TABLE 38.—Age-adjusted mortality ratios of current smokers of pipes only, by amount smoked. U.S. veterans 1954 cohort, 16-year followup

No. of pipefuls	Mortality ratio
Nonsmokers	1.00
<5	0.93
5-9	1.12
10-19	1.08
>19	1.21
Total	1.07

SOURCE: Rogot, E. (33).

TABLE 39.—Age-adjusted mortality ratios of current smokers of pipes only, by age began smoking. U.S. veterans 1954 cohort, 16-year followup

Age began years	Mortality ratio
Nonsmokers	1.00
<15	1.04
15-19	1.12
20-24	1.06
>24	1.06
Total	1.07

SOURCE: Rogot, E. (33).

in each of the eight prospective studies. These were classified according to the International Statistical Classification of Diseases, Injuries, and Causes of Death. The mortality ratios of current cigarette smokers by cause of death in the prospective epidemiological studies are presented in Table 41. The causes of death have been grouped into four categories: cancers, cardiovascular diseases, respiratory diseases, and other conditions.

Mortality ratios for the "all cancers" category are about twice as high in smokers as in nonsmokers. Accordingly, cigarette smokers are about twice as likely as nonsmokers to die of cancer. The highest mortality ratio for malignancies is for lung cancer, followed by cancer of the larynx, oral cavity, esophagus, urinary bladder, and the pancreas. Cigarette smoking has been established as a major cause in the development of these cancers. There are associations between cigarette smoking and cancer of the kidney and stomach, but further research is needed to determine the exact nature of this association. Cancer of the intestines and rectum do not appear to be related to cigarette smoking.

TABLE 40.—Age-adjusted mortality ratios of males smoking cigarettes, pipes, and cigars in various combinations and at various times. U.S. veterans 1954 cohort

Current cigarette smokers by use of other types of tobacco

Cigars	Pipes	Mortality ratio
Current	Current	1.21
Never	Current	1.28
Current	Never	1.30
Current	Former	1.33
Former	Current	1.36
Never	Former	1.47
Former	Former	1.48
Former	Never	1.53
Never	Never	1.55

Current cigar smokers by use of other types of tobacco

Cigarettes	Pipes	Mortality ratio
Never	Former	1.10
Former	Former	1.10
Never	Current	1.10
Former	Current	1.13
Never	Never	1.16
Current	Current	1.21
Former	Never	1.23
Current	Never	1.30
Current	Former	1.33

Current pipe smokers by use of other types of tobacco

Cigarettes	Cigars	Mortality ratio
Never	Never	1.07
Never	Current	1.10
Former	Never	1.10
Never	Former	1.11
Former	Current	1.14
Former	Former	1.14
Current	Current	1.21
Current	Never	1.28
Current	Former	1.36

SOURCE: Rogot, E. (*33*).

The mortality ratio for the "all cardiovascular disease" category is about 1.6. Coronary heart disease is the most important cause of cigarette smoking-related mortality. The mortality ratios for coronary heart disease in the eight studies varied from 1.3 to 2.03. Although the mortality ratio for coronary heart disease is considerably lower than for lung cancer, it results in a greater excess mortality because coronary heart disease is the most common cause of death in the

TABLE 41.—Mortality ratios of current cigarette-only smokers, by cause of death in eight prospective epidemiological studies

	British Doctors (3)	Males in 25 States 45–64 (17)	Males in 25 States 65–79 (17)	U.S. Veterans (26)	Japanese Study (24)	Canadian Veterans (1)	Males in 9 States (20)	Swedish Males (2)	Swedish Females (2)	California Occupations (12)
All cancers[1] (140-205)	- - -	2.14	1.76	2.21	1.62	- - -	1.97	- - -	- - -	- - -
Cancer of lung and bronchus (162-163)	14.0	7.84	11.59	12.14	3.64	14.2	10.73	7.0	4.5	15.9
Cancer of larynx (161)		6.09	8.99	9.95	13.59		13.10	- - -	- - -	- - -
Cancer of buccal cavity (140-141)	13.0	9.90	2.93	4.09	7.04	3.9	2.80	- - -	- - -	1.0
Cancer of pharynx (145-148)				12.54	2.81		- - -	- - -	- - -	- - -
Cancer of esophagus (150)	4.7	4.17	1.74	6.17	2.57	3.3	6.60	- - -	- - -	0.7
Cancer of bladder and other (181)	2.1	2.20	2.96	2.15	0.98	1.3	2.40	1.8	1.6	6.0
Cancer of pancreas (157)	1.6	2.69	2.17	1.84	1.83	2.1	- - -	3.1	2.5	- - -
Cancer of kidney (180)	- - -	1.42	1.57	1.45	1.11	1.4	1.50	- - -	- - -	- - -
Cancer of stomach (151)	- - -	1.42	1.26	1.60	1.51	1.9	2.30	0.9	2.3	0.8
Cancer of intestines (152-153)	- - -	1.01	1.17	1.27	1.27	1.4	0.50	- - -	- - -	0.9
Cancer of rectum (154)	2.7			0.98	0.91	0.6	0.80	- - -	- - -	1.0
All cardiovascular diseases (330-334, 400-468)	- - -	1.90	1.31	1.75	- - -	- - -	1.57	- - -	- - -	- - -
Coronary heart disease (420)	1.6	2.03	1.36	1.74	1.96	1.6	1.70	1.7	1.3	2.0
Cerebrovascular lesions (330-334)	1.3	1.38	1.06	1.52	1.14	0.9	1.30	1.0	1.1	1.8
Aortic aneurysm (nonsyphilitic) (451)	6.6	2.62	4.92	5.24	- - -	1.8	- - -	1.6	- - -	- - -
Hypertension (440-447)	- - -	1.40	1.42	1.67	2.51	1.6	1.20	1.3	1.4	1.0
General arteriosclerosis (450)	1.4	- - -	- - -	1.86	- - -	3.3	2.00	2.0	2.0	- - -
All Respiratory Disease (non-neoplastic)	- - -	- - -	- - -	- - -	- - -	- - -	2.85	- - -	- - -	- - -
Emphysema and/or bronchitis	24.7	- - -	- - -	10.08	- - -	- - -	2.30	1.6	2.2[2]	4.3
Emphysema without bronchitis (527.1)	- - -	6.55	11.41	14.17	- - -	7.7	- - -	- - -	- - -	- - -
Bronchitis (500-502)	- - -	- - -	- - -	4.49	- - -	11.3	- - -	- - -	- - -	- - -
Respiratory tuberculosis (001-008)	5.0	- - -	- - -	2.12	1.27	- - -	- - -	- - -	- - -	- - -
Asthma (241)	- - -	- - -	- - -	3.47	- - -	- - -	- - -	- - -	- - -	- - -
Influenza and pneumonia (480-493)	1.4	1.86	1.72	1.87	- - -	1.4	2.60	- - -	- - -	2.4
Certain other conditions										
Stomach ulcer (540)	2.5	4.06	4.13	4.13	2.06	- - -	- - -	- - -	- - -	- - -
Duodenal ulcer (541)		2.86	1.50	2.98		6.9	2.16	- - -	- - -	0.5
Cirrhosis (581)	3.0	2.06	1.97	3.38	1.35	2.3	1.93	2.4	0.8	4.0
Parkinsonism (350)	0.4	- - -	- - -	0.26	- - -	- - -	- - -	- - -	- - -	- - -
All causes	1.64	1.86	1.43	1.84	1.22	1.52	1.70	1.4	1.2	1.78

[1]Numbers in parenthesis represent ICD (International Classification of Diseases) codes.

[2]Includes emphysema, bronchitis, and asthma.

United States. There are several important risk factors for the development of coronary heart disease, including cigarette smoking, hypertension, and high blood cholesterol. None appears to be more important than cigarette smoking. Cigarette smoking does not appear to be a significant cause of hypertension or elevated serum cholesterol, but there is an adverse synergism between these risk factors that greatly increases the risk of ischemic heart disease for individuals who have multiple risk-factors. There is a strong and, most likely, causal relationship between cigarette smoking and death from aortic aneurysm (nonsyphylitic). General arteriosclerosis is also associated with cigarette smoking.

Of the non-neoplastic respiratory diseases, cigarette smoking is most strongly associated with emphysema and chronic bronchitis. Because of difficulty in differentiating between these diseases, and since they commonly coexist in an individual, they are frequently combined and called chronic obstructive lung disease (COLD). It is clear that cigarette smoking is the major cause of COLD. Certain industrial exposures result in COLD, and in these situations an adverse synergism with cigarette smoking exists, creating premature disability and death primarily among cigarette smokers in these industries. Asthma is not commonly caused by cigarette smoking, but this condition is seriously aggravated by cigarette smoking. Deaths from infectious pulmonary diseases such as pneumonia and influenza are more common in cigarette smokers than in nonsmokers.

The mechanisms responsible for the increased mortality from stomach and duodenal ulcers among cigarette smokers are not clearly understood. The association of cigarette smoking with cirrhosis is an indirect one. There is a strong correlation of cigarette smoking with the use of alcoholic beverages, which in turn cause cirrhosis. There is a significant negative association between cigarette smoking and parkinsonism; the cause of this association is not known.

The Constitutional Hypothesis, Social, and Environmental Factors

Certain critics have advanced various hypotheses in an attempt to dismiss cigarette smoking as a cause of mortality. The constitutional hypothesis and social and various environmental factors have been raised as explanations of the mortality trends that have been observed to be associated with cigarette smoking.

The constitutional hypothesis holds that people with certain genetically-acquired constitutional makeups are more likely to develop certain diseases and are also more likely to smoke cigarettes. This hypothesis maintains that the relationship between cigarette smoking and certain diseases is largely fortuitous.

Data from the United States and Swedish Twin Registries have been examined to try to clarify the constitutional hypothesis. Cederlof, et al. (*3*) have published the most extensive data available on the interactions of smoking, environment, and heredity in the development of disease. Comparisons were made between smoking discordant monozygotic (identical) pairs and smoking discordant dizygotic (fraternal) pairs, and between unmatched twin pairs and matched twin pairs. When smoking and overall mortality are examined, treating all twins as "unrelated" individuals, a strong correlation is found. The group smoking more than 10 cigarettes per day has a mortality ratio of about 2.0 compared to nonsmokers. This is true for both men and women in all age groups.

When smokers and nonsmokers among the dizygotic pairs were compared, a mortality ratio of 1.45 for males and 1.21 for females was observed. Corresponding mortality ratios for the monozygotic pairs were 1.5 for males and 1.22 for females. Commenting on the constitutional hypothesis and lung cancer, the authors observed that "the constitutional hypothesis as advanced by Fisher and still supported by a few, has here been tested in twin studies. The results from the Swedish monozygotic twin series speak strongly against this constitutional hypothesis" (*3*).

Preston (*27-30*) has published several articles in which he examined the excess mortality—above predicted values for men and women—that has occurred in the United States and other countries. Genetic, social, and environmental factors were analyzed in an attempt to explain this phenomenon. The genetic and social hypothesis received some support from correlation analysis; however, the correlations were weak and became trivial when cigarette smoking was taken into consideration. Preston observed: "Rather than representing victimization by nature or by hostile social forces, the current abnormal rates of dying among older males appear to be largely self-imposed and avoidable" (*28*).

Social, genetic, and environmental arguments are also weakened by the observation that epidemiological studies of the effects of cigarette smoking have been conducted in many countries on every major continent and among peoples of diverse social and cultural backgrounds who are exposed to a variety of environmental factors—all with similar results. Cigarette smoking causes the same diseases, and the same dose-response relationships are found wherever the effects of cigarette smoking are studied.

Summary of Overall Mortality Related to Smoking

The following conclusions summarize the relationships that have been established between smoking and overall mortality. Some conclusions were drawn 15 years ago; others are based on data that have accumulated in the interval since publication of the first Surgeon General's Report.

1. The overall mortality ratio for all smokers of cigarettes is about 1.7 compared to nonsmokers.

2. Life expectancy is significantly shortened by cigarette smoking. A 30-year-old, two-pack-a-day smoker has a life expectancy that is 8.1 years shorter than his nonsmoking counterpart.

3. Overall mortality ratios increase with the amount smoked. The mortality ratio is 2.0 for the two-pack-a-day smoker as compared to nonsmokers.

4. Overall mortality ratios for smokers are highest at younger ages and decline somewhat with increasing age. This reflects a relative decrease of the impact of smoking on health as death rates in general increase with age. This is a relative effect. The actual number of excess deaths attributable to cigarette smoking increases with age.

5. Overall mortality ratios are proportional to the duration of cigarette smoking. The longer one smokes, the greater the risk of dying.

6. Overall mortality ratios are higher for those who began smoking at a young age as compared to those who began smoking later.

7. Overall mortality ratios are higher for those who report they inhale smoke than for those who do not inhale.

8. Overall mortality ratios increase with the tar and nicotine content of the cigarette. Overall mortality ratios of low tar and nicotine (less than 1.2 mg nicotine and less than 17.6 mg tar) cigarette smokers are 50 percent higher than for nonsmokers.

9. Overall mortality ratios for female smokers are somewhat less than for male smokers. This probably reflects differences in exposure to cigarette smoke, such as starting smoking later, smoking cigarettes with lower tar and nicotine content, and smoking fewer cigarettes per day than men.

10. Women demonstrate the same dose-response relationships with cigarette smoking as men. An increase in mortality occurs with an increase in the number of cigarettes smoked per day, an earlier age of beginning cigarette smoking, a longer duration of smoking, inhalation of cigarette smoke, and a higher tar and nicotine content of the cigarette. Women who have smoking characteristics similar to men experience mortality rates similar to men.

11. Ex-smokers experience overall mortality ratios that decline as the number of years off cigarettes increases. After 15 years, the overall mortality ratios of ex-smokers are similar to those of individuals who have never smoked.

12. Ex-smokers have overall mortality ratios that are directly proportional to the number of cigarettes the person used to smoke.

13. Ex-smokers have overall mortality ratios that are inversely related to the age at which the person began to smoke.

14. Ex-smokers who were ill when they quit smoking have higher mortality rates than ex-smokers who quit for other reasons.

15. Regardless of how long or how much an individual has smoked, there is a decrease in overall mortality when the person quits smoking, provided the person is not ill at the time of quitting.

16. Overall mortality ratios for cigar-only smokers as a group are somewhat higher than for nonsmokers.

17. Overall mortality ratios for cigar smokers increase with the number of cigars smoked per day.

18. Overall mortality ratios for cigar smokers are inversely proportional to the age at which the individual began smoking cigars.

19. Overall mortality ratios for pipe-only smokers as a group are only slightly higher than for nonsmokers.

20. Overall mortality ratios of men who smoke cigarettes in combination with pipes and cigars are intermediate between those who smoke pipes or cigars only and those who smoke only cigarettes.

Summary of Smoking and Mortality by Cause of Death

1. Mortality ratios are particularly high for a number of diseases associated with smoking. These include:

a. Cancer of the lung
b. Chronic obstructive lung diseases, emphysema, and chronic bronchitis
c. Cancer of the larynx
d. Cancer of the oral cavity
e. Cancer of the esophagus
f. Ischemic heart disease
g. Cancer of the urinary bladder
h. Cancer of the pancreas
i. Aortic aneurysm (nonsyphilitic)
j. Ulcers of the stomach and duodenum

2. Coronary heart disease is the chief contributor to the excess mortality associated with cigarette smoking.

3. Lung cancer is the second leading contributor to excess mortality associated with cigarette smoking.

4. Chronic obstructive lung disease is the third leading contributor to excess mortality associated with cigarette smoking.

5. Pipe smoking and cigar smoking are associated with elevated mortality ratios for cancers of the upper respiratory tract, including cancer of the oral cavity, the larynx, and the esophagus.

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3. MORBIDITY.

CONTENTS

LIST OF TABLES

Introduction

For many years, researchers have been accumulating evidence of the relationship between cigarette smoking and mortality, as well as data on the relationship between smoking and the prevalence of selected chronic diseases. These findings are presented in detail elsewhere in this report. It has been only recently that data have also become available that indicate a relationship, although a statistical relationship and not an established causal relationship, between cigarette smoking and disability and other health indicators. This chapter of the report will present some of these data based on surveys conducted by the National Center for Health Statistics (NCHS).

Past Studies

One of the few sources of national data on cigarette smoking and health characteristics, and the only data set based on a large national sample, is the National Health Interview Survey. This is a continuous survey conducted by NCHS each year since 1957. Interviews are conducted in a national probability sample of approximately 40,000 households, with a new sample selected each year. Information is obtained on a wide range of health characteristics, including incidence of acute illnesses and injuries, prevalence of selected chronic diseases, short- and long-term disability associated with illness and injuries, utilization of health services, and related health topics such as health insurance coverage, usual sources of medical care, and use of prescription medicine. One of the topics on which data have been periodically collected is cigarette smoking behavior. Some data on cigar and pipe smoking have also been collected.

Shortly after the Surgeon General's first report, *Smoking and Health*, was published in 1964, NCHS began collecting information on smoking as a part of the Health Interview Survey. The result of this effort was a report, *Cigarette Smoking and Health Characteristics* (*14*), which was the first such study based on a national probability sample. While several significant studies had been conducted earlier, such as those by Hammond and Horn (*5*, *6*), they were, for the most part, not based on scientifically designed samples, and were therefore subject to the criticism that the findings could not be generalized to the total population. NCHS's first report on smoking, based on the fiscal year 1965 survey, presented data on the relationships between cigarette smoking, the incidence of selected acute illnesses, and the prevalence of selected chronic diseases, as well as information on the relationship between smoking and measures of disability, such as restricted activity days, bed days, and work-loss days.

The data showed, for example, that male cigarette smokers were almost 2 1/2 times more likely to report chronic bronchitis or emphysema than were those who had never smoked, and almost 60

TABLE 1.—Age-specific ratios[1] of prevalence rates of chronic conditions for persons who had ever smoked to persons who had never smoked, by sex, age, and selected chronic conditions: United States, July 1964 to June 1965

Selected chronic conditions	Male				Female			
	All ages, 17+ years	17–44 years	45–64 years	65+ years	All ages, 17+ years	17–44 years	45–64 years	65+ years
	Ratio							
All chronic conditions	1.09	1.27[2]	1.17	1.09	0.90	1.26	1.02	0.99
Heart conditions (excluding rheumatic heart disease)	1.00	*	1.45	1.06	0.47	1.33	0.92	0.92
Arteriosclerotic heart disease including coronary disease	1.50	†	1.80	1.22	0.75	†	1.63	1.61
Hypertension without heart involvement	0.91	1.25	0.86	0.95	0.57	1.17	0.75	0.89
Chronic bronchitis and/or emphysema	2.30	*	*	2.67	2.38	3.43	2.86	2.16
Chronic sinusitis	1.35	1.38	1.31	1.34	1.25	1.34	1.19	1.22
Peptic ulcer	2.00	2.38	1.88	1.59	1.56	1.82	1.52	2.35
Arthritis	0.95	1.64	0.99	1.06	0.63	1.32	0.89	0.97
Hearing impairments	0.88	1.31	1.06	0.97	0.55	1.05	1.02	0.75
All other chronic conditions	1.07	1.19	1.15	1.08	0.95	1.23	1.03	0.99

[1]Prevalence rate of "ever smokers" divided by prevalence rate of "never smokers."
[2]Example: 1.27 = 82.9/65.4.
*Figure does not meet standards of reliability or precision.
†Quantity zero.
SOURCE: Wilson, R.W. (*14*).

percent more likely to report arteriosclerotic heart disease (Table 1). Among the heaviest smokers the relationships were even stronger. For example, women who smoked between one and two packs a day reported chronic bronchitis or emphysema almost five times more frequently than did women who had never smoked (Table 2). In addition, former smokers, particularly among the males, reported higher rates of chronic illnesses than did the current smokers. Data were not available to further analyze illness rates by the reason people stopped smoking, i.e., the category of former smokers is composed of both those who stopped *because* of poor health and those who stopped to *avoid* poor health.

Data from this study also indicated that people who had ever smoked cigarettes also had a higher incidence of acute illnesses than did people who had never smoked. The age-adjusted incidence of acute conditions

TABLE 2.—Ratios of age-adjusted[1] prevalence rates of chronic conditions for persons 17 years old and older who have ever smoked, to persons who have never smoked, by cigarette smoking status, number of cigarettes smoked per day for present smokers—heaviest amount, sex, and selected chronic conditions: United States, July 1964 to June 1965

Sex and selected chronic conditions	Cigarette smoking status			Present smokers			
				Number of cigarettes smoked per day–heaviest amount			
	Persons who ever smoked	Former smokers	Present smokers	Under 11	11–20	21–40	41 and over
Male	Ratio[2]						
All chronic conditions	1.17	1.26	1.13	0.92	1.04	1.30	1.54
Heart conditions (excluding rheumatic heart disease)	1.22	1.44	1.12	0.93	1.07	1.29	1.71
Arteriosclerotic heart disease, including coronary disease	1.67	2.22	1.56	*	1.44	2.11	*3
Hypertension without heart involvement	1.02	1.07	1.00	0.93	0.88	1.20	1.27
Chronic bronchitis and/or emphysema	2.40	2.50	2.40	*	2.30	3.10	4.10
Chronic sinusitis	1.34	1.40	1.30	0.93	1.22	1.57	1.78
Peptic ulcer	1.92	1.75	1.96	1.25	1.92	2.17	2.75
Arthritis	1.07	1.24	0.99	0.97	0.87	1.16	1.16
Hearing impairments	1.06	1.14	1.04	0.98	0.94	1.14	1.34
All other chronic conditions	1.13	1.23	1.09	0.90	1.01	1.25	1.50
Female							
All chronic conditions	1.12	1.23	1.09	0.88	1.05	1.39	2.00
Heart conditions (excluding rheumatic heart disease)	0.91	1.26	0.81	0.65	0.81	1.05	*
Arteriosclerotic heart disease, including coronary disease	1.29	*	0.86	*	*	*	*
Hypertension without heart involvement	0.86	0.98	0.83	0.86	0.76	0.90	*
Chronic bronchitis and/or emphysema	2.83	2.17	3.17	1.33	3.33	4.92	9.67
Chronic sinusitis	1.26	1.32	1.24	0.97	1.26	1.56	1.74
Peptic ulcer	1.63	1.63	1.56	1.25	1.56	2.13	*
Arthritis	0.99	1.12	0.98	0.86	0.97	1.11	1.68
Hearing impairments	0.93	0.97	0.90	0.72	0.91	1.14	*
All other chronic conditions	1.12	1.25	1.09	0.89	1.04	1.41	2.08

[1]Adjusted by the indirect method to the age distribution of the total civilian, noninstitutional population of the United States.

[2]Prevalence rate for given smoking category divided by prevalence rate for "never smokers." Ratios of 1.00 = same as "never smoked."

[3]Even though the asterisks in this column replace figures with large sampling errors, each of the six of the replaced ratios were larger than the ratios for the lower smoking amounts.

*Figure does not meet standards of reliability or precision.

SOURCE: Wilson, R.W. (*14*).

for persons who had ever smoked was 14 percent higher among men and 21 percent higher among women than among people who had never smoked cigarettes (Table 3). As with chronic conditions, the former smokers reported higher rates of acute illness than did the present smokers.

However, just as the earlier studies were subject to criticism because of their sample designs, this study was criticized because the disease information came from reporting in household interviews rather than from physician examination. Methodological studies on the accuracy of the reporting of disease in which medical records are compared with household interview data have indicated a wide range of reporting completeness depending on the nature and the seriousness of the specific disease (*7*).

Another indication of morbidity is the impact of illness on the individual. Two of the indicators routinely collected in the Health Interview Survey are the number of days lost from work as a result of illness or injury and the number of days which a person had to spend in bed as a result of illness or injury. These indicators are independent of a physician's diagnosis and require only that a respondent attribute the disability to an illness or injury, although the data can also be analyzed by specific disease categories. The data collection procedure requires that respondents recall days spent in bed or days lost from work only for the 2-week period prior to the week of the interview, thus reducing memory loss. The data on work-loss days apply to currently employed persons only and do not reflect long-term work loss from unemployment or early retirement as a result of illness or injury.

The age-adjusted data from the 1965 Health Interview Survey indicated that there were about 15 percent more bed-disability days among current smokers than among people who had never smoked cigarettes, and about a third more bed disability days among the former smokers than among those who had never smoked (Table 4). The levels of bed-disability days tended to increase as the number of cigarettes smoked increased, as measured by the heaviest amount smoked.

The number of work-loss days among both current and former cigarette smokers was markedly higher than among workers who had never smoked. The age-adjusted rate of work loss was 33 percent higher for male current smokers, 45 percent higher for female current smokers, and 42 percent higher for both male and female former smokers. As with disease and bed-day differentials, the heaviest smokers reported the highest rates of work loss. These data were used by the Public Health Service in its early national public education and antismoking campaigns. The campaigns included television spots that noted there were an estimated 77 million "excess" work-loss days associated with cigarette smoking; that is, if the smokers had the same rate of work loss as did those workers who had never smoked, there

TABLE 3.—Ratios of age-adjusted[1] incidence of acute conditions for persons 17 years old and older who have ever smoked, to persons who have never smoked, by cigarette smoking status, number of cigarettes smoked per day for present smokers—present amount, sex, and selected acute conditions: United States, July 1964 to June 1965

Sex and selected acute conditions	Cigarette smoking status			Present smokers			
	Persons who ever smoked	Former smokers	Present smokers	Number of cigarettes smoked per day—present amount: Under 11	11–20	21–40	41 and over
Male	Ratio[2]						
All acute conditions	1.14	1.23	1.11	1.02	1.11	1.23	1.21
Infective and parasitic diseases	1.21	1.36	1.16	*	1.24	1.59	*
Upper respiratory conditions	1.03	1.22	0.96	0.98	0.98	0.92	*
Influenza	1.25	1.36	1.22	1.22	1.19	1.28	*
Other respiratory conditions	1.62	*	1.54	*	*	*	*
Digestive system conditions	1.05	1.13	1.03	*	0.90	1.41	*
Injuries	1.25	1.03	1.32	1.00	1.35	1.56	*
All other acute conditions	1.06	1.35	0.95	1.08	0.85	1.11	*
Female							
All acute conditions	1.21	1.26	1.21	1.18	1.20	1.31	*
Infective and parasitic diseases	1.35	1.62	1.29	1.26	1.04	2.29	†
Upper respiratory conditions	1.26	1.20	1.27	1.29	1.28	1.26	*
Influenza	1.13	1.28	1.09	1.23	1.03	0.99	*
Other respiratory conditions	1.68	*	1.74	*	*	*	*
Digestive system conditions	1.07	*	1.04	0.78	1.05	*	*
Injuries	1.14	1.04	1.17	0.89	1.40	*	*
All other acute conditions	1.22	1.31	1.19	1.29	1.15	1.13	*

[1]Adjusted by the indirect method to the age distribution of the total civilian, noninstitutional population of the United States.
[2]Incidence rate for given smoking category divided by incidence rate for "never smokers."
*Figure does not meet standards of reliability or precision.
†Quantity zero.
SOURCE: Wilson, R.W. (*14*).

would have been 77 million fewer days lost from work (*13*). This represented 19 percent of all work-loss days from illness at that time. More recent data are presented below.

TABLE 4.—Ratios of age-adjusted[1] number of days of disability per person 17 years old and older per year who have ever smoked, to persons who have never smoked, by number of cigarettes smoked per day for present smokers—heaviest amount, type of days of disability, smoking status, and sex: United States, July 1964 to June 1965

Type of disability days, smoking status, and sex	Total smokers	Present smokers: Number of cigarettes smoked per day-heaviest amount			
		Under 11	11-20	21-40	41 and over
	Ratio[2]				
Days of work loss[3]					
Present smokers					
Male	1.33	0.87	1.35	1.41	1.65
Female	1.45	1.09	1.57	1.83	2.74
Former smokers					
Male	1.41	1.28	1.26	1.70	2.17
Female	1.43	1.34	1.66	1.72	*
Days of bed Disability					
Present smokers					
Male	1.14	0.98	1.20	1.16	1.49
Female	1.17	0.92	1.09	1.59	2.63
Former smokers					
Male	1.31	1.27	1.24	1.45	1.65
Female	1.39	1.09	1.61	1.49	4.57

[1]Adjusted by the indirect method to the age distribution of the total civilian, noninstitutional population of the United States.
[2]Days of disability of given smoking category divided by days of disability of "never smokers."
[3]Days of work loss reported for currently employed persons only.
*Figure does not meet standards of reliability or precision.
SOURCE: Wilson, R.W. (*14*).

The following year NCHS also collected data on smoking and published a report, *Changes in Cigarette Smoking Habits Between 1955 and 1966* (*1*), which compared the 1966 data with similar data collected earlier as a part of the Current Population Survey conducted by the Bureau of the Census (*4*). The Census data, however, did not include any health-related information. NCHS continued to monitor cigarette smoking levels, but with no health data, in 1966, 1967, and 1968 through supplemental questions in the Current Population Survey. The 1970 Health Interview Survey contained many of the same smoking and health questions as the 1965–1966 surveys, with the exception that data were not collected on all chronic diseases, but only on respiratory disease. These data again showed increased reporting of selected respiratory diseases and more work loss among smokers than among those who had never smoked (*15*). In addition, the data continued to document the decline in the proportion of cigarette smokers, particularly among males, where the drop was from 51.0 percent in 1965 to 43.2 percent in 1970 (*10*). Smoking data were again collected in 1974 in conjunction with a special set of questions on hypertension (*9*). Smoking questions were also asked on the 1976 and 1977 Health Interview Surveys.

Most large scale studies on smoking and health have tended to investigate the role of smoking independently of other behavioral variables, such as alcohol consumption and other life style factors, occupational and environmental hazards, and certain psychological factors. These variables are known to be related to health status and many are also related to smoking habits. Thus it may well be that the elimination of smoking without any changes in the other factors will have only a partial impact on health status. The data collected on the 1977 survey were a part of a series of questions developed by Belloc and Breslow for a study in Alameda County, California, on health behavior, including such life-style factors as amount of sleep, eating breakfast, eating between meals, physical activity, smoking and drinking practices, and weight. It was found that persons with a number of "good health habits" live considerably longer than those with "poor health habits" (*2*).

Recent Studies

Questions on cigarette smoking behavior which were added to the July-December period of the 1978 Health Interview Survey will be continued through December 1979. These questions for the first time include information needed to determine tar and nicotine as well as carbon monoxide (CO) levels. While national surveys on adult smoking behavior conducted earlier by the National Clearinghouse on Smoking and Health had inquired about brand names to determine tar and nicotine levels, they did not include data on health characteristics.

NCHS has recently completed the first cycle of the Health and Nutrition Examination Survey, in which a large national probability sample of persons was brought to mobile examination units for a very extensive physical examination, including tests for cardiovascular and pulmonary diseases (e.g., chest x-ray, EKG, spirometry and single breath carbon monoxide diffusion) as well as a number of biochemical tests. Examinees were also asked about their smoking habits (*8*). While

TABLE 5.—Days of bed disability per person 17 years old and older, by cigarette smoking status, sex, and age: United States, 1974

Sex and age	Total	Present smoker	Former smoker	Never smoked
	Days per person per year			
Male				
17+	6.1	6.7	6.1	5.1
17–44	4.2	5.3	3.6	2.9
45–64	6.5	8.0	5.1	6.5
65+	13.9	12.9	13.2	12.4
Female				
17+	8.7	7.9	9.3	8.6
17–44	6.6	6.9	6.8	6.1
45–64	9.6	9.3	9.4	9.1
65+	13.9	10.3	18.4	13.6

Note: Actual number of bed-disability days	=	1,076,131,000
Expected number of bed-disability days if all persons had same rate as persons who never smoked	=	930,237,000
Excess bed-disability days	=	145,894,000

SOURCE: Wilson, R.W. (16).

the smoking data have not yet been fully analyzed, this study will provide a valuable source of information on smoking and health.

A second cycle of the Health and Nutrition Examination Survey is currently in the field (1976–1980) and also includes questions on smoking habits as well as data on carboxyhemoglobin, an indicator of CO in the blood. These data will be helpful in assessing the accuracy of self-reported cigarette smoking levels.

Disability data from the 1974 Health Interview Survey provide results very similar to those found a decade earlier. They indicate that smokers in all age and sex groups, except for women over age 65, report more days in bed due to illness than do persons who have never smoked (Table 5). If the number of excess bed days is calculated, as it was for the earlier antismoking campaigns, it is estimated that there were almost 150 million (145,894,000) excess bed days among smokers and former smokers. This type of calculation assumes that smokers and former smokers would experience the same rate of bed disability if they did not smoke as did those who had never smoked cigarettes.

Currently employed smokers also report more days lost from work as a result of illness and injury than do employed persons who have never smoked (Table 6). If "excess" work-loss days are calculated for

TABLE 6.—Days lost from work per year due to illness and injury, per currently employed person 17 years old and older, by smoking status, sex, and age: United States, 1974

Sex and age	Total	Present smoker	Former smoker	Never smoked
		Days per person per year		
Male				
17+	4.5	5.1	5.0	3.4
17-44	4.2	5.5	4.2	3.0
45-64	5.0	4.5	5.5	4.4
65+	3.8	0.3	7.9	*
Female				
17+	4.8	5.6	*	4.5
17-44	4.6	5.3	*	4.3
45-64	5.6	6.5	*	5.4
65+	0.9	*	*	*

*Figure does not meet standards of reliability or precision.

Note: Actual number of work-loss days	=	379,389,000
Expected number of work-loss days if all workers had the same rate as workers who never smoked	=	298,021,00
Excess work-loss days	=	81,368,000

SOURCE: Wilson, R.W. (*16*).

employed persons under 65 years of age, there would have been an estimated 81,368,000 "excess" work-loss days among smokers and former smokers, accounting for over 21 percent of all work-loss days. This is about the same proportion as a decade ago.

Another measure of the impact of illness is whether a person is limited in major activity, such as work or keeping house, or limited in other activities such as social or recreational activities as a result of chronic illness. This is a measure of long-term chronic disability as opposed to the bed-days and work-loss indicators that can result from both short-term acute illness or injury and chronic disease. For most age and sex groups, a higher proportion of current smokers and former smokers report they have a limitation of activity than do persons who have never smoked, although the differences are not always striking (Table 7). One factor that may attenuate these differences is the higher mortality rate for persons who have smoked cigarettes. One of the major causes of mortality that has been shown to be related to cigarette smoking, heart disease, is also one of the major causes of limitation of activity. Since the above findings were obtained from

TABLE 7.—Percent of persons with chronic condition(s) causing limitations of activity, by cigarette smoking status, sex, and age: United States, 1974

Sex and age	Total	Present smoker	Former smoker	Never smoked
Both sexes				
17+	18.6	17.3	22.4	18.9
17–44	8.8	9.8	9.4	8.0
45–64	23.7	26.2	24.7	22.3
65+	45.8	46.3	49.2	44.7
Male				
17+	18.7	18.7	23.5	17.3
17–44	9.0	10.0	8.8	8.4
45–64	23.7	27.8	23.8	20.0
65+	51.0	52.5	50.9	51.4
Female				
17+	18.4	15.8	20.6	19.7
17–44	8.6	9.5	10.2	7.8
45–64	23.8	24.4	26.5	23.1
65+	42.1	37.4	44.6	42.6

SOURCE: Wilson, R.W. (*16*).

interview surveys, there is a selection process by mortality that removes a certain number of smokers and former smokers from the data base. In addition, the group of former smokers is made up of two very different kinds of people—those who quit smoking before there was any noticeable deleterious impact on their health and those who quit smoking because of poor health. There are some recent data from the Health Interview Survey, although not yet fully analyzed, that indicate whether the respondent quit smoking because of a specific condition.

Respondents in the Health Interview Survey were asked whether they perceived their health to be excellent, good, fair, or poor. Although the differences are not large, there is a tendency for higher proportions of former smokers and of those who have never smoked to report their health status as excellent (Table 8). For example, among males 17 to 44 years old, about 53 percent of the present cigarette smokers said their health was excellent compared with about 60 percent for both the former smokers and those who had never smoked.

The data also indicate that smokers and former smokers are more likely to be hospitalized in the year prior to the interview than are persons who have never smoked (Table 9). However, the data have not