Breast Cancer Statistics, 2011

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Abstract

In this article, the American Cancer Society provides an overview of female breast cancer statistics in the United States, including trends in incidence, mortality, survival, and screening. Approximately 230,480 new cases of invasive breast cancer and 39,520 breast cancer deaths are expected to occur among US women in 2011. Breast cancer incidence rates were stable among all racial/ethnic groups from 2004 to 2008. Breast cancer death rates have been declining since the early 1990s for all women except American Indians/Alaska Natives, among whom rates have remained stable. Disparities in breast cancer death rates are evident by state, socioeconomic status, and race/ethnicity. While significant declines in mortality rates were observed for 36 states and the District of Columbia over the past 10 years, rates for 14 states remained level. Analyses by county-level poverty rates showed that the decrease in mortality rates began later and was slower among women residing in poor areas. As a result, the highest breast cancer death rates shifted from the affluent areas to the poor areas in the early 1990s. Screening rates continue to be lower in poor women compared with non-poor women, despite much progress in increasing mammography utilization. In 2008, 51.4% of poor women had undergone a screening mammogram in the past 2 years compared with 72.8% of non-poor women. Encouraging patients aged 40 years and older to have annual mammography and a clinical breast examination is the single most important step that clinicians can take to reduce suffering and death from breast cancer. Clinicians should also ensure that patients at high risk of breast cancer are identified and offered appropriate screening and follow-up. Continued progress in the control of breast cancer will require sustained and increased efforts to provide high-quality screening, diagnosis, and treatment to all segments of the population. CA Cancer J Clin 2011;61:409-418. © 2011 American Cancer Society.

Introduction

Excluding skin cancers, breast cancer is the most common malignancy among women, accounting for nearly 1 in 3 cancers diagnosed among women in the United States, and it is the second leading cause of cancer death among women. In this article, we describe trends in incidence, mortality, and survival by race/ethnicity for female breast cancer in the United States. We also examine trends in mammography screening, survival, and mortality by socioeconomic status (SES), as well as state variations in breast cancer incidence, mortality, and screening rates. Additional data are available from the biennial publication of Breast Cancer Facts & Figures (available at http://www.cancer.org/statistics).

Materials and Methods

Data Sources

Data regarding incidence, stage at diagnosis, and survival were obtained from the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute (NCI).1-3 The SEER program has been collecting clinical, pathological, and demographic information on cancer patients since 1973. Data are available...
for whites, African Americans, and all races combined since 1973 and for American Indians/Alaska Natives, Asian Americans/Pacific Islanders, and Hispanics/Latinas since 1992.

Incidence rates and trends were adjusted for delays in reporting whenever possible using delay adjustment ratios from the NCI through the CanQues database. Delay adjustment accounts for anticipated future corrections to reported cancer case counts and primarily affects the most recent years of incidence data.

Incidence rates by race/ethnicity for 2004 through 2008, state-specific incidence rates, and the proportion of breast cancers diagnosed at in situ and regional/distant stages were obtained using data from the North American Association of Central Cancer Registries (NAACCR) based on incidence data from SEER and the National Program of Cancer Registries.

Mortality data were obtained from the SEER program’s SEER*Stat database as provided by the National Center for Health Statistics. Beginning in 1969, data are available for whites and African Americans. Since 1990, data are available for the major racial and ethnic groups. Population data and information on county poverty levels were obtained from the US Census Bureau.

The county poverty rate is defined as the percentage of the population in a county living below the federal poverty level in the year 2000, a threshold that varies by size and age composition of the household ($17,050 for a 4-person household in 2000). This measure is linked to cancer incidence data using the county of residence of the cancer patient at the time of diagnosis. We categorized area poverty into 3 levels: low (<10%), middle (10%-19.9%), and high (≥20%). We refer to the low-poverty areas as “affluent” and the high-poverty areas as “poor.”

The prevalence of mammography by age and state was obtained from the 2008 Behavioral Risk Factor Surveillance System, an ongoing system of surveys conducted by the state health departments in cooperation with the Centers for Disease Control and Prevention. Analyses of trends in mammography screening were based on National Health Interview Survey data. All screening data are self-reported. Prevalence estimates of mammography screening were calculated using SAS-Callable SUDAAN software.

### Statistical Analyses

Estimates of the total number of invasive and in situ breast cancer cases and breast cancer deaths for 2011 were published previously. We calculated the estimated number of cases by age at diagnosis by applying the proportion of cases diagnosed in each age group during 2004 through 2008 from the NAACCR analytic file to the total number of estimated cases of invasive and in situ breast cancer. Similarly, we calculated the estimated number of breast cancer deaths by applying the proportion of deaths that occurred in each age group during 2003 through 2007 to the total estimated breast cancer deaths in 2011.

We examined incidence trends by race/ethnicity and mortality trends by state using the Joinpoint regression program to calculate the average annual percent change. The relationship between state-level mammography screening rates in 2008 and the percentage of breast cancer cases diagnosed at in situ and late stages between 2004 and 2008 was examined by the Pearson correlation coefficient using SAS statistical software.

### Selected Findings

#### Expected Numbers of New Cases and Deaths

Table 1 shows the estimated number of female breast cancer cases and deaths that are expected to occur in the United States in 2011 by age. Approximately 230,480 new cases of invasive breast cancer and 39,520 deaths are expected among US women in 2011. Approximately 78% of new cases and 87% of breast

| Age      | In Situ Cases | Invasive Cases | Deaths |
|----------|---------------|----------------|--------|
| Under 40 | 1,780         | 11,330         | 1,160  |
| Under 50 | 14,240        | 50,430         | 5,240  |
| 50-64    | 23,360        | 81,970         | 11,620 |
| 65+      | 20,050        | 98,080         | 22,660 |
| All ages | 57,650        | 230,480        | 39,520 |

*Rounded to the nearest 10.

Source: Total estimated cases are based on 1995-2007 incidence rates from 46 states as reported by the North American Association of Central Cancer Registries. Total estimated deaths are based on data from US Mortality Data, 1969-2007, National Center for Health Statistics, Centers for Disease Control and Prevention.
cancer deaths in 2011 will occur among women aged 50 years and older. In addition to invasive breast cancers, about 57,650 new diagnoses of in situ breast cancer are expected among US women in 2011.

Long-Term Incidence Trends

Delay-adjusted incidence rates for in situ and invasive female breast cancer for women under age 50 years and those aged 50 years and older are presented in Figure 1. Much of the historic increase in invasive breast cancer incidence in the early 1980s reflects the increased diagnoses due to the introduction of mammography screening, as well as changes in reproductive patterns, such as delayed childbearing and having fewer children, which are recognized risk factors for breast cancer. During this time, incidence rates of invasive breast cancer increased among both women 50 years of age and older and those aged younger than 50 years (5.4% per year and 3.2% per year, respectively).11 Among women 50 years of age and older, incidence rates stabilized from 1987 through 1993 and then increased again from 1993 to 1999, but at a slower rate (1.9% per year).11 This increase may reflect further increases in the prevalence of mammography screening, rising rates of obesity, and menopausal hormone use. Between 2002 and 2003, breast cancer rates dropped sharply (nearly 7%).12 This rapid decline is likely due to the decreased use of menopausal hormones following the 2002 publication of the Women’s Health Initiative randomized trial results that linked hormone use with an increased risk of breast cancer.13 The decline may also reflect mammography screening rates, which peaked in 2000 and then stabilized at a slightly lower rate.14 It may also reflect a reduced pool of prevalent cases as a result of widespread screening. Incidence rates have been stable among women aged older than 50 years since 2004.11 Among women aged younger than 50 years, incidence rates have remained stable since 1985.11

Incidence rates of in situ breast cancer rose rapidly in the 1980s and 1990s, largely because of increased diagnosis as a result of increases in mammography screening. The increase was observed in women aged both older and younger than 50 years, although it was larger in the older age group. Since 1999, incidence rates of in situ breast cancer have stabilized in women aged 50 years and older, but continue to increase in younger women. The stabilization in incidence among older women likely reflects the small decline and plateau in mammography screening since 2000 as well as the detection of fewer prevalent cases.14

Long-Term Mortality Trends

Figure 1 also shows trends in death rates for breast cancer by age at death. After slowly increasing for many years (0.4% annually from 1975-1990), breast cancer death rates decreased by 2.2% per year from 1990 to 2007 for women of all ages combined.15 The decline was larger among women aged younger than 50 years (3.2% per year) than among those aged 50 years and older (2.0% per year). Declines in breast cancer mortality have been attributed to both improvements in treatment and early detection.16

Racial/Ethnic and SES Differences in Breast Cancer Occurrence

Table 2 describes incidence and mortality rates and trends and cause-specific survival rates for female breast cancer by race/ethnicity. Long-term trends in...
incidence rates by race/ethnicity are also shown in Figure 2. Female breast cancer incidence rates vary substantially by race/ethnicity. From 2004 to 2008, the average annual female breast cancer incidence rate was highest in non-Hispanic white women (125.4 cases per 100,000 females) and lowest for Asian Americans/Pacific Islanders (84.9 cases per 100,000 females). From 2004 through 2008, breast cancer incidence rates were stable among all racial/ethnic groups. Trends in breast cancer rates among American Indian/Alaska Native women should be interpreted with caution because high-quality data for this group are only available from limited geographic areas.

Similar to incidence rates, mortality rates vary by race and ethnicity. During 2003 through 2007, the average annual female breast cancer death rate was highest in African Americans (32.4 deaths per 100,000 females) and lowest among Asian Americans/Pacific Islanders (12.2 deaths per 100,000 females) (Table 2). The higher death rate among African Americans, despite their having a lower incidence rate than non-Hispanic whites, is due to both later stage at diagnosis and poorer stage-specific survival. For example, the 5-year relative survival rate for regional stage breast cancer is 72.1% in African American women compared with 85.2% in white women. Research suggests that racial disparities in cancer mortality are driven in large part by differences in SES.

Long-term trends in breast cancer mortality rates by race/ethnicity are shown in Figure 3. Among white women, breast cancer death rates decreased at an average annual rate of 2.0% per year from 1990 to 1995, by 3.4% from 1995 to

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**TABLE 2. Rates, Trends, and Cause-Specific Survival for Female Breast Cancer by Race/Ethnicity**

| Race/Ethnicity          | Incidence Rate 2004-2008 | AAPC* 2004-2008 | Incidence Rate 2003-2007 | AAPC* 2003-2007 | Mortality Rate 2001-2007 | 5-Year Cause-Specific Survival |
|-------------------------|--------------------------|-----------------|--------------------------|-----------------|--------------------------|-------------------------------|
| Non-Hispanic White      | 125.4                    | 0.1             | 23.9                     | -1.8†           | 88.8                     |
| African American        | 116.1                    | 0.2             | 32.4                     | -1.6†           | 77.5                     |
| Asian American/Pacific Islander | 84.9                  | 1.4             | 12.2                     | -0.8†           | 90.3                     |
| American Indian/Alaska Native | 89.2                  | 0.1             | 17.6                     | 0.1             | 85.6                     |
| Hispanic/Latina         | 91.0                     | 0.6             | 15.3                     | -1.9†           | 83.8                     |

*AAPC indicates average annual percent change.
†AAPC is significantly different from zero (P < .05).
Sources: Incidence: North American Association of Central Cancer Registries analytic file. Mortality: Altekruse et al. Survival: Howlader et al.
1998, and again by 2.0% annually from 1998 to 2007. Among African American women, death rates declined by 1.4% annually from 1992 to 2007. Death rates also decreased from 1998 to 2007 for Hispanics/Latinas (1.9% per year) and Asian Americans/Pacific Islanders (0.8% per year), while rates remained unchanged among American Indians/Alaskan Natives (Table 2). The decline in breast cancer mortality since 1990 has been attributed to improvements in both early detection and treatment.

Table 2 also shows 5-year cause-specific survival rates by race/ethnicity. Cause-specific survival rates are used instead of relative survival to describe survival in racial and ethnic minorities because estimates of normal life expectancy are not available for all racial/ethnic groups. Cause-specific survival is the probability of not dying of breast cancer within a specified number of years following diagnosis. African American women have the lowest 5-year survival rate (77.5%) of any racial or ethnic group, indicating that they have the greatest probability of dying of breast cancer. Asian American/Pacific Islander women have the highest 5-year breast cancer survival rate (90.3%).

Survival differences by race/ethnicity reflect, in part, differences in stage at diagnosis, tumor biology, and access to high-quality treatment.

Figure 4 describes temporal trends in breast cancer mortality rates by county-level poverty status. Although death rates have decreased for all groups, the decline began earlier and was steeper among women living in affluent areas. It is also notable that before 1990, breast cancer death rates were lower in women living in poor areas compared with those living in affluent areas, by as much as 7% in 1975 to 1977. However, by 2003 to 2007, this scenario had reversed, so that women in poor areas had a 7% higher risk of breast cancer death than those in affluent areas.

The high breast cancer mortality rates noted among women living in affluent counties during the 1970s and 1980s likely reflect historically higher breast cancer incidence rates among women of higher SES.

Figure 5 shows the 5-year relative survival from breast cancer by county-level poverty status and stage for cases diagnosed between 1975 and 1979.
Despite improvements in survival across poverty levels for all known stages of disease, relative survival remains lower among women residing in poor areas compared with affluent areas. Improvements in stage-specific relative survival over the last 30 years are thought to result from a combination of advances in treatment (adjuvant chemotherapy as well as radiation, hormonal, and targeted therapies), better characterization of prognostic factors, and a shift toward smaller tumor sizes within stage groups. Not all segments of the population have benefited equally from medical advances, however, as is reflected in survival disparities by SES. The decrease in survival rates for patients with unstaged disease across all SES groups indicates a disproportionate shift of more cases from unknown stage to localized instead of late stage as a result of improved tumor characterization over the study period.

Trends in mammography screening prevalence from 1987 to 2008 by age and individual poverty status are presented in Table 3. Since 1987, mammography screening has increased considerably among all groups; however, rates peaked around the year 2000 and have since declined slightly. Despite these long-term increases, rates remain substantially lower among poor and near-poor women compared with non-poor women. In 2008, 72.8% of non-poor women reported having had a mammogram within the past 2 years, compared with 51.4% of poor women and 55.8% of near-poor women.
Variation by State

State variations in mammography screening prevalence, breast cancer incidence, and mortality rates and the proportion of breast cancers diagnosed at in situ and regional/distant stages are presented in Table 4. The prevalence of recent mammography screening within the past year among non-Hispanic white women aged 40 years and older ranged from 49.7% in Utah to 72.4% in Massachusetts. Thirty-two states had sample sizes large enough to estimate the prevalence of mammography screening within the past year in African American women aged 40 years and older, which ranged from 41.3% in Oklahoma to 77.3% in Massachusetts.

Among non–Hispanic white women, breast cancer incidence rates ranged from 110.8 cases per 100,000 females in Arkansas to 140.4 cases per 100,000 females in California and the District of Columbia. Breast cancer incidence rates among African American women ranged from 73.2 per 100,000 females in New Mexico to 131.0 per 100,000 females in Delaware. When comparing incidence rates among states, it is important to consider that incidence rates reflect the intensity of screening as well as disease occurrence. The percentage of in situ breast cancers, an indicator of mammography utilization, varied from 14.9% in North Dakota to 25.1% in Massachusetts among non-Hispanic white women and from 14.9% in Mississippi to 26.8% in Connecticut among African American women. The proportion of regional/distant stage cancers ranged from 29.7% in Vermont to 39.1% in Utah among non–Hispanic white women and from 38.1% in Iowa to 53.0% in Arkansas among African American women.

State-level mammography screening prevalence was positively correlated with the percentage of breast cancers diagnosed at in situ stage (correlation coefficient \( r = 0.66; P < .0001 \)) and negatively correlated with the percentage of breast cancers diagnosed at late stages (\( r = -0.66; P < .0001 \)) among non–Hispanic white women. Among African American women, state-level mammography screening prevalence was also strongly correlated with in situ diagnoses (\( r = 0.64; P = .002 \)), but not with late-stage diagnoses. Despite similar screening rates, African American women have remained more likely to be diagnosed with regional and distant stage breast cancers compared with white women, which may reflect differences in the quality of mammography screening and delayed follow-up for abnormal mammography findings.21,22 African American women are also more likely to be diagnosed with breast cancers with poor prognostic factors (eg, triple-negative breast cancers).23–25 It is not clear why African American women are disproportionately burdened with these aggressive subtypes, but it may reflect racial differences in breast cancer risk factors. A growing body of research suggests that breast cancer risk factors are differentially associated with molecular subtypes of breast cancer.26,27 For example, postmenopausal women who had given birth to more than 2 children had a 46% higher risk of triple-negative breast cancer and a 12% lower risk of estrogen receptor-positive disease.27 Higher parity is more common in African American women compared with white women.28

Breast cancer death rates among non–Hispanic white women ranged from 21.5 in Montana to 28.0 in New Jersey. In contrast, breast cancer death rates among African American women ranged from 19.9 in Oregon to 38.0 in Tennessee. We also examined trends in breast cancer mortality rates from 1998 through 2007 by state for women of all races combined (data not shown). Death rates declined in 36

### Table 3. Mammography Screening Prevalence* by Poverty Status†, United States, Selected Years, 1987 to 2008

| Year | Poor | Near Poor | Non-poor |
|------|------|-----------|----------|
| 1987 | 14.6 | 20.9      | 34.9     |
| 1990 | 30.8 | 39.1      | 59.2     |
| 1991 | 35.2 | 44.4      | 62.2     |
| 1993 | 41.1 | 47.5      | 67.3     |
| 1994 | 44.2 | 48.6      | 68.5     |
| 1998 | 50.1 | 56.1      | 72.6     |
| 1999 | 57.4 | 59.5      | 75.0     |
| 2000 | 54.8 | 58.1      | 75.9     |
| 2003 | 55.4 | 60.8      | 74.3     |
| 2005 | 48.5 | 55.3      | 72.5     |
| 2008 | 51.4 | 55.8      | 72.8     |

*Percent of women having a mammogram within the past 2 years.
†Poor persons are defined as those living below the poverty threshold. Near-poor persons have an income of 100% to less than 200% of the poverty threshold. Non-poor persons have an income greater than or equal to 200% of the poverty threshold.

Source: Data for 1987-2005 from Health, United States, 2008.20 Data for 2008: National Health Interview Survey Public Use Data File, National Center for Health Statistics, Centers for Disease Control and Prevention.
TABLE 4. State Variation in Female Breast Cancer Incidence and Mortality Rates* and Mammography Usage by Race

| State            | Non-Hispanic White | African American |
|------------------|--------------------|------------------|
|                  | Recent Mammogram\(^\d\) 2008 | Incidence\(^\d\) 2004-2008 | Mortality\(^\d\) 2003-2007 | Recent Mammogram\(^\d\) 2008 | Incidence\(^\d\) 2004-2008 | Mortality\(^\d\) 2003-2007 |
|                  | Age 40 +, %       | % In Situ\(^\d\) | % Regional/ Distant\(^\d\) | Invasive Overall Rate | Age 40 +, %       | % In Situ\(^\d\) | % Regional/ Distant\(^\d\) | Invasive Overall Rate | Overall Rate |
| Alabama          | 55.7              | 18.4             | 38.5             | 117.2              | 22.7              | 63.2              | 19.3             | 48.3              | 115.8          | 32.3        |
| Alaska           | 55.2              | 22.4             | 34.0             | 132.6              | 23.9              | —                | —                | —                | 122.1          | —           |
| Arizona          | 63.2              | 17.9             | 33.3             | 112.6              | 22.1              | 63.2              | 19.3             | 48.3              | 115.8          | 32.3        |
| Arkansas         | 56.4              | 17.4             | 38.0             | 110.8              | 23.3              | 61.0              | 17.4             | 53.0              | 101.5          | 33.4        |
| California       | 65.5              | 18.5             | 34.1             | 140.4              | 25.5              | 62.1              | 18.2             | 44.2              | 121.0          | 33.4        |
| Colorado         | 59.0              | 19.7             | 34.3             | 125.0              | 22.4              | 61.2              | 21.1             | 42.3              | 103.5          | 20.7        |
| Connecticut      | 71.0              | 24.4             | 31.6             | 139.4              | 24.0              | 76.1              | 26.8             | 43.6              | 112.8          | 27.4        |
| Delaware         | 68.1              | 22.2             | 33.5             | 125.5              | 24.7              | 75.1              | 21.1             | 38.2              | 131.0          | 25.4        |
| District of Columbia | 66.0          | 21.5             | 38.6             | 140.4              | 22.9              | 63.1              | 17.9             | 44.7              | 122.4          | 31.8        |
| Florida          | 66.2              | 19.5             | 31.2             | 118.6              | 22.1              | 68.1              | 19.0             | 44.0              | 102.3          | 29.7        |
| Georgia          | 63.9              | 19.6             | 34.0             | 121.2              | 22.2              | 71.3              | 19.5             | 45.8              | 118.3          | 30.4        |
| Hawaii           | 63.0              | 19.5             | 32.3             | 136.3              | 24.2              | —                | —                | —                | 78.9           | —           |
| Idaho            | 54.2              | 17.3             | 36.6             | 118.6              | 22.3              | —                | —                | —                | —              | —           |
| Illinois         | 60.2              | 19.8             | 34.9             | 128.7              | 24.4              | 58.8              | 20.5             | 46.5              | 119.5          | 36.9        |
| Indiana          | 58.3              | 18.7             | 33.8             | 115.1              | 24.1              | 60.7              | 20.7             | 42.6              | 113.8          | 35.1        |
| Iowa             | 63.1              | 18.4             | 33.3             | 123.7              | 22.1              | —                | 17.3             | 38.1              | 110.3          | 30.9        |
| Kansas           | 61.6              | —                | —                | 124.7              | 23.9              | 70.0              | —                | —                | 127.0          | 33.3        |
| Kentucky         | 58.9              | 16.6             | 35.6             | 120.2              | 23.9              | 69.7              | 17.6             | 43.4              | 128.3          | 33.0        |
| Louisiana        | 64.2              | 17.2             | 36.3             | 118.5              | 24.2              | 66.1              | 15.6             | 46.2              | 122.3          | 37.7        |
| Maine            | 70.3              | 21.5             | 32.0             | 128.7              | 22.5              | —                | —                | —                | —              | —           |
| Maryland         | 63.3              | —                | —                | 127.3              | 24.7              | 60.7              | —                | —                | 117.8          | 31.8        |
| Massachusetts    | 72.4              | 25.1             | 30.8             | 136.6              | 23.5              | 77.3              | 24.1             | 39.9              | 109.0          | 27.3        |
| Michigan         | 64.5              | —                | —                | 120.1              | 23.4              | 61.6              | —                | —                | 119.2          | 33.8        |
| Minnesota        | 62.3              | —                | —                | 127.3              | 22.0              | —                | 20.1             | 50.4              | 109.0          | 28.0        |
| Mississippi      | 54.7              | 16.0             | 38.0             | 111.7              | 22.1              | 56.9              | 14.9             | 48.6              | 115.4          | 34.6        |
| Missouri         | 56.9              | —                | —                | 120.9              | 25.2              | 58.5              | —                | —                | 125.6          | 35.3        |
| Montana          | 56.7              | 19.2             | 34.5             | 119.6              | 21.5              | —                | —                | —                | —              | —           |
| Nebraska         | 58.2              | 17.7             | 34.6             | 126.1              | 22.3              | —                | 18.1             | 49.5              | 129.1          | 29.9        |
| Nevada           | 53.9              | 16.2             | 33.4             | 115.7              | 25.7              | —                | 15.8             | 48.8              | 104.4          | 27.4        |
| New Hampshire    | 68.7              | 22.5             | 31.2             | 132.5              | 23.3              | —                | —                | —                | —              | —           |
| New Jersey       | 63.6              | 22.5             | 35.0             | 138.8              | 28.0              | 64.7              | 20.2             | 44.4              | 111.9          | 32.4        |
| New Mexico       | 57.0              | 16.3             | 32.0             | 124.4              | 24.4              | —                | 47.2             | 73.2              | —              | —           |
| New York         | 65.3              | 22.9             | 32.7             | 133.5              | 24.3              | 65.8              | 21.1             | 44.7              | 106.7          | 27.7        |
| North Carolina   | 65.5              | 18.9             | 34.3             | 124.5              | 23.0              | 63.3              | 18.3             | 43.2              | 122.3          | 33.7        |
| North Dakota     | 64.4              | 14.9             | 33.6             | 123.7              | 22.0              | —                | —                | —                | —              | —           |
| Ohio             | 60.8              | —                | —                | 119.4              | 25.9              | 69.0              | —                | —                | 120.7          | 34.5        |
| Oklahoma         | 52.0              | 16.5             | 35.9             | 125.1              | 25.1              | 41.3              | 17.5             | 44.8              | 125.3          | 32.7        |
| Oregon           | 62.1              | 18.5             | 32.7             | 129.9              | 23.9              | —                | 17.3             | 45.7              | 93.4           | 19.9        |
states and the District of Columbia during the last 10 years; however, in 14 states, mainly located in the South and West (Alabama, Alaska, Arkansas, Hawaii, Louisiana, Mississippi, Missouri, Montana, New Mexico, Oklahoma, South Dakota, Utah, Vermont, and Wyoming), rates were level. The lack of a decline in these states is likely related to variations in the prevalence and quality of mammography screening, as well as state differences in racial and socioeconomic composition.

Summary

In general, progress in reducing breast cancer death rates was observed across races/ethnicities, SES, and state. However, among American Indians/

Alaska Natives and in 14 US states, death rates have been stable during the last 10 years. The continued presence of disparities in the progress against breast

### TABLE 4. (Continued)

| Age 40 +, % | % In Situ | % Regional/Distant | Invasive Overall Rate | Overall Rate | Age 40 +, % | % In Situ | % Regional/Distant | Invasive Overall Rate | Overall Rate |
|------------|-----------|--------------------|----------------------|-------------|------------|-----------|--------------------|----------------------|-------------|
| Pennsylvania | 62.3 | 20.1 | 35.1 | 124.9 | 25.3 | 69.4 | 21.3 | 44.6 | 125.5 | 32.4 |
| Rhode Island | 70.2 | 21.3 | 32.8 | 136.1 | 23.7 | 53.8 | 15.9 | 40.5 | 118.8 | — |
| South Carolina | 59.3 | — | — | 121.5 | 22.2 | 61.5 | — | — | 114.5 | 31.2 |
| South Dakota | 63.5 | 17.9 | 35.6 | 118.3 | 22.7 | — | — | — | — | — |
| Tennessee | 57.8 | 17.8 | 36.8 | 117.3 | 23.7 | 58.2 | 15.7 | 48.4 | 116.4 | 38.0 |
| Texas | 59.7 | 17.4 | 34.9 | 121.6 | 23.3 | 58.5 | 17.2 | 45.0 | 117.1 | 35.3 |
| Utah | 49.7 | 17.5 | 39.1 | 112.1 | 23.4 | — | — | — | 75.7 | — |
| Vermont | 68.3 | 22.4 | 29.7 | 131.5 | 23.8 | — | — | — | — | — |
| Virginia | 64.2 | 20.7 | 33.5 | 125.8 | 24.3 | 68.6 | 21.2 | 42.6 | 126.4 | 34.7 |
| Washington | 61.7 | 20.5 | 34.2 | 131.6 | 23.9 | 48.5 | 17.5 | 43.5 | 117.7 | 25.7 |
| West Virginia | 60.4 | — | — | 113.3 | 24.2 | — | 19.6 | 44.9 | 98.9 | 33.9 |
| Wisconsin | 63.2 | 17.1 | 35.0 | 123.4 | 22.8 | 71.0 | 24.6 | 46.3 | 113.0 | 26.5 |
| Wyoming | 53.0 | 17.2 | 37.6 | 116.3 | 23.8 | — | — | — | — | — |
| Range | 49.7-72.4 | 14.9-25.1 | 29.7-39.1 | 110.8-140.4 | 21.5-28.0 | 41.3-77.3 | 14.9-26.8 | 38.1-53.0 | 73.2-131.0 | 19.9-38.0 |

*All rates are per 100,000 females and age adjusted to the 2000 US standard population.

†Recent mammogram is defined as having had a mammogram within the past year and is based on the Centers for Disease Control and Prevention’s (CDC) Behavioral Risk Factor Surveillance System (BRFSS) data.

‡Source: Surveillance, Epidemiology, and End Results and National Program of Cancer Registries areas reported by the North American Association of Central Cancer Registries (NAACCR) for 2004-2008. Incidence data for white women in Wisconsin are not exclusive of Hispanic origin.

§Source: National Center for Health Statistics, CDC, 2010. Mortality rates for white women in New Hampshire, North Dakota, and the District of Columbia are not exclusive of Hispanic origin.

k Percent in situ includes all breast cancers, including unstaged cancers in the denominator. Percent regional/distant includes invasive and unstaged breast cancers in the denominator.

— Statistic could not be calculated. For BRFSS estimate of mammography screening, percentage was not calculated if there were fewer than 50 respondents; for incidence and mortality, statistics were not calculated if there were 25 or fewer cases or deaths.

### TABLE 5. American Cancer Society Guidelines for the Early Detection of Breast Cancer in Average-Risk, Asymptomatic Women

| Ages 20-39 |
| --- |
| • Clinical breast examination at least every 3 y |
| • Breast self-examination (optional) |

| Age 40 and Over: |
| --- |
| • Annual mammogram |
| • Annual clinical breast examination (preferably prior to mammogram) |
| • Breast self-examination (optional) |
cancer requires enhanced efforts to ensure that all women have access to high-quality prevention, detection, and treatment services. Clinicians should follow recommended screening guidelines (Table 5) and encourage their patients aged 40 years and older to have annual mammography. Clinicians should also ensure that patients at high risk for breast cancer are identified and offered appropriate screening and follow-up. Continued investment in breast cancer research is also needed to better understand the causes, prevention, and treatment of the disease.

References

1. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Incidence-SEER 9 Regs Research Data, Nov. 2010 Sub (1973-2008) <Katrina/Rita Population Adjustment–Linked to County Attributes–Total US, 1969-2009 Counties. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Surveillance Branch; 2011. Released April 2011 based on the November 2010 submission.

2. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Incidence-SEER 17 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov. 2010 Sub (2000-2008) <Katrina/Rita Population Adjustment–Linked to County Attributes–Total US, 1969-2009 Counties. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Surveillance Branch; 2011. Released April 2011 based on the November 2010 submission.

3. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Incidence-SEER 13 Regs Research Data, Nov. 2010 Sub (2002-2008) <Katrina/Rita Population Adjustment–Linked to County Attributes–Total US, 1969-2009 Counties. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Surveillance Branch; 2011. Released April 2011 based on the November 2010 submission.

4. National Cancer Institute. Cancer Query Systems: Delay-Adjusted SEER Incidence Rates. Available at: http://surveillance.cancer.gov/delay/canques.html. Accessed June 6, 2011.

5. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: NACCR Incidence-CIN Analytic File, 1995-2008, for Expanded Races, Custom File With County, ACS Facts and Figures Projection Project, North American Association of Central Cancer Registries. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Statistics Branch; 2011.

6. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Mortality-All COD, Aggregated With Stage, Total US (1969-2007) <Katrina/Rita Population Adjustment–Linked to County Attributes–Total US, 1969-2009 Counties. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Surveillance Branch; 2010. Released June 2010; underlying mortality data provided by National Center for Health Statistics.

7. RTI International. SAS-Callable SUDAAN 10.0.1 Research Triangle Park, NC: RTI International, Inc; 2009.

8. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. CA Cancer J Clin. 2011;61:212-236.

9. Joinpoint Regression Program. Version 3.5.0. Bethesda, MD: Statistical Research and Applications Branch, National Cancer Institute; 2011.

10. SAS Institute Inc. SAS [Software], Version 9.2.0. Cary, NC: SAS Institute, Inc; 2008.

11. Howlader N, Noone AM, Krapcho M, et al, eds. SEER Cancer Statistics Review, 1975-2008. National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Statistics Branch; 2011. Available at: http://seer.cancer.gov/csr/1975_2008/, based on November 2010 SEER data submission, posted to the SEER web site. Accessed July 20, 2011.

12. Ravdin PM, Cronin KA, Howlader N, et al. The decrease in breast-cancer incidence in 2000, 2005, and 2008. JAMA. 2008;299:2429-2430.

13. Rossouw JE, Anderson GL, Prentice RL, et al. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women’s Health Initiative randomized controlled trial. JAMA. 2002;288:321-333.

14. Breen N, Gentleman JF, Schiller JS. Update on mammography trends: comparisons of rates in 2000, 2005, and 2008. Cancer. 2011;117:2209-2218.

15. Altekruse SF, Kosary CL, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2007. Bethesda, MD: National Cancer Institute; 2010.

16. Berry DA, Cronin KA, Plevritis SK, et al. Effect of screening and adjuvant therapy on mortality from breast cancer. N Engl J Med. 2005;353:1784-1792.

17. Singh GK, Miller BA, Hankey BF, Edwards BK. Area Socioeconomic Variations in U.S. Cancer Incidence, Mortality, Stage, Treatment, and Survival, 1975-1999. NCI Cancer Surveillance Monograph Series, No. 4. Bethesda, MD: National Cancer Institute; 2003.

18. Elkin EB, Hudis C, Begg CB, Schrag D. The effect of changes in tumor size on breast carcinoma survival in the U.S. 1975-1999. Cancer. 2005;104:1149-1157.

19. Lopez-Tarruella S, Martin M. Recent advances in systemic therapy: advances in adjuvant systemic chemotherapy of early breast cancer. Breast Cancer Res. 2009;11:1204.

20. National Center for Health Statistics. Health, United States, 2008 With Chartbook. Hyattsville, MD; 2009.

21. Gwyn K, Bondy ML, Cohen DS, et al. Racial differences in diagnosis, treatment, and clinical delays in a population-based study of patients with newly diagnosed breast carcinoma. Cancer. 2004;100:1595-1604.

22. Ansell D, Grapper PA, Whitman S, et al. A community effort to reduce the black/white breast cancer mortality disparity in Chicago. Cancer Causes Control. 2009;20:1681-1688.

23. Carey LA, Perou CM, Livasy CA, et al. Race, breast cancer subtypes, and survival in the Carolina Breast Cancer Study. JAMA. 2006;295:2492-2502.

24. Chlebowski RT, Chen Z, Anderson GL, et al. Ethnicity and breast cancer: factors influencing differences in incidence and outcome. J Natl Cancer Inst. 2005;97:439-448.

25. DeSantis C, Jemal A, Ward E. Disparities in breast cancer prognostic factors by race, insurance status, and education. Cancer Causes Control. 2011;22:493-504.

26. Shiode SS, Forman MR, Kuerer HM, et al. Higher parity and shorter breastfeeding duration: association with triple-negative phenotype of breast cancer. Cancer. 2010;116:4933-4943.

27. Phipps AI, Chlebowski RT, Prentice RL, et al. Reproductive history and oral contraceptive use in relation to risk of triple-negative breast cancer. J Natl Cancer Inst. 2011;103:470-477.

28. Hall JL, Moorman PG, Millikan RC, Newman B. Comparative analysis of breast cancer risk factors among African-American women and White women. Am J Epidemiol. 2005;161:40-51.