Breast Cancer Facts & Figures 2001-2002

American Cancer Society®

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Acknowledgments

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What is breast cancer?

Cancers are a group of diseases that cause cells in the body to change and grow out of control. Most types of cancer cells form a lump or mass called a tumor, and are named after the part of the body where the tumor first starts.

Breast cancer begins in breast tissue, which is made up of glands for milk production, called *lobules,* and the *ducts* that connect lobules to the nipple. The remainder of the breast is made up of fatty, connective, and lymphatic tissue.

- Most types of tumors that form in the breast are *benign;* that is, they are not cancer at all. Benign breast tumors are abnormal growths, but they do not grow and spread like cancer does, and are not life-threatening.
- Some breast tumors are cancerous, but are called *in situ,* because they have not spread beyond the area where they began. *In situ* breast cancers are confined within the ducts (*ductal carcinoma in situ, or DCIS*) or lobules (*lobular carcinoma in situ, or LCIS*) of the breast. The majority of these tumors will not progress to become an invasive tumor, and at this early stage nearly all of these cancers can be cured. Most oncologists believe that lobular carcinoma *in situ* is not a true cancer but is a marker of increased risk for developing invasive cancer in the future.
- Other cancerous breast tumors are *invasive,* or infiltrating. These cancers start in the ducts or lobules of the breast but have broken through the duct or gland walls to invade the surrounding fatty tissue of the breast. The seriousness of invasive breast cancer is strongly influenced by the *stage* of the disease, or how far the cancer has spread when it is first diagnosed:
  - local stage describes cancers confined to the breast;
  - regional stage tumors have spread to the lymph nodes;
  - distant stage cancers have *metastasized* (spread to distant sites).

Who gets breast cancer?

Estimated Cases and Deaths

- Excluding cancers of the skin, breast cancer is the most common cancer among women, accounting for nearly one of every three cancers diagnosed in American women.
- In 2001, approximately 192,200 new cases of invasive breast cancer will be diagnosed among women, as will nearly 47,100 additional cases of *in situ* breast cancer (Table 1).[1]
- Also in 2001, 40,200 women are expected to die from this disease (Table 1). Only lung cancer accounts for more cancer deaths in women.

Gender

- About 1,500 cases and 400 deaths from breast cancer are expected to occur among men in 2001, accounting for about 1% of all breast cancers.[1]

Table 1. Estimated New Breast Cancer Cases and Deaths in Women by Age, United States, 2001

Age	In Situ Cases	%	Invasive Cases	%	Deaths	%
<30	100	0.2	900	0.5	100	0.2
30-39	1,600	3.4	8,000	4.2	1,200	3.0
40-49	10,800	22.9	35,400	18.4	5,000	12.5
50-59	12,500	26.5	46,800	24.3	7,300	18.3
60-69	9,400	19.9	33,100	17.2	5,900	14.6
70-79	9,400	19.9	43,000	22.4	9,800	24.3
80+	3,300	7.0	25,000	13.0	10,900	27.2
Total	**47,100**	**100.0**	**192,200**	**100.0**	**40,200**	**100.0**

Due to rounding, percentages may not exactly total 100%.
American Cancer Society, Surveillance Research, 2001.

- Even though men are at low risk of developing breast cancer, they should be aware of risk factors, especially family history, and report *any* change in their breasts to a physician.

Age

- The incidence and death rates from breast cancer increase with age (Figure 1). Seventy-seven percent of new cases and 84% of breast cancer deaths reported between 1994-1998 occur in women ages 50 and older.
- For all races combined, for the period 1994-1998, women ages 20-24 had an age-specific incidence rate of only 1.5 cases per 100,000 population; women ages 75-79 had the highest incidence rate, 489.7 cases per 100,000.[2]

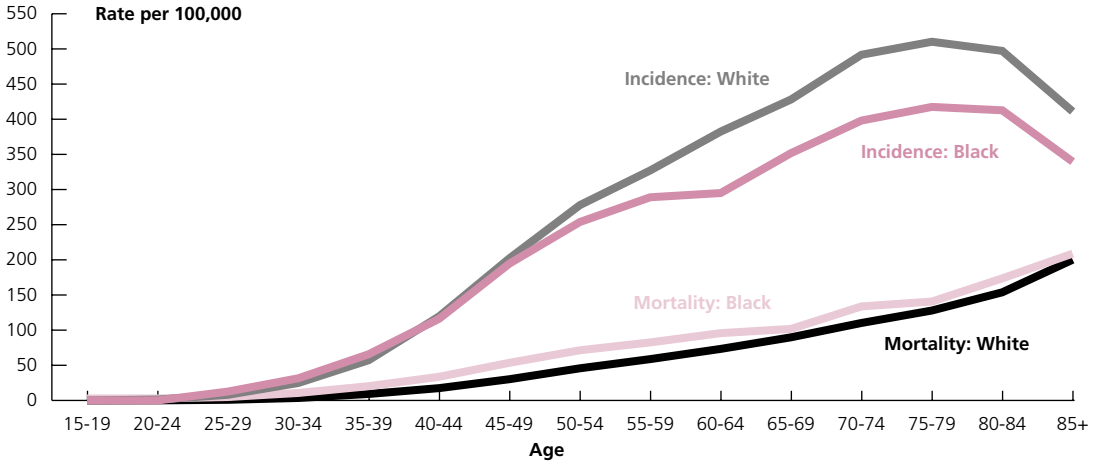
Race/Ethnicity

- After age 40, white women are more likely to be diagnosed with breast cancer than black women. With the exception of black women between the ages of 20-24, black women under age 40 have a slightly higher incidence than white women (Figure 1). Black women are more likely to die from breast cancer than are white women.
- Incidence and death rates from breast cancer are generally lower among women of other racial and ethnic groups than in white and black women (Figure 2).[2]

State

- Incidence and death rates for female breast cancer are presented by state for all racial and ethnic groups combined in Table 2. Incidence rates, especially of *in situ* breast cancers, reflect the intensity of screening as well as disease occurrence.

Figure 1. Female Breast Cancer—Age-Specific Incidence and Death Rates, by Race, United States, 1994-1998



	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Inc. Black	0.0	0.0	12.6	31.5	65.7	116.1	194.7	253.8	289.0	295.0	351.8	398.1	417.5	412.7	339.6
Inc. White	0.0	1.2	8.0	24.8	57.2	119.5	202.2	277.8	327.2	382.4	428.1	491.7	510.2	497.2	411.0
Mort. Black	0.0	0.0	2.0	7.8	17.4	30.8	50.7	68.5	79.7	92.9	98.9	130.9	137.8	170.8	206.0
Mort. White	0.0	0.1	0.9	3.5	9.2	17.5	30.2	45.7	58.8	73.3	89.8	110.2	127.9	153.8	200.2

American Cancer Society, Surveillance Research, 2001.

Data sources: NCI Surveillance, Epidemiology, and End Results Program, 2001, and National Center for Health Statistics, 2001.

Table 2. Female Invasive Breast Cancer Incidence (1994-1998) and Death (1994-1998) Rates*, by State

State	In Situ Incidence	Invasive Incidence	Mortality	State	In Situ Incidence	Invasive Incidence	Mortality
Alabama†	12.8	79.7	22.1	Montana	16.2	106.3	22.1
Alaska†	23.8	114.1	20.7	Nebraska	17.3	108.5	23.2
Arizona	17.9	103.4	21.4	Nevada	10.3	86.6	22.7
Arkansas†	15.8	93.4	22.1	New Hampshire	25.5	115.7	24.6
California‡	19.6	111.5	23.3	New Jersey‡	22.8	116.4	27.2
Colorado‡	20.5	108.8	20.0	New Mexico‡	17.0	99.7	21.7
Connecticut‡	26.6	121.6	25.1	New York	18.5	110.7	26.6
Delaware‡	30.5	117.3	26.7	North Carolina	17.6	101.8	23.8
Dist. of Columbia†	23.5	121.7	33.2	North Dakota†	16.6	100.4	22.5
Florida‡	18.0	110.0	23.2	Ohio†	19.1	107.8	25.6
Georgia†	15.5	86.0	23.7	Oklahoma†			23.7
Hawaii‡	22.3	107.4	17.1	Oregon†	20.9	119.0	23.2
Idaho‡	18.1	105.1	22.0	Pennsylvania	20.0	108.4	25.8
Illinois‡	19.3	110.3	26.0	Rhode Island‡	20.4	114.9	26.2
Indiana	16.9	102.1	24.7	South Carolina†	15.8	103.0	23.7
Iowa‡	16.1	108.7	23.1	South Dakota†			20.9
Kansas†			22.7	Tennessee			24.3
Kentucky‡	13.9	101.9	23.8	Texas	15.1	98.2	22.4
Louisiana‡	13.4	98.1	25.6	Utah‡	15.5	97.8	20.6
Maine			23.8	Vermont†			23.4
Maryland	23.9	119.6	26.4	Virginia	17.4	99.5	24.9
Massachusetts	32.7	120.5	25.8	Washington	24.1	120.4	22.8
Michigan‡	23.8	109.9	24.8	West Virginia	13.4	96.3	22.9
Minnesota‡			23.1	Wisconsin‡	18.7	110.1	23.0
Mississippi†	11.2	82.4	23.3	Wyoming‡	11.2	97.5	23.2
Missouri†	17.5	108.7	23.9	United States	23.3	118.1	24.2

*Rates are per 100,000, age-adjusted to the 1970 US standard population.

†This state's registry did not submit incidence data to the North American Association of Central Cancer Registries (NAACCR) for 1994-1998.

‡This state's registry meets the highest incidence data quality standards for 1994-1998 as defined by the North American Association of Central Cancer Registries (NAACCR). These standards are: data for all years from 1994 to 1998; an estimate of duplicate records of less than 0.1%; completion of the EDITS software program; and an adjusted completeness of case ascertainment of 90% or higher.

Data sources: Death Rates: National Center for Health Statistics, 2001. State Incidence Rates: NAACCR, 2001. US Incidence Rates: NCI Surveillance, Epidemiology, and End Results Program, 2001.

American Cancer Society, Surveillance Research, 2001.

How has the occurrence of breast cancer changed over time?

Incidence Trends

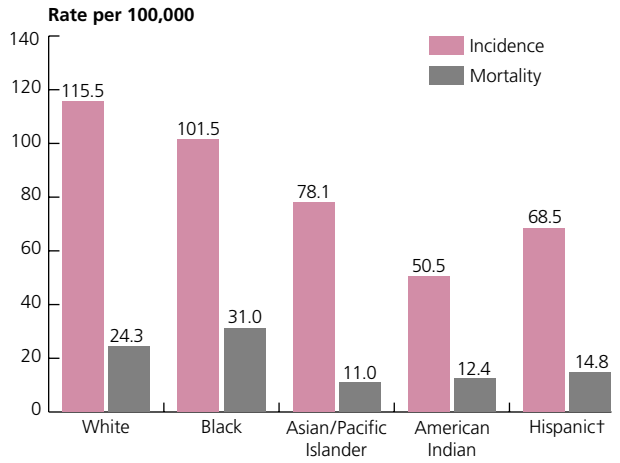
Invasive breast cancer

Incidence rates of invasive breast cancer show three distinct phases since 1973, when broad surveillance of cancer began:

- between 1973 and 1980, incidence was essentially constant;
- between 1980 and 1987, incidence increased by almost 4% per year;
- between 1987 and 1998, incidence rates increased by 0.5% per year.[5]

Much of the underlying increase in incidence is attributed to changes in reproductive patterns, such as delayed childbearing and having fewer children. The more rapid increase between 1980 and 1987 is due largely to increased detection through greater use of mammography screening, with diagnosis of smaller, more easily treatable cancers than would have occurred otherwise. During this short period, incidence rates of

Figure 2. Female Breast Cancer Incidence and Death Rates,* by Race and Ethnicity, United States, 1992-1998



*Rates are age-adjusted to the 1970 US standard population.
†Persons of Hispanic origin may be of any race.

American Cancer Society, Surveillance Research, 2001.

Data sources: NCI Surveillance, Epidemiology, and End Results Program, 2001, and National Center for Health Statistics, 2001.

smaller tumors (<2.0 cm) more than doubled, while rates of larger tumors (3.0 cm or more) decreased 27%.[3] The much slower increase in rates in the 1990s reflects the leveling off of mammography screening utilization, with incidence trends returning to baseline, and tumors continuing to be diagnosed at an earlier stage.

In situ breast cancer

Incidence rates of *in situ* breast cancer have increased considerably over the past 25 years. Most of this increase is due to increases in the detection of ductal carcinoma *in situ* (DCIS) with mammography. From 1994 to 1998 DCIS accounted for 51% of the *in situ* breast cancers diagnosed among women in SEER areas. Over the entire period 1973 through 1998, incidence rates of DCIS increased 6 times faster than incidence rates of invasive breast cancer.

Most cases of DCIS are detectable only through mammography, and the large increases in DCIS incidence rates since 1982 are a direct result of mammography screening practices.[4] Since 1988, while invasive breast cancer incidence rates have remained level, DCIS incidence rates have continued to increase. This shift is thought to reflect earlier detection of cancers, rather than a true increase in occurrence.

Lobular carcinoma *in situ* (LCIS) is less common, accounting for 13% of female *in situ* breast cancers diagnosed in recent years. Between 1982 and 1988, increases in LCIS incidence rates were smaller than increases for DCIS, and since 1988, incidence rates of LCIS have remained level.

Age

Between 1973 and 1998, incidence rates of invasive breast cancer increased for women age 40 and over, although rates grew more than two-and-a-half times faster among women age 50 and older than for women in their 40s. Incidence rates of invasive breast cancer did not increase for women under age 40 during this time. Incidence rates of DCIS increased for women of all ages during this same time period, although rates grew fastest in women over age 50 (Figure 3).

Perceptions of increasing numbers of breast cancer cases in young women in the late 1980s and early 1990s are largely due to the growth and aging of the US population, as many "baby boomer" women reached ages 25-40 at that time. Since 1985, breast cancer incidence rates among women under age 40 have actually declined significantly at an average 1.3% per year.

Race/ethnicity

Between 1992 and 1998, incidence rates have remained relatively unchanged in women of all racial and ethnic groups (Figure 4).

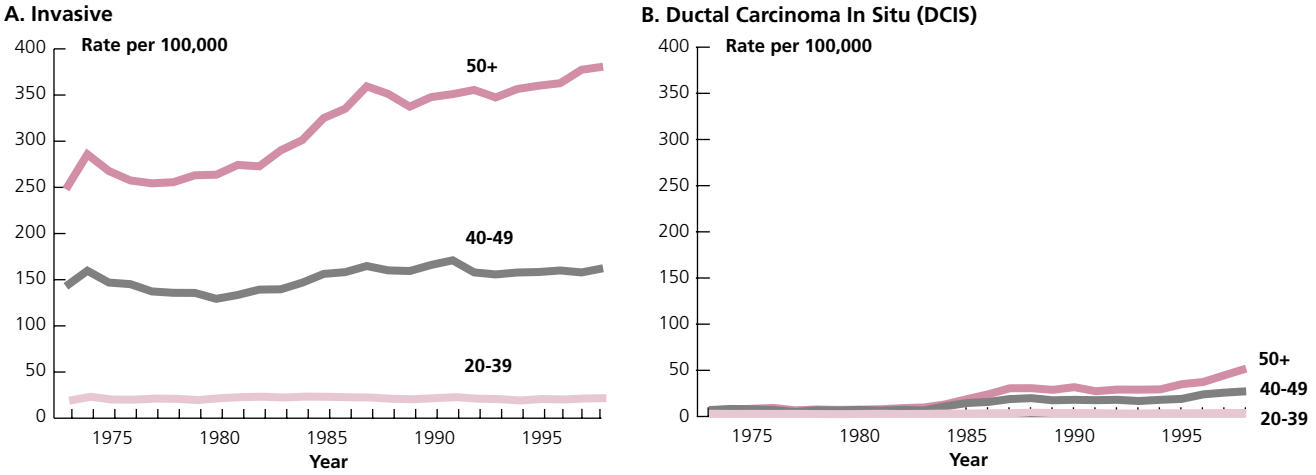
Mortality Trends

There has been an important reduction in breast cancer death rates in recent years:

- between 1950 and the late 1980s, overall breast cancer mortality was relatively stable;
- between 1989 and 1995, death rates decreased by 1.6 % annually for all races combined;
- between 1995 and 1998, the decrease accelerated to a decline of 3.4% annually.[5]

This decline in breast cancer mortality has been attributed to both improvements in breast cancer treatments and the benefits of mammography screening. As more breast cancers are diagnosed while *in situ* or at earlier stages of invasive disease, death rates should continue to decline. During the 1990s, death rate declines have been most notable in white women (Figure 5). Death rates for women under age 50 declined an average 3.1% per year between 1990 and 1998, slightly faster than the average decline for older women of 2.1% per year.[2]

Figure 3. Female Breast Cancer—Invasive and Ductal Carcinoma In Situ (DCIS) Age-Adjusted Incidence Rates*, by Age, United States (SEER), 1973-1998



*Rates are age-adjusted to the 1970 US standard population within each age group.

American Cancer Society, Surveillance Research, 2001.

Data source: NCI Surveillance, Epidemiology, and End Results Program, 2001.

What factors influence breast cancer survival?

Time since diagnosis

Based on the most recent data, relative survival rates for women diagnosed with breast cancer are:

- 86% at five years after diagnosis;
- 76% after 10 years;
- 58% after 15 years;
- 53% after 20 years.[2]

Based on recent analysis of long-term cancer patient survival, among women who have already survived five years after diagnosis with breast cancer, 81% of white women and 76% of black women are expected to survive an additional five years. Among women who have already survived 10 years after diagnosis, 87% of white women and 85% of black women are expected to survive an additional five years.[6]

Age at diagnosis

The 5-year relative survival rates for breast cancer increase with age at diagnosis until age 75:

- 82% for women age < 45;
- 86% for women ages 45-54;
- 87% for women ages 55-64;
- 88% for women ages 65-74;
- 84% for women age 75 and over.[2]

Researchers speculate that younger women have lower survival rates because their tumors may be more aggressive and less responsive to hormonal therapies.[7]

Stage at diagnosis

5-year relative survival is lower for women with a more advanced stage at diagnosis (Figure 6).[2]

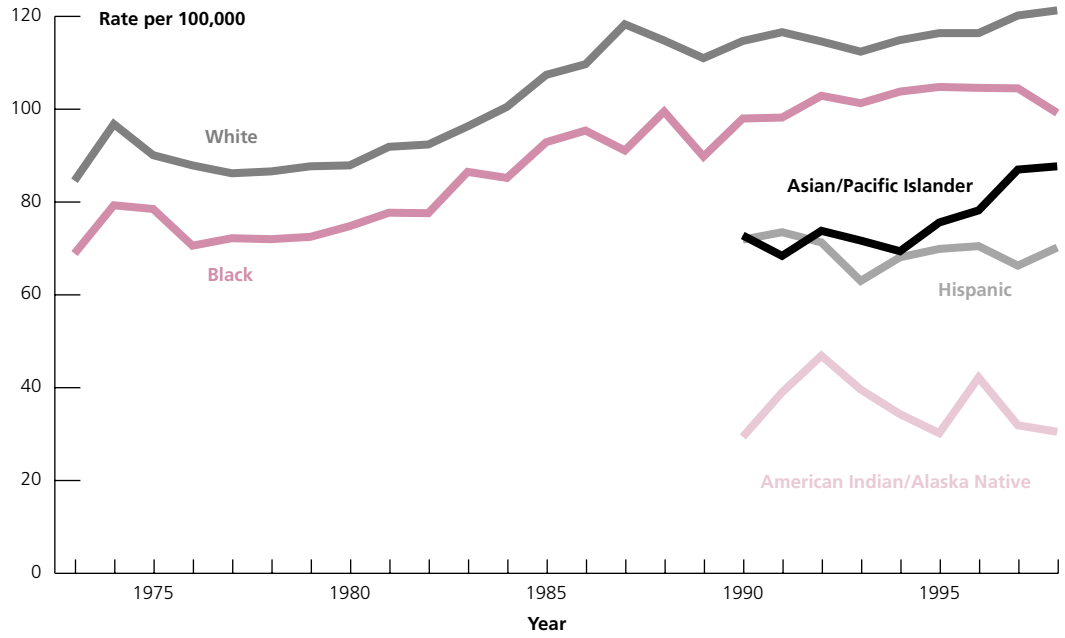
Race/ethnicity

- Black women with breast cancer are less likely than white women to survive five years: 72.0% vs. 87.0%.[2] Just over half of this difference can be attributed to later stage at detection and tumors that are more aggressive and less responsive to treatment.[8] The presence of additional illnesses and various sociodemographic factors also contribute to the observed differences in survival between blacks and whites.

Socioeconomic factors

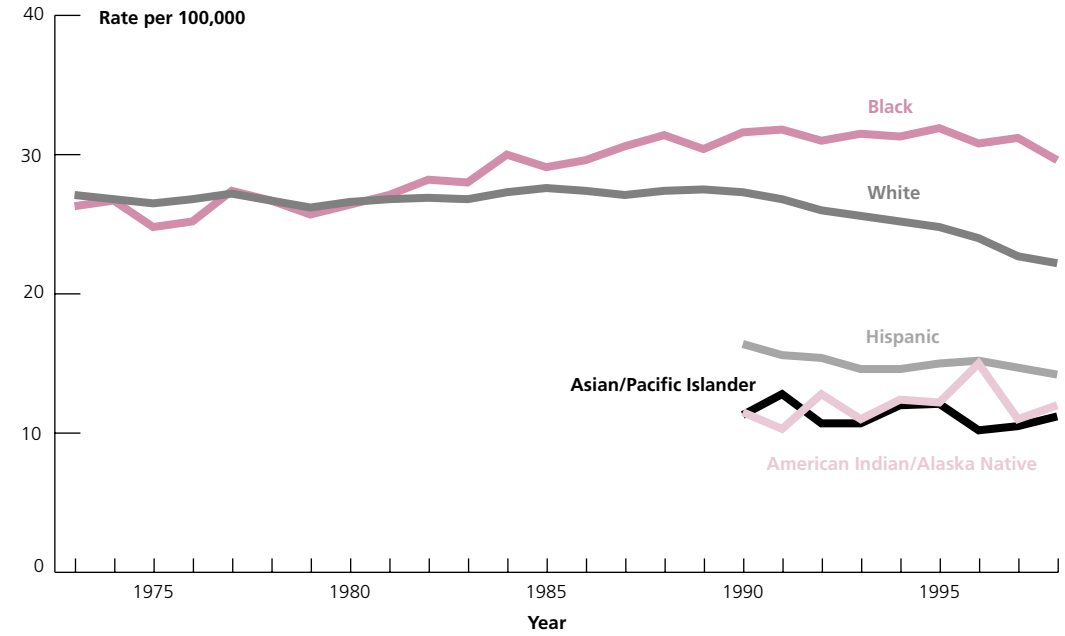
A lack of health insurance is associated with lower survival among breast cancer patients.[8] Also, breast cancer patients with low incomes have lower 5-year relative survival rates than higher-income patients, and low-income black women are three times more likely than higher-income black women to be diagnosed with advanced disease.[10]

Figure 4. Female Breast Cancer Incidence Rates* by Race and Ethnicity, SEER, 1973-1998



*Rates are age-adjusted to the 1970 US standard population.
American Cancer Society, Surveillance Research, 2001.
Data source: NCI Surveillance, Epidemiology, and End Results Program, 2001.

Figure 5. Female Breast Cancer Death Rates* by Race and Ethnicity, United States, 1973-1998



*Rates are age-adjusted to the 1970 US standard population.
American Cancer Society, Surveillance Research, 2001.
Data source: National Center for Health Statistics, 2001.

What are the known risk factors for breast cancer?

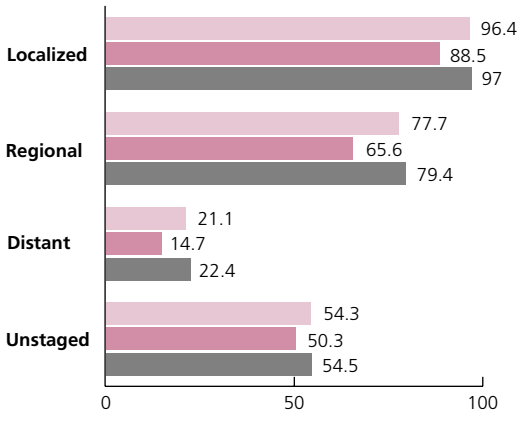
A number of factors consistently associated with increased risk of breast cancer (age, family history, age at first birth, early menarche, late menopause) are not modifiable. Other factors (alcohol consumption, use of postmenopausal hormones, and obesity after menopause) are modifiable. Some factors directly increase lifetime exposure of breast tissue to circulating sex hormones (early menarche, late menopause), and some are only correlates (higher socioeconomic status). Established risk factors for breast cancer are listed in Table 3 in order of the strength of their association. At present, there is no scientific evidence that shows an association between either underwire bras or antiperspirants and breast cancer. Risk assessment tools are available to determine one's risk for developing breast cancer at the Harvard Center for Cancer Prevention's web site (http://yourcancerrisk.harvard.edu/) and the National Cancer Institute's web site (http://bcra.nci.nih.gov/brc/).

Increasing age

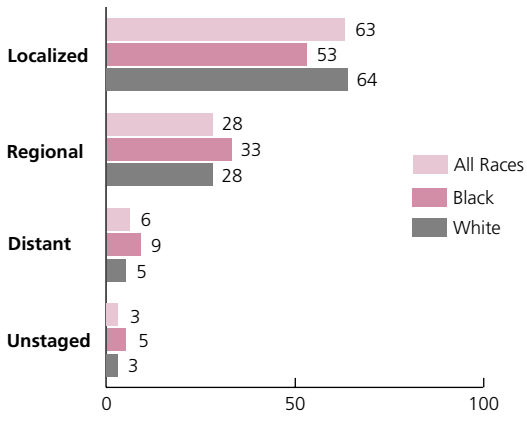
Besides being female, age is a woman's single most important risk factor for developing breast cancer.[11] Currently, a woman living in the United States has a 12.5%, or a 1 in 8, lifetime risk of developing breast cancer. However, a large portion of the overall lifetime risk is due to the risks at older ages. Table 4 gives a woman's risk of developing breast cancer at different ages (see page 9).

Figure 6. Female Breast Cancer—United States, 1992-1997

A. 5-Year Survival Rates* by Stage at Diagnosis and Race (%)



B. Percent Diagnosed by Stage and Race



*Survival rates are based on follow-up of patients through 1997.

American Cancer Society, Surveillance Research, 2001.

Data source: NCI Surveillance, Epidemiology, and End Results Program, 2001.

Table 3. Factors That Increase the Relative Risk for Breast Cancer in Women

Relative Risk	Factor
Relative Risk > 4.0	Certain inherited genetic mutations for breast cancer
	Two or more first-degree relatives with breast cancer diagnosed at an early age
	Personal history of breast cancer
	Age (65+ vs. < 65 years, although risk increases across all ages until age 80).
Relative Risk 2.1-4.0	One first-degree relative with breast cancer
	Nodular densities on mammogram (> 75% of breast volume)
	Atypical hyperplasia
	High-dose ionizing radiation to the chest
	Ovaries not surgically removed < age 40
Relative Risk 1.1-2.0	High socioeconomic status
	Urban residence
	Northern US residence
Reproductive Factors	Early menarche (<12 years)
	Late menopause (≥ 55 years)
	No full-term pregnancies (for breast cancer diagnosed at age 40+ years)
	Late age at first full-term pregnancy (≥ 30 years)
	Never breast fed a child
Other factors that affect circulating hormones or genetic susceptibility	Postmenopausal obesity
	Alcohol consumption
	Recent hormone replacement therapy
	Recent oral contraceptive use
	Tall
	Personal history of cancer of endometrium, ovary, or colon
	Jewish heritage

Adapted, with permission, from Hulka et al, 1995, and Kelsey et al, 1993.

Family history of breast cancer/ genetic predisposition

Women with a family history of breast cancer, especially in a first-degree relative (mother, sister, or daughter), have an increased risk of developing breast cancer themselves. The risk is even higher if more than one first-degree relative had breast cancer, or if the relative developed breast cancer at an early age, or in both breasts.[12,13]

Approximately 5% to 10% of breast cancer cases result from inherited mutations in breast cancer susceptibility genes, such as BRCA1 and BRCA2.[14] These mutations occur in far less than 1% of the general population.[15] Molecular tests are now commercially available to identify some of the more common BRCA mutations responsible for inherited forms of breast cancer, but the optimal medical approach for individuals who are found to carry or not to carry a mutation is complex. Women who know they carry the mutated gene may use this information to make more informed decisions about their health care, including whether to use tamoxifen (see pages 10 and 14) and/or prophylactic surgery to delay or prevent the onset of cancer. Earlier and more frequent breast cancer screening is recommended for these women, including annual mammograms beginning at age 25 to 35.[14]

It is not yet possible to predict if or when women who carry a particular mutation will develop breast cancer. Furthermore, tests are not available for all of the inherited genes that affect breast cancer risk. The American Cancer Society strongly recommends that any person considering genetic testing talk with a genetic counselor, nurse, or doctor who is qualified to interpret and explain these test results, before they proceed with testing. People should understand and carefully weigh the benefits and risks of genetic testing before these tests are done.

Shared lifestyle factors may also contribute to the familial occurrence of breast cancer and other genetic characteristics that may indirectly affect breast cancer risk.

Hormonal factors

Studies suggest that reproductive hormones influence breast cancer risk through effects on cell proliferation and DNA damage, as well as promotion of cancer growth.[16] Early menarche (<12 years), late menopause (≥55), late age at first full-term pregnancy (≥30), and fewer pregnancies all increase a woman's risk of breast cancer by affecting endogenous reproductive hormones. Recent use of oral contraceptives may slightly increase the risk of breast cancer; however, women who stopped using oral contraceptives 10 years or more in the past have the same risk as women who have never used the pill.[17] Recent use of estrogen replacement therapy (ERT) for more than 5 years also has been shown to increase breast cancer risk slightly, with higher risk associated with longer use. This effect, however, like that of oral

A Comment About Relative Risk

A *relative risk* compares the risk of disease among people with a particular exposure to the risk among people without that exposure. If the relative risk is above 1.0, then risk is higher among exposed than unexposed persons. Relative risks below 1.0 reflect an inverse association between a risk factor and the disease, i.e., a protective effect, or lower risk, associated with the exposure. However, while relative risks are useful for comparisons, they do not provide information about the absolute amount of additional risk experienced by the exposed group.

For example, current users of oral contraceptives who began using the pill at ages 25-29 have a relative risk of developing breast cancer of 1.16, or a 16% increased risk. While this increased risk may seem substantial, it proves to be less so in absolute terms because of the very low risk of breast cancer among young women in general. Among 10,000 women who began using the pill at ages 25-29, the estimated number of breast cancers expected to be diagnosed between the time of starting the pill and 10 years after stopping is 48.7. Among 10,000 women of the same ages who never used oral contraceptives, 44.0 cases would be expected over the same period. Therefore, the 16% increased risk results in relatively few (4.7) additional cases per 10,000 women to be diagnosed over a period greater than 10 years.[17]

contraceptives, seems to disappear 5-10 years after the therapy is discontinued.[18] Although there are limited data on long-term estrogen-plus-progestin therapy, the adverse effect on breast cancer risk appears to be greater than for estrogen therapy alone.[18a]

Can breast cancer be prevented?

At this time, there is no known strategy to eliminate all risk of breast cancer. A woman's best strategy, besides early detection through mammography, is to reduce her known risk factors whenever possible, by increasing physical activity, minimizing alcohol intake, and avoiding obesity. Also, recent clinical research has provided important information on ways that women at very high risk can further reduce their risk of breast cancer using the antiestrogen drug tamoxifen (see pages 10 and 14, the sections that discuss clinical trials).

Physical activity

A recent scientific workshop concluded that available evidence supports a small inverse (protective) association between physical activity and breast cancer.[19] The protective effects may be greater among lean women, women who have carried children to term, and premenopausal women. The underlying mechanism of this potential protection are not well understood, although it has been hypothesized that the benefit may be due to the effects of physical activity on hormones, energy balance, and the immune system. In addition, the physical activity parameters, such as type of activity (recreational versus occupational), frequency, duration, intensity, and time periods of life that are associated with breast cancer risk reduction, need further investigation.

Table 4. Age-Specific Probabilities of Developing Breast Cancer*

If current age is…	Then the probability of developing breast cancer in the next 10 years is:†	or 1 in:
20	0.05%	2,044
30	0.40%	249
40	1.49%	67
50	2.77%	36
60	3.45%	29
70	4.16%	24

*Among those free of cancer at beginning of age interval. Based on cases diagnosed 1995-1997. Percentages and "1 in" numbers may not be numerically equivalent due to rounding.

†Probability derived using NCI DEVCAN software.

American Cancer Society, Surveillance Research, 2001.

18a. Schairer C, Lubin J, Troisi R, Sturgeon S, Brinton L, Hoover R. Menopausal Estrogen and Estrogen-Progestin Replacement Therapy and Breast Cancer Risk. *JAMA*. 2000. 283:485-491.

Alcohol consumption

Alcohol is the dietary factor most consistently associated with an increased breast cancer risk.[11] A meta-analysis of more than 50 epidemiologic investigations suggested that the equivalent of two drinks a day may increase breast cancer risk by approximately 25%; this increased risk is dose-dependent, and exists regardless of the type of alcoholic beverage consumed.[20] A recent pooled analysis of cohort studies also concluded that alcohol consumption is associated with a linear increase in breast cancer incidence, and that reducing alcohol intake may be a useful strategy for reducing breast cancer risk for regular consumers of alcohol.[21]

Obesity

While studies of obesity and breast cancer risk have not been totally consistent, obesity after menopause appears to increase risk.[22] This relationship has been shown to be reversed in premenopausal women. Given the increasing percentage of women in the United States who are overweight, strategies to maintain a healthy body weight are important to reduce breast cancer risk and to improve general health.[12,23]

Tamoxifen

The drug tamoxifen has been used for many years as a treatment for some breast cancers. A recent clinical trial demonstrated that tamoxifen can also be used to reduce the risk of breast cancer in women at increased risk for developing the disease.[24] Over 69 months of follow-up, the group that received tamoxifen had their breast cancer risk reduced by 49%, with only 22 cases of breast cancer diagnosed per 1,000 women, compared to 43.4 cases per 1,000 in the group who did not receive tamoxifen. Administration of tamoxifen resulted in side effects, particularly an increased risk of endometrial cancer. Women who are at increased risk of breast cancer should discuss tamoxifen with their doctor.

Prophylactic mastectomy

In some rare cases, women at very high risk of breast cancer might elect preventive (prophylactic) mastectomy. This is an operation in which one or both breasts are removed before there is a known breast cancer. A recent study reported a reduction in risk of breast cancer of greater than 90% in the high-risk women with family history who received prophylactic mastectomy.[25] An important limitation was that the study did not confirm genetic susceptibility in the women who did and did not undergo the surgery. The reasons for considering this type of surgery need to be very strong. While the operation reduces the risk of breast cancer, a small risk of developing breast cancer remains due to residual breast tissue on the chest wall. A woman considering this operation should discuss these considerations carefully with her doctor. A second opinion is also strongly recommended.

How can breast cancer be detected early?

Signs and Symptoms of Breast Cancer

The most important physical symptom of breast cancer is a painless mass. Up to 10% of patients, however, have breast pain and no mass. Less common symptoms include persistent changes to the breast, such as thickening, swelling, skin irritation or distortion, and nipple symptoms, including spontaneous discharge, erosion, inversion, or tenderness. Early breast cancer, when it is most treatable, typically does not produce any symptoms. It is, therefore, very important for women to follow recommended guidelines for finding breast cancer before symptoms develop.

Early detection of breast cancer greatly improves the treatment options, the chances for successful treatment, and survival. American Cancer Society guidelines for the early detection of breast cancer change with age and include mammography, clinical breast examination (CBE), and breast self-examination (BSE) (Table 5).[26] These guidelines are for women with no symptoms of breast cancer who have not been identified to be at significantly higher risk.

Because a small percentage of cancers may be missed by mammography, it is very important that women aged 40 and older also perform monthly BSE and have an annual CBE. If symptoms develop after a recent, normal mammogram, women should not assume that it is nothing to worry about; rather, they should contact their doctors immediately. Likewise, a palpable mass that is not seen on a diagnostic mammogram does not rule out breast cancer; instead, it simply means that other diagnostic tests will need to be considered.

Mammography

Mammography is the best method available for diagnosing breast cancer at a stage when it can be most effectively treated, since it can identify cancer several years before physical symptoms develop. Participating in

mammography screening can provide peace of mind for women, since the large majority of women who are screened do not have breast cancer, and when cancer is discovered, it is found earlier, when treatments can be more successful.

Mammography is a low-dose x-ray procedure that allows visualization of the internal structure of the breast. Mammography is highly accurate, but like most medical tests, it is not perfect. On average, mammography will detect about 90% of the breast cancers in women without symptoms, and it is somewhat more accurate in postmenopausal women compared with premenopausal women.[27] The small percentage of breast cancers that are not identified by mammography may be missed for any one of the following circumstances: breast density, faster growth rate, or simply failing to see the small, early signs of an abnormality. Although the overwhelming majority of women who undergo screening each year do not have breast cancer, it is common (5%-10%) for women to have their mammograms interpreted as abnormal or inconclusive until further tests can be done. In most instances, additional imaging tests lead to a final normal interpretation.

Today's modern dedicated screen-film units result in higher quality images with considerably lower x-ray dose than the general purpose x-ray equipment used in the past. The Mammography Quality Standards Act (MQSA), passed by Congress in 1992 and administered by the Food and Drug Administration, requires facilities to meet specific standards of quality in order to offer mammography.

Prevalence of Mammography

According to data from the 2000 Behavioral Risk Factor Surveillance System (BRFSS), the percentage of US women aged 40 and older who had a recent mammogram was 62.6%.[28] Table 6 shows these results by state. An analysis of the National Health Interview Survey indicated that women with low income or less than a high school education were the least likely to have had a recent mammogram.[29] Efforts to increase screening should specifically target older women and socioeconomically disadvantaged women, who are most likely to under-utilize mammography screening.

Clinical Breast Examination (CBE)

A clinical examination performed by a trained health care professional offers substantial benefit in screening for breast cancer and should be performed in combination with mammography (women should schedule their CBE to occur near the time, and before, their annual mammogram). For this examination, the woman undresses from the waist up. Using the pads of the fingers, the examiner will gently feel the breasts, giving special attention to their shape and texture, location of any lumps, and whether such lumps are attached to the skin or to deeper tissues. The area under both arms will also be examined.

Breast Self-Examination (BSE)

A woman performs BSE in much the same way that a health care professional performs a clinical examination. A woman should do BSE monthly to become familiar with both the appearance and feel of her breasts so that she is aware of any change. Lumps are not necessarily abnormal, as they can come and go with a woman's menstrual cycle. Of lumps detected and tested, the large majority is found not to be cancerous.

Table 5. American Cancer Society Guidelines for the Early Detection of Breast Cancer in Asymptomatic Women

Age 40 and over

- Annual mammogram
- Annual clinical breast examination
- Monthly breast self-examination

Age 20-39

- Clinical breast examination every three years
- Monthly breast self-examination

How is breast cancer treated?

Treatment decisions are made by the patient and her physician, after consideration of the optimal treatment for the stage of cancer, the patient's age and preferences, and the risks and benefits ascribed to each treatment protocol.[30] Most women with breast cancer will have some type of surgery. Surgery is often combined with other treatments such as radiation therapy, chemotherapy, hormone therapy and/or monoclonal antibody therapy.

Table 6. Mammography and Clinical Breast Exam, Women 40 and Older, by State, 2000

ACS Division	State	% Mammogram Within the Past Year			% Mammogram and Clinical Breast Exam Within the Past Year		
		40+ yrs.	40-64 yrs.	65+ yrs.	40+ yrs.	40-64 yrs.	65+ yrs.
California	California*	63.0	60.5	68.8	52.6	51.5	55.2
Eastern	New Jersey	66.8	67.3	65.7	58.0	60.5	53.0
	New York	68.2	69.0	66.7	60.3	62.3	56.1
Florida	Florida	66.3	62.5	72.7	56.0	54.2	59.1
Great Lakes	Indiana	61.6	63.4	58.0	54.8	57.4	49.4
	Michigan	69.1	68.1	71.2	61.3	62.8	58.1
Heartland	Kansas	61.9	61.2	63.0	54.4	56.3	50.9
	Missouri	60.7	61.6	58.9	54.5	56.7	50.5
	Nebraska	61.9	64.5	57.4	57.5	61.9	49.8
	Oklahoma	55.8	54.6	58.1	50.1	50.0	50.4
Illinois	Illinois	63.4	64.1	61.9	55.5	58.1	50.1
Mid-Atlantic	Delaware	75.8	74.0	79.3	67.6	67.1	68.6
	Dist. of Columbia	67.9	68.1	67.4	57.9	57.3	59.4
	Maryland	69.2	67.5	73.3	62.3	61.7	63.7
	Virginia	61.9	58.7	69.3	54.0	53.3	55.6
	West Virginia	61.6	60.3	63.9	55.3	57.3	51.6
Mid-South	Alabama	58.5	56.5	62.4	52.1	52.8	50.9
	Arkansas	58.7	59.5	57.4	51.1	52.7	48.1
	Kentucky	63.3	64.4	61.0	57.8	60.1	52.9
	Louisiana	64.8	63.8	66.9	57.7	58.5	55.9
	Mississippi	51.5	54.6	45.4	45.5	49.6	37.3
	Tennessee	62.6	63.2	61.5	54.7	56.8	50.4
Midwest	Iowa	62.8	63.7	61.3	56.8	58.6	53.5
	Minnesota	61.3	61.2	61.6	54.5	57.3	48.5
	South Dakota	62.7	61.2	65.2	57.7	58.2	57.0
	Wisconsin	61.3	61.2	61.6	54.9	56.9	50.9
New England	Connecticut	73.2	72.4	74.8	66.0	67.9	62.5
	Maine	67.3	68.9	64.1	62.9	65.7	57.2
	Massachusetts	72.2	72.6	71.6	65.3	66.7	62.6
	New Hampshire	68.5	66.9	72.4	63.4	61.0	69.0
	Rhode Island	71.5	71.3	72.0	65.5	66.3	64.2
	Vermont	62.9	62.8	63.0	57.0	58.2	54.3
Northwest	Alaska	61.7	58.6	76.8	57.2	55.2	66.8
	Montana	61.6	58.4	68.2	57.3	55.8	60.5
	Oregon	62.1	60.1	66.3	54.3	55.0	52.9
	Washington	58.8	57.8	61.1	51.7	51.9	51.5
Ohio	Ohio	67.2	66.0	69.3	58.5	59.1	57.2
Pennsylvania	Pennsylvania	63.7	63.7	63.7	56.2	59.4	50.8
Rocky Mountain	Colorado	60.2	57.9	66.0	53.6	52.2	57.2
	Idaho	51.7	49.1	57.2	45.6	45.0	47.0
	North Dakota	62.0	60.1	65.3	55.1	55.2	55.0
	Utah	53.0	51.5	56.7	47.1	46.8	47.9
	Wyoming	54.4	53.1	57.6	48.6	49.1	47.2
Southeast	Georgia	60.4	59.2	63.6	53.4	53.3	53.7
	North Carolina	64.8	64.2	65.9	59.4	60.7	56.8
	South Carolina	64.8	62.7	69.3	57.0	56.1	59.1
Southwest	Arizona	69.3	67.3	72.9	55.0	55.2	54.5
	Nevada	61.9	58.7	69.7	50.6	52.6	45.9
	New Mexico	60.6	57.2	68.2	53.9	52.7	56.6
Texas	Texas	57.2	55.0	62.2	48.7	47.4	51.6
	Hawaii	65.8	65.9	65.6	57.5	58.6	55.0
United States Median		62.6	62.5	65.3	55.5	56.9	54.3

2015 Objective: Increase breast cancer screening to 90%

*Questions for mammogram and clinical breast exam differed and may not be comparable to other state percentages in this table.

Source: Behavioral Risk Factor Surveillance System, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

American Cancer Society, Surveillance Research, 2001.

Surgery

The primary goal of breast cancer surgery is to remove the cancer from the breast and lymph nodes. In a lumpectomy, only cancerous tissue plus a rim of normal tissue is removed. Simple or total mastectomy includes removal of the entire breast. Modified radical mastectomy includes removal of the entire breast and lymph nodes under the arm, but does not also include removal of the underlying chest wall muscle, as with a radical mastectomy. Radical mastectomy is used infrequently now due to the proven effectiveness of less destructive surgeries.

Lumpectomy is almost always followed by six to seven weeks of radiation therapy. A woman who chooses lumpectomy and radiation will have the same expected long-term survival as if she chose mastectomy alone.[11]

Both lumpectomy and mastectomy are often accompanied by removal of regional (axillary) lymph nodes to determine if the disease has spread beyond the breast. The presence of any cancer cells in the lymph nodes will help determine the need for and course of subsequent therapy. Unfortunately, surgery or radiation therapy involving the axillary nodes can lead to serious swelling of the arm caused by fluid retention, known as lymphedema. Newer options such as sentinel lymph node biopsy, where only one key lymph node is removed and tested, may reduce the need for full axillary lymph node dissections, particularly in women with early-stage disease.[31]

Radiation Therapy

Radiation may be used to destroy cancer cells remaining in the breast, chest wall, or underarm area after surgery, or to reduce the size of a tumor before surgery. The ability to target radiation therapy accurately has increased dramatically over past decades, which has greatly diminished resulting side effects.

Systemic Therapy

Systemic therapy includes chemotherapy and hormone therapy. Adjuvant systemic therapy is used after all visible cancer has been surgically removed in order to kill any undetected tumor cells that may have migrated to other parts of the body. Tumor size, histology, and the presence of cancer in axillary nodes are considered in the decision whether to use adjuvant systemic therapy. Adjuvant systemic therapy has been studied in over 400 randomized clinical trials, and has demonstrated benefits in reducing rates of recurrence and death that persist more than 15 years after treatment.[32]

Systemic therapy is also used in treating women with advanced breast cancer. In such conditions, removal of most of the cancer by surgery is not possible, and therefore systemic therapies become the main treatment modality.

Chemotherapy

Research has established that combinations of several drugs are more effective than just one drug alone.[32] If the disease has become resistant to the first-line therapies, which include specific combinations of cyclophosphamide, methotrexate, fluorouracil, doxorubicin (adriamycin), epirubicin, and paclitaxel (taxol), about 20% to 30% of patients will respond to second-line drugs.[11]

Hormone therapy

Estrogen, a hormone produced by the ovaries, promotes growth of some breast cancers. Women whose breast cancers test positive for estrogen or progesterone receptors can be given hormone therapy to block the effects of estrogens on the growth of breast cancer cells. Tamoxifen, the most commonly used antiestrogen drug, has been shown to provide a 26% annual reduction in recurrence and a 14% annual reduction in deaths.[33] Hormone therapy is effective in both postmenopausal and premenopausal patients whose cancers are positive for steroid hormone receptors.[33]

Randomized Clinical Trials

A clinical trial is a controlled experiment that is used to assess the safety and efficacy of treatments for human disease and health problems. Generally, participants receive either the standard treatment or a new therapy that it is believed may offer improved survival and/or fewer side effects. Each patient provides valuable information on the effectiveness and risks of a new treatment. The Physicians Data Query (PDQ) program of the National Cancer Institute (NCI) contains summaries of cancer clinical trials that are open for patient participation. Patients can obtain PDQ information from their physician, by contacting the NCI Cancer Information Service at 1-800-4-CANCER, or from the NCI CancerTrials Web page at cancertrials.nci.nih.gov.[34] Patients should consult their personal doctor and cancer specialist for detailed information about appropriate treatment options.

What research is currently being done on breast cancer?

Prevention

The antiestrogen tamoxifen was shown to reduce the incidence of breast cancer in high-risk women by almost half during a 5-year study period.[35] A second-generation antiestrogen, a selective estrogen receptor modulator (SERM) known as raloxifene, was even more effective in reducing the risk of breast cancer in postmenopausal women taking the drug for osteoporosis.[36] The National Cancer Institute's Study of Tamoxifen and Raloxifine, or STAR trial, is comparing the efficacy of the two drugs in a randomized chemoprevention trial.[37] Researchers are also searching for ways to inhibit other molecular targets involved in breast cancer progression, such as the insulin-like growth factors.[38] And in an effort to discover if lifestyle changes can make a difference, women with inherited susceptibility to breast cancer are being studied to determine what other genetic and environmental factors predispose them to the disease.[39]

Early Detection

Mammography is being improved by the use of computer-assisted diagnosis from digital images rather than human interpretation of x-ray films.[40] Ultrasound is coming into its own as an adjunct to mammography in finding breast tumors in women with dense breast tissue, e.g., premenopausal women, women with fibrocystic breasts, and women taking hormone replacement therapy.[41] In high-risk women, milk duct aspiration using ultrafine needles may identify cancerous cells undetectable by mammography.[42]

Treatment

A class of drugs known as aromatase inhibitors, drugs that interfere with the enzyme that synthesizes endogenous estrogen, appears to be beneficial in patients with advanced breast cancer.[43] Herceptin®, the monoclonal antibody directed against the HER2/neu protein of breast tumors, offers a real survival benefit for women with metastatic breast cancer and is now being investigated to see whether it might increase the cure rate for early-stage disease.[44] A new understanding of breast tumor cell biology and molecular genetics is enabling

Goals for a National Breast Cancer Research Agenda

In 1998, the Breast Cancer Progress Review Group, a collaboration formed by the National Cancer Institute of prominent members of the scientific, medical, advocacy, and industry communities, released their recommendations for a national breast cancer research agenda.[45] The report included research goals in biology, etiology, genetics, prevention, detection and diagnosis, treatment, control, and outcomes. Among the goals in these eight areas are:

- to expand knowledge of normal breast development and the earliest breast lesions.
- to identify modifiable risk factors and to investigate the interaction between genes and environment.
- to identify genetic mutations that occur at each stage of breast cancer development and progression, and evaluate these changes as targets for intervention.
- to identify surrogate endpoint biomarkers to serve as early indicators of intervention effectiveness.
- to develop better breast imaging and other technologies for diagnosis of clinically significant disease and better prediction of clinical outcomes.
- to encourage development of innovative treatments in academic settings, and to test their effectiveness through better supported, more representative clinical trials.
- to gain fuller understanding of mechanisms underlying behavioral change, and identify how psychosocial factors influence disease response and survival.
- to better understand the effects of multimodal treatments, and improve methods to study patient-focused outcomes across the continuum of age and race/ethnicity.

researchers to design rational therapeutics that may have greater efficacy and fewer side effects than conventional chemotherapy. Forty to 50 anti-angiogenesis compounds, drugs that starve the tumor of the blood it needs in order to grow, are in development for breast cancer.[46] Metronomic therapy, a relatively new concept in anti-angiogenic therapy, uses much lower and less toxic doses of chemotherapy agents than normally used, plus an anti-angiogenesis drug.[47] Researchers have gotten spectacular results with metronomic therapy in mice genetically engineered to develop human-like breast cancers.

Quality of Life

Researchers are looking at an herbal formula that has been used in the community to alleviate side effects of chemotherapy, such as fatigue, nausea, compromised immune function, and hair loss.[48] There is also a study to see if cognitive effects such as memory loss and depression (the so-called chemo brain) result from hormonal therapy or chemotherapy itself, or from the situation of having a life-threatening disease.[49] The study also asks if sexual and emotional intimacy is affected by breast cancer treatment, and what kinds of support can be offered to survivors and their partners.

What resources are available in your community?

The American Cancer Society offers several resource programs for breast cancer patients and their families:

Reach to Recovery

Reach to Recovery is a volunteer visitation program comprised of breast cancer survivors trained to respond to the concerns of patients and their families facing the diagnosis, treatment, and effects of breast cancer.

Patient and family education materials

The Society provides booklets and information for breast cancer patients and their loved ones.

I Can Cope

This program consists of a series of educational classes for people with cancer, their families, and friends. Classes are designed to provide information about cancer diagnosis and treatment and to help participants cope with the physical and emotional challenges of cancer.

Look Good…Feel Better

This program helps cancer patients to develop skills to cope with changes in appearance and with side effects of cancer treatment such as dry skin and hair loss.

"tlc"

This is a magazine/catalog designed to provide medical information and special products such as hats, turbans, hairpieces, bras, prostheses, etc. for women newly diagnosed with breast cancer and for breast cancer survivors.

Hope Lodges

Housing is provided in some areas by funds raised specifically to purchase a dwelling for use by patients and their families during treatment. There are currently 17 Hope Lodges in operation.

For information about these programs, call the ACS National Call Center at 1-800-ACS-2345 or visit the ACS Web site at www.cancer.org. The National Call Center can also provide links to specific community services.

Other sources of patient information and support include:

Cancer Information Service of the NCI: 1-800-4-CANCER (www.nci.nih.gov)

National Alliance of Breast Cancer Organizations (NABCO): 212-889-0606 (www.nabco.org)

National Breast Cancer Coalition: 202-296-7477, 1-800-622-2838 (www.natlbcc.org)

National Coalition for Cancer Survivorship: 1-877-NCCS YES (www.cansearch.org)

Susan G. Komen Foundation: 1-800-IM AWARE or 1-800-462-9273 (www.komen.org)

Y-ME National Breast Cancer Organization: 1-800-221-2141 (www.y-me.org)

YWCA Encore Plus Program: 1-800-95E PLUS (www.ywca.org/html/B4d1.asp)

What is the American Cancer Society doing about breast cancer?

The American Cancer Society is involved in the fight against breast cancer in many areas. Through its extramural research grants program, the Society currently (July 2001) funds 184 research projects relating to breast cancer totaling almost $62 million. A few areas of research now being investigated by American Cancer Society grantees are:

- Anti-angiogenesis drugs that block the supply of new blood vessels to breast tumors
- How differences in the ability to metabolize alcohol influence breast cancer risk
- How a woman's genetic makeup determines her response to treatment
- New molecular targets for anticancer drugs
- Combination gene-immunotherapy
- The effect of presurgery hypnosis on side effects, recovery, and cost of breast cancer treatment
- The psychosocial needs of American Indian women with breast cancer
- Barriers facing the elderly in accessing clinical trials

The Society also conducts **epidemiologic studies** of breast cancer and performs **surveillance research** to monitor long-term trends and statistics. Using information collected from over 600,000 women in the Cancer Prevention Study II (CPS II), ACS epidemiologists have studied the influence of many risk factors on the risk of death from breast cancer, including diethylstilbestrol, estrogen replacement therapy, family history of cancer, smoking, postmenopausal obesity, and spontaneous abortion. American Cancer Society epidemiologists have also studied the influence of mammography on breast cancer prognostic factors, conducted long-term follow-up of major breast cancer screening studies, and recommended breast cancer surveillance strategies that can be applied at local and national levels. In addition, the ACS **Behavioral Research Center** is currently piloting a study of cancer survivors to examine the determinants of a good quality of life following a breast cancer diagnosis. Specific areas of interest include identifying the unmet needs of cancer survivors, the use of complementary therapies, and the needs of minority women with breast cancer.

The Society has a strong **advocacy** program through which it works with other organizations, such as the National Breast Cancer Coalition and the Susan G. Komen Foundation, in order to speak with one voice about the importance of increased government funding for breast cancer research, access to screening and quality treatment and care for all women, protection from discrimination for women who may have a genetic predisposition for breast cancer, and concerns of breast cancer patients and survivors. Collaborative relationships and partnerships are established to achieve goals greater than could be achieved individually.

The American Cancer Society devotes significant resources to the **education** of the public and of health care professionals. Educational partnerships with organizations such as the National Education Association and the American Association of Retired Persons, as well as public outreach, are performed to encourage more women to take advantage of mammography, clinical breast examinations, and breast self-examination, and to provide comprehensive information on all aspects of breast cancer.

Sources of Statistics

General Information. The statistics and statements in this booklet, unless otherwise stated, refer to invasive breast cancer. Except for rates designated as age-specific, all incidence rates and death rates in this booklet are age-adjusted to the 1970 US standard population.

Cancer Deaths. The estimated number of US breast cancer deaths in 2001 is calculated by fitting the numbers of cancer deaths from 1979 through 1998 to a statistical forecasting model. Data on the number of deaths are obtained from the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention.

New Cancer Cases. The estimated number of new US breast cancer cases in 2001 is calculated by fitting the estimated numbers of cancer cases that occurred each year in the US from 1979 through 1998 to a statistical forecasting model. Estimates of the numbers of US cancer cases from 1979 through 1998 are used because case data are not available for all regions of the country. The estimated numbers of US cases from 1979 through 1998 are extrapolated from numbers of cases occurring in regions of the United States included in the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute, and census data.

Death Rates. Death rates are defined as the number of people per 100,000 dying of a disease during a given period of time. Death rates used in this publication were previously made available by SEER on their Web site, www-seer.ims.nci.nih.gov, within the *SEER Cancer Statistics Review 1973-1998* and other Web documents.[2,50] Death rates were calculated using data on cancer deaths compiled by NCHS and population data collected by the US Bureau of the Census. All death rates in this publication were age-adjusted to the 1970 US standard population.

Incidence Rates. Incidence rates are defined as the number of people per 100,000 who develop disease during a given period of time. When referenced as such, US SEER incidence rates were previously made available by SEER on their Web site, www-seer.ims.nci.nih.gov, within the *SEER Cancer Statistics Review 1973-1998* and other Web documents.[2,50] When not referenced otherwise, US SEER incidence rates are based on American Cancer Society analysis of the SEER Public Use Dataset, 1973-1998, April 2001 submission, using *SEER*Stat 4.0,* a statistical software package from the National Cancer Institute.[51] State incidence rates were previously published in *Cancer in North America, 1994-1998,* a publication of the North American Association of Central Cancer Registries (NAACCR).[52] Incidence rates were calculated using data on cancer cases collected by the SEER program or NAACCR registries and population data collected by the US Bureau of the Census. Except for the age-specific incidence rates described in Figure 1, all incidence rates in this publication are age-adjusted to the 1970 US standard population.

Annual Percent Change in Incidence Rates. When not referenced otherwise, annual percent changes in the incidence rate were estimated based on American Cancer Society analysis of the SEER Public Use Dataset, 1973-1998, April 2001 submission, using SEER*Stat 4.0.[51]

Survival Rates. A survival rate represents the proportion of patients who remain alive at some given amount of time since their diagnosis, such as 5 years. To adjust for normal life expectancy (factors such as dying of heart disease, accidents, and diseases of old age), a relative survival rate is calculated. The relative survival rate is obtained by dividing the observed survival among a group of cancer patients by the expected survival for persons in the general population who are similar to the patient group with respect to age, gender, race, and calendar year of observation. All survival statistics presented in this publication were originally published in the *SEER Cancer Statistics Review, 1973-1998.*[2] All 5-year survival statistics are based on cases diagnosed 1992-1995 with follow-up of patients through 1997.

Probability of Developing Cancer. Probabilities of developing breast cancer were calculated using DEVCAN (Probability of DEVeloping CANcer Software) developed by the National Cancer Institute.[53] These probabilities reflect the average experience of women in the United States and do not take into account individual behaviors and risk factors, e.g., utilization of mammography screening and family history of breast cancer.

Prevalence of Mammography. The prevalence of mammography by age and state were obtained through analysis of data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an ongoing system of surveys conducted by the state health departments in cooperation with the Centers for Disease Control and Prevention.[28]

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