Vital and Health Statistics

Breast Cancer Risk Factors and Screening: United States, 1987

Series 10: Data From the National Health Interview Survey No. 172

This report presents national estimates of the prevalence of selected risk factors and preventive behaviors related to breast cancer for women 40 years of age and over. Estimates are presented by race and age. Data on preventive practices—breast self-examinations, breast physical examinations, and mammograms—also are presented within categories of education, income, place of residence, and geographic region, all adjusted for race and age. Data are from the 1987 National Health Interview Survey of Cancer Epidemiology and Control.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Health Statistics

Hyattsville, Maryland
January 1990
DHHS Publication No. (PHS) 90–1500

Suggested citation

Dawson DA, Thompson GB. Breast cancer risk factors and screening: United States, 1987. National Center for Health Statistics. Vital Health Stat 10(172). 1989.

Library of Congress Cataloging-in-Publication Data

Dawson, Deborah A.
Breast cancer risk factors and screening: United States, 1987.
p. cm.—(Vital and health statistics. Series 10, Data from the National Health Interview Survey ; no. 172) (DHHS publication ; no. (PHS) 90-1500)
By Deborah A. Dawson and Grey B. Thompson.
"Data are from the 1987 National Health Interview Survey of Cancer Epidemiology and Control."
Includes bibliographical references.
ISBN 0-8406-0421-1
1. Breast—Cancer—United States—Statistics. 2. Breast—Cancer—United States—Risk factors. 3. United States—Statistics, Medical. 4. Health Surveys—United States. I. Thompson, Grey B. II. National Center for Health Statistics (U.S.) III. National Health Interview Survey (U.S.) IV. Title. V. Series. VI. Series: DHHS publication ; no. (PHS) 90-1500.
[DNLM: 1. Breast Neoplasms—epidemiology—United States. 2. Mass Screening—United States—statistics. 3. Risk Factors—United States—statistics. W2 A N148vj no. 172]
RA407.3.A346 no. 172
[RC280.B8]
362.1'0973'021 s—dc20
[614.5'999]
DNLM/DLC
for Library of Congress
89-14566
CIP

National Center for Health Statistics

Manning Feinleib, M.D., Dr.P.H., *Director*

Robert A. Israel, *Deputy Director*

Jacob J. Feldman, Ph.D., *Associate Director for Analysis and Epidemiology*

Gail F. Fisher, Ph.D., *Associate Director for Planning and Extramural Programs*

Peter L. Hurley, *Associate Director for Vital and Health Statistics Systems*

Stephen E. Nieberding, *Associate Director for Management*

Charles J. Rothwell, *Associate Director for Data Processing and Services*

Monroe G. Sirken, Ph.D., *Associate Director for Research and Methodology*

Division of Health Interview Statistics

Owen T. Thornberry, Jr., Ph.D., *Director*

Deborah M. Winn, Ph.D., *Deputy Director*

Gerry E. Hendershot, Ph.D., *Chief, Illness and Disability Statistics Branch*

Nelma B. Keen, *Chief, Systems and Programming Branch*

Stewart C. Rice, Jr., *Chief, Survey Planning and Development Branch*

Robert A. Wright, *Chief, Utilization and Expenditure Statistics Branch*

Cooperation of the U.S. Bureau of the Census

Under the legislation establishing the National Health Interview Survey, the Public Health Service is authorized to use, insofar as possible, the services or facilities of other Federal, State, or private agencies.

In accordance with specifications established by the Division of Health Interview Statistics, the U.S. Bureau of the Census, under a contractual arrangement, participated in planning the survey and collecting the data.

Contents

Breast Cancer Risk Factors and Screening: United States, 1987

by Deborah A. Dawson, Ph.D.,
Division of Health Interview Statistics,
and Grey B. Thompson, Ph.D.,
Division of Vital Statistics,
National Center for Health Statistics

Introduction

Data in this report include national estimates of the prevalence of selected risk factors and preventive practices related to breast cancer for women 40 years of age and over. The risk factors examined are family history of breast cancer, number of pregnancies, age at first pregnancy, history of lactation, age at menarche and menopause, type of menopause, use of oral contraceptives and postmenopausal estrogen, relative body weight, and alcohol consumption. The preventive practices described in this report include frequency of breast self-examination and several measures presented for both breast physical examinations and mammograms: familiarity with and time since last examination, reason for last examination, method of communication of results of last examination, and most important reason for not having had an examination in the 3 years preceding interview.

Estimates of risk factors and preventive practices are presented by age, and they are shown separately for black and white women as well as for women of all races combined. In addition, data on preventive practices are presented within categories of education, income, region, and place of residence, all adjusted for race and age.

The 1987 National Health Interview Survey (NHIS) of Cancer Epidemiology and Control, the results of which provide the basis for this report, was the first NHIS to focus primarily on risk factors and preventive practices related to cancer; thus most of the data presented in this report cannot be compared with previously published reports based on the NHIS. Only two of the risk factors examined in this report, relative body weight and alcohol consumption, are topics that have been included in earlier National Health Interview Surveys. The 1977 and 1983 NHIS's included questions on alcohol consumption, and the 1985 NHIS of Health Promotion and Disease Prevention collected data on alcohol consumption and relative body weight.

The questions used to measure alcohol consumption in 1983 and 1985 were quite different from those asked in 1987; accordingly, estimates presented in this report should not be compared with those from earlier reports. The relative body weight measure used in this report is identical to that used in a number of published reports based on the 1985 NHIS (1–3). However, the context in which the questions about height and weight were asked differed in 1985 and 1987; therefore, comparisons between the two years should be interpreted with caution.

Data on routine physical examinations, including breast physical examinations, were collected in three previous NHIS's: 1973, 1982, and 1985. The 1985 NHIS also included a question on frequency of breast self-examination. Although the wording of the questions included in the earlier surveys was not identical to that used in 1987, readers may refer to published reports (4–6) for estimates of preventive practices based on the 1973, 1982, and 1985 NHIS's. In addition to the NHIS, several other studies conducted by the National Center for Health Statistics have included questions on breast examinations: the National Survey of Family Growth Cycles III and IV, conducted in 1982 and 1988, and the Hispanic Health and Nutrition Examination Survey, conducted in 1982–84.

This report contains no comparisons with data from prior NHIS's because its focus is not on trends in risk factors or in preventive practices. Rather, the purpose of this report is to present in a single document the most current data available on numerous aspects of female breast cancer: incidence, mortality, and survival, in addition to risk factors and preventive practices. Data on incidence, mortality, and survival were taken from published reports prepared by the National Cancer Institute and are summarized in the text and accompanying text tables and figures. Data on risk factors and preventive practices were derived exclusively from the 1987 NHIS. These data are presented in full in the text tables and are summarized in the text.

In addition to this and other published reports, data from the NHIS are available on microdata tapes. Public use data tapes are available for the Cancer Epidemiology and Control Surveys as well as for many other special health topics included in the NHIS's from 1973 through 1987. Information on these tapes is available from the National Center for Health Statistics, Division of Health Interview Statistics, Systems and Programming Branch, 3700 East-West Highway, Hyattsville, MD 20782.

Highlights

The following highlights summarize data described in detail in the text and tables that follow.

- Eight percent of U.S. women 40 years of age and over reported having one primary female relative (mother, sister, or daughter) or more who had had breast cancer. According to previous studies, women whose mothers or sisters had breast cancer are up to 4 times as likely as other women to have or develop the disease themselves.
- Risk of breast cancer is higher among women with no live births or with first births occurring at relatively late ages than among women bearing children at relatively early ages. The 1987 NHIS found that 14 percent of women age 40 years and over had had no full-term pregnancies, and 7 percent had had their first full-term pregnancy at age 30 years and over.
- History of lactation is thought to reduce the risk of breast cancer. Fewer than half of U.S. women 40 years of age and over had ever breast-fed an infant. This proportion was lower for younger than older women, decreasing from 63 percent of women 85 years of age and over to 36 percent of those age 40–44 years, and was lower for white than black women (45 versus 52 percent after age adjustment).
- Early age at menarche is associated with an increased risk of breast cancer in a number of studies. Twenty-two percent of women age 40–44 years in 1987 reported having reached menarche before age 12 years; among women 75 years of age and over, the proportion was one-third that size (7 percent).
- Almost half (47 percent) of U.S. women age 40 years and over reported examining their breasts once a month or more frequently. Twenty percent reported doing so less frequently, and 6 percent on an irregular schedule (for example, "when I think of it"). Eleven percent stated that they did not know how to examine their own breasts.
- One-third of women age 40 years and over had had a breast physical examination (BPE) in the year preceding the NHIS interview, and 81 percent reported ever having had a BPE. Seven percent had never heard of this procedure.
- Among women who reported having had a BPE in the 3 years preceding interview, 88 percent stated that the BPE was a routine examination. Eleven percent said it was performed for medical reasons. Forty-six percent of those who had *not* had a BPE in the preceding 3 years said the most important reason was that the exam was not needed (because they had experienced no problems, for example) or that they did not know they should have one.
- Although experts recommend that women have a mammogram every year at ages 50 and over and every 1–2 years at ages 40–49 years, only 38 percent of women 40 years of age and over reported ever having had a mammogram, and just 15 percent said they had had a mammogram in the year preceding interview.
- Women with 13 years or more of school were almost twice as likely as those with fewer than 12 years of school to have ever had a mammogram, 48 versus 26 percent. The percent also increased with income, from 27 percent of women with annual family incomes of less than $10,000 to 47 percent of those with family incomes of $35,000 or more per year (all figures adjusted for race and age).
- Almost half (48 percent) of all women who had not had a mammogram in the 3 years preceding interview said their failure to do so was because it had not been needed or they had not known they should have one. Twenty-nine percent said their doctors had not suggested they have a mammogram; this proportion was higher for black than for white women (41 versus 28 percent after age adjustment).

Sources and limitations of the data

The estimates presented in this report are based on data from the National Health Interview Survey (NHIS), a continuous nationwide household interview survey conducted by the National Center for Health Statistics (NCHS). For this survey, a probability sample of the civilian noninstitutionalized population of the United States is interviewed each week by personnel of the U.S. Bureau of the Census. Information is obtained about the health and other characteristics of each member of the household.

The NHIS consists of two parts: (a) the basic health and sociodemographic section, which remains the same every year, and (b) the special topics section, which changes from year to year. For 1987, the special topics were adoption, poliomyelitis, acquired immunodeficiency syndrome, cancer epidemiology, and cancer control. The latter two topics were contained in the National Health Interview Survey of Cancer Epidemiology and Control (NHIS-CEC), a collaborative effort of NCHS and the National Cancer Institute. Both agencies provided funding and participated in planning and development of the questionnaires. The staffs of NCHS and the National Cancer Institute are performing analyses and preparing reports based on the NHIS-CEC data. Some of these are collaborative projects of the two agencies.

The NHIS-CEC consisted of two components: the Cancer Epidemiology Study (CES) and the Cancer Control Study (CCS), each of which was administered to a randomly chosen sample of adults 18 years of age and over. One adult in each family was chosen as the sample respondent for the NHIS-CEC, and that adult was systematically assigned to be asked one of the two questionnaires. Thus, for each sample respondent in the cancer survey, data were collected for either the CES or the CCS. This split sample design increased the range of data collected but limits data analysis to the extent that the information on cancer risk factors (collected in the CES) is not available for the same persons that provided data on preventive practices (collected in the CCS). The only topics that appeared on both questionnaires were smoking habits, height, and weight. Another limitation of the split sample design is the relatively small size of each of the samples. For the black and Hispanic populations, in particular, the small sample sizes resulted in estimates with large sampling errors.

The interviewed sample for 1987 for the basic health questionnaire comprised 47,240 households containing 122,859 persons. The total noninterview rate was about 4.7 percent—2.9 percent was due to respondent refusal and the remainder primarily was due to failure to locate an eligible respondent at home after repeated calls.

Self-response was required for the NHIS-CEC. A total of 22,080 questionnaires were completed with the CES questionnaire. For the CCS, the total number of completed interviews was 22,043. The total of 44,123 completed interviews for the NHIS-CEC represents an estimated 86 percent of identified eligible respondents. The combined overall response rate for the NHIS-CEC, 82 percent, can be estimated as the product of the response rate for the basic health questionnaire (0.95) and the CEC questionnaire (0.86).

A description of the survey design, methods used in estimation, and general qualifications of the data obtained from the survey are presented in appendix I. Because the estimates shown in this report are based on a sample of the population, they are subject to sampling errors. Therefore, readers should pay particular attention to the section entitled "Reliability of estimates." Formulas for computing estimated standard errors are shown in appendix I.

Many of the terms used in this report are defined in appendix II. Questionnaire items pertaining to data presented are shown in appendix III. The entire NHIS-CEC questionnaire is reproduced in the 1987 edition of the annual NHIS report entitled *Current Estimates From the National Health Interview Survey* (7).

In this report, persons for whom valid responses for particular items were not obtained are included in the population totals and denominators for percent distributions. All forms of item nonresponse are included in the "unknown" response category; this category generally is not presented in the detailed tables, but its value can be calculated by subtracting the sum of the known response categories from the total. Item nonresponse was low, generally less than 3 percent.

In this report, terms such as "similar" and "no difference" mean that there is no statistically significant difference between the categories being compared. Terms relating to difference (for example, "greater than" or "less than") indicate that differences are statistically significant. The *t*-test, with a critical value of 1.96 (0.05 level of significance), was used to test all comparisons. Lack of comment regarding the difference between any two statistics does not mean that the difference was tested and found to be not statistically significant.

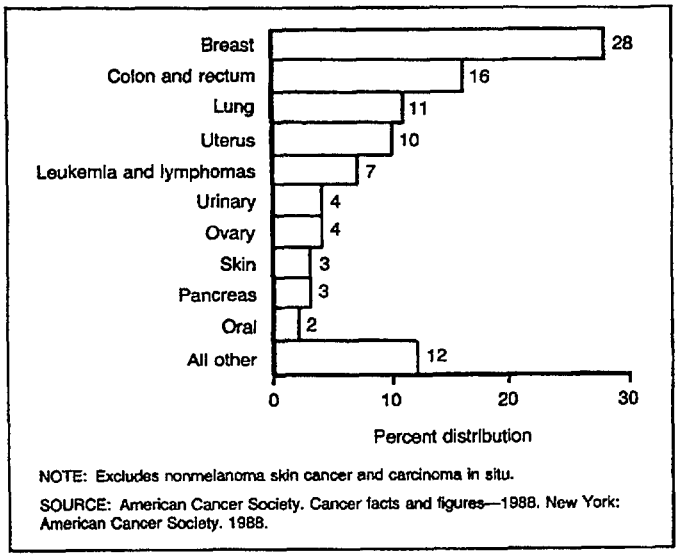
Selected topics

Incidence

Cancer of the breast accounts for approximately 28 percent of the total cancer incidence among U.S. women, more than any other single type of cancer (figure 1). In 1988, an estimated 135,000 cases of female breast cancer will be diagnosed in the United States, an incidence rate of about 109 cases per 100,000 women (8).

The incidence rate for breast cancer increased at a rate of less than 1 percent annually between 1950 (74.4 cases per 100,000 white women) and 1975 (91.5 cases per 100,000 white women), based on data collected in cancer registries in five geographic areas. Most of this increase took place in the early 1970's, when media coverage of breast cancer in two public figures may have increased American women's awareness of the disease and of the value of routine screening examinations. The initiation in 1972 of the Breast Cancer Detection Demonstration Project also may have contributed to this sudden upturn in diagnoses (9).

Incidence rates for female breast cancer decreased from 1975 to 1977 and began increasing again in 1978, at a more rapid rate than in the period 1950–75. Between 1975 and 1985, breast cancer incidence rates for white women in the five geographic areas rose from 91.5 to 107. On the basis of the 11 population-based cancer registries included in the National Cancer Institute's Cancer Surveillance, Epidemiology, and End Results (SEER) Program, incidence among women of all races rose from 87.6 to 102.1, an increase of 17 percent (9).



NOTE: Excludes nonmelanoma skin cancer and carcinoma in situ.

SOURCE: American Cancer Society. Cancer facts and figures—1988. New York: American Cancer Society. 1988.

Figure 1. Percent distribution of estimated female cancer incidence by site: United States, 1988

Breast cancer incidence increases through age 85 years and then begins to decline. Between 1982 and 1986, the incidence rate per 100,000 women of all races varied from 0.1 at ages 15–19 years to 388.7 at 85 years of age and over (table A). Below age 45 years, breast cancer occurred more frequently among black than white women; at ages 45 years and over, the incidence rates were higher for white women. Because the majority of cases of breast cancer occur at older ages, the overall incidence rate was higher for white than for black women, 107.3 compared to 92.7 in 1986 (10).

Table A. Average annual age-specific incidence rates for female breast cancer by race: United States, 1982–86

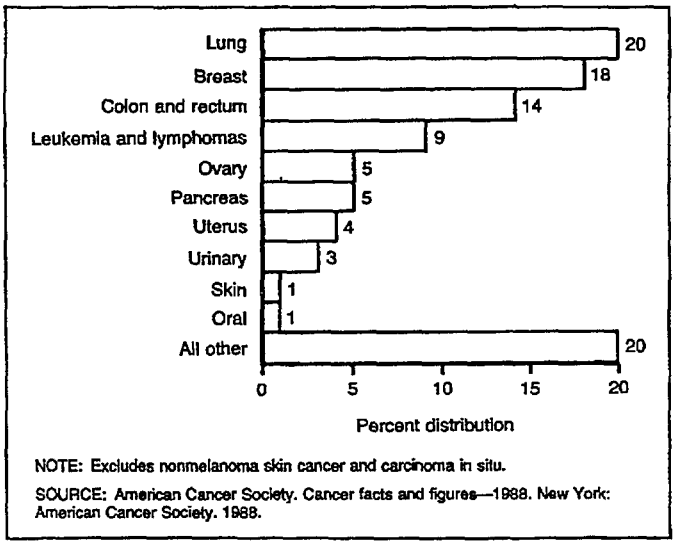
Age	*All races*[1]	*White*	*Black*
	Rate per 100,000 women[2]		
15–19 years	0.1	0.1	–
20–24 years	1.1	0.9	1.7
25–29 years	8.2	7.9	11.5
30–34 years	27.9	27.1	39.0
35–39 years	66.3	66.3	74.5
40–44 years	120.1	119.6	130.2
45–49 years	175.1	179.1	159.2
50–54 years	200.8	207.9	169.8
55–59 years	250.8	259.4	215.7
60–64 years	304.9	317.1	248.6
65–69 years	352.0	366.2	271.5
70–74 years	382.3	392.8	325.5
75–79 years	400.0	411.1	332.0
80–84 years	412.0	416.6	419.7
85 years and over	388.7	397.9	329.1

[1]Includes other races not shown separately.
[2]Estimates based on SEER program data.

SOURCE: National Cancer Institute. Cancer statistics review 1973–1986, including a report on the status of cancer control: May, 1989. NIH pub no 89-2789. Washington: Public Health Service. 1989.

Mortality

An estimated 42,000 U.S. women will die of breast cancer in 1988. Long the leading cause of cancer mortality among women, breast cancer is now ranked second to cancer of the lung (figure 2). In 1988, the American Cancer Society estimates that breast cancer will account for 18 percent of all female cancer deaths, compared with 20 percent for lung cancer. In the 15–54 year age group,



NOTE: Excludes nonmelanoma skin cancer and carcinoma in situ.

SOURCE: American Cancer Society. Cancer facts and figures—1988. New York: American Cancer Society. 1988.

Figure 2. Percent distribution of estimated female cancer deaths by site: United States, 1988

though, breast cancer continues to cause more deaths among U.S. women than any other form of cancer (8).

Despite the increase in breast cancer incidence since 1950, mortality attributed to female breast cancer has remained almost constant. The age-adjusted mortality rate per 100,000 women was 26.0 in 1950, compared with 27.4 in 1985 (9).

The age-specific mortality rate for female breast cancer increases with age, reflecting the increasing incidence of the disease at older ages (table B). For the period 1982–86, mortality varied from 0.1 deaths per 100,000 women 20–24 years of age to 178.9 for women 85 years of age and over (10).

Among women younger than 50 years of age, mortality rates were slightly higher for black than for white women; at ages 65 years and over, the reverse was true. For all ages combined, there were no differences by race in breast cancer mortality: 27.3 deaths per 100,000 white women in 1986, compared with 29.0 deaths per 100,000 black women (10).

Table B. Average annual age-specific mortality rates for female breast cancer by race: United States, 1982–86

Age	*All races*[1]	*White*	*Black*
	Rate per 100,000 women[2]		
15–19 years	0.0	0.0	–
20–24 years	0.1	0.1	0.3
25–29 years	1.2	1.1	2.3
30–34 years	5.3	5.0	8.1
35–39 years	13.0	12.3	20.0
40–44 years	23.5	22.7	33.1
45–49 years	37.2	36.2	49.5
50–54 years	55.5	55.3	62.9
55–59 years	74.0	74.4	78.5
60–64 years	89.2	90.0	91.7
65–69 years	101.5	103.4	93.4
70–74 years	114.7	116.7	103.6
75–79 years	127.5	130.2	110.4
80–84 years	147.4	149.1	142.6
85 years and over	178.9	182.1	152.3

[1]Includes other races not shown separately.
[2]Estimates based on vital statistics system.

SOURCE: National Cancer Institute. Cancer statistics review 1973–1986, including a report on the status of cancer control: May, 1989. NIH pub no 89-2789. Washington: Public Health Service. 1989.

Survival

Among women diagnosed as having breast cancer in the period 1974–85, the 5-year relative survival rate (the actual number of women surviving 5 years or more divided by the number who would have been expected to survive had they not had breast cancer) was 74 percent. As shown in table C, survival was strongly influenced by the site of the disease at diagnosis. For women whose breast cancer was still localized when diagnosed, the 5-year relative survival rate was 90 percent; for women diagnosed with regionalized breast cancer, the rate was 68 percent. Of the small proportion of women whose breast cancer had spread to distant sites by the time of diagnosis, only 18 percent survived for 5 years or more.

There is a strong racial differential in female breast cancer survival, part of which is explained by differences between black and white women in the stage at which the disease is diagnosed. Forty-nine percent of the breast cancer diagnosed in white women in 1979–84 was still localized, compared with 41 percent for black women. Among women whose breast cancer was diagnosed in a localized site, 5-year relative survival rates were only slightly higher for white than black women, 91 compared with 86 percent. Survival rates for black and white women differed more sharply when regionalized cancer was diagnosed, 55 compared with 69 percent.

McWhorter and Mayer (11), using SEER data for female breast cancers diagnosed in 1978–82 and followed for survival through 1984, found racial differences in treatment that may be related to the survival differential. After adjusting for age, site at diagnosis, and histology, black women were less likely than white women to have been surgically treated and more likely to have received nonsurgical treatment or no cancer-directed therapy.

Breast cancer survival rates have improved since the 1950's, which explains why mortality has remained constant in the face of the rising incidence of the disease. For white women, the 5-year relative survival rate for breast cancer increased from 60 percent in 1950–54 (9) to 76 percent in 1980–85 (table D). The more limited data available for black women show an even more rapid increase in survival, from 46 percent in 1960–63 to 64 percent in 1980–85. Thus, the racial differential in breast cancer survival, although still apparent, has narrowed over time.

Risk factors

Past research has identified numerous risk factors for female breast cancer. The most powerful of these is age, as was evident in the age-specific incidence rates presented earlier. For other risk factors, there is evidence that they

Table C. Percent distribution of female breast cancer cases and 5-year relative survival rates for female breast cancer by site of cancer at time of diagnosis, according to race: United States,1974–85

Site	Breast cancer cases[1]			5-year relative survival[1]		
	All races[2]	White	Black	All races[2]	White	Black
	Percent distribution			Percent		
All sites	100	100	100	74	75	63
Localized	48	49	41	90	91	86
Regionalized	41	41	44	68	69	55
Distant	7	7	11	18	19	14
Unknown	3	3	4	55	56	45

[1]Estimates based on SEER program.
[2]Includes other races not shown separately.

SOURCE: National Cancer Institute. Cancer statistics review 1973–1986, including a report on the status of cancer control: May, 1989. NIH pub no 89–2789. Washington: Public Health Service. 1989.

Table D. Trends in 5-year relative survival rates for female breast cancer by race: United States, 1950–54 through 1980–85

Period	5-year relative survival[1]	
	White	Black
	Percent	
1950–54	60	---
1960–63	63	46
1970–73	68	51
1974–76	74	62
1977–79	75	62
1980–85	76	64

[1]Estimates based on SEER program data.

SOURCES: National Cancer Institute. 1987 annual cancer statistics review. NIH pub no 88–2789. Washington: Public Health Service. 1988; and National Cancer Institute. Cancer statistics review 1973–1986, including a report on the status of cancer control: May, 1989. NIH pub no 89–2789. Washington: Public Health Service. 1989.

may differ or have varying effects at older and younger ages (12,13). Petrakis, Ernster, and King (14) have suggested that "environmental factors play a more important role in the etiology of postmenopausal breast cancer, whereas genetic, endocrinologic, and other endogenous factors strongly influence the premenopausal disease."

The following review briefly summarizes results of past research on each generally accepted risk factor for female breast cancer. For those factors for which data were collected in the 1987 National Health Interview Survey of Cancer Epidemiology and Control (NHIS-CEC), the distribution of the risk factor in the population of women 40 years of age and over is described and compared for women of different ages and races.

History of benign breast disease

Results of past studies generally are consistent in showing that a history of benign breast disease (that is, nonmalignant abnormalities of the breast tissue and ducts) increases the risk of breast cancer. Estimates of relative risk associated with benign breast disease have varied widely (13,15–21), and many of the studies examining this association have been criticized for insufficient followup (either too short an interval or too small a proportion of cases and controls) or failure to adequately match cases and controls (22). In a well-designed prospective study by Coombs and Lillienfeld (23), women diagnosed with benign breast disease during the period 1957–65 were three times as likely as their matched controls to have developed breast cancer by 1977. A case control study using data collected between 1976–80 as part of a larger drug surveillance program found that benign breast disease increased the risk of breast cancer by a factor of between 2.4 and 2.9, depending on the interval since diagnosis of the benign disease (24).

Recent evidence suggests that excess risk associated with benign breast disease may vary according to level of ductal atypia (15,25) or may occur only among women with proliferative lesions (26,27) or fibrocystic disease (28). Risks associated with certain types of benign breast disease have been found to interact with other risk factors for breast cancer, including breast size and age at first birth (26).

The NHIS-CEC did not collect data on history of benign breast disease, so data from this study cannot be utilized to estimate the prevalence of this risk factor among women 40 years of age and over.

Family history of breast cancer

Women whose mothers or sisters have had breast cancer are up to four times as likely as other women to develop or to have the disease themselves (24,28–32). Excess risk associated with a family history of breast cancer is increased when two close female relatives or more have had breast cancer (28,33–36). Dupont and Page (26) found that family history modified the effect of breast size on the risk of breast cancer. Among women who had a first-degree relative with female breast cancer, the risk of developing breast cancer increased with breast size; among women without such a family history, breast size had no effect.

The etiology of family history as a risk factor for female breast cancer is not yet fully understood. Either genetic susceptibility, common exposures/practices, or a combination of the two could explain the excess risk observed among women with family histories of breast cancer. If genetic factors play a role, science has not yet determined the specific biochemical or physiological processes involved (14).

According to the data collected in the 1987 NHIS-CEC, 8 percent of U.S. women 40 years of age and over

Table E. Percent of women 40 years of age and over with breast cancer reported in selected primary relatives by race and age: United States, 1987

Race and age	Breast cancer reported in—			
	No primary relatives[1]	1 primary relative[1] or more	Mother	Sister
	Percent			
All races[2]				
40 years and over	92.1	7.9	4.0	3.7
40–54 years	92.9	7.1	5.1	2.6
40–44 years	94.5	5.5	4.0	*1.4
45–49 years	92.0	8.0	5.6	4.0
50–54 years	91.8	8.2	6.0	2.4
55–64 years	92.2	7.8	3.8	3.8
55–59 years	93.1	6.9	3.5	3.6
60–64 years	91.5	8.5	4.0	3.9
65–74 years	90.2	9.8	3.2	5.8
65–69 years	89.5	10.5	3.8	6.1
70–74 years	91.0	9.0	2.5	5.4
75 years and over	92.7	7.3	2.1	4.2
75–79 years	93.6	6.4	*1.8	3.8
80–84 years	91.0	9.0	*2.6	*5.2
85 years and over	92.9	*7.1	*2.2	*3.5
White				
40 years and over:				
Crude	91.7	8.3	4.2	3.9
Age adjusted	91.8	8.2	4.2	3.9
40–54 years	92.6	7.4	5.6	2.5
55–64 years	91.7	8.3	3.9	3.9
65–74 years	89.7	10.2	3.2	6.3
75 years and over	92.1	7.9	2.3	4.5
Black				
40 years and over:				
Crude	95.5	4.5	*2.2	*2.1
Age adjusted	95.6	4.5	*2.2	*2.1
40–54 years	95.1	*4.9	*2.1	*2.8
55–64 years	96.4	*3.6	*2.0	*1.6
65–74 years	93.7	*6.3	*4.1	*1.7
75 years and over	98.2	*1.8	*0.5	*0.9

[1]Mother, sister, or daughter.
[2]Includes other races not shown separately.

had one primary relative or more (that is, mother, sister, or daughter) who had had breast cancer (table E). Four percent reported mothers with breast cancer, and 4 percent reported sisters with breast cancer. The proportion of women reporting breast cancer in a daughter was so small (less than 1 percent) that its reliability was questionable, as was the proportion reporting a mother and a sister with breast cancer (less than 1 percent).

The percent of women reporting mothers with breast cancer increased with age through ages 50–54 years, consistent with a mean generational length of about 25 years and the pattern of rising incidence of breast cancer through age 75. At ages 55 years and over, the percents of women who had mothers with breast cancer declined. This reflects the lower overall incidence of the disease in the period prior to 1970. The percent of women reporting breast cancer in sisters increased through ages 65–69 years, reflecting the relatively small age differences among sisters.

Generally speaking, black women were less likely than white women to report having one primary relative or more with breast cancer (5 compared with 8 percent for all ages 40 years and over after age adjustment). Although such a pattern is consistent with racial differences in incidence of female breast cancer, these comparisons should be interpreted with caution because of the small numbers upon which the estimates for black women are based.

Reproductive factors

Numerous reproductive and menstrual factors have been linked with female breast cancer. Because these factors are highly correlated, it has been difficult to assess their individual effects. In general, associations between these reproductive factors and breast cancer risk appear to be related to the sensitivity of the breast epithelium to estrogen, prolactin, and other substances produced by the ovaries, pituitary, adrenal gland, and hypothalamus (14,37,38).

Parity and age at first birth—Nulliparity and late age (that is, 30 years and over) at first full-term pregnancy have been associated with excess risk of female breast cancer; conversely, early age (less than 25 years) at first full-term pregnancy has been shown to have a protective effect (24,26,28,39–44). Helmrich et al. (24) found that excess risk of breast cancer associated with increasing age at first birth was not accounted for by parity, but Kvåle and Heuch (42) reported that adjusting for parity and age at last birth removed the association initially observed between cancer

risk and age at first birth. Additional research is needed to ascertain the net effects of these two closely related risk factors.

The protective effect of parity and early pregnancy may be related to beneficial hormonal changes occurring during pregnancy. For example, one hypothesis in the late 1960's was that pregnancy, because of associated increases in the ratio of estriol to estradiol and estrone, impeded the carcinogenic effects of the latter two (45). More recently, Musey et al. (38) concluded that pregnancy leads to a long-term (12–13 years) decrease in the secretion of prolactin, a pituitary hormone identified as a cocarcinogen in mammary cancer in rats (46).

The 1987 NHIS-CEC data indicated that 14 percent of all U.S. women 40 years of age and over were nulliparous and that 24 percent had their first full-term (6 months' duration or longer) pregnancy at age 25 years or over (table F). Seven percent were 30 years of age or over at the time of their first full-term pregnancy. Women 75 years of age and over, most of whom were in their peak childbearing years during the Great Depression of the 1930s, were the most likely to be nulliparous. Nearly one-fourth of these women had no full-term pregnancies, compared with about 1 in every 9 women age 40–54 years. The proportion of women with a first full-term pregnancy at age 30 years or over was greatest—about 1 in 10—among women 65 years of age and over.

Black women were slightly more likely than white women to have had no full-term pregnancies (16 versus 14 percent after age adjustment), but white women were more likely to have had their first full-term pregnancy at age 30 years or over (7 versus 3 percent). Racial differences in parity and age at first pregnancy were greatest among the oldest women.

Lactation—Findings concerning the effects of lactation on the risk of female breast cancer have been inconsistent. Geographic patterns of breast cancer support the hypothesis that lactation has a protective effect, with incidence of the disease being lower in areas where breast-feeding is most common and prolonged (14). Although a large international case control study conducted between 1964 and 1967 found no association between history of breast-feeding and breast cancer after adjusting for the effect of age at first pregnancy (47), two recent studies that adjusted for parity and age at first pregnancy did find a protective effect in premenopausal women (48,49). The

Table F. Percent distribution of women 40 years of age and over by age at 1st full-term pregnancy, according to age and race: United States, 1987

Race and age	Total[1]	No full-term pregnancies[1]	1st full-term pregnancy[2] at age—				
			All ages[3]	Less than 20 years	20–24 years	25–29 years	30 years or more
All races[4]	Percent distribution						
40 years and over	100.0	14.2	85.8	22.0	36.8	16.8	7.1
40–54 years	100.0	10.8	89.2	26.7	39.3	15.6	5.2
40–44 years	100.0	11.8	88.2	26.9	35.9	16.6	6.6
45–49 years	100.0	10.7	89.3	29.0	39.9	14.0	3.8
50–54 years	100.0	9.6	90.4	23.8	42.9	15.9	5.0
55–64 years	100.0	12.3	87.7	21.0	41.3	16.2	6.3
55–59 years	100.0	10.3	89.7	25.3	41.2	14.9	5.2
60–64 years	100.0	14.1	85.9	17.4	41.5	17.4	7.1
65–74 years	100.0	17.5	82.5	17.5	32.2	20.1	9.9
65–69 years	100.0	14.9	85.1	19.0	35.4	20.1	8.9
70–74 years	100.0	20.7	79.3	15.7	28.3	20.0	11.2
75 years and over	100.0	22.7	77.3	17.0	28.4	16.3	10.0
75–79 years	100.0	24.4	75.6	16.7	25.6	17.2	10.3
80–84 years	100.0	20.4	79.6	17.3	32.1	15.4	10.2
85 years and over	100.0	21.8	78.2	17.4	30.2	15.3	*9.0
White							
40 years and over:							
Crude	100.0	14.0	86.0	19.7	38.4	17.7	7.4
Age adjusted	100.0	13.9	86.1	19.9	38.5	17.7	7.3
40–54 years	100.0	10.4	89.6	24.7	41.0	16.4	5.1
55–64 years	100.0	12.2	87.8	18.2	43.5	17.2	6.3
65–74 years	100.0	17.3	82.7	15.6	33.1	21.5	10.5
75 years and over	100.0	22.2	77.9	14.5	30.2	17.0	10.9
Black							
40 years and over:							
Crude	100.0	15.5	84.4	43.2	26.3	7.9	3.1
Age adjusted	100.0	16.2	83.9	43.0	25.7	8.0	3.1
40–54 years	100.0	10.6	89.4	43.4	31.6	7.6	*3.6
55–64 years	100.0	14.4	85.6	46.6	25.3	*7.7	*2.1
65–74 years	100.0	20.8	79.2	38.5	25.5	*7.4	*4.8
75 years and over	100.0	28.8	71.1	42.3	*9.6	*10.0	*0.9

[1]Includes unknown if any full-term pregnancies.
[2]Pregnancies lasting 6 months or more.
[3]Includes unknown age at first full-term pregnancy.
[4]Includes other races not shown separately.

second of these studies found a weak protective effect in postmenopausal women as well, but the postmenopausal women studied were relatively young, less than 55 years.

Byers and others (48) found that duration of lactation was a more powerful correlate of breast cancer risk than was the crude measure of ever having breast-fed. Women who breast-fed for less than 1 month after their first live birth actually were at higher risk of breast cancer than women who did not breast-feed, but among women who breast-fed for 1 month or longer, the estimated relative risk decreased with increased duration of lactation. The authors suggested that the process of lactation either might be inherently beneficial, as a result of changes in the breast resulting from breast-feeding, or might simply act as an indicator of a normally balanced endocrine system, with failure to lactate indicating an underlying endocrine problem that might increase the risk of breast cancer. Some evidence in support of the hypothesis of inherent benefit was offered by a study that reported a disproportionate amount of postmenopausal breast cancer in the left breasts of Tanka women in Hong Kong, who traditionally nurse with the right breast only (50,51).

Slightly fewer than half of all U.S. women 40 years of age and over ever breast-fed (table G). Fifteen percent never had a live birth, and 39 percent never breast-fed despite having had 1 live birth or more. The proportion of women who ever breast-fed increased steadily with age, reflecting the more widespread practice of lactation among earlier cohorts of American women. Sixty-three percent of women 85 years of age and over ever breast-fed, compared with 36 percent of women 40–44 years of age.

Black women were more likely than white women ever to have breast-fed a child (52 versus 45 percent after age adjustment) despite the fact that they were more likely to have never had a live birth (17 compared with 14 percent for white women after age adjustment). Women 55 years of age and over accounted for the racial differential in lactation history; among women age 40–54 years, black and white women were equally likely to have breast-fed.

Age at menarche—Early menarche has been associated with an increased risk of breast cancer in a number of studies (13,24,40,44,52–55). As is evident in table H, age at menarche has declined in successive cohorts of U.S. women. Twenty-two percent of women age 40–44 years in 1987 reported reaching menarche before age 12; among women 75 years of age and over, the proportion was one-third that size, 7 percent. Part of this difference can be attributed to a greater proportion of older women who

Table G. Percent distribution of women 40 years of age and over by status of lactation, according to race and age: United States, 1987

Race and age	Total[1]	Never breast-fed		Ever breast-fed
		No live births	1 live birth or more	
	Percent distribution			
All races[2]				
40 years and over	100.0	14.6	39.2	45.6
40–54 years	100.0	11.1	48.8	39.3
40–44 years	100.0	12.2	51.2	35.8
45–49 years	100.0	11.0	47.5	40.5
50–54 years	100.0	9.9	47.1	42.5
55–64 years	100.0	12.6	40.9	46.1
55–59 years	100.0	10.5	41.7	47.4
60–64 years	100.0	14.3	40.2	44.9
65–74 years	100.0	18.0	31.6	50.1
65–69 years	100.0	15.2	33.6	50.9
70–74 years	100.0	21.3	29.1	49.3
75 years and over	100.0	23.2	19.5	56.6
75–79 years	100.0	25.0	19.2	54.8
80–84 years	100.0	20.7	23.2	55.7
85 years and over	100.0	22.2	14.1	63.0
White				
40 years and over:				
Crude	100.0	14.3	40.2	44.9
Age adjusted	100.0	14.2	40.4	44.9
40–54 years	100.0	10.8	49.4	39.2
55–64 years	100.0	12.4	43.3	43.9
65–74 years	100.0	17.6	32.6	49.4
75 years and over	100.0	22.5	20.6	56.1
Black				
40 years and over:				
Crude	100.0	16.3	31.2	51.3
Age adjusted	100.0	17.0	30.0	51.9
40–54 years	100.0	11.1	46.3	40.8
55–64 years	100.0	15.3	24.9	59.1
65–74 years	100.0	22.1	17.7	60.3
75 years and over	100.0	30.2	*7.5	61.4

[1]Includes unknown if ever had any live births and unknown if ever breast-fed.
[2]Includes other races not shown separately.

Table H. Percent distribution of women 40 years of age and over by age at menarche, according to race and age: United States, 1987

Race and age	Total	Age at menarche: Less than 12 years	12 years	13 years	14 years	15 years	Greater than 15 years	Unknown
All races[1]				Percent distribution				
40 years and over	100.0	16.0	19.9	24.5	15.9	7.8	8.1	7.9
40–54 years	100.0	20.4	22.4	25.6	13.3	6.9	6.6	4.7
40–44 years	100.0	21.6	23.3	24.7	13.0	6.1	6.1	5.1
45–49 years	100.0	22.5	21.2	25.7	13.6	8.1	5.2	3.6
50–54 years	100.0	16.4	22.7	26.5	13.5	6.5	8.8	5.3
55–64 years	100.0	15.4	20.1	26.2	15.5	7.9	8.0	6.9
55–59 years	100.0	16.8	19.6	26.4	17.3	7.3	6.4	6.3
60–64 years	100.0	14.2	20.6	26.0	14.0	8.4	9.4	7.4
65–74 years	100.0	14.2	16.8	22.9	19.5	7.9	9.4	9.1
65–69 years	100.0	16.7	16.9	24.4	17.7	7.3	8.7	8.1
70–74 years	100.0	11.1	16.8	21.1	21.7	8.6	10.3	10.5
75 years and over	100.0	7.0	16.3	20.6	18.5	9.9	10.6	17.1
75–79 years	100.0	7.9	15.4	23.7	20.0	10.1	8.7	14.2
80–84 years	100.0	6.3	18.7	21.3	17.5	10.9	10.2	15.1
85 years and over	100.0	*5.8	14.5	11.0	15.8	*7.7	16.4	28.7
White								
40 years and over:								
Crude	100.0	16.0	19.9	24.9	15.9	7.7	7.9	7.5
Age adjusted	100.0	16.1	20.0	24.9	15.8	7.7	7.9	7.5
40–54 years	100.0	20.6	22.9	25.7	13.4	7.0	6.1	4.2
55–64 years	100.0	15.5	20.1	27.1	15.7	7.4	7.8	6.4
65–74 years	100.0	14.4	16.7	23.4	18.7	8.3	9.6	8.9
75 years and over	100.0	6.7	16.1	21.3	18.9	9.7	10.9	16.4
Black								
40 years and over:								
Crude	100.0	17.4	19.8	22.4	14.3	7.8	8.7	9.6
Age adjusted	100.0	17.0	19.7	22.2	14.6	8.0	8.6	10.0
40–54 years	100.0	21.4	20.4	26.6	11.1	5.5	9.0	5.9
55–64 years	100.0	16.4	20.1	20.5	14.1	12.2	*8.7	*8.1
65–74 years	100.0	13.4	18.7	19.8	22.4	*5.0	*8.5	*12.2
75 years and over	100.0	*10.5	*18.6	*14.6	*14.8	*11.4	*7.7	22.3

[1]Includes other races not shown separately.

could not recall how old they were when they started menstruating. Age-specific patterns in age at menarche were similar for black and white women.

Age at menopause—Past research has shown that early menopause, whether natural or surgical, is associated with a reduced risk of female breast cancer. For cases of early surgical menopause, a protective effect generally has been identified only when both ovaries were removed (40,44,52,55,56).

The 1987 NHIS-CEC data indicated that 24 percent of U.S. women 40 years of age and over still were menstruating, 44 percent had reached natural menopause, and 30 percent had experienced surgical termination of menses (table J). Approximately one-fifth reported an early age at menopause. Seven percent had reached natural menopause prior to age 45 years, and 13 percent reported surgically induced menopause before age 40 years. These data do not indicate the specific nature of the surgical procedure for women with surgical menopause; presumably not all of these women had both ovaries removed, so not all of the women with an early reported age at surgical menopause were at reduced risk of breast cancer.

Among women 55 years of age and over, the proportion who experienced natural menopause decreased with age, while the proportion reporting surgical menopause increased. The small proportions of older women reported as still menstruating are those who answered negatively to the question "Have your menstrual cycles stopped permanently?" These women may have confused irregular spotting or bleeding with continued menses.

Exogenous estrogens

Oral contraceptives—Many case control and cohort studies have attempted to assess the effect of oral contraceptive use on the risk of female breast cancer. Although most of these studies have found that use of oral contraceptives neither increased nor decreased risk (53,57–61), several studies observed an increased risk of breast cancer among women with prolonged use of oral contraceptives if they also had benign breast disease (62,63) or if the use occurred at early ages (64–66). One recent case control study found that women who ever used oral contraceptives had double the risk of breast cancer before age 45 years; for women with 10 years or more of use, the estimated relative risk was 4.1 (67).

Most investigators agree that the existing data do not yet permit definite conclusions about the association between oral contraceptives and the risk of breast cancer. Larger scale studies and research that consider the estro-

Table J. Percent distribution of women 40 years of age and over by menstrual status and age at menopause, according to race and age: United States, 1987

Race and age	Total[1]	Still menstruating	Natural menopause at—					Surgical menopause at—			
			All ages[2]	Under 45 years	45–49 years	50–54 years	55 years and over	All ages[3]	Under 40 years	40–49 years	50 years and over
			Percent distribution								
All races[4]											
40 years and over	100.0	24.3	44.1	7.1	11.8	17.2	5.8	29.7	12.7	12.5	3.6
40–54 years	100.0	54.9	15.0	4.0	5.6	5.0	...	28.5	16.3	10.9	0.6
40–44 years	100.0	76.3	*1.3	*1.1	...	...	...	20.8	16.7	3.6	...
45–49 years	100.0	58.5	9.1	3.7	5.4	...	...	31.3	16.2	14.7	...
50–54 years	100.0	23.0	39.6	8.1	13.2	17.1	...	35.3	15.7	16.0	2.1
55–64 years	100.0	3.3	59.5	7.7	14.7	25.7	9.5	35.4	12.1	16.5	5.8
55–59 years	100.0	4.5	54.9	5.8	13.5	27.3	6.3	38.2	12.4	19.6	4.9
60–64 years	100.0	2.2	63.5	9.2	15.7	24.4	12.3	33.0	11.9	13.9	6.5
65–74 years	100.0	3.5	64.8	9.6	15.6	25.4	10.8	29.3	10.3	11.7	6.5
65–69 years	100.0	3.1	64.5	11.0	16.7	23.2	10.3	30.4	11.6	12.0	5.9
70–74 years	100.0	3.9	65.1	7.8	14.2	28.1	11.3	28.0	8.7	11.3	7.3
75 years and over	100.0	3.5	71.4	11.5	19.2	25.9	8.6	23.8	6.8	11.4	4.2
75–79 years	100.0	*2.9	68.9	11.6	17.6	27.5	7.6	27.2	8.2	11.3	4.9
80–84 years	100.0	*3.3	72.0	13.1	19.2	25.5	8.8	23.0	6.4	12.8	*3.8
85 years and over	100.0	*5.4	77.2	*8.6	23.7	22.2	11.0	15.5	*3.4	9.6	*2.5
White											
40 years and over:											
Crude	100.0	24.2	44.7	7.2	12.1	17.8	5.6	29.4	12.5	12.4	3.7
Age adjusted	100.0	25.1	43.8	7.1	12.0	17.5	5.4	29.3	12.5	12.3	3.6
40–54 years	100.0	55.9	14.8	3.9	5.5	5.0	...	27.9	16.1	10.5	*0.5
55–64 years	100.0	3.4	59.3	7.8	15.2	25.6	9.1	35.4	11.9	16.7	6.0
65–74 years	100.0	3.2	65.4	9.7	16.0	26.6	10.3	29.1	10.4	11.2	6.6
75 years and over	100.0	3.3	71.7	11.5	19.8	26.6	8.2	23.9	6.2	11.8	4.3
Black											
40 years and over:											
Crude	100.0	23.4	40.5	6.5	9.4	13.0	7.3	33.8	15.5	13.9	3.3
Age adjusted	100.0	22.4	42.3	6.6	9.6	13.4	7.9	33.1	15.3	13.2	3.4
40–54 years	100.0	46.5	14.7	*4.6	5.9	*3.7	...	36.5	18.6	15.8	*1.3
55–64 years	100.0	*2.6	58.9	*6.5	11.5	25.5	12.2	38.4	14.7	16.3	*5.1
65–74 years	100.0	*6.1	62.1	*7.6	*12.5	15.8	16.3	27.7	*10.4	*10.0	*6.6
75 years and over	100.0	*5.0	68.2	*12.1	*13.9	*18.4	*11.4	23.4	*12.9	*7.5	*2.3

[1]Includes never menstruated, unknown if ever menstruated, unknown if stopped menstruating, and unknown if natural or surgical menopause.
[2]Includes unknown age at natural menopause.
[3]Includes unknown age at surgical menopause.
[4]Includes other races not shown separately.

gen/progesterone ratio of the oral contraceptives used may help to clarify this association (53).

The importance of the relationship between oral contraceptive use and breast cancer risk is evident in table K, which shows the rapidly increasing proportions of U.S. women who ever used birth control pills. Seventy-four percent of U.S. women age 40–44 years ever used oral contraceptives, compared with 58 and 38 percent, respectively, of those 45–49 and 50–54 years. Just 20 percent of women 55–64 years of age ever used oral contraceptives, and the proportion was less than 5 percent for older women. Thus, if any excess risk can be attributed to use of oral contraceptives, it would have important implications for the future trend in breast cancer incidence.

White women were slightly more likely than black women ever to have used oral contraceptives, 31 compared with 27 percent for all ages 40 years and over after age adjustment. Black and white women who ever used oral contraceptives were fairly evenly divided between those reporting 3 years or less and more than 3 years of use.

Postmenopausal estrogens—Studies of estrogen replacement therapy have provided mixed evidence as to the effects of postmenopausal estrogen (PME) on breast cancer risk. The majority of studies found no association or suggested a decreased risk among women who ever used PME (53,59,68–70), but two studies (71,72) suggested a positive association in some groups of women.

In 1987, almost one-third of women age 40 years and over who had stopped menstruating had used postmenopausal estrogen (table L). Eighteen percent had used PME for 3 years or less; 13 percent reported more than 3 years of use. Three percent of women did not know if they had used PME, and 65 percent never used PME. The proportion of women who had used this form of estrogen replacement generally declined with age, although the pattern was somewhat irregular. White women were considerably more likely than black women to have used PME (36 compared with 20 percent after age adjustment), and this difference was most pronounced at older ages.

Body weight

Several studies have found that the association between risk of breast cancer and body weight or body mass index (weight for height) differs for premenopausal and post-

Table K. Percent distribution of women 40 years of age and over by duration of use of oral contraceptives, according to race and age: United States, 1987

Race and age	Total[1]	Never used oral contraceptives	Ever used oral contraceptives		
			All durations[2]	3 years or less	More than 3 years
All races[3]			Percent distribution		
40 years and over	100.0	69.0	29.6	14.5	14.2
40–54 years	100.0	40.3	58.4	28.4	29.0
40–44 years	100.0	24.4	74.2	34.3	38.5
45–49 years	100.0	40.9	58.1	27.8	29.6
50–54 years	100.0	60.4	38.2	21.4	16.0
55–64 years	100.0	78.3	20.1	10.5	8.5
55–59 years	100.0	70.5	27.8	14.5	12.0
60–64 years	100.0	85.0	13.5	7.2	5.6
65–74 years	100.0	94.4	3.9	1.8	1.5
65–69 years	100.0	93.3	5.6	2.7	2.2
70–74 years	100.0	95.8	*1.9	*0.7	*0.7
75 years and over	100.0	98.3	*0.3	–	–
75–79 years	100.0	98.9	*0.2	–	–
80–84 years	100.0	98.2	*0.6	–	–
85 years and over	100.0	97.2	–	–	–
White					
40 years and over:					
Crude	100.0	68.7	29.9	14.6	14.5
Age adjusted	100.0	67.8	30.9	15.1	15.0
40–54 years	100.0	39.1	59.8	29.0	29.8
55–64 years	100.0	77.4	21.0	10.8	9.2
65–74 years	100.0	94.1	4.2	1.9	1.6
75 years and over	100.0	98.5	*0.3	–	–
Black					
40 years and over:					
Crude	100.0	69.6	29.0	14.2	13.9
Age adjusted	100.0	71.6	27.0	13.3	12.8
40–54 years	100.0	42.1	56.0	26.6	28.4
55–64 years	100.0	85.9	14.0	*8.1	*3.8
65–74 years	100.0	98.6	*0.8	*0.5	*0.4
75 years and over	100.0	96.6	–	–	–

[1]Includes unknown if ever used oral contraceptives.
[2]Includes unknown duration of use of oral contraceptives.
[3]Includes other races not shown separately.

menopausal women. Prior to menopause, leaner women are at greater risk than are heavier women; after menopause, risk increases directly with weight (13,24,53). Choi and others (52) found no evidence of a protective effect of weight prior to menopause but did find risk positively associated with body weight among postmenopausal women. Other studies that have found a positive association between weight or body mass index and breast cancer risk in postmenopausal women include Verreault and others (73) and de Waard (74,75), but Staszewski (76) found that weight had no independent effect after controlling for height.

Table M shows the distribution of U.S. women by relative body weight, that is, by actual weight compared with desirable weight as defined by the Metropolitan Life Insurance Company height/weight charts (see appendix II). More than 4 of 10 women 40 years of age and over were either 5 percent or more below their desirable weight (21 percent) or within 5 percent of that weight (another 21 percent). One-fourth of the women were slightly overweight, and more than one-fourth, 28 percent, were obese—20 percent or more above their desirable weight.

There was little variation by age in the proportion of women who were 20 percent or more overweight, but the percent of women who were 5 percent or more underweight was highest among women 75 years of age and over and lowest among women age 55–74 years. Relative weight was considerably higher, on average, for black than white women. After adjusting for age, black women were twice as likely to be 30 percent or more overweight (33 compared with 16 percent for white women), and were less likely to be at or below their desirable weight.

Alcohol consumption

A number of recent studies have found a positive relationship between alcohol consumption and the risk of female breast cancer. Two large cohort studies (77,78) reported dose response effects, with estimates of relative risk increasing with level of alcohol consumed. Both studies adjusted for the effects of other important risk factors such as parity and history of benign breast disease. An earlier cohort study by Hiatt and Bawol (79) found similar results but did not consider the effects of other known risk factors. While numerous case control studies reported findings

Table L. Percent distribution of women 40 years of age and over who have stopped menstruating by duration of use of postmenopausal estrogen (PME), according to race and age: United States, 1987

Race and age	Total	Never used PME	Ever used PME			Unknown if ever used PME
			All durations[1]	3 years or less	More than 3 years	
All races[2]	Percent distribution					
40 years and over	100.0	64.6	32.4	17.6	13.1	3.0
40–54 years	100.0	60.8	36.8	23.3	12.9	2.4
40–44 years	100.0	58.2	40.0	24.7	14.5	*1.8
45–49 years	100.0	58.4	40.2	24.3	13.4	*1.4
50–54 years	100.0	63.2	33.5	20.2	12.0	3.3
55–64 years	100.0	60.3	37.1	17.7	17.2	2.6
55–59 years	100.0	62.5	36.1	16.8	16.8	*1.4
60–64 years	100.0	58.4	38.0	18.4	17.6	3.6
65–74 years	100.0	64.3	33.1	18.0	13.3	2.6
65–69 years	100.0	60.5	37.2	20.2	15.0	2.3
70–74 years	100.0	69.1	28.0	15.4	11.1	2.9
75 years and over	100.0	77.7	17.2	10.4	5.6	5.1
75–79 years	100.0	73.0	20.9	12.2	7.6	6.1
80–84 years	100.0	81.0	15.4	10.4	*3.8	*3.6
85 years and over	100.0	85.5	10.0	*5.0	*3.0	*4.5
White						
40 years and over:						
Crude	100.0	62.6	34.4	18.5	14.0	3.0
Age adjusted	100.0	61.4	35.9	19.9	14.1	2.6
40–54 years	100.0	59.0	38.7	23.3	13.6	2.3
55–64 years	100.0	57.3	39.9	18.6	18.9	2.8
65–74 years	100.0	62.2	35.4	19.3	14.1	2.4
75 years and over	100.0	76.8	18.3	11.0	6.0	4.9
Black						
40 years and over:						
Crude	100.0	79.5	17.1	10.1	6.5	3.4
Age adjusted	100.0	76.7	19.7	12.3	7.0	3.6
40–54 years	100.0	69.7	27.0	16.7	10.3	*3.3
55–64 years	100.0	82.4	16.3	9.9	*5.9	*1.3
65–74 years	100.0	83.9	*12.4	*6.0	*5.6	*3.7
75 years and over	100.0	86.9	*5.2	*3.1	*1.0	*7.7

[1]Includes unknown duration of use of PME.
[2]Includes other races not shown separately.

supportive of the hypothesis that moderate to heavy levels of drinking increase the risk of breast cancer (80–87), four studies did not find a positive association (88–91). Although some of these negative studies suffered methodological limitations, the study by Webster, Layde, and Ory (91) was large and well designed. Their negative finding suggests the need for additional research to confirm the association between alcohol consumption and breast cancer.

The data on alcohol consumption in the 1987 NHIS-CEC were collected as part of a series of questions on food intake that asked about consumption of various foods and beverages, including beer, wine, and liquor, in the year preceding the interview. Women were classified as abstainers or light drinkers (less than three drinks per week, on average), moderate drinkers (three drinks per week to less than two drinks per day, on average), or heavy drinkers (two drinks or more per day, on average). These categories have been used in a number of surveys of drinking habits (92–95). The criteria used in assigning women to these categories are presented in detail in appendix II.

Eighty-one percent of women 40 years of age and over were either light drinkers or abstainers in the year preceding their NHIS interview (table N). Twelve percent were classified as moderate drinkers, and 4 percent as heavy drinkers. Level of alcohol consumption was unknown for 3 percent of women. The proportion of women classified as abstainers or light drinkers increased with age, while the percent of moderate drinkers declined. Black women were more likely than white women to be classified as abstainers or light drinkers, 85 versus 81 percent after age adjustment.

Preventive behaviors

Breast self-examination

The American Cancer Society recommends that all women begin practicing monthly breast self-examination (BSE) by the age of 20 (8). Although not citing benefits for any specific age groups, the National Cancer Institute's guidelines for breast cancer screening state that "physicians should encourage their female patients in doing monthly breast self-examination" (96). The U.S. Preventive Services Task Force and the World Health Organization, however, have stated that the existing evidence as to the value of BSE

Table M. Percent distribution of women 40 years of age and over by relative weight, according to race and age: United States, 1987

Race and age	Total	5 percent or more below desirable weight	Within 5 percent of desirable weight	5–9.9 percent above desirable weight	10–19.9 percent above desirable weight	20–29.9 percent above desirable weight	30 percent or more above desirable weight	Unknown
All races[1]				Percent distribution				
40 years and over	100.0	21.3	21.1	10.2	15.3	10.4	17.7	4.1
40–54 years	100.0	22.6	22.3	9.3	14.0	9.9	18.1	3.8
40–44 years	100.0	25.4	23.9	9.0	12.5	8.8	16.8	3.6
45–49 years	100.0	22.6	21.1	9.1	15.2	10.8	17.7	3.6
50–54 years	100.0	18.9	21.3	10.1	14.7	10.4	20.3	4.3
55–64 years	100.0	16.9	20.6	10.5	16.4	11.3	20.4	3.8
55–59 years	100.0	16.7	21.2	11.0	16.2	10.7	20.7	3.6
60–64 years	100.0	17.2	20.1	10.1	16.6	11.9	20.2	4.0
65–74 years	100.0	18.6	18.8	11.8	16.8	11.8	18.5	3.7
65–69 years	100.0	16.7	19.3	11.8	17.8	12.1	19.3	3.0
70–74 years	100.0	21.2	18.2	11.7	15.4	11.5	17.4	4.6
75 years and over	100.0	28.8	22.0	9.6	14.8	8.5	10.4	5.9
75–79 years	100.0	26.2	20.2	9.6	15.3	10.8	13.1	4.8
80–84 years	100.0	30.0	22.8	9.4	15.5	7.2	9.2	6.0
85 years and over	100.0	34.1	25.5	10.1	12.5	*4.0	*5.3	*8.6
White								
40 years and over:								
Crude	100.0	22.5	22.0	10.6	15.0	10.1	15.9	3.9
Age adjusted	100.0	22.6	22.1	10.5	14.9	10.1	15.9	3.9
40–54 years	100.0	24.3	23.3	9.7	13.6	9.4	16.2	3.5
55–64 years	100.0	17.9	21.8	11.2	16.1	10.9	18.3	3.8
65–74 years	100.0	19.2	19.5	12.2	16.6	11.9	16.9	3.6
75 years and over	100.0	30.0	22.1	9.7	14.6	8.2	10.0	5.4
Black								
40 years and over:								
Crude	100.0	8.9	13.3	7.5	17.3	13.9	33.5	5.6
Age adjusted	100.0	9.3	13.4	7.5	17.5	13.8	32.6	5.8
40–54 years	100.0	7.5	14.3	8.1	15.5	14.7	34.1	5.9
55–64 years	100.0	*8.3	*8.9	*5.5	18.8	14.3	40.8	*3.4
65–74 years	100.0	*10.4	*13.0	*8.0	18.9	*12.5	32.3	*4.9
75 years and over	100.0	*14.0	*19.3	*9.1	*18.7	*12.3	*16.1	*10.4

[1]Includes other races not shown separately.

NOTE: Relative weight is actual weight relative to desirable weight based on Metropolitan Life Insurance Company height-weight charts (see appendix II).

is insufficient to recommend BSE screening programs as public health policy (97).

The screening value of BSE is a source of some controversy among researchers and clinicians. While some retrospective studies have shown that BSE is associated with earlier detection of breast cancer (98–102) or prolonged survival (99), there are not yet any prospective survey results linking BSE with reduced mortality. Frank and Mai (103) have argued that BSE may do more harm than good, citing the risk of unwarranted reassurance associated with false negative results and the inconvenience, anxiety, and potential morbidity stemming from unnecessary medical investigation of false positives.

As of 1987, according to data collected in the NHIS-CEC, more than three-fourths of U.S. women practiced BSE on at least an irregular basis (table O). Almost half (47 percent) claimed to examine their breasts once a month or more often, in concurrence with the recommendation of the American Cancer Society. Twenty percent practiced BSE less than once a month, and 6 percent specified some irregular schedule, for example, "when I think of it" or "rarely." Eleven percent of U.S. women 40 years of age and over did not know how to examine their own breasts, and 10 percent did not ever practice BSE despite knowing how to do so.

The proportions of women who never examined their breasts, including those who knew how to do so and those who did not, increased with age. Almost half of women age 85 years and over never performed BSE, 30 percent because they did not know how. Among women who did report examining their breasts, there was no consistent variation by age in the frequency of BSE.

Black women were more likely than white women to be unaware of how to perform BSE (18 compared with 9 percent) but less likely to never practice BSE despite knowing how (5 compared with 11 percent). Among women who did examine their breasts, black women were more likely than white women to do so once a week or more often.

Socioeconomic status, as indicated by education and income, was strongly associated with the practice of BSE even after adjusting for the potentially confounding effects of age and race (table P). The proportion of women who did not know how to examine their own breasts decreased from 18 percent of women with less than 12 years of school to 5 percent of those with more than 12 years of school.

Table N. Percent distribution of women 40 years of age and over by level of alcohol consumption in past year, according to race and age: United States, 1987

Race and age	Total	Abstainer or light drinker[1]	Moderate drinker[2]	Heavy drinker[3]	Unknown
All races[4]			Percent distribution		
40 years and over	100.0	81.3	11.7	3.5	3.4
40–54 years	100.0	78.2	14.3	4.1	3.4
40–44 years	100.0	78.1	14.3	4.0	3.7
45–49 years	100.0	79.9	13.7	3.8	2.7
50–54 years	100.0	76.6	15.0	4.5	3.8
55–64 years	100.0	81.8	11.2	3.8	3.3
55–59 years	100.0	82.8	10.4	3.7	3.1
60–64 years	100.0	80.9	11.8	3.9	3.4
65–74 years	100.0	83.4	10.5	3.2	3.0
65–69 years	100.0	82.3	11.6	3.5	2.7
70–74 years	100.0	84.8	9.2	2.8	3.3
75 years and over	100.0	86.5	7.0	2.1	4.3
75–79 years	100.0	86.9	6.2	*2.3	4.6
80–84 years	100.0	88.8	6.1	*2.4	*2.6
85 years and over	100.0	81.8	10.6	*1.0	*6.5
White					
40 years and over:					
Crude	100.0	80.8	12.3	3.7	3.2
Age adjusted	100.0	80.8	12.3	3.7	3.2
40–54 years	100.0	77.8	15.0	4.1	3.1
55–64 years	100.0	81.2	11.5	4.2	3.1
65–74 years	100.0	82.5	11.5	3.3	2.8
75 years and over	100.0	86.1	7.4	2.2	4.3
Black					
40 years and over:					
Crude	100.0	84.3	8.4	*2.3	5.0
Age adjusted	100.0	84.8	7.9	*2.2	5.1
40–54 years	100.0	78.8	11.7	*3.7	5.8
55–64 years	100.0	85.6	9.7	*0.3	*4.4
65–74 years	100.0	91.6	*2.0	*1.9	*4.4
75 years and over	100.0	91.1	*2.5	*1.8	*4.6

[1]Less than 3 drinks per week, on average (see appendix II).
[2]Three drinks per week to less than 2 drinks per day, on average (see appendix II).
[3]Two drinks per day or more, on average (see appendix II).
[4]Includes other races not shown separately.

With respect to income, the percent of women who did not know how to perform BSE dropped from 15 percent of women with family incomes of less than $10,000 to 5 percent of those with incomes of $35,000 or more. The percent of women who practiced BSE less than once a month or between once a month and once a week increased with income and education, but the percent of women practicing BSE once a week or more was highest among women with the least education and lowest incomes.

Breast physical examination

A breast physical examination (BPE), also referred to as a clinical breast examination, consists of manual examination (palpation) of the breasts by a physician or other trained professional. The American Cancer Society and the U.S. Preventive Services Task Force concur in recommending annual BPE's for women 40 years of age and over (8,97). Between the ages of 20 and 39 years, the American Cancer Society recommends a BPE every 3 years. The National Cancer Institute does not recommend a specific frequency for BPE, stating instead that "physicians should be encouraged to do clinical breast examinations on all female patients in whom they are doing a periodic examination" (96). While two retrospective studies found evidence of an association between early detection of breast cancer and BPE alone (104,105), most studies have examined the effects of BPE in conjunction with mammography rather than as an independent procedure.

In 1987, only one-third of U.S. women age 40 years and over reported having had a BPE in the preceding year, although more than 8 in 10 reported ever having had a BPE (table Q). For 30 percent of women, the interval since last BPE was 1–3 years, and for 14 percent it was more than 3 years. Fifteen percent had never had a BPE—this includes 7 percent who had never heard of the procedure.

The proportion of women who had ever had a breast physical examination decreased sharply with age, from 87 percent of women 40–44 years of age to 59 percent of those 85 years and over. The proportion of women who had never heard of the procedure increased with age from 4 to 16 percent, respectively, of those age 40–44 years and 85 years and over. Black women were as likely as white women to have had a BPE in the preceding year but were more likely to have never had one (22 compared with 14 percent). White women were more likely to have had a BPE more than 1 year before the NHIS interview.

Table O. Percent distribution of women 40 years of age and over by frequency of breast self-examination (BSE), according to race and age: United States, 1987

Race and age	Total[1]	Never perform BSE		Perform BSE				
		Do not know how	Do know how	Less than once a month	Once a month to less than once a week	Once a week or more	Other[2]	Unknown frequency
				Percent distribution				
All races[2]								
40 years and over	100.0	10.5	10.4	20.0	32.8	14.5	6.4	3.7
40–54 years	100.0	6.3	8.4	24.5	37.4	13.4	5.4	3.1
40–44 years	100.0	5.1	7.1	27.4	42.0	9.7	4.6	3.2
45–49 years	100.0	6.7	9.0	22.8	35.2	15.8	5.2	3.2
50–54 years	100.0	7.4	9.5	22.3	33.2	16.1	6.9	2.9
55–64 years	100.0	9.6	10.4	18.6	35.0	14.8	6.4	3.4
55–59 years	100.0	9.6	9.7	19.4	35.5	14.3	6.9	3.1
60–64 years	100.0	9.7	11.1	17.7	34.4	15.4	5.9	3.7
65–74 years	100.0	12.8	11.3	17.2	30.4	15.7	7.1	3.5
65–69 years	100.0	13.1	11.0	16.4	33.6	15.9	6.0	2.5
70–74 years	100.0	12.5	11.7	18.3	26.1	15.6	8.5	4.9
75 years and over	100.0	21.5	15.0	13.1	18.8	15.3	8.0	6.1
75–79 years	100.0	17.8	15.1	14.6	23.0	13.7	7.3	6.5
80–84 years	100.0	22.4	14.3	10.7	17.7	18.6	8.7	*5.5
85 years and over	100.0	30.2	15.7	12.9	9.2	14.5	*8.7	*5.7
White								
40 years and over:								
Crude	100.0	9.4	11.1	20.9	33.5	13.5	6.5	3.6
Age adjusted	100.0	9.4	11.1	20.9	33.4	13.5	6.4	3.6
40–54 years	100.0	5.3	8.9	26.1	38.2	11.9	5.1	3.0
55–64 years	100.0	8.1	11.2	19.0	36.0	13.7	6.8	3.4
65–74 years	100.0	11.5	12.1	17.8	31.3	15.1	7.4	3.4
75 years and over	100.0	20.0	15.7	13.8	19.2	14.9	8.3	6.2
Black								
40 years and over:								
Crude	100.0	15.8	5.2	14.5	30.1	21.9	5.0	4.6
Age adjusted	100.0	17.9	5.1	13.7	28.4	22.2	5.0	4.6
40–54 years	100.0	8.8	6.1	16.3	35.1	20.5	5.8	4.9
55–64 years	100.0	14.3	*3.8	16.5	32.3	23.5	*4.0	*4.0
65–74 years	100.0	26.7	*4.3	*12.1	21.4	23.7	*4.0	*4.4
75 years and over	100.0	36.5	*5.6	*4.4	*14.5	*22.1	*4.6	*5.2

[1]Includes unknown if ever perform BSE.
[2]For example, "When I think of it."

Table P. Percent distribution of women 40 years of age and over by frequency of breast self-examination (BSE), according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Never perform BSE		Perform BSE				
		Do not know how	Do know how	Less than once a month	Once a month to less than once a week	Once a week or more	Other[2]	Unknown frequency
				Percent distribution				
Educational level								
Less than 12 years	100.0	17.6	9.7	15.9	28.0	16.4	5.7	4.7
12 years	100.0	8.1	10.7	21.9	33.8	13.9	6.2	3.5
More than 12 years	100.0	5.1	11.7	23.1	35.0	13.2	7.4	3.4
Family income								
Less than $10,000	100.0	14.8	10.6	19.8	27.1	16.9	5.7	3.9
$10,000–$19,999	100.0	12.4	10.4	20.2	31.0	14.1	6.6	3.2
$20,000–$34,999	100.0	8.0	10.6	22.3	34.1	13.9	7.7	2.6
$35,000 or more	100.0	4.8	12.7	24.2	37.2	11.0	5.9	2.5
Place of residence[3]								
MSA, central city	100.0	12.0	12.6	20.2	29.7	13.5	6.9	3.5
MSA, not central city	100.0	9.1	9.5	19.5	36.0	15.4	5.3	3.2
Not in MSA	100.0	11.1	9.3	20.6	30.8	14.1	7.4	5.1
Geographic region								
Northeast	100.0	11.4	11.0	20.5	32.7	14.7	4.7	3.2
Midwest	100.0	7.7	10.2	22.6	35.2	12.9	6.5	3.4
South	100.0	11.4	10.1	17.5	31.8	15.8	7.2	4.3
West	100.0	11.3	11.6	20.9	31.4	13.2	6.8	3.0

[1]Includes unknown if ever perform BSE.
[2]For example, "When I think of it."
[3]MSA = metropolitan statistical area.

Table Q. Percent distribution of women 40 years of age and over by interval since last breast physical examination (BPE), according to race and age: United States, 1987

Race and age	Total[1]	Never had BPE			Ever had BPE			
		Total[2]	Never heard of BPE	Ever heard of BPE	Total[3]	Interval since last BPE		
						0–11 months	12–36 months	37 months or more
All races[4]	Percent distribution							
40 years and over	100.0	15.0	6.9	8.1	81.3	33.2	30.4	14.1
40–54 years	100.0	9.2	4.1	5.2	86.7	39.0	32.3	12.2
40–44 years	100.0	7.8	3.7	4.0	87.3	39.4	32.5	12.0
45–49 years	100.0	9.5	4.3	5.2	86.6	39.1	30.4	14.0
50–54 years	100.0	11.1	4.3	6.8	86.1	38.5	34.3	10.5
55–64 years	100.0	13.3	6.2	7.1	83.1	31.9	32.4	15.1
55–59 years	100.0	10.3	5.2	5.1	85.9	34.5	33.6	14.5
60–64 years	100.0	16.8	7.4	9.3	80.0	28.9	31.1	16.0
65–74 years	100.0	20.5	9.0	11.4	76.8	30.7	26.3	15.7
65–69 years	100.0	17.4	6.7	10.6	79.8	33.3	26.0	16.5
70–74 years	100.0	24.7	12.1	12.5	72.7	27.1	26.9	14.7
75 years and over	100.0	27.0	13.5	13.5	68.2	21.8	26.7	15.4
75–79 years	100.0	23.6	10.7	12.9	73.1	23.6	27.7	17.0
80–84 years	100.0	29.5	16.8	12.7	65.5	20.1	29.6	13.6
85 years and over	100.0	32.4	16.0	16.4	58.8	19.7	19.4	14.2
White								
40 years and over:								
Crude	100.0	13.7	6.1	7.6	82.8	33.6	30.9	14.9
Age adjusted	100.0	13.7	6.1	7.6	82.8	33.6	31.0	15.0
40–54 years	100.0	8.1	3.5	4.5	88.6	39.5	32.9	13.3
55–64 years	100.0	11.6	4.9	6.8	84.8	32.5	33.2	16.0
65–74 years	100.0	19.0	8.1	10.9	78.3	31.0	26.9	16.3
75 years and over	100.0	25.3	12.5	12.8	70.2	22.7	27.3	16.0
Black								
40 years and over:								
Crude	100.0	19.9	10.7	9.2	73.7	33.4	25.8	8.3
Age adjusted	100.0	22.2	11.7	10.5	71.6	31.8	25.1	8.5
40–54 years	100.0	12.0	6.6	5.4	79.6	39.8	27.4	6.5
55–64 years	100.0	18.5	10.7	*7.8	78.0	31.2	28.0	10.7
65–74 years	100.0	31.6	16.8	14.7	65.7	30.4	21.7	*8.6
75 years and over	100.0	43.2	*20.9	22.3	47.6	*12.7	*19.7	*10.0

[1]Includes unknown if ever had BPE.
[2]Includes unknown if ever heard of BPE.
[3]Includes unknown interval since last BPE.
[4]Includes other races not shown separately.

Socioeconomic status was strongly associated with interval since last BPE (table R). Women with less than 12 years of school were twice as likely as those with more than 12 years of school to have never had a BPE (22 versus 10 percent), and a similar pattern occurred within categories of income. The proportion of women having had a BPE in the preceding year increased with both of these indicators of socioeconomic status, as did the percent of women who had ever had a BPE. Interval since last BPE did not vary by geographic region, but women living in metropolitan statistical areas (MSA's) were more likely than those living outside MSA's to have had a BPE in the preceding year.

Eighty-eight percent of women who had a BPE in the 3 years preceding interview said that their last BPE was a routine examination (table S), while 11 percent cited medical reasons: lumps (4 percent); soreness, swelling, and pain (2 percent); other medical problems, including follow-up tests/treatment and discharge from the breasts (3 percent); and unrelated medical problems (2 percent). There was little variation by age and none by race in the reason for last BPE. Similarly, socioeconomic status and geographic/residential factors were not associated with reason for last examination (table T).

More than three-fourths (78 percent) of the women who reported having had a BPE in the 3 years preceding interview stated that they were told the results of their last BPE in person (table U). Nine percent received the results of the examination over the telephone, and 4 percent were notified by mail. Six percent stated that they were never told the results of the exam; many of these women volunteered that they were told they would not be contacted unless there was a problem. Method of notification did not vary by race, age, or socioeconomic status (table W); however, women residing in the West were twice as likely as those from other geographic regions to have never been told the results of their last BPE.

Almost half (46 percent) of the women who had not had a BPE in the 3 years preceding interview said that the most important reason for not doing so was that it was not

Table R. Percent distribution of women 40 years of age and over by interval since last breast physical examination (BPE), according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Never had BPE			Ever had BPE			
		Total[2]	Never heard of BPE	Ever heard of BPE	Total[3]	Interval since last BPE— 0–11 months	12–36 months	37 months or more
Educational level	Percent distribution							
Less than 12 years	100.0	22.1	10.4	11.7	73.5	25.9	27.8	16.4
12 years	100.0	12.9	5.5	7.4	83.5	33.6	32.2	14.3
More than 12 years	100.0	9.7	4.3	5.5	87.2	40.1	30.7	12.1
Family income								
Less than $10,000	100.0	21.4	9.2	12.2	75.7	26.2	26.7	18.8
$10,000–$19,999	100.0	16.8	7.7	9.1	80.5	29.7	30.1	17.5
$20,000–$34,999	100.0	11.4	4.9	6.4	85.4	34.9	33.2	14.3
$35,000 or more	100.0	10.9	3.7	7.2	86.2	41.9	29.2	11.2
Place of residence[4]								
MSA, central city	100.0	15.5	6.7	8.8	80.8	34.1	31.1	12.3
MSA, not central city	100.0	13.0	6.2	6.8	83.4	36.0	29.7	13.5
Not in MSA	100.0	18.0	8.7	9.3	78.0	26.5	30.5	17.6
Geographic region								
Northeast	100.0	14.7	5.4	9.3	80.8	34.7	27.1	12.6
Midwest	100.0	14.7	6.2	8.5	81.9	32.1	31.8	15.6
South	100.0	15.3	7.7	7.6	80.7	33.9	30.2	13.9
West	100.0	15.1	8.1	7.0	82.6	31.6	33.0	14.3

[1]Includes unknown if ever had BPE.
[2]Includes unknown if ever heard of BPE.
[3]Includes unknown interval since last BPE.
[4]MSA = metropolitan statistical area.

needed or that they had experienced no problems (table Y). This category includes women who stated that they did not know they should have a BPE and women whose doctors explicitly told them the examination was not needed. An additional 10 percent reported that their doctors had never suggested that they have a BPE. Fourteen percent said they had "put it off," and 22 percent cited other reasons, including cost (3 percent); lack of insurance coverage (1 percent); no regular doctor, including not going to doctors at all (7 percent); embarrassment (1 percent); fear (1 percent); and substitution of breast self-examination (2 percent).

The percent of women who claimed to have postponed having a BPE decreased with age, while the proportions who felt the examination was not needed or whose doctors had not suggested having a BPE increased with age. Over twice as many black as white women reported that the examination had not been suggested by their doctors, 22 compared with 8 percent.

Most of the variation by socioeconomic and geographic/residential characteristics in the main reason for not having had a BPE in the past 3 years was within sampling error or displayed no meaningful pattern (table Z); however, the proportion of women citing procrastination increased consistently with income (7 percent of women with incomes of less than $10,000, compared with 24 percent of those with incomes of $35,000 or more).

Mammography

Mammography—film screen or xerographic—is the main imaging technique used in screening for female breast cancer. This procedure is far more sensitive than manual breast examination, capable of detecting lumps 2–3 years earlier than when they would be palpable (106). However, it involves exposure to low-dose irradiation and is a fairly expensive procedure. Thus, many experts disagree about the optimum interval for mammograms in asymptomatic women (107–111).

The American Cancer Society (8) recommends that all women have a baseline mammogram between the ages of 35 and 40 years. Between ages 40 and 49 years, they recommend mammograms every 1 to 2 years, depending upon presence of risk factors. At ages 50 years and over, annual mammograms are recommended. The National Cancer Institute concurs in recommending mammograms every 1 to 2 years between ages 40 and 49 years, with annual examinations starting at age 50 years; however, they do not recommend use of mammography below the age of 40 except among women with a personal history of breast cancer (96). The U.S. Preventive Services Task Force (97) also recommends yearly mammograms for women 50 years of age and over, but they do not support "the general use of mammography for women younger than 50 years except in the context of studies designed to evaluate effectiveness."

Table S. Percent distribution of women 40 years of age and over who had a breast physical examination (BPE) in the past 3 years by reason for last BPE, according to race and age: United States, 1987

Race and age	Total[1]	Routine examination	Medical reason
All races[2]	Percent distribution		
40 years and over	100.0	88.3	11.0
40–54 years	100.0	87.1	12.6
40–44 years	100.0	85.8	13.5
45–49 years	100.0	86.6	13.2
50–54 years	100.0	89.5	10.5
55–64 years	100.0	89.8	9.5
55–59 years	100.0	87.5	11.5
60–64 years	100.0	92.8	6.9
65–74 years	100.0	87.8	10.5
65–69 years	100.0	86.8	11.8
70–74 years	100.0	89.2	8.4
75 years and over	100.0	91.3	8.3
75–79 years	100.0	91.0	8.8
80–84 years	100.0	93.0	*6.6
85 years and over	100.0	89.3	*9.9
White			
40 years and over:			
Crude	100.0	87.9	11.4
Age adjusted	100.0	88.2	11.1
40–54 years	100.0	86.2	13.6
55–64 years	100.0	89.8	9.4
65–74 years	100.0	87.8	10.5
75 years and over	100.0	91.1	8.5
Black			
40 years and over:			
Crude	100.0	91.0	8.0
Age adjusted	100.0	91.4	7.6
40–54 years	100.0	91.7	7.1
55–64 years	100.0	91.2	*8.8
65–74 years	100.0	86.5	*10.9
75 years and over	100.0	95.0	*5.0

[1]Includes unknown if for medical reason.
[2]Includes other races not shown separately.

Table T. Percent distribution of women 40 years of age and over who had a breast physical examination (BPE) in the past 3 years by reason for last BPE, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Routine examination	Medical reason
Educational level	Percent distribution		
Less than 12 years	100.0	87.5	11.8
12 years	100.0	88.8	10.5
More than 12 years	100.0	89.0	10.3
Family income			
Less than $10,000	100.0	87.3	12.3
$10,000–$19,999	100.0	87.2	11.9
$20,000–$34,999	100.0	89.1	10.2
$35,000 or more	100.0	88.2	10.9
Place of residence[2]			
MSA, central city	100.0	90.0	8.9
MSA, not central city	100.0	88.0	11.5
Not in MSA	100.0	87.1	12.4
Geographic region			
Northeast	100.0	90.4	9.1
Midwest	100.0	87.5	11.7
South	100.0	86.7	12.4
West	100.0	90.7	8.9

[1]Includes unknown if for medical reason.
[2]MSA = metropolitan statistical area.

Two major studies have investigated the effectiveness of mammography as a means of secondary prevention of breast cancer: the Health Insurance Plan of Greater New York Screening Project (HIP) and the Breast Cancer Detection Demonstration Project (BCDDP). The HIP study was a prospective case control study in which half of the 62,000 women were randomly assigned to receive intensive screening (BPE and mammography). The remaining women were assigned no intervention during the study period from 1963–70. Results of this study showed that among women age 50 years and over upon entry, those who received intensive screening had significantly lower mortality than those in the control group (112,113). While no clear evidence of screening benefits among younger women was found in the initial analysis of the HIP data, a reanalysis using cases occurring up to 6 years after entry into the study suggested possible benefits for younger women as well (107). These results may be questionable in light of the decision to exclude noncases. The HIP study did not assess the relative contribution of BPE and mammography in the reduced mortality observed, but it is estimated that at least one-third of the reduction can be attributed to mammography (113,114).

The BCDDP, begun in 1973, was not a randomized trial; however, it involved followup of 280,000 women in 29 screening centers across the country. Recent results of the BCDDP established a protective effect of mammography with respect to breast cancer mortality at all ages 40 years and over (115,116). Reflecting improvements in mammography technology over the past three decades, mammograms played a role in 91 percent of all program-detected cancers and was solely responsible for 42 percent of the breast cancer cases detected (115).

Despite the demonstrated benefits of mammography in early detection of breast cancer, the NHIS-CEC found that 59 percent of U.S. women 40 years of age and over had never had a mammogram (table AA). Thirteen percent had never heard of mammography, and 46 percent had never had a mammogram despite having heard of the procedure. Fifteen percent of all women 40 years of age and over had a mammogram in the preceding year, 14 percent reported an interval of 1–3 years since their last mammogram, and 7 percent reported an interval of more than 3 years.

The proportion of women who had ever had a mammogram increased with age between ages 40–44 years (39 percent) and 50–54 years (46 percent), then decreased steadily to 18 percent of those 85 years and over. The proportion of women who had never heard of mammography increased with age, from 8 percent of those age 40–44 years to 40 percent of those age 85 years and over. White women were more likely than black women to have ever had a mammogram, 39 compared with 30 percent after age adjustment. Among women who had never had a mammogram, the proportion who had never heard of the procedure was higher for black than for white women.

History of mammography was strongly associated with education and income (table BB). The proportion of women who had ever had a mammogram rose from

Table U. Percent distribution of women 40 years of age and over who had a breast physical examination (BPE) in the past 3 years by method of communication of results of last BPE, according to race and age: United States, 1987

Race and age	Total[1]	Method of communication: Never told	Face to face	By telephone	By mail
		Percent distribution			
All races[2]					
40 years and over	100.0	6.3	78.4	8.6	4.0
40–54 years	100.0	5.9	77.7	9.3	3.9
40–44 years	100.0	6.1	77.1	9.2	4.5
45–49 years	100.0	6.1	78.1	8.8	*2.2
50–54 years	100.0	5.4	78.1	10.1	5.0
55–64 years	100.0	6.9	79.1	7.7	4.6
55–59 years	100.0	6.8	79.9	8.4	3.5
60–64 years	100.0	7.0	78.0	6.9	6.1
65–74 years	100.0	5.1	78.5	9.3	3.6
65–69 years	100.0	5.0	77.5	10.1	4.1
70–74 years	100.0	5.2	79.9	8.1	*3.0
75 years and over	100.0	8.6	79.6	6.0	3.6
75–79 years	100.0	8.8	82.0	*5.1	*2.8
80–84 years	100.0	*8.8	72.5	*9.1	*5.1
85 years and over	100.0	*7.7	85.3	*3.0	*3.2
White					
40 years and over:					
Crude	100.0	6.1	78.4	8.9	3.9
Age adjusted	100.0	6.2	78.4	8.7	3.9
40–54 years	100.0	5.6	77.8	9.9	3.7
55–64 years	100.0	6.5	78.9	7.9	4.9
65–74 years	100.0	5.1	78.4	9.5	3.3
75 years and over	100.0	8.9	79.1	6.4	*3.4
Black					
40 years and over:					
Crude	100.0	7.0	79.7	5.6	5.0
Age adjusted	100.0	6.6	81.2	4.9	4.7
40–54 years	100.0	*6.6	77.6	*6.3	*5.5
55–64 years	100.0	*9.7	81.1	*5.7	*2.8
65–74 years	100.0	*5.5	82.7	*5.0	*5.9
75 years and over	100.0	*2.5	87.0	–	*6.8

[1]Includes other, unknown, and combination of methods.
[2]Includes other races not shown separately.

Table W. Percent distribution of women 40 years of age and over who had a breast physical examination (BPE) in the past 3 years by method of communication of results of last BPE, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Method of communication: Never told	Face to face	By telephone	By mail
		Percent distribution			
Educational level					
Less than 12 years	100.0	7.2	79.5	7.7	2.6
12 years	100.0	6.6	77.9	8.8	4.7
More than 12 years	100.0	5.5	78.0	8.5	4.4
Family income					
Less than $10,000	100.0	6.8	80.7	7.3	3.2
$10,000–$19,999	100.0	5.9	78.5	8.3	4.8
$20,000–$34,999	100.0	7.0	76.9	8.7	4.7
$35,000 or more	100.0	5.5	78.7	8.9	4.3
Place of residence[2]					
MSA, central city	100.0	7.7	77.1	8.4	3.5
MSA, not central city	100.0	6.1	79.0	9.0	3.6
Not in MSA	100.0	5.6	79.3	6.9	5.6
Geographic region					
Northeast	100.0	5.4	82.6	7.0	2.4
Midwest	100.0	5.6	75.1	11.9	5.4
South	100.0	5.9	79.6	7.4	4.0
West	100.0	10.4	75.0	7.3	4.3

[1]Includes other, unknown, and combination of methods.
[2]MSA = metropolitan statistical area.

Table Y. Percent distribution of women 40 years of age and over who had no breast physical examination (BPE) in the past 3 years by most important reason for not having a BPE, according to race and age: United States, 1987

Race and age	Total	Not needed or no problems[1]	Never suggested by doctor	Put it off	Other[2]	Unknown
All races[3]			Percent distribution			
40 years and over	100.0	46.2	10.4	14.2	21.6	7.6
40–54 years	100.0	35.5	6.4	22.2	30.3	5.6
40–44 years	100.0	34.4	*5.4	25.1	30.0	*5.0
45–49 years	100.0	30.8	*6.7	28.1	27.8	*6.4
50–54 years	100.0	42.9	*7.0	*10.9	33.9	*5.5
55–64 years	100.0	45.4	8.1	16.8	21.6	8.1
55–59 years	100.0	41.8	11.3	18.8	21.6	*6.5
60–64 years	100.0	48.6	*5.2	15.0	21.7	9.5
65–74 years	100.0	52.8	12.3	9.2	17.6	8.1
65–69 years	100.0	48.8	7.9	11.7	23.2	8.4
70–74 years	100.0	58.2	18.2	*5.8	*10.1	*7.7
75 years and over	100.0	57.6	18.3	*3.3	11.4	9.5
75–79 years	100.0	62.1	16.7	*4.2	11.2	*5.8
80–84 years	100.0	56.4	*15.3	*1.5	*15.0	*11.9
85 years and over	100.0	47.0	*27.1	*3.1	*6.7	*16.0
White						
40 years and over:						
Crude	100.0	46.8	9.3	14.7	21.9	7.2
Age adjusted	100.0	45.0	8.4	16.0	23.7	6.9
40–54 years	100.0	34.7	4.2	23.2	32.5	5.4
55–64 years	100.0	45.4	7.9	17.7	20.9	8.1
65–74 years	100.0	54.5	11.6	9.3	17.0	7.6
75 years and over	100.0	59.0	16.7	*3.6	11.9	8.8
Black						
40 years and over:						
Crude	100.0	42.4	21.7	*12.4	16.5	*7.0
Age adjusted	100.0	42.2	21.8	*13.2	16.3	*6.6
40–54 years	100.0	*36.5	*19.8	*22.9	*12.8	*8.0
55–64 years	100.0	50.9	*12.1	*11.6	*24.1	*1.3
65–74 years	100.0	*42.3	*23.3	*7.9	*22.2	*4.2
75 years and over	100.0	*40.7	*37.0	–	*4.9	*16.7

[1]Includes "did not know I should."
[2]Includes cost, lack of insurance coverage, no regular doctor, fear, embarrassment, and substitution of breast self-examination.
[3]Includes other races not shown separately.

Table Z. Percent distribution of women 40 years of age and over who had no breast physical examination (BPE) in the past 3 years by most important reason for not having a BPE, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total	Not needed or no problems[1]	Never suggested by doctor	Put it off	Other[2]	Unknown
Educational level			Percent distribution			
Less than 12 years	100.0	48.3	10.0	12.7	20.2	8.8
12 years	100.0	42.5	10.0	18.2	24.5	4.7
More than 12 years	100.0	43.2	9.6	15.5	22.6	9.1
Family income						
Less than $10,000	100.0	47.2	12.5	7.3	28.0	5.0
$10,000–$19,999	100.0	42.6	10.7	12.8	27.3	6.8
$20,000–$34,999	100.0	45.9	8.0	18.2	19.6	8.4
$35,000 or more	100.0	33.9	10.3	23.7	21.4	10.7
Place of residence[3]						
MSA, central city	100.0	43.4	11.8	15.0	20.0	9.6
MSA, not central city	100.0	42.3	8.6	16.0	26.5	6.6
Not in MSA	100.0	47.1	11.4	14.4	20.4	6.5
Geographic region						
Northeast	100.0	47.4	7.8	14.9	25.4	*4.4
Midwest	100.0	39.2	11.5	20.1	19.2	10.1
South	100.0	47.0	10.1	16.8	20.2	5.9
West	100.0	47.5	9.1	9.5	25.7	8.3

[1]Includes "did not know I should."
[2]Includes cost, lack of insurance coverage, no regular doctor, fear, embarrassment, and substitution of breast self-examination.
[3]MSA = metropolitan statistical area.

Table AA. Percent distribution of women 40 years of age and over by interval since last mammogram, according to race and age: United States, 1987

Race and age	Total[1]	Never had mammogram			Ever had mammogram			
		Total[2]	Never heard of mammogram	Ever heard of mammogram	Total[3]	Interval since last mammogram: 0–11 months	12–36 months	37 months or more
	Percent distribution							
All races[4]								
40 years and over	100.0	58.9	13.0	45.9	38.1	14.8	14.3	7.2
40–54 years	100.0	55.0	8.5	46.5	42.2	16.8	16.1	7.3
40–44 years	100.0	58.8	8.3	50.5	38.8	14.7	15.3	6.7
45–49 years	100.0	52.4	8.7	43.6	43.5	18.1	16.7	6.9
50–54 years	100.0	52.6	8.5	44.1	45.5	18.3	16.6	8.7
55–64 years	100.0	56.6	11.4	45.2	41.1	16.9	13.6	8.3
55–59 years	100.0	54.9	10.2	44.7	43.2	17.6	14.9	9.5
60–64 years	100.0	58.6	12.7	45.9	38.7	16.1	12.1	7.0
65–74 years	100.0	61.7	13.7	47.9	35.2	12.9	14.3	6.7
65–69 years	100.0	59.4	11.1	48.4	37.5	14.7	14.0	7.2
70–74 years	100.0	64.7	17.3	47.4	32.1	10.5	14.7	6.0
75 years and over	100.0	70.6	28.1	42.5	24.8	8.0	9.9	5.5
75–79 years	100.0	66.8	21.8	45.0	30.0	9.6	12.4	6.4
80–84 years	100.0	74.1	31.1	43.0	20.4	*5.1	9.4	*4.8
85 years and over	100.0	75.2	40.2	35.0	17.5	*7.9	*3.6	*3.9
White								
40 years and over:								
Crude	100.0	58.1	11.2	46.9	39.2	15.3	14.8	7.4
Age adjusted	100.0	58.1	11.2	46.8	39.2	15.3	14.8	7.4
40–54 years	100.0	53.7	7.0	46.7	43.9	17.6	16.8	7.4
55–64 years	100.0	55.7	8.8	46.9	42.2	17.1	14.1	8.9
65–74 years	100.0	60.8	11.6	49.1	36.5	13.4	14.9	7.0
75 years and over	100.0	70.3	26.1	44.1	25.5	8.3	10.3	5.3
Black								
40 years and over:								
Crude	100.0	63.3	23.9	39.4	31.2	12.9	10.4	5.7
Age adjusted	100.0	64.1	26.0	38.1	30.1	12.2	10.0	5.6
40–54 years	100.0	61.2	15.1	46.2	33.7	13.7	11.5	6.6
55–64 years	100.0	60.4	25.1	35.2	36.4	17.9	10.7	*4.5
65–74 years	100.0	67.9	33.3	34.6	24.7	*8.4	*10.0	*4.2
75 years and over	100.0	73.1	48.6	24.5	*17.1	*3.4	*5.2	*7.4

[1]Includes unknown if ever had mammogram.
[2]Includes unknown if ever heard of mammogram.
[3]Includes unknown interval since last mammogram.
[4]Includes other races not shown separately.

Table BB. Percent distribution of women 40 years of age and over by interval since last mammogram, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Never had mammogram			Ever had mammogram			
		Total[2]	Never heard of mammogram	Ever heard of mammogram	Total[3]	Interval since last mammogram: 0–11 months	12–36 months	37 months or more
	Percent distribution							
Educational level								
Less than 12 years	100.0	71.3	27.0	44.3	25.7	8.7	10.0	6.0
12 years	100.0	57.3	8.4	48.9	39.7	15.2	15.2	7.3
More than 12 years	100.0	49.2	4.9	44.4	48.1	19.4	17.3	8.7
Family income								
Less than $10,000	100.0	70.8	24.6	46.2	27.0	9.2	10.0	6.4
$10,000–$19,999	100.0	64.4	15.4	49.0	32.9	11.4	12.7	7.8
$20,000–$34,999	100.0	56.1	8.8	47.3	41.6	16.3	15.9	8.0
$35,000 or more	100.0	50.9	5.9	45.0	47.4	20.9	16.6	7.4
Place of residence[4]								
MSA, central city	100.0	57.4	13.9	43.5	39.7	15.3	14.9	8.0
MSA, not central city	100.0	56.4	11.4	45.1	40.1	16.7	14.2	7.0
Not in MSA	100.0	65.0	15.0	50.1	32.1	10.5	13.2	7.1
Geographic region								
Northeast	100.0	59.7	11.8	47.9	37.2	13.9	13.4	6.8
Midwest	100.0	57.7	11.5	46.2	39.1	14.8	14.2	8.4
South	100.0	61.8	15.5	46.3	35.2	14.3	13.6	6.0
West	100.0	54.1	11.5	42.5	43.0	16.5	16.8	7.9

[1]Includes unknown if ever had mammogram.
[2]Includes unknown if ever heard of mammogram.
[3]Includes unknown interval since last mammogram.
[4]MSA = metropolitan statistical area.

26 percent of those with less than 12 years of education to 48 percent of those with more than 12 years of school and from 27 percent of those with family incomes of less than $10,000 to 47 percent of those with incomes of $35,000 or more. Among women who had ever had a mammogram, the proportion whose last examination had occurred within the year prior to interview increased steadily with education and income.

Women residing in MSA's were more likely than their nonmetropolitan counterparts to have ever had a mammogram, 40 compared with 32 percent. Regional variation was evident as well, with women living in the West the most likely to have ever had a mammogram (117,118).

As would be expected, mammograms were more likely than BPE's to be performed for medical reasons, 22 compared with 11 percent. Among women who had a mammogram in the preceding 3 years, the proportion whose last mammogram was performed as a routine examination increased sharply between ages 40–49 and 50–54 years (70 to 82 percent). This reflects the more widespread acceptance of mammography as a routine screening procedure at ages 50 years and over than at younger ages (table CC).

Table CC. Percent distribution of women 40 years of age and over who had a mammogram in the past 3 years by reason for last mammogram, according to race and age: United States, 1987

Race and age	Total[1]	Routine examination	Medical reason
All races[2]	Percent distribution		
40 years and over	100.0	77.0	22.3
40–54 years	100.0	74.0	25.4
40–44 years	100.0	69.0	30.6
45–49 years	100.0	72.4	26.2
50–54 years	100.0	81.9	18.1
55–64 years	100.0	78.4	20.9
55–59 years	100.0	75.8	22.9
60–64 years	100.0	81.8	18.2
65–74 years	100.0	79.3	19.7
65–69 years	100.0	79.9	18.9
70–74 years	100.0	78.5	20.9
75 years and over	100.0	83.6	15.0
75–79 years	100.0	86.0	*13.4
80–84 years	100.0	84.2	*12.0
85 years and over	100.0	*69.7	*30.3
White			
40 years and over:			
Crude	100.0	77.1	22.2
Age adjusted	100.0	77.4	21.9
40–54 years	100.0	74.6	25.0
55–64 years	100.0	77.9	21.3
65–74 years	100.0	79.0	20.2
75 years and over	100.0	83.5	15.1
Black			
40 years and over:			
Crude	100.0	74.7	23.7
Age adjusted	100.0	78.9	19.2
40–54 years	100.0	65.4	32.5
55–64 years	100.0	84.9	*15.1
65–74 years	100.0	83.2	*13.4
75 years and over	100.0	*93.0	*7.0

[1]Includes unknown if for medical reason.
[2]Includes other races not shown separately.

Table DD. Percent distribution of women 40 years of age and over who had a mammogram in the past 3 years by reason for last mammogram, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Routine examination	Medical reason
Educational level	Percent distribution		
Less than 12 years	100.0	73.6	25.9
12 years	100.0	77.5	21.8
More than 12 years	100.0	79.6	19.4
Family income			
Less than $10,000	100.0	70.9	28.9
$10,000–$19,999	100.0	72.8	26.6
$20,000–$34,999	100.0	75.6	24.0
$35,000 or more	100.0	79.2	19.8
Place of residence[2]			
MSA, central city	100.0	83.6	15.3
MSA, not central city	100.0	76.8	22.4
Not in MSA	100.0	70.7	28.5
Geographic region			
Northeast	100.0	77.5	22.0
Midwest	100.0	78.5	20.6
South	100.0	75.7	23.8
West	100.0	80.7	18.1

[1]Includes unknown if for medical reason.
[2]MSA = metropolitan statistical area.

The proportion of women reporting that their last mammogram was for routine, nonmedical reasons increased with education, and increased even more with income (table DD), suggesting that the cost of mammography may be a factor in the prevalence of its use as a preventive screening procedure. However, recent analyses by Bernstein, Thompson, and Harlan (117) and Thompson, Kessler, and Boss (118) indicate that even when cost is not a factor, that is, when cost is covered by health maintenance organizations, mammography is more common among those with more educational and financial resources.

Reason for last mammogram was strongly related to place of residence, with a pattern that may reflect ease of access to irradiation centers. Women living in central cities of MSA's were the most likely to have had their last mammogram for routine, nonmedical reasons (84 percent), followed by those living in other areas of MSA's (77 percent) and those living outside MSA's (71 percent).

Almost half (46 percent) of all women who had a mammogram in the 3 years preceding the NHIS-CEC interview stated that they were informed of the results of the procedure in person (table EE). Twenty-seven percent received the results by telephone, 13 percent by mail, and 9 percent never were notified of the results. Many of the women who were not notified volunteered that lack of notification was specified as signifying no problems.

Being told results in person was more common among women 65 years of age and over than among younger women, while telephone notification was more frequently

Table EE. Percent distribution of women 40 years of age and over who had a mammogram in the past 3 years by method of communication of results of last mammogram, according to race and age: United States, 1987

Race and age	Total[1]	Method of communication: Never told	Face to face	By telephone	By mail
All races[2]			Percent distribution		
40 years and over	100.0	9.0	45.7	27.1	12.8
40–54 years	100.0	8.5	44.6	29.6	12.9
40–44 years	100.0	6.6	50.0	26.3	12.4
45–49 years	100.0	12.7	42.4	29.9	9.8
50–54 years	100.0	6.1	40.6	33.2	17.2
55–64 years	100.0	11.0	39.0	27.7	15.9
55–59 years	100.0	10.6	39.5	28.3	14.9
60–64 years	100.0	11.5	38.3	26.8	17.1
65–74 years	100.0	9.2	51.6	23.6	9.6
65–69 years	100.0	8.0	50.8	24.5	10.7
70–74 years	100.0	10.9	52.9	22.1	*7.8
75 years and over	100.0	*5.5	58.9	20.0	9.6
75–79 years	100.0	*3.8	57.4	21.8	*10.8
80–84 years	100.0	*7.9	52.4	*21.2	*10.3
85 years and over	100.0	*9.0	80.0	*8.3	*2.8
White					
40 years and over:					
Crude	100.0	9.3	44.1	28.5	12.7
Age adjusted	100.0	9.2	45.4	27.5	12.4
40–54 years	100.0	9.2	42.9	31.1	12.6
55–64 years	100.0	10.4	37.2	29.4	16.0
65–74 years	100.0	9.8	49.7	24.8	9.7
75 years and over	100.0	*5.7	57.4	20.6	10.1
Black					
40 years and over:					
Crude	100.0	*6.7	63.8	13.3	11.9
Age adjusted	100.0	*5.0	69.7	11.7	9.2
40–54 years	100.0	*2.8	61.0	*16.4	*13.9
55–64 years	100.0	*17.0	54.7	*12.8	*13.4
65–74 years	100.0	–	86.6	*5.4	*3.4
75 years and over	100.0	–	*100.0	–	–

[1]Includes other, unknown, and combination of methods.
[2]Includes other races not shown separately.

reported by younger women. Even after adjustment for age, black women reported receiving results in person more often than white women (70 compared with 45 percent), who were more likely to have been notified by telephone (28 compared with 12 percent for black women). The proportion of women who were informed of their mammography results by mail did not vary according to race, nor was there a consistent pattern by age.

The probability of being notified of mammography results in person was inversely related to income and education and showed geographic variation consistent with the effects of socioeconomic status (table FF). Fifty-seven percent of women not living in MSA's reported being notified in person, compared with 47 percent of those living in central cities and 41 percent of those living outside central cities of MSA's. In terms of geographic region, personal notification was most often mentioned by women living in the South (53 percent) and least often mentioned by women residing in the West (41 percent) or Midwest (43 percent).

Of those women who had not had a mammogram in the 3 years preceding the NHIS-CEC interview, the main reason given was that it was not needed or that no problems had been experienced. This rationale was reported by 48 percent of women 40 years of age and over (table GG). Twenty-nine percent of these women said that their doctors had never suggested that they have a mammogram, and 7 percent said they had "put it off." Twelve percent reported other reasons, including cost (3 percent); lack of insurance coverage (less than 1 percent); no regular doctor, including not going to doctors at all (2 percent); embarrassment (less than 1 percent); fear, including fear of irradiation (2 percent); painful procedure (1 percent); and unpredictable results (less than 1 percent).

The proportion of women stating that they had not needed to have a mammogram increased with age, from 43 percent of women 40–54 years of age to 56 percent of those age 75 years and over, and was higher for white than for black women, 48 compared with 42 percent after age adjustment. Black women were more likely than white women to report that their doctors never suggested mammography, 41 compared with 28 percent. Surprisingly, the proportion of women who stated that their doctors had never suggested they have a mammogram increased with income, from 26 percent of women with family incomes of less than $10,000 to 34 percent of those with family incomes of $35,000 or more (table HH).

Table FF. Percent distribution of women 40 years of age and over who had a mammogram in the past 3 years by method of communication of results of last mammogram, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total[1]	Method of communication: Never told	Face to face	By telephone	By mail
		Percent distribution			
Educational Level					
Less than 12 years	100.0	10.3	55.5	22.6	7.9
12 years	100.0	8.5	45.3	27.7	13.2
More than 12 years	100.0	7.8	45.4	26.0	13.6
Family income					
Less than $10,000	100.0	9.1	58.0	17.1	10.3
$10,000–$19,999	100.0	9.1	49.1	24.4	12.3
$20,000–$34,999	100.0	8.2	49.1	27.2	12.9
$35,000 or more	100.0	8.0	39.3	29.6	15.3
Place of residence[2]					
MSA, central city	100.0	9.6	47.4	24.8	13.5
MSA, not central city	100.0	10.8	41.1	28.7	13.1
Not in MSA	100.0	5.8	57.2	21.4	11.1
Geographic region					
Northeast	100.0	10.7	48.9	24.2	11.6
Midwest	100.0	7.0	43.0	29.3	14.3
South	100.0	5.7	53.1	25.2	10.6
West	100.0	13.6	41.0	26.4	12.5

[1]Includes other, unknown, and combination of methods.
[2]MSA = metropolitan statistical area.

Table GG. Percent distribution of women 40 years of age and over who had no mammogram in the past 3 years by most important reason for not having a mammogram, according to race and age: United States, 1987

Race and age	Total	Not needed or no problems[1]	Never suggested by doctor	Put it off	Other[2]	Unknown
			Percent distribution			
All races[3]						
40 years and over	100.0	47.8	29.0	6.5	12.1	4.6
40–54 years	100.0	43.2	30.5	8.4	14.1	3.8
40–44 years	100.0	42.1	32.7	8.6	13.9	2.6
45–49 years	100.0	43.7	29.7	10.0	13.6	*3.0
50–54 years	100.0	44.2	27.9	6.4	14.7	6.8
55–64 years	100.0	48.7	26.4	7.8	13.1	4.0
55–59 years	100.0	48.9	26.0	7.3	12.8	5.0
60–64 years	100.0	48.3	26.9	8.4	13.6	*2.7
65–74 years	100.0	51.1	27.9	4.3	11.2	5.5
65–69 years	100.0	47.8	28.1	5.8	13.0	5.4
70–74 years	100.0	55.8	27.8	*2.3	8.6	5.6
75 years and over	100.0	55.9	30.6	*1.4	5.4	6.8
75–79 years	100.0	58.8	28.0	*1.8	6.4	*5.0
80–84 years	100.0	51.4	35.6	*1.1	*4.0	*7.7
85 years and over	100.0	54.4	30.1	–	*4.3	*11.2
White						
40 years and over:						
Crude	100.0	48.3	27.8	6.9	12.6	4.4
Age adjusted	100.0	48.4	27.8	6.8	12.6	4.4
40–54 years	100.0	43.3	29.1	8.9	15.4	3.2
55–64 years	100.0	48.7	25.6	8.5	13.3	3.9
65–74 years	100.0	51.7	26.9	4.5	11.2	5.7
75 years and over	100.0	57.2	29.6	*1.4	5.3	6.4
Black						
40 years and over:						
Crude	100.0	41.9	40.8	*4.1	7.7	5.5
Age adjusted	100.0	41.8	41.1	*3.1	7.8	6.0
40–54 years	100.0	38.7	42.1	*6.6	*7.5	*5.2
55–64 years	100.0	51.2	34.3	*1.4	*8.1	*5.0
65–74 years	100.0	44.4	44.4	*0.6	*7.7	*3.2
75 years and over	100.0	*34.0	*44.7	–	*7.5	*13.8

[1]Includes "did not know I should."
[2]Includes cost, lack of insurance coverage, no regular doctor, fear, embarrassment, painful procedure, and unpredictable results.
[3]Includes other races not shown separately.

Table HH. Percent distribution of women 40 years of age and over who had no mammogram in the past 3 years by most important reason for not having a mammogram, according to selected characteristics adjusted for race and age: United States, 1987

Characteristic	Total	Not needed or no problems[1]	Never suggested by doctor	Put it off	Other[2]	Unknown
			Percent distribution			
Educational level						
Less than 12 years	100.0	50.3	27.1	3.7	11.1	7.8
12 years	100.0	46.1	30.5	7.2	13.0	3.2
More than 12 years	100.0	48.0	30.0	6.4	11.8	3.7
Family income						
Less than $10,000	100.0	45.8	26.0	3.4	19.5	5.3
$10,000–$19,999	100.0	49.7	27.5	5.5	11.7	5.5
$20,000–$34,999	100.0	50.6	29.1	5.7	10.8	3.8
$35,000 or more	100.0	40.7	33.5	7.0	15.2	3.6
Place of residence[3]						
MSA, central city	100.0	48.5	29.7	4.8	12.7	4.4
MSA, not central city	100.0	46.9	29.5	7.3	12.3	4.1
Not in MSA	100.0	48.1	29.7	6.4	10.0	5.7
Geographic region						
Northeast	100.0	48.3	30.0	6.3	10.8	4.5
Midwest	100.0	44.4	32.1	7.7	11.3	4.5
South	100.0	47.4	29.3	7.2	11.3	4.7
West	100.0	54.5	23.1	3.1	14.8	4.5

[1]Includes "did not know I should."
[2]Includes cost, lack of insurance coverage, no regular doctor, fear, embarrassment, painful procedure, and unpredictable results.
[3]MSA = metropolitan statistical area.

Screening trends

Breast cancer screening has become more common in recent years (119–121); however, breast cancer screening procedures continued to be underutilized in 1987. Results from a recent analysis of the 1987 (NHIS) suggest that the extensive underutilization of most screening procedures may be due largely to such psychosocial factors as lack of knowledge or awareness of specific tests, noncognizance of the importance of screening in the absence of symptoms, not living where mammography is readily available, and possible race or ethnic factors associated with education and income resources available (122). These data also imply that a communication problem may exist between physicians and patients; for example, while there are published guidelines for physicians regarding ages at which to initiate mammographic screening and recommendations for periodicity based on empirical data, a number of women reported never having been told they needed to obtain a mammogram.

Data from previous National Health Interview Surveys are available to compare with the 1987 data. Pre-1987 data represent estimates obtained from questions differently worded than in 1987 and thus are not directly comparable to 1987 estimates. However, an analysis of the 1973 and 1985 NHIS data performed by Makuc, Freid, and Kleinman (123) suggests that mammography and BPE's have increased markedly for certain population subgroups (black women, for example), while there has been little change in utilization rates for white women.

With reference to mammography, recent data from the Behavioral Risk Factor Surveillance System confirm the trend toward increased usage (124), but these data, based on a sample of women who saw a physician for routine care in the year preceding interview, are not comparable to nor as accurate or representative as those from the 1987 NHIS. A recent Gallup survey indicated that 85 percent of women 40 years of age and over were aware of mammography and that 40 percent had ever received one (125). These estimates are comparable to findings of the 1987 NHIS-CEC.

In contrast, a recent telephone poll (126) found that 94 percent of respondents were aware of mammograms and that 54 percent had had a mammogram in the past. These figures are considerably higher than the 1987 NHIS estimates, and need to be interpreted with respect to the methodological differences between personal interviews, as used in the NHIS-CEC and Gallup poll, and a telephone survey. Another factor that may explain the discrepancy is that the telephone survey data were collected in the last quarter of 1987. Awareness and use of mammography increased sharply in that quarter (124), possibly as a result of publicity concerning Nancy Reagan's breast cancer. Because the NHIS data were collected over the course of the full 12 months, the effects of this publicity on NHIS estimates were somewhat attenuated.

Legislative trends

Over the past 3 years State legislatures have accelerated efforts to mandate some form of cost sharing or program provision for the purpose of decreasing access barriers of cost in obtaining screening mammograms. Specific aspects of legislation for preventive care vary markedly among the States. Legislative variations include differences in ages for screening and periodicity of examinations, limitations on radiation dosage and equipment, differences in amount an insurer must pay or the professional charge, and types of insurance policies or plans that are affected.

Legislation addressing mammography exists at the national and the State levels. The Medicare Catastrophic Coverage Act, which becomes effective in 1990, will provide 80 percent coverage of the actual charge of a screening mammogram, to a maximum of $50, for Medicare beneficiaries (age 65 years and over, or disabled). As of July 1989, 30 States had enacted some form of legislation related to breast cancer screening by mammography. Of these, 24 (Arkansas, Arizona, California, Colorado, Connecticut, Florida, Iowa, Kansas, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, Nevada, New York, North Dakota, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, Washington, and West Virginia) mandated some form of third-party payment for screening. While the geographic pattern was less clear in 1989 than in 1988, most States were located either in the northeastern or southwestern sectors of the United States.

States with the most comprehensive legislation (Massachusetts, California, and Connecticut) mandate third-party coverage by most health plans. The majority of these base their mandates on National Cancer Institute and American Cancer Society guidelines or they provide for annual mammograms. States providing for somewhat less comprehensive coverage (for example, Texas, Oklahoma, New

Hampshire, and Arizona) generally mandate what dose mammography should be used (for example, less than 1 rad per breast), but they tend to be more restrictive with reference to types of policies or health plans affected and the ages at which women may receive these benefits (45 years and over in Oklahoma, for example). States that are least comprehensive (for example, Illinois and Alaska) do not mandate insurance coverage, but they are increasing efforts to promote screening either by provision of funds for health education pamphlets or by setting up systems to provide coverage at the State health level.

As new laws and related programs get under way, other States will undoubtedly adopt similar policies or modify their plans based on the experience of the States in the forefront of mandating coverage for preventive services. It is clear that legislation is not the causal force leading to increased mammography screening. The apparent trend toward increased screening appears to have either preceded or occurred conjointly with the movement toward legislating third-party involvement in these services (118).

In summary, the data indicate that if breast cancer screening is to become more than nominally utilized, several factors affecting use of these tests must be addressed. Physicians and the public must become more aware of the importance of mammography in breast cancer mortality reduction and the current availability of mammography screening, so that these procedures are requested or recommended regularly. Second, because the data clearly indicate that older women (60 years and over), while more likely to have or get breast cancer, are less likely to receive screening, programs directed toward increasing participation of the elderly need to be increased. Third, because black women, Hispanic women, and women of low socioeconomic status are the least likely to know about these procedures and their benefits and to have access to the testing facilities, health program planners and practitioners need to focus on service delivery to these subgroups in the population.

References

1. Stephenson MG, Levy AS, Sass NL, McCarvey WE. 1985 NHIS findings: Nutrition knowledge and baseline data for weight loss objectives. Pub Health Rep 102(1):61–7. 1987.
2. Gillum RF. Overweight and obesity in black women: A review of published data from the National Center for Health Statistics. JAMA 79(8):865–71. 1987.
3. Schoenborn CA. Health habits of U.S. adults, 1985: The "Alameda 7" revisited. Pub Health Rep 101(6):571–80. 1986.
4. Dawson DA. Trends in routine screening examinations. Am J Pub Health 77(8):1004–5. 1987.
5. Bloom B. Use of selected preventive care procedures. National Center for Health Statistics. Vital Health Stat 10(157). 1986.
6. Moss AJ, Wilder MH. Use of selected medical procedures associated with medical care: United States, 1973. National Center for Health Statistics. Vital Health Stat 10(110). 1977.
7. Schoenborn CA, Marano M. Current estimates from the National Health Interview Survey: United States, 1987. National Center for Health Statistics. Vital Health Stat 10(166). 1988.
8. American Cancer Society. Cancer facts and figures—1988. New York: American Cancer Society. 1988.
9. National Cancer Institute. 1987 annual cancer statistics review. NIH pub no 88–2789. Washington: Public Health Service. 1988.
10. National Cancer Institute. Cancer statistics review 1973–1986, including a report on the status of cancer control: May, 1989. NIH pub no 89–2789. Washington: Public Health Service. 1989.
11. McWhorter WP, Mayer WJ. Black/white differences in type of initial breast cancer treatment and implications for survival. Am J Pub Health 77(12):1515–17. 1987.
12. Janerich DT, Hoff MB. Evidence for a crossover in breast cancer risk factors. Am J Epidemiol 116(5):737–42. 1982.
13. Paffenbarger RS Jr, Kampert JB, Chang HG. Characteristics that predict risk of breast cancer before and after the menopause. Am J Epidemiol 112(2):258–68. 1980.
14. Petrakis NL, Ernster VL, King MC. Breast. In: Schottfield D, Fraumeni JF Jr, eds. Cancer epidemiology and prevention. Philadelphia: WB Saunders Co. 1982.
15. Kodlin D, Winger EE, Morgenstern NL, et al. Chronic mastopathy and breast cancer. A follow-up study. Cancer 39:2603–7. 1977.
16. Potter JF, Slimbaugh WP, Woodward SC. Can breast cancer be anticipated? A follow-up of benign breast lesions. Ann Surg 167:829–38. 1968.
17. Davis HH, Simons M, Davis JB. Cystic disease of the breast. Relationship to carcinoma. Cancer 17:957–78. 1964.
18. Donnelly PK, Baker KW, Carney JA, et al. Benign breast lesions and subsequent breast carcinoma in Rochester, Minnesota. Mayo Clin Proc 50:650–6. 1975.
19. Roberts MM, Jones V, Elton RA, et al. Risk of breast cancer in women with benign disease of the breast. Br Med J 288:275–8. 1984.
20. Lewison EF, Lyons JG. Relationship between benign breast disease and cancer. Arch Surg 66:94–114. 1953.
21. Monson RR, Yen S, MacMahon B, Warren S. Chronic mastitis and carcinoma of the breast. Lancet 2:224–6. 1976.
22. Webber W, Boyd N. A critique of the methodology of studies of benign breast disease and breast cancer risk. JNCI 77(2):397–404. 1986.
23. Coombs LJ, Lillienfeld AM. A prospective study of the relationship between benign breast diseases and breast carcinoma. Prev Med 8(1):40–52. 1979.
24. Helmrich SP, Shapiro S, Rosenberg L, et al. Risk factors for breast cancer. Am J Epidemiol 117(1):35–45. 1983.
25. Black MM, Barclay THC, Cutler SJ, et al. Association of atypical characteristics of benign breast lesions with subsequent risk of breast cancer. Cancer 29:338–43. 1972.
26. Dupont WD, Page DL. Breast cancer risk associated with proliferative disease, age at first birth, and a family history of breast cancer. Am J Epidemiol 125(5):769–79. 1987.
27. Page DL, Vander-Zwaag R, Rogers LW, et al. Relation between component parts of fibrocystic disease and breast cancer. JNCI 61(6):1055–63. 1978.
28. Lipnick R, Speizer FE, Bain C, et al. A case-control study of risk indicators among women with premenopausal and early postmenopausal cancer. Cancer 53(4):1020–4. 1984.
29. Jacobsen O. Heredity in breast cancer: A genetic and clinical study of two hundred probands. London: Lewis. 1946.
30. Macklin MT. Comparison of the number of breast cancer deaths observed in relatives of breast cancer patients, and the number expected on the basis of mortality rates. JNCI 22:927–51. 1959.
31. Penrose LS, MacKenzie HJ, Karn MN. A genetic study of human mammary cancer. Ann Eug 14:234–66. 1948.
32. Woolf CM. Investigations on genetic aspects of carcinoma of the stomach and breast. Berkeley: University of California Press. 1955.
33. Anderson DE. A genetic study of human breast cancer. JNCI 48:1029–34. 1972.
34. Anderson DE. Genetic study of breast cancer: Identification of a high risk group. Cancer 34:1090–7. 1974.
35. Anderson DE. Breast cancer in families. Cancer 40:1855–60. 1977.
36. Sattin RW, Rubin GL, Webster LA, et al. Family history and the risk of breast cancer. JAMA 253(13):1908–13. 1985.
37. Kleinberg DL. Prolactin and breast cancer. N Engl J Med 316(5):269–71. 1987.

38. Musey VC, Collins DC, Musey PI, et al. Long term effect of a first pregnancy on the secretion of prolactin. N Engl J Med 316(5):229–34. 1987.
39. Bain C, Willet W, Rosner B, et al. Early age at first birth and decreased risk of breast cancer. Am J Epidemiol 114(5):705–9. 1981.
40. Kelsey JL. A review of the epidemiology of human breast cancer. Epidemiol Rev 1:74–109. 1979.
41. Kvåle G, Heuch I, Eide GE. A prospective study of reproductive factors and breast cancer. I. Parity. Am J Epidemiol 126(5):831–41. 1987.
42. Kvåle G, Heuch I. A prospective study of reproductive factors and breast cancer. II. Age at first and last birth. Am J Epidemiol 126(5):842–50. 1987.
43. MacMahon B, Cole P, Lin TM, et al. Age at first birth and breast cancer risk. Bull WHO 43:209–21. 1970.
44. MacMahon B, Cole P, Brown J. Etiology of human breast cancer—A review. JNCI 50:21–42. 1973.
45. Cole P, MacMahon B. Oestrogen fractions during early reproductive life in the aetiology of breast cancer. Lancet 1:604–6. 1969.
46. Pearson OH, Llerena O, Llerena L, et al. Prolactin-dependent rat mammary cancer: A model for man? Trans Assoc Am Phys 82:225–38. 1969.
47. MacMahon B, Lin TM, Lowe CR, et al. Lactation and cancer of the breast. A summary of an international study. Bull WHO 42:185–94. 1970.
48. Byers T, Saxon G, Rzepka T, Marshall J. Lactation and breast cancer. Evidence for a negative association in premenopausal women. Am J Epidemiol 121(5):664–74. 1985.
49. McTiernan A, Thomas DB. Evidence for a protective effect of lactation on risk of breast cancer in young women. Results from a case-control study. Am J Epidemiol 124(3):353–8. 1986.
50. Ing R, Ho JHC, Petrakis NL. Unilateral breast feeding and breast cancer. Lancet 2:124–7. 1977.
51. Ing R, Ho JHC, Petrakis NL. Unilateral suckling and breast cancer (Letter). Lancet 2:655–7. 1977.
52. Choi NW, Howe GR, Miller AB, et al. An epidemiologic study of breast cancer. Am J Epidemiol 107(6):510–21. 1978.
53. Kelsey JL, Fisher DB, Holford TR, et al. Exogenous estrogens and other factors in the epidemiology of breast cancer. JNCI 67(2):327–33. 1981.
54. Staszewski J. Age at menarche and breast cancer. JNCI 47:935–40. 1971.
55. Stavraky K, Emmons S. Breast cancer in pre-menopausal and post-menopausal women. JNCI 53:647–54. 1974.
56. Levin ML, Sheehe PR, Graham S, et al. Lactation and menstrual function as related to cancer of the breast. Am J Pub Health 54(4):580–7. 1964.
57. Lipnick RJ, Buring JE, Hennekens CH, et al. Oral contraceptives and breast cancer. A prospective cohort study. JAMA 255(1):58–61. 1986.
58. Ory H, Cole P, MacMahon B, et al. Oral contraceptives and reduced risk of benign breast diseases. N Engl J Med 294(8):419–22. 1976.
59. Sartwell PE, Arthes FG, Tonascia JA. Exogenous hormones, reproductive history, and breast cancer. JNCI 59:1589–92. 1977.
60. Thomas DB. Role of exogenous female hormones in altering the risk of benign and malignant neoplasms in humans. Cancer Res 38:3991–4000. 1978.
61. Vessey MP, Doll R, Jones K, et al. An epidemiological study of oral contraceptives and breast cancer. Br Med J 1:1755–8. 1979.
62. Brinton LA, Williams RR, Hoover RN, et al. Breast cancer risk factors among screening program participants. JNCI 62(1):37–42. 1979.
63. Paffenbarger RS, Fasal E, Simmons ME, Kampert JB. Cancer risk as related to use of oral contraceptives during fertile years. Cancer 39(suppl):1887–91. 1977.
64. McPherson K, Neil A, Vessey MP, et al. Oral contraceptives and breast cancer. Lancet 2:1441–5. 1983.
65. Meirik O, Lund E, Adams HO, et al. Oral contraceptives and breast cancer in young women. Lancet 2:650–4. 1986.
66. Pike MC, Henderson BE, Krailo MD, et al. Breast cancer in young women and use of oral contraceptives: Possible modifying effects of formulation and age at use. Lancet 2:926–30. 1983.
67. Miller DR, Rosenberg L, Kaufman DW, et al. Breast cancer before age 45 and oral contraceptive use: New findings. Am J Epidemiol 129(2):269–80. 1989.
68. Buring JE, Hennekens CH, Lipnick RJ, et al. A prospective cohort study of postmenopausal hormone use and risk of breast cancer in U.S. women. Am J Epidemiol 125(6):939–47. 1987.
69. Casagrande J, Gerkins V, Henderson BE, et al. Brief communication: Exogenous estrogens and breast cancer in women with natural menopause. JNCI 56:839–41. 1976.
70. Wingo PA, Layde PM, Lee NC, et al. The risk of breast cancer in postmenopausal women who have used estrogen replacement therapy. JAMA 257(2):209–15. 1987.
71. Hoover R, Gray LA, Cole P, et al. Menopausal estrogens and breast cancer. N Engl J Med 295(8):401–5. 1976.
72. Ross RK, Paganini-Hill A, Gerkins VR, et al. A case-control study of menopausal estrogen therapy and cancer. JAMA 243(16):1635–9. 1980.
73. Verreault R, Bresson J, Deschenes L, Naud F. Body weight and prognostic indicators in breast cancer. Modifying effect of estrogen receptors. Am J Epidemiol 129(2):260–8. 1987.
74. de Waard F. Breast cancer incidence and nutritional status with particular reference to body weight and height. Cancer Res 35:3351–6. 1975.
75. de Waard F, Cornelius JP, Aoki K, et al. Breast cancer incidence according to weight and height in two cities of the Netherlands and in Aichi Prefecture, Japan. Cancer 40:1269–75. 1977.
76. Staszewski J. Breast cancer and body build. Prev Med 6(3):410–5. 1977.
77. Schatzken A, Jones Y, Hoover RN, et al. Alcohol consumption and breast cancer in the epidemiologic follow-up study of the first National Health and Nutrition Examination Survey. N Engl J Med 316(19):1169–73. 1987.
78. Willett WC, Stampfer MJ, Colditz GA, et al. Moderate alcohol consumption and the risk of breast cancer. N Engl J Med 316(19):1174–80. 1987.
79. Hiatt RA, Bawol RD. Alcoholic beverage consumption and breast cancer incidence. Am J Epidemiol 120(5):676–83. 1984.
80. Harvey E, Schairer C, Brinton L, Hoover R. Alcohol consumption and breast cancer. Paper presented at annual meeting of the Society for Epidemiologic Research, Pittsburgh. 1986.

81. LaVecchia C, Decarli A, Franceschi S, et al. Alcohol consumption and the risk of breast cancer in women. JNCI 75(1):61–5. 1985.
82. Le MG, Hill C, Kramar A, Flamant R. Alcohol beverage consumption and breast cancer in a French case-control study. Am J Epidemiol 120(3):350–7. (1984.
83. Le MG, Moulton LH, Hill C, Kramar A. Consumption of dairy products and alcohol in a case-control study of breast cancer. JNCI 77(3):633–6. 1986.
84. O'Connell DL, Hullea BS, Chambless LE, et al. Cigarette smoking, alcohol consumption and breast cancer risk. JNCI 78(2):229–34. 1987.
85. Rosenberg L, Sloane D, Shapiro S, et al. Breast cancer and alcoholic-beverage consumption. Lancet 1:267–71. 1982.
86. Talamine R, LaVecchia C, Decarli A, et al. Social factors, diet and breast cancer in a Northern Italian population. Br J Cancer 49:723–9. 1984.
87. Williams RR, Horm JW. Association of cancer sites with tobacco and alcohol consumption and socioeconomic status of patients: Interview study from the Third National Cancer Survey. JNCI 58:525–47. 1977.
88. Begg CB, Walker AM, Wessen B, Zelen M. Alcohol consumption and breast cancer. Lancet 1:293–4. 1983.
89. Byers T, Funch DF. Alcohol and breast cancer. Lancet 1:799–801. 1982.
90. Paganini-Hill A, Ross RK. Breast cancer and alcohol consumption. Lancet 2:626–7. 1983.
91. Webster LA, Layde PM, Ory HW. Cancer and Steroid Hormone Group. Alcohol consumption and risk of breast cancer. Lancet 2:724–6. 1983.
92. Clark WB, Midanik L. Alcohol use and alcohol problems among U.S. adults: Results of the 1979 national survey. In: Alcohol and health monograph. 1: Alcohol consumption and related problems. Washington: Public Health Service. 1982.
93. Johnson P, Armor D, Polick S, Stambal H. U.S. adult drinking practices: Time trends, social correlates and sex roles. Contract No. ADM–281–76–0200. Santa Monica, California: Rand Corporation. 1977.
94. Wilsnack SC, Wilsnack RN, Klassen AD. Epidemiological research on women's drinking, 1978–84. In: Proceedings of the National Research Conference on Women and Alcohol. Seattle, Washington: University of Washington. 1984.
95. Williams GD, Dufour M, Bertolucci D. Drinking levels, knowledge, and associated characteristics, 1985 NHIS findings. Pub Health Rep 101(6):593–8. 1986.
96. Early Detection Branch, Division of Cancer Prevention and Control. Working guidelines for early cancer detection. Rationale and supporting evidence to decrease mortality. National Cancer Institute. Bethesda, Maryand. 1987.
97. U.S. Preventive Services Task Force. Recommendations for breast cancer screening. JAMA 257(16):2196. 1987.
98. Foster R Jr, Lang SP, Costanza MC, et al. Breast self-examination practices and breast cancer stage. N Engl J Med 299(6):265–70. 1978.
99. Foster RS Jr, Costanza MC. Breast self-examination practices and breast cancer survival. Cancer 53(4):999–1005. 1984.
100. Feldman J, Carter A, Nicastri A, et al. Breast self-examination: Relationship to stage of breast cancer at diagnosis. Cancer 47(11):2740–5. 1981.
101. Greenwald P, Lawrence C, Horton J, et al. Effect of breast self-examination and routine physician examinations on breast cancer mortality. N Engl J Med 299(6):271–3. 1978.
102. Huguley C, Brown R. The value of breast self-examination. Cancer 47(5):989–95. 1981.
103. Frank JW, Mai V. Breast self-examination in young women: More harm than good? (Letter) Lancet 1:654–7. 1985.
104. Senie RT, Rosen PP, Lesser ML, Kinne DW. Breast self-examination and medical examination related to breast cancer stage. Am J Public Health 71(6):583–90. 1981.
105. Smith EM, Francis AM, Polissar L. The effect of breast self-exam practices and physician examinations on extent of disease at diagnosis. Prev Med 9(3):409–17. 1980.
106. Leis P, Hewitt JC, Greene FL, Haynes JL. The war on breast cancer: prevention and early detection. The Female Patient 13:57–62. 1988.
107. Chu KC, Smart CR, Tarone RE. Analysis of breast cancer mortality and stage distribution by age for the Health Insurance Plan clinical trial. JNCI 8(14):1125–31. 1988.
108. American Cancer Society. Mammography guidelines 1983: Background statement and update of cancer-related checkup guidelines for breast cancer detection in asymptomatic women age 40–49. American Cancer Society. New York, New York. 1983.
109. Shapiro S, Venet W, Strax L, Roeser R. Selection, follow-up, and analysis in the Health Insurance Plan Study: A randomized trial with breast cancer screening. Presented at the Workshop on Selection, Follow-up, and Analysis in Prospective Studies held October 3–5, 1983, at the Waldorf Astoria Hotel, New York. National Cancer Institute Monograph no 67. 1985.
110. Tabar L, Fagerberg DJG, Gad A, et al. Reduction in mortality from breast cancer after mass screening with mammography. Randomized trial from the Breast Cancer Screening Working Group of the Swedish National Board of Health and Welfare. Lancet 1:829–32. 1985.
111. Eddy DM, Hasselblad V, McGivney W, et al. The value of mammography screening in women under age 50 years. JAMA 259(10):1512–9. 1988.
112. Shapiro S, Venet W, Strax P, et al. Ten- to fourteen-year effect of screening on breast cancer mortality. JNCI 69(2):349–55. 1982.
113. Shapiro S. Evidence on screening for breast cancer from a randomized trial. Cancer 39(suppl):2772–82. 1977.
114. Breslow L, Henderson B, Massey F, et al. Report of National Cancer Institute Ad Hoc Working Group on the gross and net benefits of mammography in a mass screening for the detection of breast cancer. JNCI 59:475–8. 1977.
115. Baker LH. Breast Cancer Detection Demonstration Project: Five-year summary report. CA 32:194–225. 1982.
116. Seidman H, Gelb SK, Silverberg E, et al. Survival experience in the Breast Cancer Detection Demonstration Project. CA 37:258–90. 1987.
117. Bernstein AB, Thompson GB, Harlan LC. Screening for cancer in HMO's. Data from the 1987 National Health Interview Survey. Medical Care (in press). 1990.
118. Thompson GB, Kessler LG, Boss L. Breast cancer screening legislation in the United States: A commentary. Am J Public Health 79(11):1541–1543. 1989.
119. Huguley CM. Screening for breast cancer. J Med Assoc Ga 76(5):310–3. 1987.
120. Chow WH, Liff JM, Greenberg RS. Mammography in Atlanta. J Med Assoc Ga 76(11):788–92. 1987.
121. Bang KM, White JE, Gause B, Leffall LD. Evaluation of recent trends in cancer mortality and incidence among blacks. Cancer 61(6):1256–61. 1988.

122. Thompson GB, Kessler LG, Mayer W, Howard J. Breast cancer screening practices in the United States in 1987: Data from the National Health Interview Survey. Paper presented at the annual meeting of the American Public Health Association. Boston. 1988.
123. Makuc DM, Freid VM, Kleinman JC. National trends in the use of preventive health care by women. Am J Public Health 79(1):21–26. 1989.
124. Heath CW, Fink DJ. Trends in screening mammograms for women 50 years of age and older—Behavioral Risk Factor Surveillance System, 1987. MMWR 38(9):137–40. 1989.
125. Gallup Organization. 1987 Survey of Public Awareness and Use of Cancer Tests. Unpublished results of a poll sponsored by the American Cancer Society and analyzed by Leiberman Research, Inc. 1987.
126. National Cancer Institute, Office of Cancer Communications. Report: Knowledge, Attitudes, and Behavior Cancer Survey, Wave I. Bethesda, Maryland: GK Shifflet and Associates, Ltd. 1988.
127. Moore TF. Redesign of the National Health Interview Survey. Statistical Methods Division Methodological Memorandum Series; Rep no CB/SMD/MM/85/02. Unpublished technical paper. 1985.
128. Kovar MG, Poe GS. The National Health Interview Survey design, 1973–84, and procedures, 1975–83. National Center for Health Statistics. Vital Health Stat 1(18). 1985.
129. Koons DA. Quality control and measurement of nonsampling error in the Health Interview Survey. National Center for Health Statistics. Vital Health Stat 2(54). 1973.
130. Balamuth E, Shapiro S. Health interview responses compared with medical records. National Center for Health Statistics. Vital Health Stat 2(7). 1965.
131. Cannell CF, Fowler FJ Jr. Comparison of hospitalization reporting in three survey procedures. National Center for Health Statistics. Vital Health Stat 2(8). 1965.
132. Madow WG. Interview data on chronic conditions compared with information derived from medical records. National Center for Health Statistics. Vital Health Stat 1(23). 1967.
133. Cannell CF, Fowler FJ Jr, Marquis KH. The influence of interviewer and respondent psychological and behavioral variables on the reporting in household interviews. National Center for Health Statistics. Vital Health Stat 2(26). 1968.
134. Metropolitan Life Insurance Company. 1983 Metropolitan height and weight tables. Stat Bull 64(1):1–9. 1983.
135. National Institutes of Health, Public Health Service. Office of Medical Applications of Research. Health implications of obesity. National Institutes of Health Consensus Conference Development Statement; vol 5, no 9. Bethesda, Maryland. 1985.
136. Metropolitan Life Insurance Company. New weight standards for men and women. Stat Bull 40:1. 1959.
137. Rowland ML. Reporting bias in height and weight data. Stat Bull 70(2):2–10. 1989.
138. Van Itallie TB. Health implications of overweight and obesity in the United States. Ann Intern Med 103 (suppl., pt. 2):983–88. 1985.

Appendixes

Contents

Appendix tables

Appendix I
Technical notes on methods

Background

This report is one of a series of statistical reports published by the staff of the National Center for Health Statistics (NCHS). It is based on information collected from a nationwide sample of households included in the National Health Interview Survey (NHIS). Data are obtained on the sociodemographic and health characteristics of all family members and unrelated individuals living in these households.

Field operations for the survey are conducted by the U.S. Bureau of the Census under specifications established by NCHS. The U.S. Bureau of the Census participates in the survey planning, selects the sample, and conducts the interviews. The data then are transmitted to NCHS for preparation, processing, and analysis.

Summary reports and reports on special topics for each year's data are prepared by the staff of the Division of Health Interview Statistics for publication in Series 10 publications of NCHS. Data also are tabulated for other reports published by NCHS staff and for use by other organizations and by researchers within and outside the Government. Since 1969, public use data tapes have been prepared for each year of data collection.

The health characteristics described by NHIS estimates pertain only to the resident, civilian noninstitutionalized population of the United States living at the time of the interview. The sample does not include persons residing in nursing homes, members of the armed forces, institutionalized persons, or U.S. nationals living abroad.

Statistical design of the NHIS

General design

The NHIS has been conducted continuously since 1957. The sample design of the survey has undergone changes following each decennial census. This periodic redesign of the NHIS sample allows the incorporation of the latest population information and statistical methodology into the survey design. The data presented in this report were collected using an NHIS sample design first used in 1985. It is anticipated that this design will be used until 1995.

The sample design of the NHIS follows a multistage probability design that permits continuous sampling of the civilian noninstitutionalized population residing in the United States. The survey is designed in such a way that the sample scheduled for each week is representative of the target population and the weekly samples are additive over time. This design permits estimates for frequent events or for large population groups to be produced from data collected over a short period of time. Estimates for frequent events or for smaller population subgroups can be obtained from data collected over a longer period of time. The annual sample is designed so that tabulations can be provided for each of the four major geographic regions. Because interviewing is done throughout the year, there is no seasonal bias for annual estimates. The continuous data collection also has administrative and operational advantages because fieldwork can be handled on a continuing basis with an experienced, stable staff.

Sample selection

The target population for the NHIS is the civilian noninstitutionalized population residing in the United States. For the first stage of the sample design, the United States is considered a universe composed of approximately 1,900 geographically defined primary sampling units (PSU's). A PSU consists of a county, small group of contiguous counties, or a metropolitan statistical area. The PSU's collectively cover the 50 States and the District of Columbia. The 52 largest PSU's in the universe are referred to as self-representing PSU's. The other PSU's in the universe are clustered into 73 strata, and 2 sample PSU's are chosen from each stratum with probability proportional to population size. The selection of two PSU's per stratum allows more efficient variance estimation than was possible under the pre-1985 NHIS design in which only one PSU was selected per stratum (127). The current procedure yields a total of 198 PSU's selected in the second stage.

Within a PSU, two types of second stage units, referred to as segments, are used: area segments and permit area segments. Area segments are defined geographically and contain an expected eight households. Permit area segments cover geographical areas containing housing units built after the 1980 census. The permit area segments are defined using updated lists of building permits issued in the PSU since 1980 and contain an expected four households.

Within each segment, all occupied households are targeted for interview. On occasion, a sample segment may contain a large number of households. In this situation, the

households are subsampled to provide a manageable interviewer workload.

To increase the precision of estimates for black persons, differential sampling rates are applied in PSU's containing between 5 and 50 percent black population. Within those PSU's, sampling rates for selection of segments are increased in areas known to have the highest concentration of black persons; segment sampling rates are decreased in other areas within those PSU's to ensure that the total sample is the same size as it would have been without oversampling black persons.

The sample was designed so that a typical NHIS full sample for the data collection years 1985 to 1995 will consist of approximately 7,500 segments containing about 59,000 assigned households. Of these households, an expected 10,000 will be vacant, demolished, or occupied by persons not in the target population of the survey. The expected sample of 49,000 occupied households will yield a probability sample of about 127,000 persons.

The NHIS sample is designed so that it can serve as a sample frame for other NCHS population-based surveys. Four national subdesigns, or panels, constitute the full NHIS sample design. Each panel contains a representative sample of the U.S. civilian noninstitutionalized population. All four panels have identical sampling properties, and any combination of panels defines a national design. Panels were constructed to facilitate the linkage of the NHIS to other surveys and also to efficiently make large reductions in the size of the sample by eliminating panels from the survey when budgetary constraints make this necessary.

In 1987, the NHIS sample consisted of 8,282 segments containing 61,009 assigned households. Of the 49,569 households eligible for interview, 47,240 households actually were interviewed, resulting in a sample of 122,859 persons.

Collection and processing of data

The NHIS questionnaire contains two major parts. The first, the basic health and demographic component, consists of topics that remain relatively unchanged from year to year. Among these topics are the incidence of acute conditions, the prevalence of chronic conditions, persons limited in activity due to chronic conditions, restriction in activity due to impairment or health problems, and utilization of health care services involving physician care and short-stay hospitalization. The second part, a special topics component, consists of additional topics that change from year to year. Details of the special topics covered in the 1987 NHIS follow this general description of data collection and processing techniques.

Careful procedures are followed to assure the quality of the data collected in the NHIS interview. Most households in the sample are contacted by mail before the interviewer arrives. Potential respondents are informed of the importance of the survey and assured that all information obtained in the interview will be held in strict confidence. Interviewers make repeated trips to a household when a respondent is not found on the first visit. The success of these procedures is indicated by the response rate for the survey, which has been between 96 and 98 percent over the years.

When contact is made, the interviewer attempts to have all family members of the household 19 years and over present during the interview. When this is not possible, proxy responses for absent family members are accepted. In most situations, proxy respondents are used for persons under 19 years of age. Persons 17 and 18 years of age may respond for themselves, however.

Interviewers undergo extensive training and retraining. The quality of their work is checked by means of periodic observation and by reinterview. Their work also is evaluated by statistical studies of the data they obtain in their interviews. A field edit is performed on all completed interviews so that if there are any problems with the information on the questionnaire, respondents may be recontacted to solve the problem.

Completed questionnaires are sent from the U.S. Bureau of the Census field offices to NCHS for coding and editing. To ensure the accuracy of coding, a 5-percent sample of all questionnaires is recoded and keyed by other coders. A 100-percent verification procedure is used if certain error tolerances are exceeded. Staff members of the Division of Health Interview Statistics then edit files to remove impossible and inconsistent codes.

The interview, fieldwork, and data processing procedures summarized above are described in detail in Series 1, No. 18 (128).

The National Health Interview Survey of Cancer Epidemiology and Control

In general, one adult 18 years of age or over was randomly chosen from each NHIS sample family to participate in the 1987 NHIS of Cancer Epidemiology and Control (NHIS-CEC). The procedure differed slightly in families falling into a special "Hispanic oversample." Hispanic persons were oversampled in selected PSU's in three consolidated metropolitan statistical areas (CMSA's): the New York– Northern New Jersey–Long Island, New York–New Jersey–Connecticut CMSA; the Chicago–Gary-Lake County, Illinois–Indiana–Wisconsin CMSA; and the Miami–Fort Lauderdale, Florida CMSA. In the PSU's selected for the oversample, up to two additional sample persons were included in each Hispanic family, yielding an additional 354 Hispanic respondents. In households where only Spanish was spoken, interviews were conducted with the aid of a Spanish translation guide.

Self-response was required for the NHIS-CEC, and callbacks were made as necessary. Two questionnaires were used for the survey—one for the Cancer Epidemiology Study (CES) and one for the Cancer Control Study (CCS). One-half of the sample was interviewed with each questionnaire. Respondents were systematically assigned to one of

the two questionnaires at the time of sample selection. A total of 22,080 persons were interviewed with the CES questionnaire; 22,043 were interviewed with the CCS questionnaire. The total of 44,123 interviewed persons represents a response rate of approximately 86 percent.

The survey included a wide range of information related to cancer, including questions on acculturation; medical care; food knowledge; cancer knowledge and attitudes; smoking and other tobacco use; occupational exposures; height and weight; food, vitamin, and mineral intake; cancer screening behavior; reproduction; hormone use; family history of cancer; cancer survival; and social relationships and activities.

Estimation procedures

The complex, multistage probability sample utilized by the NHIS must be reflected in the derivation of survey-based estimates. The estimates presented in this report are based upon 1987 NHIS-CEC sample person counts weighted to produce national estimates. The weight for each sample person is the product of five component weights:

1. *Probability of selection*—The basic weight for each person is obtained by multiplying the reciprocals of the probabilities of selection at each step of the design: PSU, segment, and household.
2. *Household nonresponse adjustment within segment*—In the NHIS, interviews are completed in about 96 percent of all eligible households. Because of household nonresponse, a weighting adjustment is required. The nonresponse adjustment weight is a ratio with the number of households in a sample segment as the numerator and the number of households actually interviewed in that segment as the denominator. This adjustment reduces bias in an estimate to the extent that persons in the noninterviewed households have the same characteristics as persons in interviewed households in the same segment. For nonresponse by NHIS-CEC sample persons, an additional adjustment was performed.
3. *First-stage ratio adjustment*—The weight for persons in the non-self-representing PSU's is ratio adjusted to the 1980 population within four race-residence classes of the non-self-representing strata within each geographic region.
4. *Adjustment for the probability of selection within household*—The weight for each NHIS-CEC sample person is multiplied by the within-family sampling weight, which is the inverse of the person's probability of selection within the family. The within-family sampling weight then is multiplied by 2 because each questionnaire was administered in only 1 of every 2 sample families. For example, in a family of four adults, the sample person had a 1 in 4 probability of selection. That person's weight is multiplied by 4, then doubled. In the Hispanic oversample, the within-family sampling weight is calculated using a more complex formula that takes into account the number of eligibles and the distribution of eligibles by Hispanic status.
5. *Poststratification by age-sex-race*—Within each of the 20 age-sex-race cells shown in table I, a weight is constructed each quarter to ratio adjust the first-stage population estimates based on the NHIS to an independent estimate of the population of each cell. These independent estimates are prepared by the U.S. Bureau of the Census and are updated quarterly.

The main effect of the ratio-estimating process is to make the sample more closely representative of the target population by age, sex, race, and residence. The poststratification adjustment helps to reduce the component of bias resulting from sampling frame undercoverage; furthermore, this adjustment frequently reduces sampling variance.

Table I. Age-sex-race classes used in poststratification for the 1987 National Health Interview Survey of Cancer Epidemiology and Control

Race and sex	Age				
	18–24 years	*25–34 years*	*35–44 years*	*45–54 years*	*55 years and over*
Black					
Male	X	X	X	X	X
Female	X	X	X	X	X
Other than black					
Male	X	X	X	X	X
Female	X	X	X	X	X

In some households responding to the basic health and demographic component of the NHIS, there is nonresponse to the special topics questionnaire. While the NHIS estimation procedures include no separate adjustment factor to reduce the bias due to this type of nonresponse, the poststratification by age-sex-race also serves to reduce the nonresponse bias in estimates derived from the special topics sections, to the extent that nonrespondents to the special topics questionnaire are similar to respondents in each poststratification adjustment cell.

Types of estimates

As noted previously, NHIS data are collected weekly, with each week's sample representing the resident, civilian noninstitutionalized population of the United States living during that week. The weekly samples are consolidated to produce quarterly files, each consisting of data for 13 weeks. Weights to adjust these data to represent the U.S. population are assigned to each of the four quarterly files. These quarterly files are later consolidated to produce the annual file, which is the basis of most tabulations of NHIS data.

For prevalence statistics such as those included in this report (for example, the percent of women who have ever had a mammogram), the annual estimates are derived by summing the weighted quarterly files and dividing by 4. This division is necessary because each quarterly file has been weighted to produce an estimate of the number of persons in the United States with a given characteristic. Summing the quarters and dividing by 4 in effect averages these quarterly results for the year. Thus the type of prevalence estimate ordinarily derived from NHIS data is an annual average prevalence estimate.

In the NHIS-CEC, for which two separate questionnaires were used, most of the questions were unique to one or the other of the questionnaires. A few questions were asked on both. For this report, in instances where data were drawn from only one of the instruments, the estimation procedures were those described above. For data related to body weight, which were obtained on both questionnaires, estimates from the CES and the CCS were pooled. In this case, average annual estimates were derived by summing the eight quarterly estimates (four from each of the two questionnaires) and dividing by 8.

Reliability of estimates

Because NHIS estimates are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same survey and processing procedures. There are two types of errors possible in an estimate based on a sample survey: sampling and nonsampling errors. To the extent possible, these types of errors are kept to a minimum by methods built into the survey procedures and described elsewhere (129). Although it is very difficult to measure the extent of bias in the NHIS, several studies have been conducted to examine this problem (130–133).

Nonsampling errors

Interviewing process—Some types of information, such as the number of days of restricted activity caused by a medical condition, can be obtained more accurately from household members than from any other source, because only the persons directly concerned with the situation are in a position to report this information. However, there are limits to the accuracy of diagnostic and other information collected in the household interviews. For diagnostic information, the household respondent can pass on to the interviewer only the information the physician has given to the family. For conditions not medically attended, diagnostic information is often no more than a description of symptoms. Further, a respondent might not answer a question in the intended manner because he or she has not properly understood the question, has forgotten the event, does not know, or does not wish to divulge the answer. Regardless of the type of measure, all NHIS data are estimates of known reported morbidity, disability, and so forth.

Reference-period bias—NHIS estimates do not represent a complete measure of any given topic during the specified calendar period because data are not collected in the interview for persons who died or became institutionalized during the reference period. For many types of statistics collected in the survey, the reference period is the 2 weeks prior to the interview week. For such a short period, the contribution by decedents to a total inventory of conditions or services should be very small. However, the contribution by decedents during a long reference period, such as 1 year, might be significant, especially within the older age groups.

Rounding of numbers—In published tables, the figures are rounded to the nearest thousand, although they are not necessarily accurate to that detail. Derived statistics, such as rates and percents, are computed after the estimates on which they are based are rounded to the nearest thousand.

Sampling errors

The standard error is the primary measure of sampling error, that is, the variation that might occur by chance because only a sample of a population is surveyed. The chances are about 68 in 100 that an estimate based on a sample would differ from that obtained from a complete census by less than the standard error. The chances are about 95 in 100 that the difference between a sample-based and census estimate would differ by less than twice the standard error of the estimate and about 99 in 100 that it would differ by less than a factor of 2.5.

Individual standard errors were not computed for each estimate in this report because of the complexity of the replication or linearization procedures required to estimate variance when a complex, multistage sample design is used. Instead, standard errors were computed for a broad spectrum of estimates. Regression techniques then were used to produce equations whose parameters a and b can be used to approximate standard errors for any estimate.

For each percent p included in this report, the standard error of the percent can be estimated as

$$SE(p) = \sqrt{\frac{bp(100-p)}{y}}$$

where $b = 10{,}000$ (as estimated by the regression equations)

y = denominator for the percent

Tables II–VI, which provide denominators y for all percents, also present estimated standard errors for selected percents. Standard errors for percents not shown in these tables can be estimated using the formula above or interpolation techniques.

The denominators in tables II–VI are themselves population estimates, because they are not simple counts of population within any of the 20 age-sex-race poststratification cells shown in table I. These population estimates were derived from the NHIS and may differ from official population estimates from other sources, such as those published in the U.S. Bureau of the Census reports (Series

Table II. Estimated standard errors for selected base percents of all women 40 years of age and over by selected characteristics: United States, 1987

Characteristic	Estimated population	Base percent: 1 or 99	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
All races[1]	Number in thousands	Standard error of percent										
40 years and over	47,676	0.1	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7
40–54 years	19,597	0.2	0.5	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.1
40–44 years	7,664	0.4	0.8	1.1	1.3	1.4	1.6	1.7	1.7	1.8	1.8	1.8
45–49 years	6,344	0.4	0.9	1.2	1.4	1.6	1.7	1.8	1.9	1.9	2.0	2.0
50–54 years	5,588	0.4	0.9	1.3	1.5	1.7	1.8	1.9	2.0	2.1	2.1	2.1
55–64 years	11,749	0.3	0.6	0.9	1.0	1.2	1.3	1.3	1.4	1.4	1.5	1.5
55–59 years	5,814	0.4	0.9	0.5	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
60–64 years	5,935	0.4	0.9	1.2	1.5	1.6	1.8	1.9	2.0	2.0	2.0	2.1
65–74 years	9,665	0.3	0.7	1.2	1.1	1.3	1.4	1.5	1.5	1.6	1.6	1.6
65–69 years	5,436	0.4	0.9	1.3	1.5	1.7	1.9	2.0	2.0	2.1	2.1	2.1
70–74 years	4,229	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
75 years and over	6,665	0.4	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
75–79 years	3,418	0.5	1.2	1.6	1.9	2.2	2.3	2.5	2.6	2.6	2.7	2.7
80–84 years	2,008	0.7	1.5	2.1	2.5	2.8	3.1	3.2	3.4	3.5	3.5	3.5
85 years and over	1,239	0.9	2.0	2.7	3.2	3.6	3.9	4.1	4.3	4.4	4.5	4.5
White												
40 years and over:												
Crude	41,877	0.2	0.3	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
Age adjusted	41,877	0.2	0.3	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
40–54 years	16,757	0.2	0.5	0.7	0.9	1.0	1.1	1.1	1.2	1.2	1.2	1.2
55–64 years	10,311	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.6
65–74 years	8,715	0.3	0.7	1.0	1.2	1.4	1.5	1.6	1.6	1.7	1.7	1.7
75 years and over	6,094	0.4	0.9	1.2	1.4	1.6	1.8	1.9	1.9	2.0	2.0	2.0
Black												
40 years and over:												
Crude	4,830	0.5	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.2	2.3	2.3
Age adjusted	4,830	0.5	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.2	2.3	2.3
40–54 years	2,272	0.7	1.4	2.0	2.4	2.7	2.9	3.0	3.2	3.3	3.3	3.3
55–64 years	1,205	0.9	2.0	2.7	3.3	3.6	3.9	4.2	4.3	4.5	4.5	4.6
65–74 years	824	1.1	2.4	3.3	3.9	4.4	4.8	5.0	5.3	5.4	5.5	5.5
75 years and over	529	1.4	3.0	4.1	4.9	5.5	6.0	6.3	6.6	6.7	6.8	6.9
Educational level												
Less than 12 years	15,112	0.3	0.6	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.3	1.3
12 years	19,827	0.2	0.5	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.1
More than 12 years	12,877	0.3	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.4
Family income												
Less than $10,000	8,396	0.3	0.8	1.0	1.2	1.4	1.5	1.6	1.6	1.7	1.7	1.7
$10,000–$19,999	10,026	0.3	0.7	0.9	1.1	1.3	1.4	1.4	1.5	1.5	1.6	1.6
$20,000–$34,999	10,991	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.5
$35,000 or more	11,399	0.3	0.6	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.5
Place of residence[2]												
MSA, central city	15,100	0.3	0.6	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.3	1.3
MSA, not central city	21,099	0.2	0.5	0.7	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.1
Not in MSA	11,820	0.3	0.6	0.9	1.0	1.2	1.3	1.3	1.4	1.4	1.4	1.5
Geographic region												
Northeast	10,705	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.5
Midwest	11,421	0.3	0.6	0.9	1.1	1.2	1.3	1.4	1.4	1.4	1.5	1.5
South	16,816	0.2	0.5	0.7	0.9	1.0	1.1	1.1	1.2	1.2	1.2	1.2
West	9,076	0.3	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.7

[1]Includes other races not shown separately.
[2]MSA = metropolitan statistical area.

Table III. Estimated standard errors for selected base percents of women 40 years of age and over who had a breast physical examination (BPE) in the past 3 years by selected characteristics: United States, 1987

Characteristic	Estimated population	Base percent: 1 or 99	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
All races[1]	Number in thousands	Standard error of percent										
40 years and over	30,527	0.2	0.4	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.9	0.9
40–54 years	14,230	0.3	0.6	0.8	0.9	1.1	1.1	1.2	1.3	1.3	1.3	1.3
40–44 years	5,760	0.4	0.9	1.3	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
45–49 years	4,419	0.5	1.0	1.4	1.7	1.9	2.1	2.2	2.3	2.3	2.4	2.4
50–54 years	4,052	0.5	1.1	1.5	1.8	2.0	2.2	2.3	2.4	2.4	2.5	2.5
55–64 years	7,549	0.4	0.8	1.1	1.3	1.5	1.6	1.7	1.7	1.8	1.8	1.8
55–59 years	4,242	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
60–64 years	3,307	0.5	1.2	1.6	2.0	2.2	2.4	2.5	2.6	2.7	2.7	2.7
65–74 years	5,471	0.4	0.9	1.3	1.5	1.7	1.9	2.0	2.0	2.1	2.1	2.1
65–69 years	3,279	0.5	1.2	1.7	2.0	2.2	2.4	2.5	2.6	2.7	2.7	2.8
70–74 years	2,192	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.4	3.4
75 years and over	3,277	0.5	1.2	1.7	2.0	2.2	2.4	2.5	2.6	2.7	2.7	2.8
75–79 years	1,781	0.7	1.6	2.2	2.7	3.0	3.2	3.4	3.6	3.7	3.7	3.7
80–84 years	1,001	1.0	2.2	3.0	3.6	4.0	4.3	4.6	4.8	4.9	5.0	5.0
85 years and over	495	1.4	3.1	4.3	5.1	5.7	6.2	6.5	6.8	7.0	7.1	7.1
White												
40 years and over:												
Crude	27,132	0.2	0.4	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0
Age adjusted	27,132	0.2	0.4	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0
40–54 years	12,271	0.3	0.6	0.9	1.0	1.1	1.2	1.3	1.4	1.4	1.4	1.4
55–64 years	6,747	0.4	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
65–74 years	5,018	0.4	1.0	1.3	1.6	1.8	1.9	2.0	2.1	2.2	2.2	2.2
75 years and over	3,096	0.6	1.2	1.7	2.0	2.3	2.5	2.6	2.7	2.8	2.8	2.8
Black												
40 years and over:												
Crude	2,950	0.6	1.3	1.7	2.1	2.3	2.5	2.7	2.8	2.9	2.9	2.9
Age adjusted	2,950	0.6	1.3	1.7	2.1	2.3	2.5	2.7	2.8	2.9	2.9	2.9
40–54 years	1,626	0.8	1.7	2.4	2.8	3.1	3.4	3.6	3.7	3.8	3.9	3.9
55–64 years	740	1.2	2.5	3.5	4.2	4.6	5.0	5.3	5.5	5.7	5.8	5.8
65–74 years	422	1.5	3.4	4.6	5.5	6.2	6.7	7.1	7.3	7.5	7.7	7.7
75 years and over	161	2.5	5.4	7.5	8.9	10.0	10.8	11.4	11.9	12.2	12.4	12.5
Educational level												
Less than 12 years	7,835	0.4	0.8	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.8
12 years	13,294	0.3	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.3	1.4	1.4
More than 12 years	9,306	0.3	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.6	1.6
Family income												
Less than $10,000	4,227	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
$10,000–$19,999	6,018	0.4	0.9	1.2	1.5	1.6	1.8	1.9	1.9	2.0	2.0	2.0
$20,000–$34,999	7,626	0.4	0.8	1.1	1.3	1.4	1.6	1.7	1.7	1.8	1.8	1.8
$35,000 or more	8,544	0.3	0.7	1.0	1.2	1.4	1.5	1.6	1.6	1.7	1.7	1.7
Place of residence[2]												
MSA, central city	9,735	0.3	0.7	1.0	1.1	1.3	1.4	1.5	1.5	1.6	1.6	1.6
MSA, not central city	14,104	0.3	0.6	0.8	1.0	1.1	1.2	1.2	1.3	1.3	1.3	1.3
Not in MSA	6,688	0.4	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
Geographic region												
Northeast	6,583	0.4	0.8	1.2	1.4	1.6	1.7	1.8	1.9	1.9	1.9	1.9
Midwest	7,300	0.4	0.8	1.1	1.3	1.5	1.6	1.7	1.8	1.8	1.8	1.9
South	10,691	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.5
West	5,952	0.4	0.9	1.2	1.5	1.6	1.8	1.9	2.0	2.0	2.0	2.0

[1]Includes other races not shown separately.
[2]MSA = metropolitan statistical area.

Table IV. Estimated standard errors for selected base percents of women 40 years of age and over who had no breast physical examination (BPE) in the past 3 years by selected characteristics: United States, 1987

Characteristic	Estimated population	Base percent										
		1 or 99	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
All races[1]	Number in thousands	Standard error of percent										
40 years and over	10,630	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.5
40–54 years	3,460	0.5	1.2	1.6	1.9	2.2	2.3	2.5	2.6	2.6	2.7	2.7
40–44 years	1,278	0.9	1.9	2.7	3.2	3.5	3.8	4.1	4.2	4.3	4.4	4.4
45–49 years	1,216	0.9	2.0	2.7	3.2	3.6	3.9	4.2	4.3	4.4	4.5	4.5
50–54 years	966	1.0	2.2	3.1	3.6	4.1	4.4	4.7	4.9	5.0	5.1	5.1
55–64 years	2,615	0.6	1.3	1.9	2.2	2.5	2.7	2.8	2.9	3.0	3.1	3.1
55–59 years	1,219	0.9	2.0	2.7	3.2	3.6	3.9	4.2	4.3	4.4	4.5	4.5
60–64 years	1,396	0.8	1.8	2.5	3.0	3.4	3.7	3.9	4.0	4.1	4.2	4.2
65–74 years	2,602	0.6	1.4	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1
65–69 years	1,499	0.8	1.8	2.5	2.9	3.3	3.5	3.7	3.9	4.0	4.1	4.1
70–74 years	1,104	0.9	2.1	2.9	3.4	3.8	4.1	4.4	4.5	4.7	4.7	4.8
75 years and over	1,953	0.7	1.6	2.1	2.6	2.9	3.1	3.3	3.4	3.5	3.6	3.6
75–79 years	1,037	1.0	2.1	2.9	3.5	3.9	4.3	4.5	4.7	4.8	4.9	4.9
80–84 years	528	1.4	3.0	4.1	4.9	5.5	6.0	6.3	6.6	6.7	6.8	6.9
85 years and over	387	1.6	3.5	4.8	5.7	6.4	7.0	7.4	7.7	7.9	8.0	8.0
White												
40 years and over:												
Crude	9,504	0.3	0.7	1.0	1.2	1.3	1.4	1.5	1.5	1.6	1.6	1.6
Age adjusted	9,504	0.3	0.7	1.0	1.2	1.3	1.4	1.5	1.5	1.6	1.6	1.6
40–54 years	3,029	0.6	1.3	1.7	2.1	2.3	2.5	2.6	2.7	2.8	2.9	2.9
55–64 years	2,328	0.7	1.4	2.0	2.3	2.6	2.8	3.0	3.1	3.2	3.3	3.3
65–74 years	2,361	0.6	1.4	2.0	2.3	2.6	2.8	3.0	3.1	3.2	3.2	3.3
75 years and over	1,786	0.7	1.6	2.2	2.7	3.0	3.2	3.4	3.6	3.7	3.7	3.7
Black												
40 years and over:												
Crude	872	1.1	2.3	3.2	3.8	4.3	4.6	4.9	5.1	5.2	5.3	5.4
Age adjusted	872	1.1	2.3	3.2	3.8	4.3	4.6	4.9	5.1	5.2	5.3	5.4
40–54 years	288	1.9	4.1	5.6	6.7	7.5	8.1	8.5	8.9	9.1	9.3	9.3
55–64 years	232	2.1	4.5	6.2	7.4	8.3	9.0	9.5	9.9	10.2	10.3	10.4
65–74 years	189	2.3	5.0	6.9	8.2	9.2	10.0	10.5	11.0	11.3	11.4	11.5
75 years and over	162	2.5	5.4	7.5	8.9	9.9	10.8	11.4	11.9	12.2	12.4	12.4
Educational level												
Less than 12 years	4,257	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
12 years	4,213	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
More than 12 years	2,106	0.7	1.5	2.1	2.5	2.8	3.0	3.2	3.3	3.4	3.4	3.4
Family income												
Less than $10,000	2,576	0.6	1.4	1.9	2.2	2.5	2.7	2.9	3.0	3.1	3.1	3.1
$10,000–$19,999	2,598	0.6	1.4	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1
$20,000–$34,999	2,203	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.4	3.4
$35,000 or more	1,708	0.8	1.7	2.3	2.7	3.1	3.3	3.5	3.6	3.7	3.8	3.8
Place of residence[2]												
MSA, central city	3,164	0.6	1.2	1.7	2.0	2.2	2.4	2.6	2.7	2.8	2.8	2.8
MSA, not central city	4,243	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
Not in MSA	3,223	0.6	1.2	1.7	2.0	2.2	2.4	2.6	2.7	2.7	2.8	2.8
Geographic region												
Northeast	2,362	0.6	1.4	2.0	2.3	2.6	2.8	3.0	3.1	3.2	3.2	3.3
Midwest	2,785	0.6	1.3	1.8	2.1	2.4	2.6	2.7	2.9	2.9	3.0	3.0
South	3,571	0.5	1.2	1.6	1.9	2.1	2.3	2.4	2.5	2.6	2.6	2.6
West	1,913	0.7	1.6	2.2	2.6	2.9	3.1	3.3	3.4	3.5	3.6	3.6

[1]Includes other races not shown separately.
[2]MSA = metropolitan statistical area.

Table V. Estimated standard errors for selected base percents of women 40 years of age and over who had a mammogram in the past 3 years by selected characteristics: United States, 1987

Characteristic	Estimated population	Base percent: 1 or 99	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
All races[1]	Number in thousands	Standard error of percent										
40 years and over	13,966	0.3	0.6	0.8	1.0	1.1	1.2	1.2	1.3	1.3	1.3	1.3
40–54 years	6,564	0.4	0.9	1.2	1.4	1.6	1.7	1.8	1.9	1.9	1.9	2.0
40–44 years	2,400	0.6	1.4	1.9	2.3	2.6	2.8	3.0	3.1	3.2	3.2	3.2
45–49 years	2,216	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.3	3.4
50–54 years	1,948	0.7	1.6	2.1	2.6	2.9	3.1	3.3	3.4	3.5	3.6	3.6
55–64 years	3,584	0.5	1.2	1.6	1.9	2.1	2.3	2.4	2.5	2.6	2.6	2.6
55–59 years	2,027	0.7	1.5	2.1	2.5	2.8	3.0	3.2	3.4	3.4	3.5	3.5
60–64 years	1,557	0.8	1.7	2.4	2.9	3.2	3.5	3.7	3.8	3.9	4.0	4.0
65–74 years	2,614	0.6	1.3	1.9	2.2	2.5	2.7	2.8	3.0	3.0	3.1	3.1
65–69 years	1,591	0.8	1.7	2.4	2.8	3.2	3.4	3.6	3.8	3.9	3.9	4.0
70–74 years	1,023	1.0	2.2	3.0	3.5	4.0	4.3	4.5	4.7	4.8	4.9	4.9
75 years and over	1,204	0.9	2.0	2.7	3.3	3.6	3.9	4.2	4.3	4.5	4.5	4.6
75–79 years	767	1.1	2.5	3.4	4.1	4.6	4.9	5.2	5.4	5.6	5.7	5.7
80–84 years	292	1.8	4.0	5.6	6.6	7.4	8.0	8.5	8.8	9.1	9.2	9.3
85 years and over	145	2.6	5.7	7.9	9.4	10.5	11.4	12.0	12.5	12.9	13.1	13.1
White												
40 years and over:												
Crude	12,647	0.3	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.4
Age adjusted	12,647	0.3	0.6	0.8	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.4
40–54 years	5,834	0.4	0.9	1.2	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
55–64 years	3,206	0.6	1.2	1.7	2.0	2.2	2.4	2.6	2.7	2.7	2.8	2.8
65–74 years	2,453	0.6	1.4	1.9	2.3	2.6	2.8	2.9	3.0	3.1	3.2	3.2
75 years and over	1,153	0.9	2.0	2.8	3.3	3.7	4.0	4.3	4.4	4.6	4.6	4.7
Black												
40 years and over:												
Crude	1,160	0.9	2.0	2.8	3.3	3.7	4.0	4.3	4.4	4.5	4.6	4.6
Age adjusted	1,160	0.9	2.0	2.8	3.3	3.7	4.0	4.3	4.4	4.5	4.6	4.6
40–54 years	610	1.3	2.8	3.8	4.6	5.1	5.5	5.9	6.1	6.3	6.4	6.4
55–64 years	358	1.7	3.6	5.0	6.0	6.7	7.2	7.7	8.0	8.2	8.3	8.4
65–74 years	149	2.6	5.6	7.8	9.3	10.4	11.2	11.9	12.4	12.7	12.9	13.0
75 years and over	43	4.8	10.5	14.5	17.2	19.3	20.9	22.1	23.0	23.6	24.0	24.1
Educational level												
Less than 12 years	2,805	0.6	1.3	1.8	2.1	2.4	2.6	2.7	2.8	2.9	3.0	3.0
12 years	6,244	0.4	0.8	1.2	1.4	1.6	1.7	1.8	1.9	2.0	2.0	2.0
More than 12 years	4,859	0.5	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.2	2.3	2.3
Family income												
Less than $10,000	1,503	0.8	1.8	2.4	2.9	3.3	3.5	3.7	3.9	4.0	4.1	4.1
$10,000–$19,999	2,438	0.6	1.4	1.9	2.3	2.6	2.8	2.9	3.1	3.1	3.2	3.2
$20,000–$34,999	3,626	0.5	1.1	1.6	1.9	2.1	2.3	2.4	2.5	2.6	2.6	2.6
$35,000 or more	4,593	0.5	1.0	1.4	1.7	1.9	2.0	2.1	2.2	2.3	2.3	2.3
Place of residence[2]												
MSA, central city	4,400	0.5	1.0	1.4	1.7	1.9	2.1	2.2	2.3	2.3	2.4	2.4
MSA, not central city	6,792	0.4	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
Not in MSA	2,774	0.6	1.3	1.8	2.1	2.4	2.6	2.8	2.9	2.9	3.0	3.0
Geographic region												
Northeast	2,906	0.6	1.3	1.8	2.1	2.3	2.5	2.7	2.8	2.9	2.9	2.9
Midwest	3,362	0.5	1.2	1.6	1.9	2.2	2.4	2.5	2.6	2.7	2.7	2.7
South	4,599	0.5	1.0	1.4	1.7	1.9	2.0	2.1	2.2	2.3	2.3	2.3
West	3,099	0.6	1.2	1.7	2.0	2.3	2.5	2.6	2.7	2.8	2.8	2.8

[1]Includes other races not shown separately.
[2]MSA = metropolitan statistical area.

Table VI. Estimated standard errors for selected base percents of women 40 years of age and over who had no mammogram in the past 3 years by selected characteristics: United States, 1987

Characteristic	Estimated population	Base percent: 1 or 99	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
All races[1]	Number in thousands	Standard error of percent										
40 years and over	25,499	0.2	0.4	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.0
40–54 years	10,731	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	1.5
40–44 years	4,581	0.5	1.0	1.4	1.7	1.9	2.0	2.1	2.2	2.3	2.3	2.3
45–49 years	3,213	0.6	1.2	1.7	2.0	2.2	2.4	2.6	2.7	2.7	2.8	2.8
50–54 years	2,938	0.6	1.3	1.8	2.1	2.3	2.5	2.7	2.8	2.9	2.9	2.9
55–64 years	6,288	0.4	0.9	1.2	1.4	1.6	1.7	1.8	1.9	2.0	2.0	2.0
55–59 years	3,375	0.5	1.2	1.6	1.9	2.2	2.4	2.5	2.6	2.7	2.7	2.7
60–64 years	2,913	0.6	1.3	1.8	2.1	2.3	2.5	2.7	2.8	2.9	2.9	2.9
65–74 years	5,240	0.4	1.0	1.3	1.6	1.7	1.9	2.0	2.1	2.1	2.2	2.2
65–69 years	3,072	0.6	1.2	1.7	2.0	2.3	2.5	2.6	2.7	2.8	2.8	2.9
70–74 years	2,168	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.4	3.4
75 years and over	3,239	0.6	1.2	1.7	2.0	2.2	2.4	2.5	2.7	2.7	2.8	2.8
75–79 years	1,787	0.7	1.6	2.2	2.7	3.0	3.2	3.4	3.6	3.7	3.7	3.7
80–84 years	961	1.0	2.2	3.1	3.6	4.1	4.4	4.7	4.9	5.0	5.1	5.1
85 years and over	491	1.4	3.1	4.3	5.1	5.7	6.2	6.5	6.8	7.0	7.1	7.1
White												
40 years and over:												
Crude	22,825	0.2	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
Age adjusted	22,825	0.2	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
40–54 years	9,172	0.3	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.6	1.7
55–64 years	5,724	0.4	0.9	1.3	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
65–74 years	4,865	0.5	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.2	2.3	2.3
75 years and over	3,064	0.6	1.2	1.7	2.0	2.3	2.5	2.6	2.7	2.8	2.8	2.9
Black												
40 years and over:												
Crude	2,248	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.3	3.3
Age adjusted	2,248	0.7	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.3	3.3
40–54 years	1,279	0.9	1.9	2.7	3.2	3.5	3.8	4.1	4.2	4.3	4.4	4.4
55–64 years	496	1.4	3.1	4.3	5.1	5.7	6.1	6.5	6.8	7.0	7.1	7.1
65–74 years	313	1.8	3.9	5.4	6.4	7.1	7.7	8.2	8.5	8.8	8.9	8.9
75 years and over	159	2.5	5.5	7.5	9.0	10.0	10.9	11.5	12.0	12.3	12.5	12.5
Educational level												
Less than 12 years	7,349	0.4	0.8	1.1	1.3	1.5	1.6	1.7	1.8	1.8	1.8	1.8
12 years	11,276	0.3	0.6	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.5
More than 12 years	6,819	0.4	0.8	1.1	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
Family income												
Less than $10,000	4,243	0.5	1.1	1.5	1.7	1.9	2.1	2.2	2.3	2.4	2.4	2.4
$10,000–$19,999	5,754	0.4	0.9	1.3	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
$20,000–$34,999	6,134	0.4	0.9	1.2	1.4	1.6	1.7	1.9	1.9	2.0	2.0	2.0
$35,000 or more	5,874	0.4	0.9	1.2	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
Place of residence[2]												
MSA, central city	7,659	0.4	0.8	1.1	1.3	1.4	1.6	1.7	1.7	1.8	1.8	1.8
MSA, not central city	11,056	0.3	0.7	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.5
Not in MSA	6,784	0.4	0.8	1.2	1.4	1.5	1.7	1.8	1.8	1.9	1.9	1.9
Geographic region												
Northeast	5,866	0.4	0.9	1.2	1.5	1.7	1.8	1.9	2.0	2.0	2.1	2.1
Midwest	6,272	0.4	0.9	1.2	1.4	1.6	1.7	1.8	1.9	2.0	2.0	2.0
South	8,698	0.3	0.7	1.0	1.2	1.4	1.5	1.6	1.6	1.7	1.7	1.7
West	4,663	0.5	1.0	1.4	1.7	1.9	2.0	2.1	2.2	2.3	2.3	2.3

[1] Includes other races not shown separately.
[2] MSA = metropolitan statistical area.

P-20, P-25, and P-60). The standard error for each of these NHIS-based population figures x can be estimated as

$$SE(x) = \sqrt{ax^2 + bx}$$

where $a = 0$ } (as estimated by the
$b = 10{,}000$ } equations)
x = the population figure itself

Age-race adjustment

This report contains a number of tables presenting data that have been adjusted for the effects of age or for age and race. These adjusted estimates were derived by direct standardization:

$$p_{adj} = \frac{\Sigma p w_i}{\Sigma w_i}$$

where p_{adj} = age or age-race adjusted percent
p_i = crude or unadjusted percent in category i
w_i = weighted female population in category i

For the figures adjusted for age alone (that is, the age-adjusted estimates for white women 40 years of age and over and for black women 40 years of age and over), the following age categories of i were used: 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80–84, and 85 years and over.

For the figures adjusted for age and race (that is, those broken down by education, income, place of residence, and geographic region), the following age-race categories of i were used: black, 40–54 years; black, 55–64 years; black, 65–74 years; black, 75 years and over; nonblack, 40–54 years; nonblack, 55–64 years; nonblack, 65–74 years; and nonblack, 75 years and over.

In the few instances in which the sample size did not permit use of categories as narrow as those listed above, adjacent age categories were combined as required.

Appendix II
Definitions of certain terms used in this report

Sociodemographic terms

Age—The age recorded for each person is the age at last birthday. Age is recorded in single years and grouped for presentation in tables.

Race—The population is divided into three racial groups: "white," "black," and "all other." "All other" includes Aleut, Eskimo, or American Indian; Asian or Pacific Islander; and any other races. Characterization of race is based on the respondent's description of his or her racial background.

Education—The categories of educational status refer to years of school completed. Only years completed in regular schools in which persons are given a formal education are included. A regular school is one that advances a person toward an elementary or high school diploma or a college, university, or professional school degree. Thus education in vocational, trade, or business schools outside the regular school system is not counted in determining the highest grade of school completed.

Family income—Each member of a family is classified according to the total income of the family of which he or she is a member. Within the household, all persons related to each other by blood, marriage, or adoption constitute a family. Unrelated individuals are classified according to their own incomes. The income recorded is the total of all income received in the 12-month period preceding the week of interview. Income from all sources—for example, wages, salaries, rents from property, pensions, government payments, and help from relatives—is included.

Place of residence—Place of residence is classified as inside or outside a metropolitan statistical area (MSA). Place of residence inside an MSA is further classified as either central city or not central city.

The definition and titles of MSA's are established by the U.S. Office of Management and Budget with the advice of the Federal Committee on Metropolitan Statistical Areas. Generally speaking, an MSA consists of a county or group of counties containing at least one city (or twin cities) having a population of 50,000 or more plus adjacent counties that are metropolitan in character and are economically and socially integrated with the central city. In New England, towns and cities rather than counties are the units used in defining MSA's. There is no limit to the number of adjacent counties included in the MSA as long as they are integrated with the central city, nor is an MSA limited to a single State; boundaries may cross State lines. The metropolitan population in this report is based on MSA's as defined in the 1980 census and does not include any subsequent additions or changes.

Central city of an MSA—The largest city in an MSA is always a central city. One or two additional cities may be secondary central cities in the MSA on the basis of either of the following criteria:

- The additional city or cities must have a population one-third or more of that of the largest city and a minimum population of 25,000.
- The additional city or cities must have at least 250,000 inhabitants.

Not central city of an MSA—This includes all of the MSA that is not part of the central city itself.

Not in MSA—This includes all other places in the country.

Geographic region—The States are grouped into four geographic regions. These regions, which correspond to those used by the U.S. Bureau of the Census, are as follows:

Region	*States included*
Northeast	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania
Midwest	Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
South	Delaware, Maryland, District of Columbia, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Arkansas, and Texas
West	Washington, Oregon, California, Nevada, New Mexico, Arizona, Idaho, Utah, Colorado, Montana, Wyoming, Alaska, and Hawaii

Terms related to health

Relative weight—Relative weight is the ratio of an individual's self-reported weight to his or her desirable weight as established by the 1983 Metropolitan Life Insurance Company (MLIC) weight-for-height charts (134). The midpoint of the medium frame category for a particular height was used as the desirable weight for that height. The MLIC standards were developed based on weight in indoor clothing and height with 1-inch heels for men and 2-inch heels for women. The National Health Interview Survey (NHIS) asked respondents to report their heights and weights without shoes. The MLIC standards were adjusted by subtracting 2 pounds from the midpoint of the medium frame category for both sexes, and by subtracting 1 inch from the height of men and 2 inches from the height of women.

The MLIC desirable weight standards are based on the mortality experience of a group of life insurance policyholders. Because persons who obtain life insurance are not representative of the general population, the appropriateness of these standards for some population subgroups is unknown (135). The 1983 MLIC standards differ slightly from the earlier published 1959 MLIC standards (136).

Both MLIC and NHIS data are based on self-reported height and weight. Self-reported height and weight data produce conservative estimates of the extent of overweight in the population, because heavier people tend to underreport their weight, and shorter people tend to overreport their height (137).

A variety of measures of overweight status have been used (138) in past research. A major source of data on the prevalence of overweight in the U.S. population is the 2nd National Health and Nutrition Examination Survey (NHANES II). Data released from the NHANES II on overweight status are computed using measured height and weight and expressed as body mass index, calculated as weight divided by height squared. Although not identical, the proportions of population defined as "20 percent or more overweight" using the NHANES II body mass index cutpoints and the 1983 MLIC standards are not substantially different (138).

Alcohol consumption—Level of alcohol consumption reflects drinking patterns during the 12 months preceding the NHIS interview. NHIS respondents were asked how often they drank beer "during the past year or so"; how many cans, bottles, or glasses they usually consumed on days when they drank beer; and whether these portions were small, medium, or large. The same set of three questions was repeated for wine and for liquor.

For each of the three types of alcoholic beverages, the number of drinks consumed per year was calculated by multiplying the number of days per year on which the beverage was consumed by the usual number of drinks consumed on those days. If either the number of days or usual number of drinks was unknown, the value for the number of drinks consumed per year was set to unknown as well. Total number of alcoholic drinks consumed per year was calculated as the sum of the numbers of drinks per year of beer, wine, and alcohol. An unknown value for any of the three types of alcoholic beverage resulted in an overall unknown value.

The categories of alcohol consumption were set as follows:

- Abstainer or light drinker—0 to 155 drinks per year (less than three drinks per week, on average)
- Moderate drinker—156 to 729 drinks per year (three drinks per week to less than two drinks per day, on average)
- Heavy drinker—730 drinks per year or more (two drinks per day or more, on average)

These categories roughly correspond to those that have been used in a number of studies of alcohol consumption (92–95); most of these other studies, however, have used a more sophisticated classification scheme that involved conversion to grams of ethanol on the basis of type of beverage consumed and size of drink. The questions on alcohol consumption in the NHIS-CEC were asked as part of a series of questions on general food and beverage intake; the data collected on alcohol were not of sufficient detail to permit such detailed classification as has been used elsewhere.

Appendix III
Survey instruments

Section GG — REPRODUCTION AND HORMONE USE

GG1 *Refer to sex*		54 1 ☐ Male *(section HH)* 2 ☐ Female *(1)*
These next questions are about pregnancy and reproduction.		55
1a.	**Have you ever given birth to a liveborn infant?**	1 ☐ Yes 2 ☐ No *(2)*
b.	**How many live births have you had?**	56–57 _____ Number
c.	**How old were you when your (first) child was born?**	58–59 _____ Age *(2)* 99 ☐ DK *(1d)*
d.	**Were you 20 or younger, or older than 20?**	60 1 ☐ 20 or younger *(2)* 2 ☐ Older than 20 *(1e)* 9 ☐ DK *(2)*
e.	**Were you 21 to 24, 25 to 29, 30 to 34, or 35 or older?**	61 1 ☐ 21–24 2 ☐ 25–29 3 ☐ 30–34 4 ☐ 35+ 9 ☐ DK
2a.	**(Besides [that pregnancy/those pregnancies]), Have you ever had any (other) pregnancies that lasted six months or more?**	62 1 ☐ Yes 2 ☐ No *(GG2)*
b.	**How many of those (other) pregnancies have you had?**	63–64 _____ Number
c.	**How old were you at the end of [that pregnancy/ the first of those pregnancies]?**	65–66 _____ Age *(GG2)* 99 ☐ DK *(2d)*
d.	**Were you 20 or younger, or older than 20?**	67 1 ☐ 20 or younger *(GG2)* 2 ☐ Older than 20 9 ☐ DK *(GG2)*
e.	**Were you 21 to 24, 25 to 29, 30 to 34, or 35 or older?**	68 1 ☐ 21–24 2 ☐ 25–29 3 ☐ 30–34 4 ☐ 35+ 9 ☐ DK
GG2 *Refer to 1a*		69 1 ☐ "Yes" in 1a *(3)* 8 ☐ Other *(4)*
3.	**Did you breastfeed any of your children?**	70 1 ☐ Yes 2 ☐ No
4a.	**How old were you when your menstrual cycles began?**	71–72 _____ Age *(5)* 00 ☐ Never menstruated *(7)* 99 ☐ DK *(4b)*
b.	**Were you younger than 10, 10 to 12, 13 to 15, or 16 or older?**	73 1 ☐ Younger than 10 2 ☐ 10–12 3 ☐ 13–15 4 ☐ 16+ 9 ☐ DK
5.	**Have your menstrual cycles stopped permanently?**	74 1 ☐ Yes 2 ☐ No *(8)*
6a.	**How old were you when they completely stopped?**	75–76 _____ Age *(7)* 99 ☐ DK *(6b)*
b.	**Were you younger than 20, 20 to 29, 30 to 39, 40 to 44, 45 to 49, 50 to 54, or 55 or older?**	77 1 ☐ Younger than 20 2 ☐ 20–29 3 ☐ 30–39 4 ☐ 40–44 5 ☐ 45–49 6 ☐ 50–54 7 ☐ 55+ 9 ☐ DK
7.	**[Did they stop/Was this] due to surgery?**	78 1 ☐ Yes 2 ☐ No

Section GG — REPRODUCTION AND HORMONE USE — Continued

8a. **Have you ever had an operation to remove a lump from your breast that was found to be NONCANCEROUS?** — 79

1 ☐ Yes *(8b)*
2 ☐ No
3 ☐ Lumps removed that were cancerous } *(9)*
9 ☐ DK

b. **How many of these operations have you had?** — 80

_____ Number of operations
9 ☐ DK

c. **How old were you when you had the (first) operation?** — 81–82

_____ Age at first operation
99 ☐ DK

We are interested in learning about the relationship between birth control pills and health. — 83

9. **Have you ever used birth control pills?**

1 ☐ Yes
2 ☐ No *(GG 3)*

10a. **How old were you when you started using birth control pills?** — 84–85

_____ Age *(11)*
99 ☐ DK *(10b)*

b. **Were you younger than 25, or 25 or older?** — 86

1 ☐ Younger than 25 *(10c)*
2 ☐ 25+ *(10d)*
8 ☐ DK *(11)*

c. **Were you 18 or younger, 19 to 21, or 22 to 24?** — 87

1 ☐ 18 or younger
2 ☐ 19–21
3 ☐ 22–24 } *(11)*
9 ☐ DK

d. **Were you 25 to 29, 30 to 34, or 35 or older?** — 88

1 ☐ 25–29
2 ☐ 30–34
3 ☐ 35+
8 ☐ DK

11a. **Altogether, about how long did you take birth control pills? Include any breaks in usage that lasted less than one month.** — 89–91

Number { 1 ☐ Days, 2 ☐ Months, 3 ☐ Years } *(GG3)*

000 ☐ Less than one month *(GG3)*
888 ☐ Other *(Specify)* ↘

_____ *(GG3)*

999 ☐ DK *(11b)*

b. **Was it less than a year, or a year or more?** — 92

1 ☐ Less than one year *(GG3)*
2 ☐ One year or more *(11c)*
9 ☐ DK *(GG 3)*

c. **Was it 3 years or less, more than 3 but less than 5, or 5 or more years?** — 93

1 ☐ 3 years or less
2 ☐ More than 3, less than 5 years
3 ☐ 5 or more years
9 ☐ DK

GG3 *Refer to age* — 94

1 ☐ Under 40 *(section HH)*
2 ☐ 40 and over *(12)*

12. **Estrogen is a female hormone that may be taken after a hysterectomy or during menopause. Have you ever taken estrogen pills for any reason?** — 95

1 ☐ Yes
2 ☐ No } *(section HH)*
9 ☐ DK

13a. **How old were you when you started using estrogen pills?** — 96–97

_____ Age *(14)*
99 ☐ DK *(13b)*

b. **Were you younger than 20, 20 to 29, 30 to 39, 40 to 44, 45 to 49, 50 to 54, or 55 or older?** — 98

1 ☐ Younger than 20
2 ☐ 20–29
3 ☐ 30–39
4 ☐ 40–44
5 ☐ 45–49
6 ☐ 50–54
7 ☐ 55+
9 ☐ DK

Section GG — REPRODUCTION AND HORMONE USE — Continued

14a. **Altogether, about how long did you take estrogen pills? Include any breaks in usage that lasted less than one month.**

99–101

Number
1 ☐ Days
2 ☐ Months
3 ☐ Years
(15)

000 ☐ Less than one month *(15)*
888 ☐ Other *(Specify)* → _____ *(15)*
999 ☐ DK *(14b)*

b. **Was it less than a year, or a year or more?**

102

1 ☐ Less than one year *(15)*
2 ☐ One year or more *(14c)*
9 ☐ DK *(15)*

c. **Was it 3 years or less, more than 3 but less than 5, or 5 or more years?**

103

1 ☐ 3 years or less
2 ☐ More than 3, less than 5 years
3 ☐ 5 or more years
9 ☐ DK

15. **What was the brand name of the estrogen pills?**

104–119

_____
Brand name

☐ DK

Notes

RT 85

Section HH — FAMILY HISTORY OF CANCER

3–4

These next questions are about your natural or birth mother and father. Do not include step or adoptive parents.

Ask 1—2 for mother, then for father.

		MOTHER	FATHER
1a. In what year was your natural [mother/father] born?	1a.	5–8 _____ Year 9999 ☐ DK	22–25 _____ Year 9999 ☐ DK
b. Is your [mother/father] still living?	b.	9 1 ☐ Yes *(2)* 2 ☐ No *(1c)* 9 ☐ DK *(2)* 7 ☐ Never knew natural mother *(1 for father)*	26 1 ☐ Yes *(2)* 2 ☐ No *(1c)* 9 ☐ DK *(2)* 7 ☐ Never knew natural father *(3)*
c. At what age did your [mother/father] die?	c.	10–11 _____ Age 99 ☐ DK	27–28 _____ Age 99 ☐ DK
2a. Was your [mother/father] ever diagnosed by a doctor as having cancer?	2a.	12 1 ☐ Yes 2 ☐ No 9 ☐ DK *(1 for father)*	29 1 ☐ Yes 2 ☐ No 9 ☐ DK *(3)*
b. What kind of cancer was it?	b.	13–15 _____ *(2d)* 799 ☐ DK *(2c)*	30–32 _____ *(2d)* 799 ☐ DK *(2c)*
c. What part of the body was affected?	c.	_____ ☐ DK	_____ ☐ DK
d. Did your [mother/father] have any other kind of cancer that was diagnosed by a doctor?	d.	16 1 ☐ Yes 2 ☐ No 9 ☐ DK *(2g)*	33 1 ☐ Yes 2 ☐ No 9 ☐ DK *(2g)*
e. The FIRST time [she/he] was diagnosed with cancer, what kind of cancer was it?	e.	000 ☐ Same as 2b/c *(2g)* 17–19 _____ *(2g)* 799 ☐ DK *(2f)*	000 ☐ Same as 2b/c *(2g)* 34–36 _____ *(2g)* 799 ☐ DK *(2f)*
f. What part of the body was affected?	f.	_____ ☐ DK	_____ ☐ DK
g. How old was your [mother/father] when cancer was first diagnosed by a doctor?	g.	20–21 _____ Age 99 ☐ DK *(1 for father)*	37–38 _____ Age 99 ☐ DK

Notes

Section HH — FAMILY HISTORY OF CANCER — Continued

Read to respondent: **Now I'm going to ask about your sisters and brothers who have the same natural or birth mother AND father as you. Do not include step, half, or adoptive sisters and brothers.**

3a. How many sisters do you have, including any that may have died?	3a.	00☐ None _____ Sisters 99☐ DK	39–40
b. How many brothers do you have, including any that may have died?	b.	00☐ None _____ Brothers 99☐ DK	41–42
If "None" in 3a and 3b, skip to 9. **4.** Have any of your [brothers /(or) sisters] ever been diagnosed by a doctor as having cancer?	4.	1☐Yes 2☐No } *(9)* 9☐DK }	43
5. What are the first names of your [brothers/(or) sisters] who had cancer? *Record each person in a separate column* **Anyone else?**	5.	_____ Name Sex: 1☐Male 2☐Female 9☐DK	44
		_____ Name Sex: 1☐Male 2☐Female 9☐DK	82
Ask 6–8 for the first person listed in 5 before asking 6–8 for the next person. **6a.** What kind of cancer did *(name in 5)* have?	6a.	_____ *(6c)* 799☐DK *(6b)*	45–47
		_____ *(6c)* 799☐DK *(6b)*	83–85
b. What part of the body was affected?	b.	_____ ☐DK	
		_____ ☐DK	
c. Did *(name in 5)* have any other kind of cancer that was diagnosed by a doctor?	c.	1☐Yes 2☐No } *(7)* 9☐DK }	48
		1☐Yes 2☐No } *(7)* 9☐DK }	86
d. The FIRST time [he/she] was diagnosed with cancer, what kind of cancer was it?	d.	000☐Same as 6a/b *(7)* _____ *(7)* 799☐DK *(6e)*	49–51
		000☐Same as 6a/b *(7)* _____ *(7)* 799☐DK *(6e)*	87–89
e. What part of the body was affected?	e.	_____ ☐DK	
		_____ ☐DK	
7. How old was *(name in 5)* when cancer was first diagnosed by a doctor?	7.	_____ Age 99☐DK	52–53
		_____ Age 99☐DK	90–91
8a. In what year was *(name in 5)* born?	8a.	_____ Year 9999☐DK	54–57
		_____ Year 9999☐DK	92–95
If known, mark without asking. **b.** Is *(name in 5)* still living?	b.	1☐Yes *(HH1)* 2☐No *(8c)* 9☐DK *(HH1)*	58
		1☐Yes *(HH1)* 2☐No *(8c)* 9☐DK *(HH1)*	96
c. At what age did *(name in 5)* die?	c.	_____ Age 99☐DK	59–60
		_____ Age 99☐DK	97–98
HH1 *Refer to entries in 5.*	HH1	1☐Additional siblings *(6)* 2☐No more siblings *(9)*	61
		1☐Additional siblings *(6)* 2☐No more siblings *(9)*	99

Notes

Section HH — FAMILY HISTORY OF CANCER — Continued

Read to respondent: **These questions are about your natural or birth children. Do not include any children for whom you are an adoptive, step, or foster parent.**

9a. How many daughters do you have, including any that may have died?	9a.	00 ☐ None _____ Daughters 99 ☐ DK	23–24
b. How many sons do you have, including any that may have died?	b.	00 ☐ None _____ Sons 99 ☐ DK	25–26
If "None" in 9a and 9b, skip to section II. **10.** Have any of your children ever been diagnosed by a doctor as having cancer?	10.	1 ☐ Yes 2 ☐ No 9 ☐ DK *(15)*	27
11. What are the first names of your children who had cancer? *Record each person in a separate column* **Anyone else?**	11.	_____ Name Sex: 1 ☐ Male 2 ☐ Female	28–35 36
		_____ Name Sex: 1 ☐ Male 2 ☐ Female	54–61 62
Ask 12—14 for the first person listed in 11 before asking 12—14 for the next person. **12a.** What kind of cancer did *(name in 11)* have?	12a.	_____ *(12c)* 799 ☐ DK *(12b)*	37–39
		_____ *(12c)* 799 ☐ DK *(12b)*	63–65
b. What part of the body was affected?	b.	_____ ☐ DK	
		_____ ☐ DK	
c. Did *(name in 11)* have any other kind of cancer that was diagnosed by a doctor?	c.	1 ☐ Yes 2 ☐ No 9 ☐ DK *(13)*	40
		1 ☐ Yes 2 ☐ No 9 ☐ DK *(13)*	66
d. The FIRST time [he/she] was diagnosed with cancer, what kind of cancer was it?	d.	000 ☐ Same as 12a/b *(13)* _____ *(13)* 799 ☐ DK *(12e)*	41–43
		000 ☐ Same as 12a/b *(13)* _____ *(13)* 799 ☐ DK *(12e)*	67–69
e. What part of the body was affected?	e.	_____ ☐ DK	
		_____ ☐ DK	
13. How old was *(name in 11)* when cancer was first diagnosed by a doctor?	13.	_____ Age 99 ☐ DK	44–45
		_____ Age 99 ☐ DK	70–71
14a. In what year was *(name in 11)* born?	14a.	_____ Year 9999 ☐ DK	46–49
		_____ Year 9999 ☐ DK	72–75
If this child in household, mark "Yes" box without asking. **b.** Is *(name in 11)* still living?	b.	1 ☐ Yes *(HH2)* 2 ☐ No *(14c)* 9 ☐ DK *(HH2)*	50
		1 ☐ Yes *(HH2)* 2 ☐ No *(14c)* 9 ☐ DK *(HH2)*	76
c. At what age did *(name in 11)* die?	c.	_____ Age 99 ☐ DK	51–52
		_____ Age 99 ☐ DK	77–78
HH2 *Refer to entries in 11.*	HH2	1 ☐ Additional children *(12)* 2 ☐ No more children *(15)*	53
		1 ☐ Additional children *(12)* 2 ☐ No more children *(15)*	79

Notes

RT 88
3–4

Section HH — FAMILY HISTORY OF CANCER — Continued

15. **Has the natural [father/mother] of [any of your (other) children/your child] ever been diagnosed by a doctor as having cancer?** — 15. — 1 ☐ Yes; 2 ☐ No; 9 ☐ DK *(section III)* — 5

16a. **What is the [father's/mother's] name?** — 16a. — _____ Name

b. **Is *(name in 16a)* the [father/mother] of all your (other) children?** — b. — 1 ☐ Yes; 2 ☐ No — 6

17a. **What kind of cancer did *(name in 16a)* have?** — 17a. — _____ *(17c)*; 789 ☐ DK *(17b)* — 7–9

b. **What part of the body was affected?** — b. — _____ ☐ DK

c. **Did *(name in 16a)* have any other kind of cancer that was diagnosed by a doctor?** — c. — 1 ☐ Yes; 2 ☐ No; 9 ☐ DK *(18)* — 10

d. **The FIRST time [he/she] was diagnosed with cancer, what kind of cancer was it?** — d. — 000 ☐ Same as 17a/b *(18)*; _____ *(18)*; 799 ☐ DK *(17e)* — 11–13

e. **What part of the body was affected?** — e. — _____ ☐ DK

18. **How old was *(name in 16a)* when cancer was first diagnosed by a doctor?** — 18. — _____ Age; 99 ☐ DK — 14–15

19a. **In what year was *(name in 16a)* born?** — 19a. — _____ Year; 9999 ☐ DK — 16–19

If person in household, mark "Yes" without asking.

b. **Is *(name in 16a)* still living?** — b. — 1 ☐ Yes *(20)*; 2 ☐ No *(19c)*; 9 ☐ DK *(20)* — 20

c. **At what age did *(name in 16a)* die?** — c. — _____ Age; 99 ☐ DK — 21–22

20a. **How many children did you and *(name in 16a)* have together, including any that may have died?** — 20a. — _____ No. of children — 23–24

b. **How many of these children are sons and how many are daughters?** — b. — _____ No. of sons — 25–26; _____ No. of daughters — 27–28

c. **What are the children's first names?** — c. — _____ First name — 29–36; _____ First name — 37–44; _____ First name — 45–52; _____ First name — 53–60; _____ First name — 61–68; _____ First name — 69–76; _____ First name — 77–84; _____ First name — 85–92

HH3 *Refer to 16b.* — HH3 — 1 ☐ "No" in 16b *(15)*; 8 ☐ "Yes" in 16b *(section III)* — 93

Section KK — HEIGHT, WEIGHT, RELATIONSHIPS, AND SOCIAL ACTIVITIES

1. About how tall are you without shoes? [28–30]

_____ Feet

_____ Inches

2. About how much do you weigh without shoes? [31–33]

_____ Pounds

3. When you weighed the most, how much did you weigh (not including pregnancy)? [34–36]

_____ Pounds

These next questions are about social activities and relationships. [37–38]

4a. (Not including your [husband/wife]) Of all your friends, how many are there that you can talk to about private matters or can call on for help?

_____ Friends

oo☐ None

b. (Not including your [husband/wife]) How many relatives do you have that you can talk to about private matters or can call on for help? [39–40]

_____ Relatives

oo☐ None

If None in 4a and 4b, skip to 5.

c. How many of these friends and relatives do you see or talk to at least once a month? [41–42]

_____ Friends and relatives

oo☐ None

5a. How often do you participate in or attend group meetings or activities, for example, social clubs, PTA, sporting events, church groups or other community service groups? [43–45]

_____ Times per { 2 ☐ Week, 3 ☐ Month, 4 ☐ Year }

ooo☐ Never

b. How often do you go to church, temple, or other religious services? [46–48]

_____ Times per { 2 ☐ Week, 3 ☐ Month, 4 ☐ Year }

ooo☐ Never

Notes

Section BB — FOOD FREQUENCY — Continued

48. Pie?

66–69

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(49)*

Small, medium or large? 70

1 ☐ Small
2 ☐ Medium (1 med. slice)
3 ☐ Large

49. Doughnuts, cookies, cake or pastry?

71–74

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(50)*

A medium serving is 1 piece or 3 cookies 75

1 ☐ Small
2 ☐ Medium (1 piece or 3 cookies)
3 ☐ Large

50. Chocolate candy?

76–79

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(51)*

80

1 ☐ Small
2 ☐ Medium (1 oz.)
3 ☐ Large

51. Sugar in coffee or tea or on cereal?

81–84

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(52)*

85

1 ☐ Small
2 ☐ Medium (2 tsp.)
3 ☐ Large

52. Whole milk or drinks made with whole milk, not including on cereal? I'm going to ask about 1%, 2% and skim milk separately.

86–89

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(53)*

90

1 ☐ Small
2 ☐ Medium (8 oz. glass)
3 ☐ Large

53. 2% milk or drinks made with 2% milk, not including on cereal?

91–94

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(54)*

95

1 ☐ Small
2 ☐ Medium (8 oz. glass)
3 ☐ Large

54. Skim milk, 1% milk or buttermilk, not including on cereal?

96–99

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(55)*

100

1 ☐ Small
2 ☐ Medium (8 oz. glass)
3 ☐ Large

55. Milk or cream in coffee or tea?

101–104

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(56)*

105

1 ☐ Small
2 ☐ Medium (1 tbs.)
3 ☐ Large

56. Soda or soft drinks with sugar?

106–109

Times per
1 ☐ Day
2 ☐ Week
3 ☐ Month
4 ☐ Year
0000 ☐ Less than 6 a year or never *(57)*

110

1 ☐ Small
2 ☐ Medium (12 oz.)
3 ☐ Large

57a. During the past year or so, how often did you drink beer?

111–114

0011 ☐ Everyday/daily

Times per
2 ☐ Week
3 ☐ Month
4 ☐ Year

0000 ☐ Never *(58)*

b. On the days you drank beer, how many cans, bottles or glasses did you drink?

115–116

Number
99 ☐ DK

c. Were they small, medium, or large?

117

1 ☐ Small
2 ☐ Medium (12 oz.)
3 ☐ Large (16 oz.)

Notes

RT 82

Section BB — FOOD FREQUENCY — Continued

3–4

58a. During the past year or so, how often did you drink wine? — 5–8

0011 ☐ Everyday/daily
_____ Times per { 2 ☐ Week, 3 ☐ Month, 4 ☐ Year }
0000 ☐ Never *(59)*

b. On the days you drank wine, how many glasses did you drink? — 9–10

_____ Number
99 ☐ DK

c. Were they small, medium, or large? — 11

1 ☐ Small
2 ☐ Medium (1med. wine glass)
3 ☐ Large

59a. During the past year or so, how often did you drink liquor? — 12–15

0011 ☐ Everyday/daily
_____ Times per { 2 ☐ Week, 3 ☐ Month, 4 ☐ Year }
0000 ☐ Never *(60)*

b. On the days you drank liquor, how many drinks did you have? — 16–17

_____ Number
99 ☐ DK

c. Were they small, medium, or large? — 18

1 ☐ Small
2 ☐ Medium (1shot)
3 ☐ Large

60a. Was there ever a period in your life when you drank five or more drinks of any alcoholic beverage almost every day? — 19

1 ☐ Yes
2 ☐ No } *(61)*
9 ☐ DK }

b. For how long did that period last? — 20–23

_____ Number { 1 ☐ Days, 2 ☐ Weeks, 3 ☐ Months, 4 ☐ Years }
9999 ☐ DK

61. When you eat chicken or other poultry, how often do you eat it with the skin on? Would you say often, sometimes, rarely or never? — 24

1 ☐ Often or always
2 ☐ Sometimes
3 ☐ Rarely
4 ☐ Never
0 ☐ Don't eat chicken or poultry

62. When you eat red meat, how often do you eat the fat? Would you say often, sometimes, rarely or never? — 25

1 ☐ Often or always
2 ☐ Sometimes
3 ☐ Rarely
4 ☐ Never
0 ☐ Don't eat red meat

63a. On most weekdays, how many meals do you usually eat each day? — 26

0 ☐ Less than one a day
_____ Meals
9 ☐ DK

b. On most weekdays, how many snacks do you usually eat each day, including snacks after dinner? — 27

0 ☐ Less than one a day
_____ Snacks
9 ☐ DK

c. On most Saturdays or Sundays, how many meals do you usually eat each day? — 28

0 ☐ Less than one a day
_____ Meals
9 ☐ DK

d. On most Saturdays or Sundays, how many snacks do you usually eat each day? — 29

0 ☐ Less than one a day
_____ Snacks
9 ☐ DK

64. In a typical week, how many meals do you usually get in restaurants, cafeterias, or fast food places? — 30–31

00 ☐ Less than one a week
_____ Meals
99 ☐ DK

Notes

Section S — CANCER SCREENING KNOWLEDGE AND PRACTICE — Continued

5a. **Have you ever had a Pap smear where the results were NOT normal?** — 43
1 ☐ Yes
2 ☐ No } *(S3)*
9 ☐ DK }

b. **Because of the abnormal results, did you have any additional tests?** — 44
1 ☐ Yes
2 ☐ No
9 ☐ DK

c. **Because of the abnormal results, did you have any surgery or other treatment?** — 45
1 ☐ Yes
2 ☐ No
9 ☐ DK

d. **Did the [Pap smear/additional tests/surgery or other treatment] indicate that you had cancer?** — 46
1 ☐ Yes
2 ☐ No } *(S3)*
9 ☐ DK }

e. **When were you diagnosed as having cancer?** — 47–50
____ / **19** ____ mo. / year **OR** ____ 1 ☐ Days ago 2 ☐ Weeks ago 3 ☐ Months ago 4 ☐ Years ago
999 ☐ DK — 51–53

S3 *Refer to 1c and 1f.* — 54
1 ☐ More than 3 years in 1c or 1f *(6)*
8 ☐ Other *(7)*

6. **What is the most important reason why you have [never had a Pap smear/not had a Pap smear in the past few years]?** — 55–56
00 ☐ Procrastinated/Put it off
01 ☐ Had a hysterectomy *(8)*
02 ☐ Didn't know I should
03 ☐ Not needed/not necessary
04 ☐ Cost too much
05 ☐ No insurance coverage
06 ☐ Don't go to doctors
07 ☐ Don't have a doctor
08 ☐ Not recommended by doctor/Dr. never said it was needed
09 ☐ Dr. said it wasn't needed
10 ☐ Too embarrassing
11 ☐ Haven't had any problems
12 ☐ Fear
88 ☐ Other
99 ☐ DK

7a. **Do you have menstrual periods?** — 57
1 ☐ Yes *(8)*
2 ☐ No *(7b)*
3 ☐ Never had menstrual periods *(7c)*

b. **Did they stop due to surgery?** — 58
1 ☐ Yes } *(8)*
2 ☐ No }

c. **Was this due to surgery?** — 59
1 ☐ Yes
2 ☐ No

8a. **Do you know how to examine your own breasts for lumps?** — 60
1 ☐ Yes
2 ☐ No *(S4)*

b. **About how often do you examine your breasts for lumps?** — 61–63
____ Times per 1 ☐ Day 2 ☐ Week 3 ☐ Month 4 ☐ Year
000 ☐ Never
888 ☐ Other *(Specify)* ____
999 ☐ DK

c. **Who taught you how to examine your breasts?**

Mark all mentioned, do not probe.

1 ☐ Doctor — 64
1 ☐ Nurse — 65
1 ☐ Other health professional — 66
1 ☐ Learned in a class/meeting — 67
1 ☐ Read in a book, pamphlet, magazine, etc. — 68
1 ☐ Television — 69
1 ☐ Other *(Specify)* ____ — 70
1 ☐ DK — 71

Section S — CANCER SCREENING KNOWLEDGE AND PRACTICE — Continued

S4 *Refer to age.*

72
1 ☐ Under 40 *(39)*
2 ☐ 40 and over *(9)*

9a. **A breast physical exam is when the breast is felt for lumps by a doctor or medical assistant. Have you ever heard of a breast physical examination?** — 73
1 ☐ Yes
2 ☐ No } *(15)*
9 ☐ DK }

b. **Have you ever had a breast physical exam?** — 74
1 ☐ Yes
2 ☐ No *(14)*
9 ☐ DK *(15)*

c. **When did you have your last breast physical exam?** — 75–78
__/__ mo. / 19__ year **OR** ——— 1 ☐ Days ago / 2 ☐ Weeks ago / 3 ☐ Months ago / 4 ☐ Years ago *If 3 years ago or less (10) If more than 3 years ago (12)*
999 ☐ DK *(9d)* — 79–81

d. **Was it within the past year or a year or more ago?** — 82
1 ☐ Within past year *(9e)* 9 ☐ DK *(12)*
2 ☐ 1 year or more *(9f)*

e. **Was it less than three months, or 3 or more months ago?** — 83
1 ☐ Less than 3 months } *(10)*
2 ☐ 3 or more months
9 ☐ DK

f. **Was it 3 years ago or less, between three and 5 years, or 5 or more years ago?** — 84
1 ☐ 3 years or less *(10)*
2 ☐ Between 3 and 5 years } *(12)*
3 ☐ 5 or more years
9 ☐ DK

10. **Where was this exam done — In a doctor's office, a clinic, a hospital, or some other place?** — 85
1 ☐ Doctor's office
2 ☐ Clinic
3 ☐ Hospital
8 ☐ Other place *(Specify)* _____
9 ☐ DK

11a. **Did you go for your last breast physical exam because of a health problem?** — 86
1 ☐ Yes
2 ☐ No } *(11c)*
9 ☐ DK

b. **What was the problem?**
Mark all mentioned, do not probe.
1 ☐ Follow-up tests/treatment — 87
1 ☐ Soreness — 88
1 ☐ Swelling — 89
1 ☐ Lumps — 90
1 ☐ Pain — 91
1 ☐ Discharge — 92
1 ☐ Complications related to breast feeding — 93
1 ☐ Unrelated medical problem — 94
1 ☐ Other — 95
1 ☐ DK — 96

c. **How were you told the results of the test — In person, over the telephone, through the mail, or some other way?** — 97
1 ☐ In person
2 ☐ Telephone
3 ☐ Through the mail
4 ☐ Combination of methods
5 ☐ Never told; meaning results normal
6 ☐ Never told; DK if problem
8 ☐ Other

S5 *Refer to 11a.* — 98
1 ☐ Yes *(13)*
2 ☐ No } *(12)*
9 ☐ DK }

12a. **Have you EVER had a breast physical exam because of a health problem?** — 99
1 ☐ Yes
2 ☐ No } *(13)*
9 ☐ DK }

b. **What was the problem?**
Mark all mentioned, do not probe.
1 ☐ Follow-up tests/treatment — 100
1 ☐ Soreness — 101
1 ☐ Swelling — 102
1 ☐ Lumps — 103
1 ☐ Pain — 104
1 ☐ Discharge — 105
1 ☐ Complications related to breast feeding — 106
1 ☐ Unrelated medical problem — 107
1 ☐ Other — 108
1 ☐ DK — 109

RT 70

Section S — CANCER SCREENING KNOWLEDGE AND PRACTICE — Continued

3–4

13a. Have you ever had a breast physical exam where the results were NOT normal? — 5

1 ☐ Yes
2 ☐ No } *(S6)*
9 ☐ DK }

b. Because of the abnormal results, did you have any additional tests? — 6

1 ☐ Yes
2 ☐ No
9 ☐ DK

c. Because of the abnormal results, did you have any surgery or other treatment? — 7

1 ☐ Yes
2 ☐ No
9 ☐ DK

d. Did the [breast physical exam/additional tests/surgery or other treatment] indicate that you had cancer? — 8

1 ☐ Yes
2 ☐ No } *(S6)*
9 ☐ DK }

e. When were you diagnosed as having cancer? — 9–12

____ / **19**__ mo. / year **OR** ____ { 1 ☐ Days ago; 2 ☐ Weeks ago; 3 ☐ Months ago; 4 ☐ Years ago }

999 ☐ DK

13–15

S6 *Refer to 9c and 9f.* — 16

1 ☐ More than 3 years in 9c or 9f *(14)*
8 ☐ Other *(15)*

14. What is the most important reason why you have [never had a breast physical exam/not had a breast physical exam in the past few years] by a doctor or other health professional? — 17–18

00 ☐ Procrastinated/Put it off
01 ☐ Didn't know I should
02 ☐ Not needed/not necessary
03 ☐ Cost too much
04 ☐ No insurance coverage
05 ☐ Don't go to doctors
06 ☐ Don't have a doctor
07 ☐ Not recommended by doctor/Dr. never said it was needed
08 ☐ Dr. said it wasn't needed
09 ☐ Too embarrassing
10 ☐ Haven't had any problems
11 ☐ Fear
12 ☐ Examine own breasts
88 ☐ Other
99 ☐ DK

Notes

Section S — CANCER SCREENING KNOWLEDGE AND PRACTICE — Continued

HAND CARD S

15a. **A mammogram is when an x-ray is taken only of the breasts by a machine that presses against the breast while the picture is taken. Have you ever heard of a mammogram?**

19
1 ☐ Yes
2 ☐ No
9 ☐ DK *(21)*

b. **Have you ever had a mammogram?**

20
1 ☐ Yes
2 ☐ No *(20)*
9 ☐ DK *(21)*

c. **When did you have your last mammogram?**

21–24
___ / **19**___ mo. / year **OR** ___ 1 ☐ Days ago, 2 ☐ Weeks ago, 3 ☐ Months ago, 4 ☐ Years ago *If 3 years ago or less (16) If more than 3 years ago (18)*

999 ☐ DK *(15d)*

d. **Was it within the past year or a year or more ago?**

25–27
28
1 ☐ Within past year *(15e)*
2 ☐ 1 year or more *(15f)*
9 ☐ DK *(18)*

e. **Was it less than three months, or 3 or more months ago?**

29
1 ☐ Less than 3 months
2 ☐ 3 or more months *(16)*
9 ☐ DK

f. **Was it 3 years ago or less, between three and 5 years, or 5 or more years ago?**

30
1 ☐ 3 years or less *(16)*
2 ☐ Between 3 and 5 years
3 ☐ 5 or more years *(18)*
9 ☐ DK

16. **Where was this test done — in a doctor's office, a clinic, a hospital, or some other place?**

31
1 ☐ Doctor's office
2 ☐ Clinic
3 ☐ Hospital
4 ☐ Imaging center/x-ray lab
8 ☐ Other place *(Specify)* _____
9 ☐ DK

17a. **Did you go for your last mammogram because of a health problem?**

32
1 ☐ Yes
2 ☐ No *(17c)*
9 ☐ DK *(17c)*

b. **What was the problem?**

Mark all mentioned, do not probe.

1 ☐ Thickening — 33
1 ☐ Soreness — 34
1 ☐ Swelling — 35
1 ☐ Lumps — 36
1 ☐ Pain — 37
1 ☐ Discharge — 38
1 ☐ Unrelated medical problem — 39
1 ☐ Other — 40
1 ☐ DK — 41

c. **How were you told the results of the test — in person, over the telephone, through the mail, or some other way?**

42
1 ☐ In person
2 ☐ Telephone
3 ☐ Through the mail
4 ☐ Combination of methods
5 ☐ Never told; meaning results normal
6 ☐ Never told; DK if problem
8 ☐ Other

S7 *Refer to 17a.*

43
1 ☐ Yes *(19)*
2 ☐ No *(18)*
9 ☐ DK *(18)*

18a. **Have you EVER had a mammogram because of a health problem?**

44
1 ☐ Yes
2 ☐ No *(19)*
9 ☐ DK *(19)*

b. **What was the problem?**

Mark all mentioned, do not probe.

1 ☐ Thickening — 45
1 ☐ Soreness — 46
1 ☐ Swelling — 47
1 ☐ Lumps — 48
1 ☐ Pain — 49
1 ☐ Discharge — 50
1 ☐ Unrelated medical problem — 51
1 ☐ Other — 52
1 ☐ DK — 53

Section S — CANCER SCREENING KNOWLEDGE AND PRACTICE — Continued

19a. **Have you ever had a mammogram where the results were NOT normal?** — 54

1 ☐ Yes
2 ☐ No } *(S8)*
9 ☐ DK }

b. **Because of the abnormal results, did you have any additional tests?** — 55

1 ☐ Yes
2 ☐ No
9 ☐ DK

c. **Because of the abnormal results, did you have any surgery or other treatment?** — 56

1 ☐ Yes
2 ☐ No
9 ☐ DK

d. **Did the [mammogram/additional tests/surgery or other treatment] indicate that you had cancer?** — 57

1 ☐ Yes
2 ☐ No } *(S8)*
9 ☐ DK }

e. **When were you diagnosed as having cancer?** — 58–61

____ / mo. **19** ____ year **OR**

1 ☐ Days ago
2 ☐ Weeks ago
3 ☐ Months ago
4 ☐ Years ago

999 ☐ DK — 62–64

S8 *Refer to 15c and 15f.* — 65

1 ☐ More than 3 years in 15c or 15f *(20)*
8 ☐ Other *(21)*

20. **What is the most important reason why you have [never had a mammogram/not had a mammogram in the past few years]?** — 66–67

00 ☐ Procrastinated/Put it off
01 ☐ Didn't know I should
02 ☐ Not needed/not necessary
03 ☐ Cost too much
04 ☐ No insurance coverage
05 ☐ Don't go to doctors
06 ☐ Don't have a doctor
07 ☐ Not recommended by doctor/Dr. never said it was needed
08 ☐ Dr. said it wasn't needed
09 ☐ Too embarrassing
10 ☐ Haven't had any problems
11 ☐ Fear
12 ☐ Fear of radiation
13 ☐ Painful procedure
14 ☐ Unpredictable results
88 ☐ Other
99 ☐ DK

Notes

Vital and Health Statistics series descriptions

SERIES 1. **Programs and Collection Procedures**—Reports describing the general programs of the National Center for Health Statistics and its offices and divisions and the data collection methods used. They also include definitions and other material necessary for understanding the data

SERIES 2. **Data Evaluation and Methods Research**—Studies of new statistical methodology including experimental tests of new survey methods, studies of vital statistics collection methods, new analytical techniques, objective evaluations of reliability of collected data, and contributions to statistical theory. Studies also include comparison of U.S. methodology with those of other countries.

SERIES 3. **Analytical and Epidemiological Studies**—Reports presenting analytical or interpretive studies based on vital and health statistics, carrying the analysis further than the expository types of reports in the other series.

SERIES 4. **Documents and Committee Reports**—Final reports of major committees concerned with vital and health statistics and documents such as recommended model vital registration laws and revised birth and death certificates.

SERIES 5. **Comparative International Vital and Health Statistics Reports**—Analytical and descriptive reports comparing U.S. vital and health statistics with those of other countries.

SERIES 6. **Cognition and Survey Measurement**—Reports from the National Laboratory for Collaborative Research in Cognition and Survey Measurement using methods of cognitive science to design, evaluate, and test survey instruments.

SERIES 10. **Data From the National Health Interview Survey**—Statistics on illness, accidental injuries, disability, use of hospital, medical, dental, and other services, and other health-related topics, all based on data collected in the continuing national household interview survey.

SERIES 11. **Data From the National Health Examination Survey and the National Health and Nutrition Examination Survey**—Data from direct examination, testing, and measurement of national samples of the civilian noninstitutionalized population provide the basis for (1) estimates of the medically defined prevalence of specific diseases in the United States and the distributions of the population with respect to physical, physiological, and psychological characteristics and (2) analysis of relationships among the various measurements without reference to an explicit finite universe of persons.

SERIES 12. **Data From the Institutionalized Population Surveys**—Discontinued in 1975. Reports from these surveys are included in Series 13.

SERIES 13. **Data on Health Resources Utilization**—Statistics on the utilization of health manpower and facilities providing long-term care, ambulatory care, hospital care, and family planning services.

SERIES 14. **Data on Health Resources: Manpower and Facilities**—Statistics on the numbers, geographic distribution, and characteristics of health resources including physicians, dentists, nurses, other health occupations, hospitals, nursing homes, and outpatient facilities.

SERIES 15. **Data From Special Surveys**—Statistics on health and health-related topics collected in special surveys that are not a part of the continuing data systems of the National Center for Health Statistics.

SERIES 16. **Compilations of Advance Data From Vital and Health Statistics**—These reports provide early release of data from the National Center for Health Statistics' health and demographic surveys. Many of these releases are followed by detailed reports in the Vital and Health Statistics Series.

SERIES 20. **Data on Mortality**—Various statistics on mortality other than as included in regular annual or monthly reports. Special analyses by cause of death, age, and other demographic variables; geographic and time series analyses; and statistics on characteristics of deaths not available from the vital records based on sample surveys of those records.

SERIES 21. **Data on Natality, Marriage, and Divorce**—Various statistics on natality, marriage, and divorce other than as included in regular annual or monthly reports. Special analyses by demographic variables; geographic and time series analyses; studies of fertility; and statistics on characteristics of births not available from the vital records based on sample surveys of those records.

SERIES 22 **Data From the National Mortality and Natality Surveys**—Discontinued in 1975. Reports from these sample surveys based on vital records are included in Series 20 and 21, respectively.

SERIES 23. **Data From the National Survey of Family Growth**—Statistics on fertility, family formation and dissolution, family planning, and related maternal and infant health topics derived from a periodic survey of a nationwide probability sample of women 15–44 years of age.

SERIES 24. **Compilations of Data on Natality, Mortality, Marriage, Divorce, and Induced Terminations of Pregnancy**—Advance reports of births, deaths, marriages, and divorces are based on final data from the National Vital Statistics System and are published annually as supplements to the Monthly Vital Statistics Report (MVSR). These reports are followed by the publication of detailed data in Vital Statistics of the United States annual volumes. Other reports including induced terminations of pregnancy issued periodically as supplements to the MVSR provide selected findings based on data from the National Vital Statistics System and may be followed by detailed reports in Vital and Health Statistics Series.

For answers to questions about this report or for a list of titles of reports published in these series, contact:

Scientific and Technical Information Branch
National Center for Health Statistics
Centers for Disease Control
Public Health Service
Hyattsville, Md. 20782

301–436–8500

U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Health Statistics
3700 East-West Highway
Hyattsville, Maryland 20782

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

BULK RATE
POSTAGE & FEES PAID
PHS/NCHS
PERMIT NO. G-281

DHHS Publication No. (PHS) 90-1500, Series 10, No. 172