects the usefulness of these data in reporting historical trends. Respondents' sensitivity to social stigma associated with

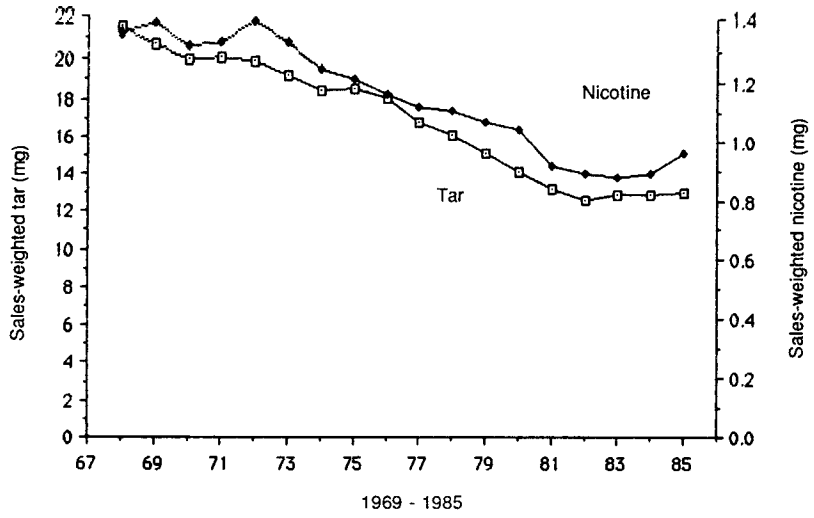

FIGURE 1.—Sales-weighted averages of tar and nicotine per cigarette, 1968–1985 (1985 data preliminary)

SOURCE: U.S. Federal Trade Commission (February 1988).

smoking is cited as a major reason why persons might underreport their smoking status (Warner 1978; Kozlowski 1986). Whereas biochemical assessment is significantly more reliable than self-reports in assessing level of nicotine intake (see Chapters II and IV), self-reported data appear valid for estimating prevalence of smoking in the population. For example, studies of patients in several settings (Petitti, Friedman, Kahn 1981; Pojer et al. 1984), as well as two large community studies (Fortmann et al. 1984; Pierce, Dwyer et al. 1987), have shown that measurements of smoking by self-report and biochemical markers give approximately the same estimates of prevalence. It is possible that the accuracy of self-reported data will vary depending on whether the data collection method is face-to-face or by telephone interview. However, biochemical validation data do not exist to allow quantification of such a difference. In addition, serious concerns have been expressed about the validity of data (Thornberry 1987) reported by one person on behalf of another (proxy response).

National Health Interview Surveys

The National Health Interview Survey (NHIS), which is conducted regularly by the National Center for Health Statistics, uses a

sampling frame developed by the U.S. Bureau of the Census and is based on a multistaged random probability sampling design. Information on behavioral health risk factors is collected in face-to-face interviews. Basic smoking information has been collected for several years, including 1965, 1976, 1978, 1979, 1980, 1983, and 1985 (data for 1965 are based on both self-report and proxy reporting; all of the more recent surveys were based on self-reports). The 1987 survey results were not available for this Report. Beginning in 1985, an adequate sample of blacks was ensured by the survey design (using the technique of oversampling). The NHIS generally has a response rate of 96 percent (Thornberry 1987). However, the smoking information is collected only by self-report in a supplement. This extra step in data collection procedures leads to a decrease in the response rate to approximately 90 percent.

Demographic Trends in Smoking Prevalence in Adults

Between 1965 and 1985, smoking prevalence decreased in all age, sex, and race categories with the exception of women aged 65 years and older (Table 3). This exception can be explained as a birth cohort effect (Warner and Murt 1982).

Both black and white males have decreased their smoking by an average of a percentage point per year over this 20-year period. However, in 1985, 41 percent of black males smoked, compared with 32 percent of white males. For all races, the largest decrease in smoking occurred in younger males; the 20- to 24-year-old age group decreased an average of 1.4 percentage points per year. The marked gradient in the degree of change per year across age groups suggests that a birth cohort effect may have occurred, with many more young males never having become regular smokers.

Proportionately fewer women smoke than men within every age group and race category except for persons 20 to 40 years old in 1985 (31.0 percent for men, 32.1 percent for women). However, the yearly rate of decline in smoking prevalence across these categories is, on average, three times less than the male rate of decline. Moreover, the decline in female smoking appears mainly in the under-44-year age group. This may indicate that uptake of smoking among women in the more recent birth cohorts is beginning to decline. Of particular importance is the almost complete lack of change in smoking prevalence among black women from 1965 to 1985.

Smoking rates among Hispanics have been reported using NHIS data (Marcus and Crane 1985, 1987), but the small sample size of this subpopulation reduces the reliability of the estimates. According to the 1985 NHIS, the prevalence of smoking among Hispanic males and females aged 18 and older was 31.3 percent and 20.8 percent, respectively (Marcus and Crane 1987). Information on Hispanic smoking is also available from the Hispanic Health and Nutrition

TABLE 3.—Twenty-year trends in smoking prevalence (percentage) among adults 20 years of age and older, by sex, race, and age, United States

Sex, race, age	1965	1976	1980	1985	Difference 1965–1985
Men					
Total[1,2]	52.1	41.6	37.9	32.7	-19.4
Race[1]					
White	51.3	41.0	37.1	31.8	-19.5
Black	59.6	50.1	44.9	40.6	-19.0
Age[2]					
20–24	59.2	45.9	39.7	31.0	-28.2
25–34	60.7	48.5	43.1	38.2	-22.5
35–44	58.2	47.6	42.6	37.6	-20.6
45–64	51.9	41.3	40.8	33.4	-18.5
≥65	28.5	23.0	17.9	19.6	-8.9
Women					
Total[1,2]	34.2	32.5	29.8	28.3	-5.9
Race[1]					
White	34.5	32.4	30.0	28.3	-6.2
Black	32.7	34.7	30.6	31.6	-1.1
Age[2]					
20–24	41.9	34.2	32.7	32.1	-9.8
25–34	43.7	37.5	31.6	32.0	-11.7
35–44	43.7	38.2	34.9	31.5	-12.2
45–64	32.0	34.8	30.8	29.9	-2.1
≥65	9.6	12.8	16.8	13.5	+3.9

[1] Age-adjusted prevalence rates.
[2] Includes white, black, and other.
SOURCE: U.S. PHS (1987).

Examination Survey (HHANES), which was conducted by the National Center for Health Statistics between 1982 and 1984. This study surveyed 9,090 Mexican-Americans in the Southwest, 4,000 Puerto Ricans in the Northeast, and 1,600 Cuban-Americans in Miami. For males aged 20 to 74 the age-adjusted smoking rates were 43 percent for Mexican-Americans, 42 percent for Cuban-Americans, and 40 percent for Puerto Rican-Americans. Among females, the smoking prevalence was 24 percent for Mexican-Americans and Cuban-Americans and 30 percent for Puerto Rican-Americans (Haynes 1987). Estimates of smoking prevalence among other minority groups may be unreliable because of small sample sizes included in the NHIS. Trend data are not available because Hispanic status was not ascertained on earlier surveys.

TABLE 4.—Smoking prevalence (percentage) among adults 18 years of age and older, by sociodemographic subgroups, United States, 1985

Subgroup	Men	Women	Total
Education			
Less than high school	40.1	31.4	35.4
High school graduate	36.6	31.0	33.4
Some college	29.9	24.9	27.3
College graduate	22.6	17.1	20.1
Postgraduate	17.3	15.1	16.5
Occupation			
Employed	33.8	30.0	32.1
White-collar	26.4	28.0	27.5
Blue-collar	40.1	33.9	39.7
Service	40.3	35.4	37.2
Unemployed	44.3	28.0	36.1
Not in workforce/Unknown	28.6	25.3	26.4
Marital status			
Never married	30.0	26.3	28.3
Divorced/Separated	48.2	42.4	44.7
Married/Cohabitating	31.9	27.7	29.7
Widowed	29.3	20.1	21.6
Income			
<$10,000	36.3	29.7	32.3
$10,000–19,999	37.0	29.8	33.1
$20,000–34,999	33.1	28.1	30.7
≥$35,000	27.0	25.1	26.1

SOURCE: National Center for Health Statistics, National Health Interview Survey 1985.

Other Social Correlates of Smoking

The prevalence of smoking varies across sociodemographic categories. A detailed analysis of the sociodemographic correlates of smoking status in the 1985 NHIS survey is presented below.

Current smoking prevalence by sex, occupation, marital status, employment, education, and income groups for 1985 is shown in Table 4. Current smoking prevalence was inversely related to educational status. Persons who were employed were less likely to be current smokers than unemployed persons. Persons employed in white-collar jobs were less likely to be smokers than persons employed in blue-collar or service jobs. Persons with higher income and persons who were single, married, or widowed had a lower prevalence of smoking than persons with lower income or who were divorced or separated.

Because blacks were oversampled in the 1985 NHIS and subsequent sample designs, it is possible to make detailed comparisons

TABLE 5.—Percentage of current smokers in 1985, by age, race, and sex

Sex, age	White	Black
Men		
18–24	29.1	26.6
25–34	37.1	45.2
35–44	36.3	44.9
45–54	33.4	47.4
55–64	30.1	44.6
65–74	21.2	31.0
≥75	13.9	21.4
Women		
18–24	33.0	24.2
25–34	32.6	35.7
35–44	31.4	40.2
45–54	32.9	37.0
55–64	27.4	28.9
65–74	17.8	18.6
≥75	7.1	8.0

SOURCE: National Center for Health Statistics, National Health Interview Survey 1985.

between blacks and whites in smoking prevalence. Table 5 shows that across all age categories, except among those aged 18 to 24 years, blacks have higher smoking prevalence than whites. The lower smoking prevalence among blacks in this age group may reflect an older age of initiation among blacks.

In a multivariate analysis of NHIS data, controlling for sex, age, employment, poverty status, education, and marital status, blacks were no more likely to be ever smokers than whites (Novotny et al., in press). In this study, blacks were less likely than whites to quit smoking. Blacks also were less likely than whites to be heavier smokers ($\geq$ 15 cigarettes per day).

Other Surveys Reporting Adult Prevalence of Smoking

The 1986 Adult Use of Tobacco Survey showed slightly lower rates of smoking than that expected from the trends observed in the National Health Interview Surveys (NHIS). These data, based on a telephone interview of 13,031 adults aged 17 and older, were weighted to reflect the U.S. population according to age, sex, education level, and region. An estimated 29.5 percent of males (95 percent confidence interval, 28.4 to 30.6) and 23.8 percent of females (95 percent confidence interval, 22.7 to 24.9) smoked cigarettes regularly. Differences from the NHIS may reflect differences in age of respondents (NCHS-age 18 and above, Adult Use Survey-age 17 and above), methodology (Waksberg 1978), or response rates (NCHS approximately 90 percent, Adult Use Survey approximately 74

percent). The exclusion of households lacking telephones appears to account for an underestimate of approximately 1 percentage point in telephone surveys; persons living in households without telephones have a higher smoking prevalence than those in households with telephones (US DHHS 1987c).

In 1985, a supplement to the Current Population Survey contained smoking information collected by household interviews. These data are particularly relevant because of the large sample population. However, 45 percent of responses were by proxy. Of the 114,342 persons surveyed, the overall smoking prevalence for persons 16 years of age and older was 31.8 percent for males and 25.4 percent for females (Table 1). A detailed analysis of this data set is available from the Office on Smoking and Health (Marcus and Crane 1987).

Since 1981, the Centers for Disease Control has coordinated the collection of State-specific data on several behavioral risk factors in the Behavioral Risk Factor Surveillance System (BRFSS). In 1986, 25 States and the District of Columbia participated in this telephone interview system (Table 6). Median State smoking prevalence among adults 18 years of age and older varied between 18 percent and 35 percent (US DHHS 1987c), with marked geographical distribution patterns. States east of the Mississippi appeared to have the highest smoking prevalences (US DHHS 1987d). These States also had the highest adult per capita consumption of cigarettes (Tobacco Institute 1986), as measured by sales of cigarettes taxed in each State.

Trends in Adolescent Smoking

The National Institute on Drug Abuse (NIDA) conducted household surveys on drug use in 1979, 1982, and 1985. Data were obtained from a stratified random sample of 8,000 U.S. households; approximately 2,000 interviews were conducted with respondents in the 12- to 17-year-old age group. Questions included whether any cigarettes were smoked within 30 days as well as within the previous year. These surveys indicated that approximately 26 percent of the teenage population surveyed smoked at least one cigarette at some time during 1985 (Table 7). In 1985, 15.6 percent of this population had smoked within the previous month. However, these overall mean values probably underestimate the level of experimentation and uptake of smoking during these ages due to response bias or underreporting. Comparisons with 1979 are not appropriate, because in that year, there was a markedly different definition of smoking compared with later years (“at least 100 cigarettes in lifetime” compared with “any smoking in last 30 days”).

The “Monitoring of the Future” project, sponsored by NIDA, is conducted by the Institute for Social Research at the University of Michigan. It consists of a yearly survey of a representative sample of

TABLE 6.—Current smoking prevalence (percentage) in 25 States and the District of Columbia, 1986

State	Sample size	Current smokers			95 percent confidence interval
		Percentage			
		Men	Women	Total	
Alabama	559	30.3	20.0	24.8	±4.1
Arizona	1,178	24.4	24.7	24.5	±2.8
California	1,579	25.4	23.9	24.6	±2.4
District of Columbia	1,145	32.1	22.5	26.7	±3.1
Florida	1,162	30.9	27.8	29.3	±2.8
Georgia	1,140	29.3	24.8	26.7	±2.9
Hawaii	1,551	27.8	20.3	24.1	±2.9
Idaho	1,185	30.9	16.2	23.4	±2.6
Illinois	1,142	32.7	23.6	27.9	±2.8
Indiana	1,182	31.6	23.5	27.3	±3.0
Kentucky	1,216	37.2	32.6	34.8	±3.2
Massachusetts	1,105	27.1	27.5	27.3	±3.0
Minnesota	3,023	25.3	25.0	25.1	±1.7
Missouri	873	29.4	23.0	26.0	±3.3
Montana	1,176	23.5	22.8	23.0	±2.7
New Mexico	1,139	29.9	22.4	26.1	±2.8
New York	1,135	28.7	26.1	27.4	±3.0
North Carolina	1,622	30.7	22.5	26.4	±2.4
North Dakota	1,182	27.4	25.1	26.2	±2.9
Ohio	1,158	29.4	26.9	28.1	±2.8
Rhode Island	1,535	31.0	31.1	30.9	±2.5
South Carolina	1,793	28.6	24.4	26.3	±2.4
Tennessee	1,779	30.7	25.5	28.0	±2.4
Utah	1,188	20.8	15.1	17.8	±2.5
West Virginia	1,380	32.2	26.9	29.5	±2.8
Wisconsin	1,268	31.5	21.1	26.2	±2.6

SOURCE: US DHHS (1987a).

high school seniors. This approach does not include students who do not complete high school (estimated to be about 15 percent of the population by the US. Bureau of Census in 1978). Dropouts tend to have a higher smoking prevalence than in-school students (Kandel 1980; Pirie, Murray, Luepker 1988); however, Johnston and O'Malley (1985) estimate that the underestimate of the true population prevalence is no more than 5 percentage points. The latter researchers argue that the magnitude of this bias is unlikely to change between the yearly surveys; thus, the estimate of the rate of change should reflect the true rate of population change.

Smoking prevalence among female high school seniors was higher than among males in 1986 (Table 8), and there are marked

TABLE 7.--Prevalence (percentage) of cigarette use among youth 12 to 17 years of age, 1979, 1982, 1985 surveys, United States

Survey year	Any use in last year	Used in last 30 days
1979[1]	13.3	12.1
1982	24.8	14.7
1985	26.0	15.6

[1]The 1979 survey asked questions only of those who had smoked 100 cigarettes in their lifetime.
SOURCE: National Institute on Drug Abuse (1979, 1982, 1985).

TABLE 8.-Thirty-day prevalence of daily use of cigarettes by subgroups, high school class of 1986

Subgroups	N (approx.)	Percentage who used cigarettes daily in last 30 days: One or more	Half-pack or more
All seniors	15,200	18.7	11.4
sex			
Men	7,106	16.9	10.7
Women	7,706	19.8	11.6
College plans			
None or under 4 years	5,100	28.2	19.2
Complete 4 years	9,100	12.8	6.4
Region			
Northeast	3,600	24.9	15.6
North-central	4,300	19.9	12.3
South	4,700	15.8	10.0
West	2,600	13.4	6.5

SOURCE: Johnston, O'Malley, Bachman (1987).

geographic differences in smoking prevalence among students. In addition, those students who plan to complete 4 years of college have a smoking rate less than half that of students without such plans.

The prevalence of daily use within the previous 30 days among high school seniors fell substantially from 1975 to 1986 for males and females (Figure 2). Since 1976, there has been an overall 35 percent reduction in smoking prevalence in this population. Most of this decline occurred between 1977 and 1981. For all students, the prevalence has fallen an average of 0.68 percentage points per year during this period (to 18.7 percent in 1986), similar to the rate of

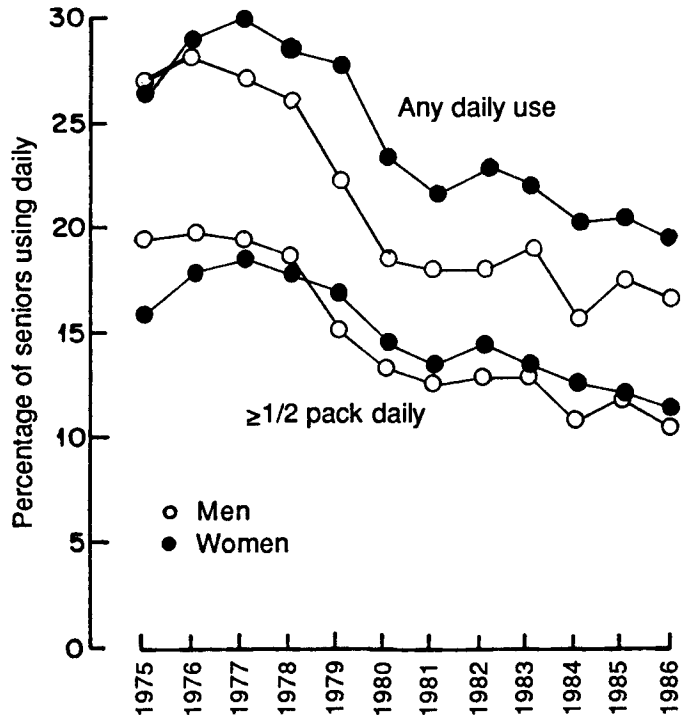

FIGURE 2.—Trends in 30-day prevalence of daily cigarette use (smoking one or more cigarettes/day) among high school seniors, by sex

SOURCE: Johnston, O'Malley, Bachman (1987).

decline noticed in adults (see Tables 1, 3). However, the rate of decline has tapered off in recent years. The smoking rates among females have consistently exceeded the rates among males.

The Monitoring of the Future Project has also followed representative samples from each graduating class since 1976. This was done by selecting two matched panels from each graduating class and following each panel in alternate years. The data obtained from these surveys are presented in Figure 3. Recently, differences in prevalence of any cigarette smoking within the last 30 days has disappeared between those still in high school and those who have graduated, suggesting that far fewer young adults are taking up smoking after high school, and that most uptake has occurred by the time of high school graduation. However, when either the 30 day prevalence of daily use or the 30 day prevalence of the use of half a

pack or more per day is considered, there is a clear marked increase in smoking prevalence in the early years after high school, suggesting that occasional and experimenting high school smokers become regular smokers once they leave school.

Trends in the Proportion of Smokers Who are Heavy Smokers

The average reported number of cigarettes smoked per day in 1985 by age, race, and sex is presented in Table 9. There are marked differences between the black and white population in the number of cigarettes reported. Both black males and females report smoking one-third fewer cigarettes per day than do their white counterparts. Even though blacks smoke fewer cigarettes per day than whites, their smoking patterns and choices of brands may provide the nicotine content necessary to maintain daily blood nicotine levels similar to whites (Chapter VII; Cummings, Giovino, Mendicino 1987). Across all race and age categories, females report smoking fewer cigarettes than males. In the over 35 age groups this difference is approximately 20 percent.

Successful quitting behavior may not be uniform across all smokers. Heavy smokers (defined as those who report smoking 25 or more cigarettes per day) are more likely to have a strong nicotine dependence (Chapter IV) and, therefore, are less likely to be successful at quitting than lighter smokers. Thus, one would expect the cross-sectional surveys over time to indicate an increasing proportion of heavy smokers as the smoking prevalence declined. These data from self-reported consumption measures are presented in Table 10. The percentage of heavy smokers reported by the 1965 survey may be biased due to the use of proxy interviews which were not used in subsequent surveys.

Between 1976 and 1985, there was no substantial change in the proportion of smokers reporting smoking 25 or more cigarettes per day. In 1985, approximately one-third of all male smokers and one-fifth of all female smokers were classified as heavy smokers. Three times as many white as black adults were classified as heavy smokers. For both males and females, the proportion peaked in the group aged 35 to 44, possibly indicative of a higher mortality rate among older smokers.

Trends in Quitting Activity

Public health efforts to reduce the prevalence of smoking concentrate on reducing the proportion of the population that begins to smoke cigarettes as well as increasing the proportion of smokers who quit. One indicator of quitting activity is the prevalence of former smokers. However, this variable is of limited use due to marked

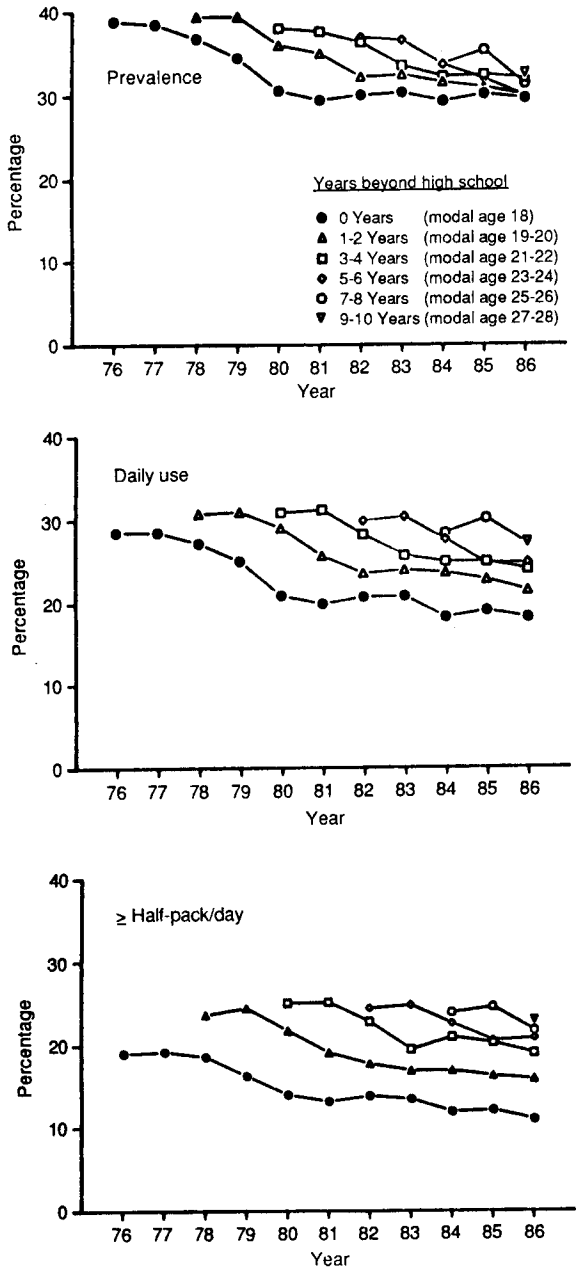

FIGURE 3.—Trends in 30-day cigarette smoking prevalence, daily use, and use of a half-pack or more per day among young adults, by age group

SOURCE: Johnston, O'Malley, Bachman (1987).

TABLE 9.—Average number of cigarettes smoked per day by current smokers, by race, age, and sex, United States, 1985

Race/Age	Men	Women	Difference
All races	21.8	18.1	3.7
Blacks	14.7	13.5	1.2
Whites	23.4	19.1	4.5
Age			
18–24	17.2	15.3	1.9
25–34	20.3	18.0	2.3
35–44	24.3	20.1	4.2
45–54	24.7	19.9	4.8
55–64	23.9	18.0	5.9
≥65	20.2	16.0	4.2

SOURCE: National Center for Health Statistics, National Health Interview Survey 1985.

TABLE 10.—Twenty-year trends in the proportion of smokers reporting smoking 25 or more cigarettes per day, by sex, race, and age, United States

Sex, race, age	1965	1976	1980	1985
Men				
Total	24.1	30.7	34.2	32.8
Race				
White	26.0	33.3	37.3	36.5
Black	8.6	10.8	13.8	10.7
Age				
20–24	15.4	18.5	19.8	17.1
25–34	24.3	28.7	30.1	28.5
35–44	31.5	39.2	40.7	42.3
45–64	28.0	37.4	42.6	39.3
≥65	13.8	18.2	25.2	25.4
Women				
Total	13.0	19.0	23.2	20.6
Race				
White	13.9	20.9	25.2	22.8
Black	4.6	5.6	8.6	6.7
Age				
20–24	9.7	14.5	15.9	12.2
25–34	15.5	20.5	24.2	21.3
35–44	17.1	21.8	32.7	27.8
45–64	13.6	21.5	24.9	22.7
≥65	6.4	11.8	13.1	13.4

SOURCE: National Center for Health Statistics, National Health Interview Surveys 1965, 1976, 1980, 1985.

differences in uptake of cigarettes between males and females in different birth cohorts (Warner and Murt 1982). A more meaningful index of quitting behavior has been defined as the quit ratio (Pierce, Aldrich et al. 1987)-the proportion of former smokers in a given population divided by the proportion of that population who have ever been smokers.

Trends in this quit ratio are presented in Figure 4. The quit ratio has consistently been higher among men compared with women. Quit ratios among both males and females increase with age. In 1985, nearly one-third of those persons aged 25 to 34 who reported that they had ever smoked had quit smoking by 1985. Among those aged 65 or older, the quit ratio was over 60 percent for women and 70 percent for men. Moreover, over the last 20 years, successful quitting activity has been increasing in all age groups. The quit ratio differences between men and women increased with age from 1965 to 1985 (several possible explanations for this phenomenon exist; see Chapter VII).

Trends in Cigar, Pipe, and Roll-Your-Own Cigarette Smoking

Figure 5 shows 20-year trends in pipe and cigar smoking among adult males. For both tobacco products, there has been an 80 percent decline in prevalence. In fact, cigar smoking in 1964 (30 percent) was as prevalent as cigarette smoking in 1985 (30.4 percent).

Hand-rolled cigarettes are the least expensive cigarettes to consume. According to the 1986 Adult Use of Tobacco Survey, only 0.4 percent of smokers aged 17 and older use roll-your-own cigarettes (US DHHS 1988).

Trends in Smokeless Tobacco Use

The prevalence of both snuff and chewing tobacco use by younger men has increased substantially between 1970 and 1986, as shown in Figure 6. Among women, use of smokeless tobacco products decreased between 1970 and 1986, but prevalence of use in this group has always been low. In 1986, less than 0.4 percent of females used snuff or chewing tobacco, whereas 8.2 percent of men used these products (Novotny and Lynn, in press). Additionally, among men, almost half of current users reported initiation of smokeless tobacco use before age 17 (Table 11).

In 1985, the NIDA National Household Survey of persons 12 years of age and older found that 12 percent of men and 1 percent of women used chewing tobacco, snuff, or other kinds of smokeless tobacco in the year of the survey. Smokeless tobacco use rates were highest among young males (12-25 years old) who were residents of nonmetropolitan areas (Rouse, in press).

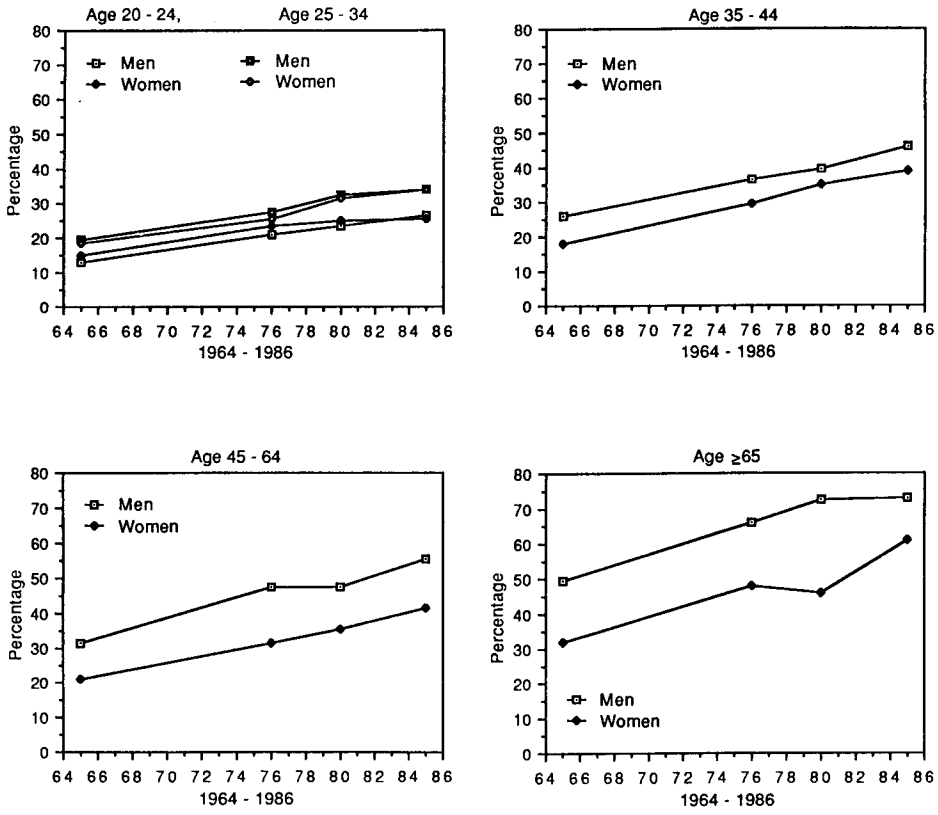

FIGURE 4.—Quit ratios (ratios of former smokers to ever smokers), by age and sex, 1965–1985

SOURCE: U.S. DHHS (1986b).

The BRFSS collected data from 25 States and the District of Columbia in 1986. In this survey, smokeless tobacco use among men ranged from 0.7 percent in New York to 21.4 percent in West Virginia (median State prevalence, 6.5 percent) (US DHHS 1987b). In addition, there was a regional pattern of use, with highest

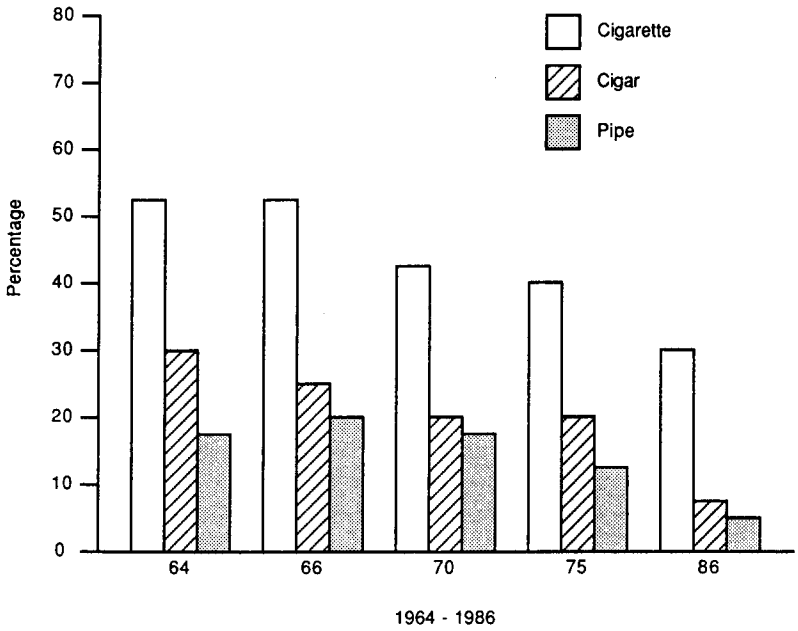

FIGURE 5.—Trends in prevalence of cigarettes, cigars, and pipes, adult men, 1964–1986

SOURCE: U.S. PHS (1970, 1975, 1986), U.S. DHHS (1987a).

prevalence found in Southern and North Central States, just as in the NIDA survey mentioned above.

Summary and Conclusions

1. An estimated 32.7 percent of men and 28.3 percent of women smoked cigarettes regularly in 1985. The overall prevalence of smoking in the United States decreased from 36.7 percent in 1976 (52.4 million adults) to 30.4 percent in 1985 (51.1 million adults).
2. In 1985, the mean reported number of cigarettes smoked per day was 21.8 for male smokers and 18.1 for female smokers.
3. Smoking is more common in lower socioeconomic categories (blue-collar workers or unemployed persons, less educated persons, and lower income groups) than in higher socioeconomic categories. For example, the prevalence of smoking in 1985 among persons without a high school diploma was 35.4 percent, compared with 16.5 percent among persons with postgraduate college education.

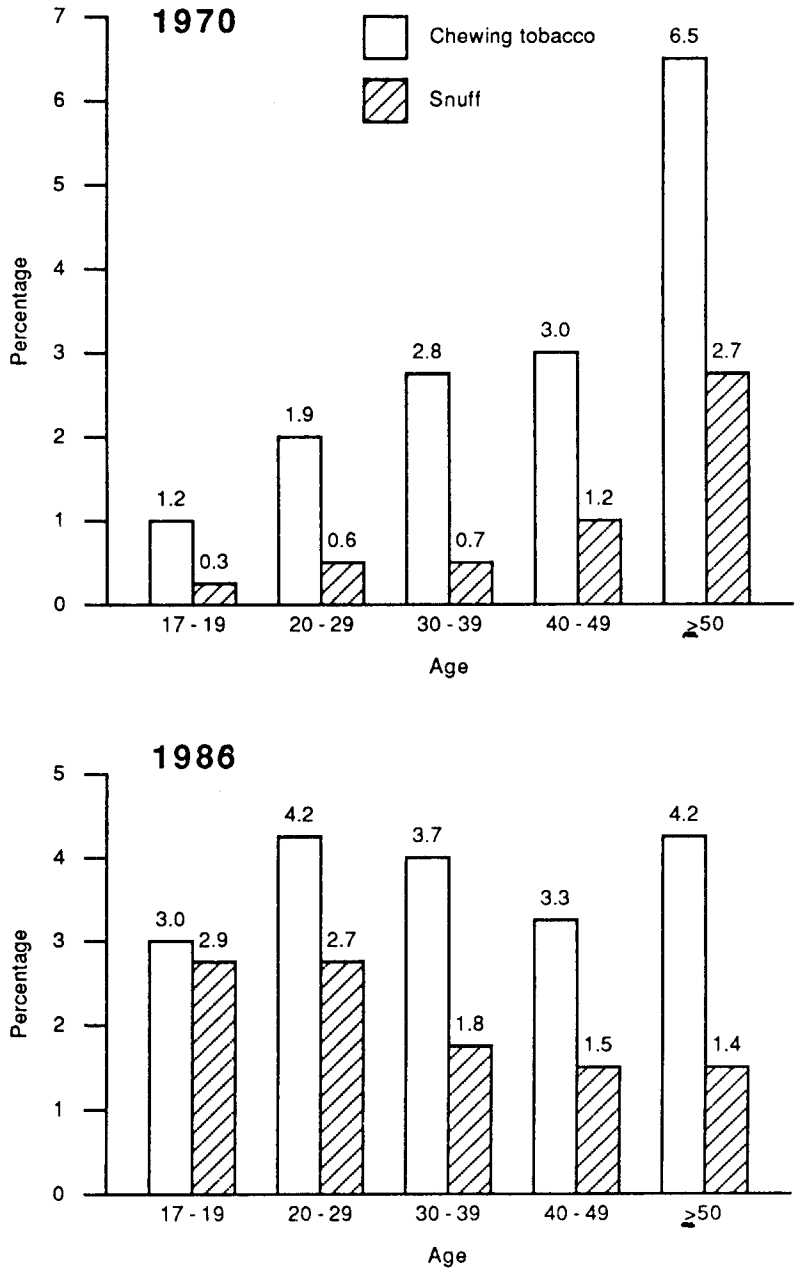

FIGURE 6.—Prevalence of chewing tobacco and snuff use among men, 1970 and 1986

SOURCE: U.S. DHHS (1986a); Novotny and Lynn (in press).

TABLE 11.—Reported age at initiation, by current smokeless tobacco users (percentage), both sexes, 1986, United States

Age at initiation	Any smokeless tobacco	Chewing tobacco	Snuff
<17years	44.3	42.5	43.5
17–24 years	37.9	27.3	35.1
≥25 years	17.8	30.2	21.4

SOURCE: Novotny and Lynn. (in press).

4. An estimated 18.7 percent of high school seniors reported daily use of cigarettes in 1986. The prevalence of daily use of one or more cigarettes among high school seniors declined between 1975 and 1986 by approximately 35 percent; the smoking prevalence among females has consistently been slightly higher than among males. Most of the decline occurred between 1977 and 1981.
5. The use of cigars and pipes has declined 80 percent since 1964.
6. Smokeless tobacco use has increased substantially among young men and has declined among older men since 1975. An estimated 8.2 percent of 17- to 19-year-old men were users of smokeless tobacco products in 1986.

References

CUMMINGS, K.M., GIOVINO, G., MENDICINO, A.J. Cigarette advertising and black-white differences in brand preference. *Public Health Reports* 102(6):698-701, November-December 1987.

DAVIS, R.M. Current trends in cigarette advertising and marketing. *New England Journal of Medicine* 316(12):725-732, March 19, 1987.

FORTMANN, S.P., ROGERS, T., VRANIZAN, K., HASKELL, W.L., SOLOMON, D.S., FARQUHAR, J.W. Indirect measures of cigarette use: Expired-air carbon monoxide versus plasma thiocyanate. *Preventive Medicine* 13(1):127-135, January 1984.

HAYNES, S. The impact of cigarette smoking on minority populations. Presentation to the Federal Interagency Committee on Smoking and Health. Washington, D.C., March 31, 1987.

JOHNSTON, L.D., O'MALLEY, P.M. Issues of validity and population coverage in student surveys of drug use. In: Rerse, B.A., Kozel, N.J., Richards, L.G. (eds.) Self *Report Methods of Estimating Drug Use: Meeting Current Challenges to Validity,* NIDA Research Monograph 57. U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse. DHHS Publication No. (ADM) 85-1402, 1985.

JOHNSTON, L.D., O'MALLEY, P.M., BACHMAN, J.G. *National Trends in Drug Use and Related Factors Among American High School Students and Young Adults, 1975-66.* U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse. DHHS Publication No. (ADM) 87-1535, 1987.

KANDEL, D.B. Drug and drinking behavior among youth. *Annual Review of Sociology* 6:235-285, 1980.

KOZLOWSKI, L.T. Pack size, self-reported smoking rates and public health. *American Journal of Public Health* 76(11):1337-1338, November 1986.

KOZLOWSKI, L.T. Less hazardous smoking and the pursuit of satisfaction. *American Journal of Public Health* 77(5):539-541, May 1987.

MARCUS, A.C., CRANE, L.A. Smoking behavior among US Latinos: An emerging challenge for public health. *American Journal of Public Health* 75(2):169-172, February 1985.

MARCUS, A.C., CRANE, L.A. *Use of Tobacco in the United States: Recent Estimates from the Current Population Suruey.* Unpublished manuscript, 1987.

NOVOTNY, T.E., WARNER, K.E., KENDRICK, J.E., REMINGTON, P.L. Socioeconomic factors and racial smoking differences in the United States. *American Journal of Public Health,* in press.

NOVOTNY, T.E., LYNN, W. Smokeless tobacco use in the United States, 1970-86 *Proceedings of the Sixth World Conference on Smoking and Health,* November 9-12, 1987, in press.

PETITTI, D.B., FRIEDMAN, G.D., KAHN, W. Accuracy of information on smoking habits provided on self-administered research questionnaires. *American Journal of Public Health* 71(3):308-311, March 1981.

PIERCE, J.P., ALDRICH, R.N., HANRATTY, S., DWYER, T., HILL, D. Uptake and quitting smoking trends in Australia 1974-1984. *Preventive Medicine* 16(2):252-260, March 1987.

PIERCE, J.P., DWYER, T., DIGIUSTO, E., CARPENTER, T., HANNAM, C., AMIN, A., YONG, C., SARFATY, G., SHAW, J., BURKE, N. Cotinine validation of self-reported smoking in commercially run community surveys. *Journal of Chronic* Diseases 40(7):689-695, 1987.

PIRIE, P.L., MURRAY, D.M., LUEPKER, R.V. Smoking prevalence in a cohort of adolescents, including absentees, dropouts, and transfers. *American Journal of Public Health* 78(2):176-178, February 1988.

POJER, R., WHITFIELD, J.B., POULOS, V., ECKHARD, I.F., RICHMOND, R., HENSLEY, W.J. Carboxyhemoglobin, cotinine, and thiocyanate assay compared for distinguishing smokers from non-smokers. Clinical Chemistry 30(8):1377-1380, 1984

ROUSE, B. Epidemiology of smokeless tobacco use: A national study. *Journal of the National Cancer Institute,* in press.

THORNBERRY, O.T. An experimental comparison of telephone and personal health interview surveys. *Data Evaluation and Methods Research,* Series 2, No. 106. DHHS Publication No. (PHS) 87-1380, 1987.

TOBACCO INSTITUTE. *The Tax Burden on Tobacco,* Volume 21. Washington, D.C.: The Tobacco Institute, 1986.

U.S. DEPARTMENT OF AGRICULTURE. *Tobacco Situation and Outlook.* U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service. September 1986.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. *The Health Consequences of Smoking: The Changing Cigarette. A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Office on Smoking and Health. DHHS Publication No. (PHS) 81-50156, 1981.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. *Why People Smoke Cigarettes.* U.S. Department of Health and Human Services, Public Health Service, 1983.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. *The Health Consequences of Using Smokeless Tobacco. A Report of the Advisory Committee to the Surgeon General.* NIH Publication No. 86-2874. Department of Health and Human Services, Public Health Service, National Institutes of Health, April 1986a.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. *National Center for Health Statistics: Health, United States, 1986.* U.S. Department of Health and Human Services, Public Health Service. DHHS Publication No. (PHS) 87-1232, December 1986b.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. Behavioral risk factor surveillance-selected states, 1986. *Morbidity and Mortality Weekly Report* 36(16):252-254, May 1, 1987a.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. Smokeless tobacco use in the United States: Behavioral risk factor surveillance system, 1986. *Morbidity and Mortality Weekly Report* 36(22):337-340, June 12, 1987b.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. Cigarette smoking in the United States, 1986. *Morbidity and Mortality Weekly Report* 36(35)581-585, September 11, 1987c.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. Regional variation in smoking, prevalence and cessation: Behavioral risk factor surveillance, 1986. *Morbidity and Mortality Weekly Report* 36(45):751-754, November 20, 1987d.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. *Adult Use of Tobacco, 1986.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Office on Smoking and Health. In press.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. *Adult Use of Tobacco,* 1970. U.S. Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Clearinghouse for Smoking and Health, June 1973.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. *Adult Use of Tobacco, 1975.* U.S. Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Clearinghouse for Smoking and Health, 1976.

U.S. FEDERAL TRADE COMMISSION. Staff report on the cigarette advertising investigation. U.S. Federal Trade Commission, May 1981.

U.S. FEDERAL TRADE COMMISSION. Report to Congress pursuant to the Federal Cigarette Labeling and Advertising Act, 1985. U.S. Federal Trade Commission, February 1988.

U.S. TOBACCO COMPANY. *Annual Report 1986*. Greenwich, Connecticut: United States Tobacco Company, 1986.

WAKSBERG, J. Sampling methods for random digit dialing. *Journal of the American Statistical Association* 73(361):40-46, March 1978.

WARNER, K. E. Possible increases in the underreporting of cigarette consumption. *Journal of the American Statistical Association* 73(362):314-318, June 1978.

WARNER, K.E., MURT, H.A. Impact of the antismoking campaign on smoking prevalence: A cohort analysis. *Journal of Public Health Policy* 3(4):374-390, December 1982.