Wisconsin Cancer Data Bulletin

Wisconsin Department of Health Services
Division of Public Health
Office of Health Informatics

In Situ Breast Cancer in Wisconsin

INTRODUCTION

This bulletin provides information about *in situ* (premalignant) breast cancer diagnoses in Wisconsin based on data collected by the Wisconsin Cancer Reporting System. The data bulletin is intended for health professionals and those interested in the detection and management of *in situ* breast cancer. This bulletin presents surveillance data from years 1995 through 2012 for all types of breast carcinoma *in situ* combined, and for the two main types: ductal carcinoma *in situ* (DCIS), and lobular carcinoma *in situ* (LCIS). Data are displayed as proportions (percentages), age-specific and age-adjusted rates by year of diagnosis, age at diagnosis, and major race/ethnicity groups. Trends in age-adjusted incidence rates for *in situ* breast cancer are presented for Wisconsin and compared to U.S. data for the selected time period.

DEFINITIONS

In situ – A Latin term that means 'in place' and refers to cancer in the earliest stage. In general, a cancer that is diagnosed at an *in situ* stage indicates that abnormal cancer cells are present but have not spread beyond the wall of the tissues where they developed. *In situ* cancer is sometimes referred to as noninvasive or precancerous and is classified as stage zero. All types of *in situ* breast cancer, lobular and ductal, are included in this report.

Carcinoma – Cancer arising in epithelial cells (cells that cover the body and internal hollow organs). The breast glands and ducts are covered in epithelial cells and most cancers of the breast are carcinomas.

Ductal carcinoma *in situ* (DCIS) – This is the most common type of noninvasive breast cancer. Abnormal cell growth begins in the milk ducts, but the abnormal cells have not spread outside the duct to other tissue in the breast. Approximately 85 percent of all *in situ* breast cancers in the U.S. are diagnosed as DCIS. Most DCIS is discovered by mammography.

Lobular carcinoma *in situ* (LCIS) – This is the less common noninvasive breast cancer in which abnormal cells are found inside the lobule (milk producing glands) of the breast, but have not spread outside the lobule walls. Nationally, less than 15 percent of all *in situ* breast cancers are diagnosed as LCIS. LCIS is not detected by a clinical exam or mammography but is incidentally diagnosed in a breast biopsy performed for another purpose.

Invasive – Malignant cancer or tumor that has invaded surrounding tissue or organs.

Age-adjusted rates – Incidence rates adjusted to account for the different age distributions between populations. Rates in this bulletin are age-adjusted to the 2000 U.S. standard population.

Cancer incidence – The number of new cancer cases that occur during a specified period in a population at risk for developing the disease, expressed as the number of cases or as a rate per 100,000 population.

IN SITU BREAST CANCER

Before 1980, *in situ* breast cancer was rarely diagnosed and reported. However, the proportion of *in situ* breast cancer has increased with the standardization of mammography screening recommendations. *In situ* cancer currently accounts for one in five diagnosed breast cancers in Wisconsin.

As shown Table 1, the percentage of all female breast cancers diagnosed as *in situ* cancers in Wisconsin increased approximately 54 percent from 1995 to 2012. The number of *in situ* cancers more than doubled.

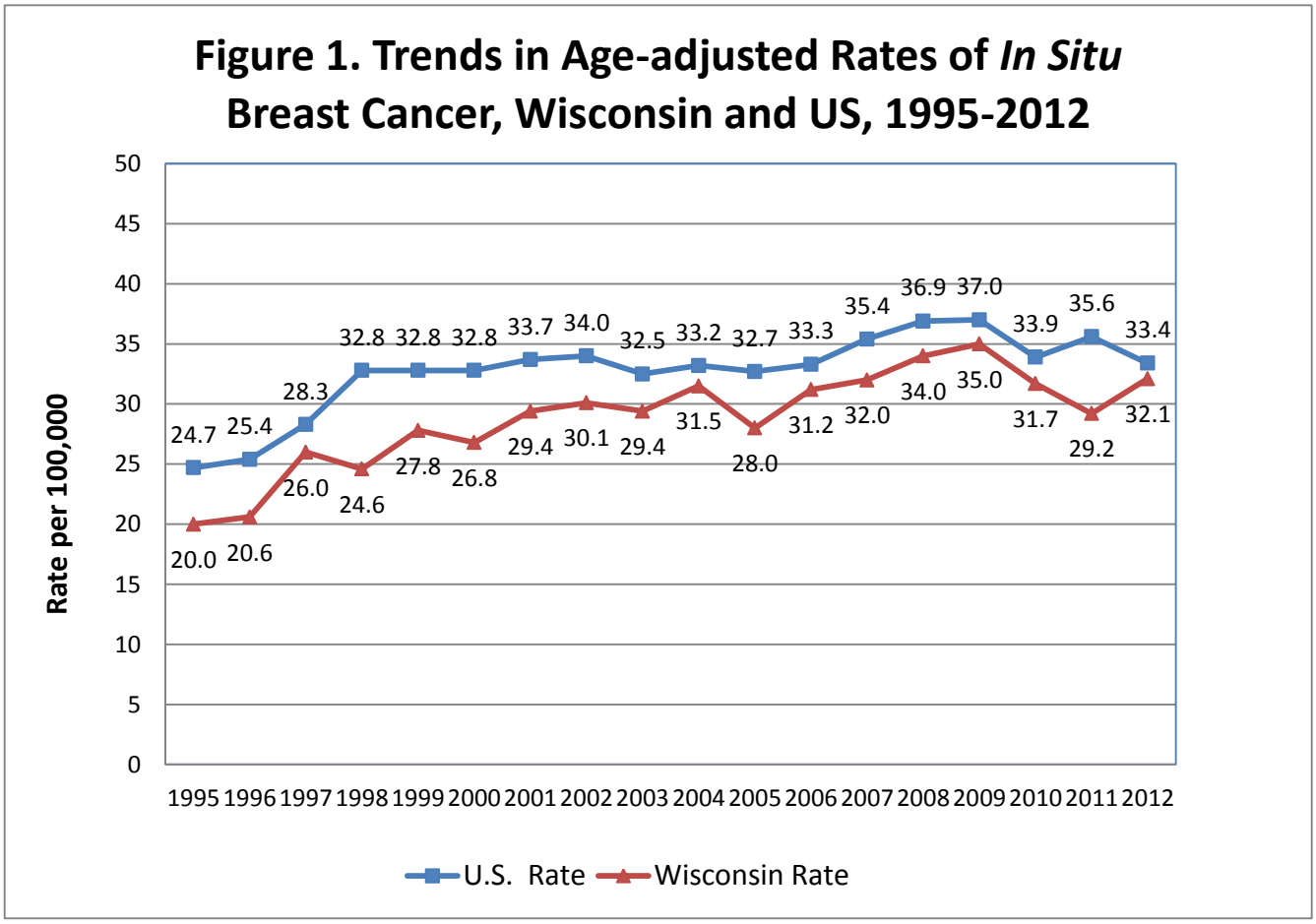
Table 1. *In Situ* Breast Cancer as a Percent of Total Breast Cancer, Wisconsin, 1995-2012

Year of Diagnosis	*In Situ* Count	*In Situ* Percent	Total Cancers*
1995	533	13.1%	4,078
1996	555	13.6%	4,093
1997	709	15.7%	4,515
1998	674	14.6%	4,619
1999	776	16.0%	4,851
2000	760	15.5%	4,897
2001	852	16.8%	5,060
2002	884	18.2%	4,864
2003	878	18.7%	4,702
2004	956	20.4%	4,687
2005	869	18.3%	4,745
2006	972	19.7%	4,924
2007	1,016	19.9%	5,093
2008	1,099	21.1%	5,216
2009	1,132	21.3%	5,321
2010	1,041	20.3%	5,131
2011	985	18.5%	5,327
2012	1,088	20.2%	5,397
Total	15,779	18.0%	87,520

*Total cancers include in situ and invasive breast cancers.

For the period 1995-2012, the annual age-adjusted rate of *in situ* breast cancer was consistently lower in Wisconsin than in the U.S. (Figure 1).

In general, both Wisconsin and the U.S. showed similar patterns of increasing incidence during the period 1995-2012. The rates peaked in 2009, at 37.0 per 100,000 in the U.S. and 35.0 per 100,000 in Wisconsin.



Note: Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

DUCTAL CARCINOMA *IN SITU* (DCIS) AND LOBULAR CARCINOMA *IN SITU* (LCIS)

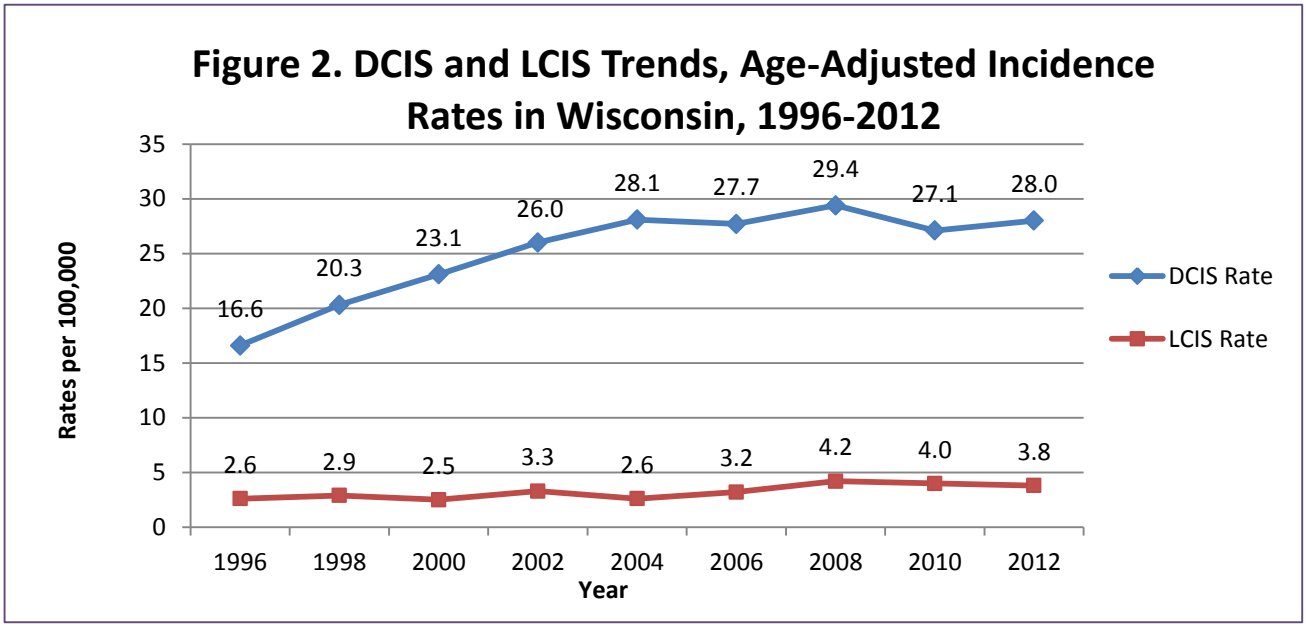
Table 2 shows that the increase in *in situ* breast cancer is largely attributable to the increase in DCIS diagnoses. Approximately 88 percent of all *in situ* breast cancers were diagnosed as DCIS in 2012; 12 percent were LCIS; and 1 percent were mixed or other. In 2012, DCIS represented 18 percent of all newly diagnosed breast cancers in Wisconsin (954 of 5,397 total breast cancers).

Table 2. DCIS as a Percent of *In Situ* Breast Cancer, Wisconsin, 1995-2012			
Year of Diagnosis	**DCIS Count**	**DCIS Percent**	**All *In Situ* Cancers***
1995	439	82.4%	533
1996	450	81.1%	555
1997	551	77.7%	709
1998	560	83.1%	674
1999	652	84.0%	776
2000	659	86.7%	760
2001	762	89.4%	852
2002	767	86.8%	884
2003	754	85.9%	878
2004	850	89.4%	956
2005	777	89.4%	869
2006	865	89.0%	972
2007	907	89.3%	1,016
2008	955	86.9%	1,099
2009	989	87.4%	1,132
2010	892	85.7%	1,041
2011	874	88.7%	985
2012	954	87.7%	1,088
Total	13,657	86.6%	15,779

* *In situ* cancers include DCIS, LCIS and miscellaneous types.

DCIS and LCIS are very different in their natural development, detection, and treatment. Many research studies and surveillance reports focus exclusively on DCIS because it is usually treated with surgery and radiation, while LCIS is usually not treated but followed with careful observation.

As shown in Figure 2, DCIS incidence in Wisconsin has increased more dramatically since 1996 while LCIS incidence increased only slightly. The age-adjusted rate of DCIS increased 68 percent from 1996 to 2012. Age-adjusted incidence rates of DCIS are on average seven times higher than rates of LCIS.



DCIS incidence increases sharply among women aged 40-44, and increases with age thereafter until peaking at 97.1 per 100,000 among women aged 70-74. Incidence declines dramatically after age 75, consistent with reduced rates of screening among the elderly (Figure 3). LCIS rates are relatively flat across age groups and increase only gradually with age, peaking at 12.8 per 100,000 among women aged 50-54.

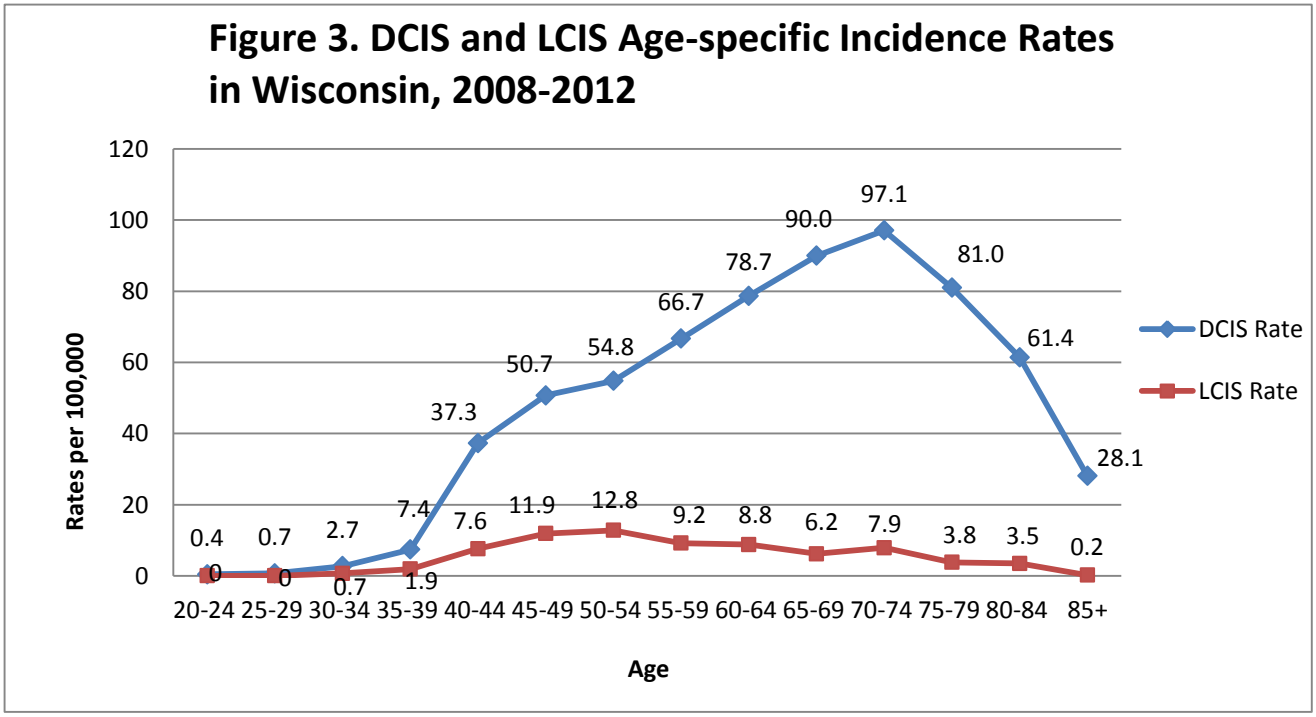
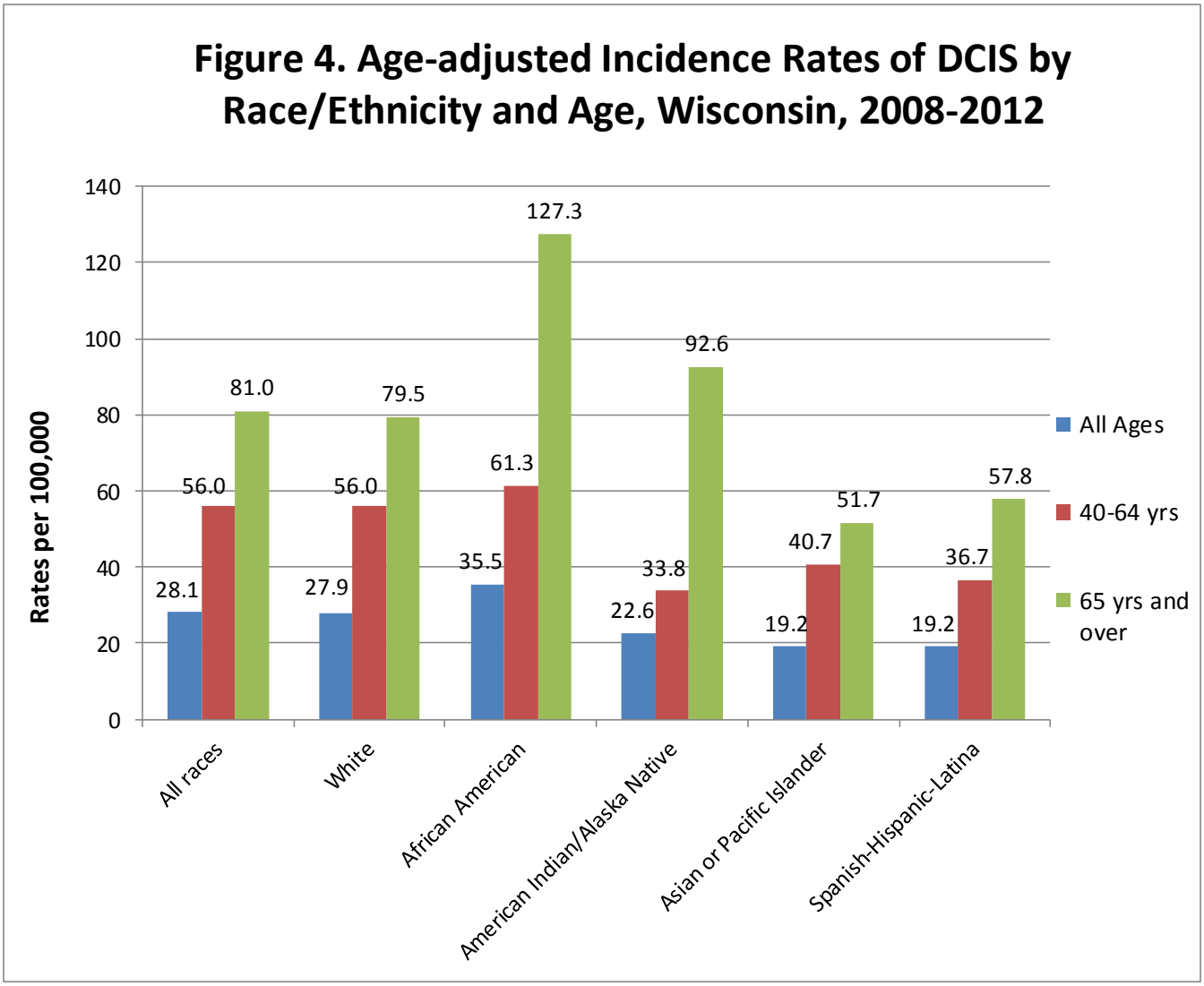


Figure 4 shows that the age-adjusted rates of DCIS for all ages combined were similar across all races/ethnicities. However, when rates are examined by age groups, African-American women aged 65 and older experienced the highest DCIS rate. American Indian women also are diagnosed later in their life span, when aged 65 and over, and less frequently during younger ages, 40-64.



BREAST CANCER SCREENING GUIDELINES

In October 2015 the American Cancer Society (ACS) updated screening mammography guidelines for women of average risk for breast cancer. The previous guidelines from ACS encouraged women to get screened starting at age 40. ACS now recommends that women with an average risk of breast cancer undergo screening starting at age 45 and that women aged 45-54 be screened annually. ACS recommends that women aged 55 and older should transition to screening every two years (1).

Since 2009 the U.S Preventive Services Task Force has issued general guidelines that recommend the use of screening mammography for breast cancer every two years for women aged 50-74. The Task Force concluded there was not enough evidence available to draw reliable conclusions about the additional benefits and harms of screening mammography for women aged 75 years and older (2).

These screening recommendations are for women without a history of breast cancer and without factors placing them at high risk for developing breast cancer. For all women, both ACS and the Task Force stated that the decision to start regular screening mammography for breast cancer should be an individual one in consultation with the woman's health care provider, and should take into account the woman's health status and her values regarding the specific benefits and harms of screening.

DCIS AND TREATMENT OPTIONS

Ductal carcinoma *in situ* (DCIS) may perhaps be a controversial diagnosis. DCIS is sometimes referred to as a "precancer." When classified as a cancer, it is referred to as a noninvasive or preinvasive form. The National Cancer Institute describes it as a "noninvasive condition." DCIS is Stage 0 in the staging scheme for breast cancer of 0 to IV (3).

As mammography technology becomes increasingly more sensitive, the number of abnormalities detected in the breast also increases. DCIS rarely produces symptoms or palpable lumps but is usually detected during routine mammograms, and then subsequently diagnosed by a needle biopsy to collect cell tissue.

Studies suggest that DCIS and invasive breast cancer share many of the same risk factors. Common risk factors include increasing age, lifetime exposure to estrogen and progesterone (age at menarche, number of children, age at menopause, postmenopausal hormone therapy), family history of breast cancer, high body mass index, high breast density, and alcohol consumption (4).

Prognostic factors, or factors used to estimate the likelihood of progression or recurrence, and predictive factors, those that indicate responsiveness to treatment, include nuclear grade, histology, size, and estrogen receptor status (5).

- Nuclear Grade: Higher grade tumors have more cells with abnormal nuclei and a greater probability of progression and recurrence.
- Histology: DCIS is generally classified as papillary, solid, comedo, micopapillary, and cribriform. The comedo type of DCIS has more aggressive characteristics (6).
- Size: DCIS can spread along several milk ducts, and the extent of breast tissue involved is associated with the likelihood of invasive breast cancer.
- Estrogen receptor status: Treatment guidelines require that estrogen receptor status be measured before tamoxifen therapy, and tamoxifen prescribed only for estrogen-receptor-positive tumors.

According to the American Cancer Society, about 60,000 cases of DCIS are diagnosed each year in the U.S. It is estimated that only about 20 percent of untreated cases will become malignant. Medical

professionals cannot determine with certainty which women diagnosed with DCIS will eventually develop invasive breast cancer and which will not.

Current clinical data from the National Cancer Institute support the use of breast-conserving surgery and radiotherapy as appropriate therapy for DCIS (3). Tamoxifen and raloxifene are two drugs approved by the U.S. Food and Drug Administration to help lower the risk of recurrence for estrogen-receptor-positive breast cancer, including DCIS and invasive breast cancer (7). Faced with uncertainty, most women elect treatment and undergo a lumpectomy and radiation. Some women opt for a mastectomy if the diagnostics indicate a high-grade cell type. That may be changing, however, as physicians are increasingly concerned about over-treatment and the risks associated with treatment. Major studies found that the survival benefits of breast surgery for low-grade DCIS were less than for higher grade DCIS and recommend active (monitored) surveillance (8). A large study of more than 100,000 women diagnosed with DCIS from 1988 to 2011 found the breast cancer-specific mortality rate at 20 years to be only 3.3 percent, and the 10-year breast cancer mortality rate was 1.1 percent (9). These recent studies would suggest many cases of DCIS with favorable prognostic factors could be monitored carefully by "watchful waiting" rather than treated aggressively with surgery and radiation.

SUMMARY

In 2012, *in situ* or preinvasive breast cancers represented approximately 20 percent of all newly diagnosed breast cancers in Wisconsin. Age-adjusted incidence rates for *in situ* breast cancer increased steadily through 2009, and then decreased slightly in subsequent years. Generally the trend toward higher rates of *in situ* breast cancer reflects improved compliance with standard screening recommendations. DCIS is the major component of *in situ* breast cancer and currently requires standard treatment of surgery and radiation, although treatment is becoming more tailored to tumor characteristics. LCIS is more uncommon and usually monitored with continued screening and annual exams.

DATA SOURCES FOR BULLETIN

Wisconsin Cancer Reporting System (WCRS): WCRS is part of the Office of Health Informatics, Division of Public Health, Department of Health Services. WCRS collects all newly diagnosed cancer cases for Wisconsin residents from hospitals, clinics, physician offices, out-of-state registries, and selected Minnesota hospitals.

Surveillance, Epidemiology and End Results (SEER): National data on cancer incidence are from the National Cancer Institute's SEER Program. The SEER incidence rate data in this report are from nine SEER registries, and accessed using SEER*Stat software version 8.2.1 (www.seer.cancer.gov/seerstat)

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