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Rod R. Blagojevich, Governor

Department of Public Health
Damon T. Arnold, M.D., M.P.H., Director

Invasive Breast Cancer Incidence Among Illinois Women

Temporal Trends 1990-2004

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Invasive Breast Cancer Incidence Among Illinois Women,

Temporal Trends 1990 – 2004

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Prepared by

Fangchao Ma, M.D., Ph.D.
Sr. Cancer Epidemiologist

Tiefu Shen, M.D., Ph.D.
Division Chief

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Abstract

Background

Several recent reports have demonstrated a decline in breast cancer incidence in the United States. This study examined the recent temporal trends for breast cancer incidence overall and by age, race/ethnicity, socioeconomic status (SES), and urbanity level in Illinois.

Methods

Using incidence data from the Illinois State Cancer Registry (ISCR) and population data produced by the U.S. Census Bureau's Population Estimates Program, the annual age-adjusted incidence rates for invasive breast cancer among Illinois women were calculated for the period 1990 – 2004. In addition, Joinpoint regression analyses were performed to quantify the trends at various periods of time.

Results

Similar to the national trends, a recent decline in breast cancer incidence was observed among Illinois women. The decline for Illinois women, 50 years or older, occurred around 2000 after a steady rise in the 1990s. For these women, a significant upward trend in breast cancer incidence was first observed, with the incidence rate increasing by 2.2 percent yearly from 1990 to 1999 (95 percent CI: 1.8 – 2.5). The incidence peaked in 1999, then a yearly 3.8 percent decline [(-5.9) – (-1.8)] was observed. Analysis by race and ethnicity demonstrated that the decline in breast cancer incidence occurred across racial groups but happened earlier in Hispanic (1997) and African-American women (1998) than in white women (2001). The annual percentage changes in rates were -2.2 [(-4.1) – (-0.2)] in African-American women, -5.2 [(-8.6) – (-1.8)] in white women, and -4.4

[(-6.8) – (-2.0)] in Hispanic women, respectively. In addition, similar temporal trends in breast cancer incidence were seen across SES and urbanity levels. A converging trend in breast cancer incidence among racial, SES, and rural-urban groups also was noted.

Conclusion

The temporal trends for breast cancer incidence among Illinois women were similar to that in the United States. Continuing population-based surveillance in the state of Illinois for breast cancer is warranted in order to provide a comprehensive picture of the burden of breast cancer and to generate new insights about the impact of various interventions.

Introduction

Breast cancer is the most frequently diagnosed cancer among women in the United States, accounting for nearly one in three cancers in women. It is the second leading cause of cancer death after lung cancer and represents 15 percent of all female cancer deaths.[1] In Illinois, more than 8,000 invasive breast cancer cases have been reported every year since 1994. From 1986 to 2004, more than 153,000 Illinois women were diagnosed with invasive breast cancer which accounted for 31 percent of all invasive cancer diagnosed in women.[2]

Female breast cancer incidence rates in the United States have increased steadily for decades, although the reasons have not been well understood. Beginning in 1982, the rates increased at an even faster pace, caused in part by the increased detection of localized disease and tumors measuring less than 2 cm in diameter that were attributed to the increased use of mammography.[3-5] However, a recent CDC MMWR report has indicated that the age-adjusted annual incidence rates for invasive breast cancer decreased each year from 1999 to 2003, with the greatest decrease in rates occurring from 2002 to 2003.[6] Further analysis has shown that, after the sharp decline in 2003, breast cancer incidence rate has leveled off in 2004.[7]

Interpretation of cancer incidence in a defined population requires understanding of multiple complex and interacting factors. These factors include the prevalence of risk factors in the population, changes in the use of medical interventions related to screening, and changes in how data are collected and reported.[8] Analyzing temporal trends in cancer incidence can provide a more comprehensive picture of the burden of the disease and its evolution over time, as well as generate new insights about the impact of various

interventions. The present report analyzes the temporal incidence trends for invasive breast cancer among Illinois women for the period of 1990 to 2004. Invasive breast cancer incidence from the National Cancer Institute's (NCI) Surveillance, Epidemiology and End Results (SEER) 9 registries for the same time period are used for comparison. The Illinois female breast cancer incidence is further examined by age, race, ethnicity, socioeconomic status (SES), and urbanity level.

Methods

Data source

Invasive breast cancer incidence cases [International Classification of Disease-Oncology, 3rd edition (ICD-O-3) site codes 50.0-50.9, excluding contralateral breast cancers, lymphomas and carcinoid tumors (seer.cancer.gov/siterecode)] were obtained from the Illinois Department of Public Health, Illinois State Cancer Registry (ISCR). ISCR began collection of data on all newly diagnosed cancer cases among Illinois residents in 1986. It is the only population-based source for cancer incidence information in Illinois. Cancer cases are collected through mandated reporting by hospitals, ambulatory surgical treatment centers, non-hospital affiliated radiation therapy treatment centers, independent pathology labs, dermatologists and through the voluntary exchange of cancer patient data with 12 other (mostly nearby) states. For this report, the incidence data reflect the most recent data available to ISCR as of November 2006. It was estimated that ISCR maintains 100 percent completeness of case ascertainment for 1995-2004 period and close to 93 percent for 1990-1994 period.

Socioeconomic Status (SES) and Urbanity Definition

In the present report, the SES for breast cancer cases was estimated using the 2000 census percentage of persons below poverty line at county level as a proxy measure. Each case was categorized into one of the four SES groups: High, Up-middle, Middle, or Low if the case resided in the county with <5, 5-9.9, 10-19.9, or ≥20 percent of persons below poverty line, respectively. The ISCR cluster grouping system was used to examine the breast cancer incidence temporal trends by urbanity level. This system was established in 1993 by ISCR for reference in cluster studies. It was based on population density, rate of growth, and Beale codes. The state is divided into four categories according to this system: Urban, Suburban, Small Urban, and Rural. Suburban consisted of the five collar counties (Lake, McHenry, DuPage, Will, and Kane), and urban consisted of Cook County. The 2000 census data showed that the populations in the ISCR defined Urban, Suburban, Small Urban, and Rural were about 5.4 million, 2.7 million, 2.1 million, and 2.2 million, respectively. The four groups had distinctive population demographics. The majority of the population in Rural was white (95.7 percent) with small proportions of African Americans (3.6 percent) and Hispanics (2.4 percent). In contrast, Urban (Cook County) had relatively high proportions of African Americans (26.7 percent) and Hispanics (20.1 percent). Proportions of African Americans and Hispanics in Small Urban and Suburban were 12.2 percent and 3.5 percent, and 5.9 percent and 12.4 percent, respectively.

SEER 9 Registries

The SEER program is an epidemiologic surveillance system sponsored by NCI consisting of population-based tumor registries that routinely collect information on all newly diagnosed cancer (incident) cases that occur in persons residing in SEER areas (seer.cancer.gov). The information collected about each incident cancer diagnosis includes the patient's demographic characteristics, date of diagnosis, tumor data (e.g., histology, stage, and grade), type of treatment recommended or provided within four months of diagnosis, follow-up of vital status, and cause of death, if applicable.

The SEER 9 Registries are Atlanta, Connecticut, Detroit, Hawaii, Iowa, New Mexico, San Francisco-Oakland, Seattle-Puget Sound, and Utah. Data from SEER 9 Registries are available for the cases diagnosed from 1973 and later. Although the SEER program was expanded to include 13 registries in 1992 and 17 registries in 2000, cancer incidence data from the expansion registries were not available for 1990 and 1991. For this reason, data from the original nine SEER registries were used as a comparison in the present study. It should be noted that SEER 9 Registry data do not constitute a national probability sample; they encompass a lower proportion of blacks and a higher proportion of "other" races than the average U.S. population. In spite of these limitations, they are a primary source of national information on cancer incidence.

Statistical Analysis

SEER*Stat® version 6.3.6 software was used to calculate breast cancer incidence rates. All rates are expressed per 100,000 population and are age-adjusted by the direct method to the 2000 U.S. standard million population.

To examine the temporal trends, the NCI-developed Joinpoint 3.0 was used in Joinpoint regression analysis.[9] A Joinpoint regression model fits a series of joined straight lines on a log scale to estimate trends in age-adjusted rates. The resultant trends of varying time periods were described by annual percentage changes, which equal to $100 \times (e^b - 1)$, where b is the slope of the regression line. Significance level was set at two-sided, p = 0.05 for all statistical tests.

Results

Overall breast cancer incidence in Illinois women in comparison to the SEER 9 Registries

Relative to the pooled rates from SEER 9 Registries, the breast cancer incidence in Illinois was consistently lower for the period 1990 to 2004, but shared a similar temporal trend (Figure 1). The difference in incidence rates between Illinois and SEER 9 Registries was the greatest in 2003 and 2004 when the rates in Illinois were about 5.4 percent lower. Overall, breast cancer incidence in Illinois women was 3.3 percent lower compared to that in SEER 9 Registries.

A gradual but steady increase in breast cancer incidence was seen in the 1990s, with the lowest incidence rate recorded in 1993 (123.5/100,000) and peak incidence in 1999 (137.8/100,000). After reaching a relative plateau between 1999 and 2001, a sharp decline was observed. The results from Joinpoint analysis indicated two significant trends – a steady rise in the 1990s with an annual percentage change (APC) of the incidence rate by 0.7 percent (95 percent CI: 0.1 – 1.1) and a decline from 2001 to 2004 with the

incidence rate decreasing 5.2 percent annually [(-8.3) – (-1.9)]. The greatest decline occurred between 2002 and 2003, with an 8.4 percent drop in the breast cancer incidence rate.

Age-specific female breast cancer incidence in Illinois

Among women younger than 50 years old, there was little change in incidence rates of breast cancer over the period of 1990 to 2004. Trends analysis showed a slight decline but it was not statistically significant (Figure 2).

Also shown in Figure 2 is the breast cancer incidence for Illinois women older than 50. There was an upward trend during 1990s, and then a sharp decline after 2000. The Joinpoint analysis identified the year 2000 as the turning point. Breast cancer incidence experienced a significant upward course from 1990 to 2000, rising 2.2 percent per year during the period (95 percent CI: 1.8 – 2.5). After peaking in 1999, a downward trend occurred from 2000 to 2004 when breast cancer incidence rates declined 3.8 percent a year for the period [95 percent CI: (-5.9) – (-1.8)].

Further analyses on age-specific breast cancer incidence trends were summarized in Table 1. For women aged 35-44, breast cancer incidence rates did not see a significant change, and for age group 75+, the increase was not significant, but the rate decline started as early as in 1998, declining 3.3 percent a year from 1998 to 2004. The greatest declines in breast cancer rates were observed in age groups 55-64 and 65-74 years. Both groups saw a yearly 6.6 percent decrease in breast cancer rates from 2001 to 2004.

The incidence of female breast cancer by race and ethnicity in Illinois

The breast cancer incidence rates were consistently higher in white women than in African American women and women of other racial groups (including American Indians, Asian or Pacific Islanders, and other unspecified) (Figure 3). Incidence rates in white women during 1991 to 1993 were about 20 percent greater than in their African-American counterpart. This incidence gap, however, was narrowed down to less than 3 percent in 2002 and 2003. The Joinpoint analysis indicated a slightly different temporal trend between whites and African Americans. While white women saw a minor increase in breast cancer incidence from 1990 to 2001 (APC = 0.5; 95 percent CI: 0.1 – 1.1), African Americans experienced a sharp rise during 1990 to 1998 (APC = 2.9, 95 percent CI: 1.4 – 4.3). A declining trend was observed for both white and African-American women. However, the decline in breast cancer incidence started in African-American women in 1998 [APC = (-2.2), 95 percent CI: (-4.1) – (0.2)], which was three years earlier than in white women [Join point = 2001; APC = (-5.2), 95 percent CI: (-8.6), (-1.8)]. The rate decline in white women was much sharper than in African-American women.

The breast cancer incidence for race group "Other" was consistently and significantly lower across the study period as compared to white and African-American women. The Joinpoint analysis showed a significant rise in breast cancer incidence over the study period (APC = 1.9, 95 percent CI: 1.1 – 2.7). No downward trend was seen for this racial group.

Compared to non-Hispanic white and African-American females, breast cancer incidence in Hispanic women was substantially lower across the study period and the

difference did not show any sign of narrowing (Figure 4). While the non-Hispanic white and African-American women shared the similar incidence trends with the overall white and African-American females, the Hispanic women's breast cancer incidence rose sharply from 1990 to 1997 (APC = 5.6, 95 percent CI: 2.4 – 8.9), and then declined from 1997 to 2004 [APC = (-4.4), 95 percent CI: (-6.8) – (-2.0)]. The Joinpoint analysis suggested that the turning point in breast cancer incidence for Hispanic women was in 1997, which was a year earlier than that for non-Hispanic African Americans and four years earlier than that for non-Hispanic white women.

Female breast cancer incidence by SES in Illinois

Breast cancer incidence by SES was presented in Figure 5. Overall, there was a reverse relationship between the incidence rates and the SES level. Except for the Low SES group, three other SES groups all demonstrated a significant temporal trend: breast cancer incidence rose during early and middle 1990s, peaked around 2000, and then declined sharply. Joinpoint analysis results were: High SES: 1990 – 1999, APC = 1.2 (95 percent CI: 0.4 – 2.1); 1999 – 2004, APC = (-4.1) [(-6.0) – (-2.1)]; Up-middle SES: 1990 – 2001, APC = 0.86 (0.3 – 1.4); 2001 – 2004, APC = (-4.3) [(-7.8) – (-0.7); and Middle SES: 1990 – 2001, APC = 0.6 (0.1 – 1.1); 2001 – 2004, APC = (-5.4) [(-8.6) – (-2.0)]. There was no identifiable trend for the Low SES group.

Breast cancer incidence by region in Illinois

Breast cancer incidence varied greatly by the level of urbanity. The highest rates were observed in Suburban (five collar counties), followed by Small Urban and Urban (Cook County). The breast cancer rate was the lowest in Rural (Figure 6). The rate differences among four groups were narrowed noticeably over the study period. The 2002 and 2003 rates for Suburban and Small Urban were almost identical. The breast cancer incidence in Suburban was flat during 1990 and 2001, but had a sharp decline since 2001 [APC = (-6.1), 95 percent CI: (-11.2) – (-0.7)). We also observed a significant rise in breast cancer incidence in Urban before 2000 (APC = 0.5, 95 percent CI: 0.1 – 1.0), in Small Urban before 2001 (APC = 1.0, 95 percent CI: 0.4 – 1.7), and in Rural before 1999 (APC = 1.7, 95 percent CI: 0.5 – 2.8). A significant decline in incidence was seen for Urban [APC = (-4.2), 95 percent CI: (-6.2) – (-2.3)]. To certain extent, declines in breast cancer incidence in Small Urban and Rural also were appreciable, but not statistically significant.

Discussion

Consistent with the national data, breast cancer incidence among Illinois women 50 years or older rose in the early and middle 1990s, peaked around 1999-2001, and then declined afterwards. These trends were seen among white women, African-American women, and Hispanic women, and across most of the SES and urbanity levels.

Some variations in breast cancer incidence among different groups of race, ethnicity, SES, and urbanity were noticed, but the differences narrowed down over the period 1990-2004. The differences between white and African-American women in

breast cancer rates were less than 3 percent in recent years. Nevertheless, they were still apparent among certain SES and urbanity groups by 2004.

Many studies have examined the rise in breast cancer incidence. Most authors have concluded that the long history of increasing incidence for breast cancer suggests that artifacts, including those caused by screening, are likely to explain part of the trends.[10] According to the National Health Interview Survey, between 1987 and 1990, the percentage of women older than 40 years who reported having an annual mammographic examination increased nearly twofold, from 17 percent to 33 percent. Although the rate of increase in mammography use leveled off during the 1990s, biennial mammography use continued to increase to 67 percent in 1998,[11] and to 76.6 percent in 2006 (www.statehealthfacts.org). The upward trend observed in the present study for invasive breast cancer incidence among Illinois women during the 1990s could be partly due to the increased screening practice. As the incidence of breast cancer in situ correlates with the screening rate, an examination of 1990 to 2004 in situ breast cancer incidence among Illinois women demonstrated a steady rise during the 1990s, but the rising trend stagnated since 2000. These data suggested that mammography screening might have played a role in the rise of breast cancer incidence in Illinois in the 1990s. The increased use of hormone replacement therapy (HRT) during the 90s might also be attributable to the upward trend.[12] But the HRT prescription data for Illinois women were not available and its impact on the breast cancer incidence could not be evaluated in this report.

Many factors have been associated with increasing risk of female breast cancer, including aging, genetic disposition, family or personal history of breast cancer, and lifestyle-related factors such as later age at first birth, nulliparity, oral contraceptive use,

and HRT (www.cancer.org). Lack of individual-level data limited our ability to explore these hypotheses.

Because of the highly publicized reports from the Women's Health Initiative, which reported an increased breast cancer risk in women who used the estrogen-progestin combination therapy, the use of HRT had decreased by 38 percent in the United States, with approximately 20 million fewer prescriptions written in 2003 than in 2002.[7] Some authors have postulated that discontinuation of HRT could have caused a decreased incidence of breast cancer as there is a similar declining time course between breast cancer incidence and the use of HRT.[7;13] In a recent ecologic study of HRT and breast cancer incidence, Clarke, Glaser, Uratsu, Selby, Kushi, and Herrinton have shown a correlation between breast cancer decline and reduced HRT usage, thus suggesting a short latency may be possible between hormone replacement therapy discontinuance and reduced risk.[13] Other possibilities for the decline include a drop in mammography rates, the use of the selective estrogen receptor modulators such as raloxifene and tamoxifen, and the growing use of nonsteroidal anti-inflammatory agents and statins, which also may be preventive of breast cancer.[14]

In spite of the fact that screening usually leads to an increase in incidence for screened disease, a decrease in incidence also is expected in a heavily screened population, as seen for prostate cancer. The prostate cancer incidence peaked in 1992 in whites and 1993 in African Americans after a long period of steady increase, it was attributed largely to screening practice.[8] Using SEER data, Ravdin, et al[7] have demonstrated that the decline in breast cancer incidence was only seen for estrogen-receptor-positive tumors, which are more likely to be detected on mammography.[15] It is

plausible that the continued high rates of mammography may have in fact contributed to the recent incidence decline.

Alternatively, our data clearly showed that breast cancer incidence peaked around 2000, two years before the 2002 reports of HRT and breast cancer risk from the Women's Health Initiative trial. In addition, Connelly, Richardson and Platt[16] have reported that the greatest use of HRT (24 percent) occurred among menopausal women age 50 to 54 years. In the present study, we found that the greatest decline in breast cancer incidence occurred in women aged 55-64 and 65-74 years, not in the heaviest HRT use group. Thus, given the postulated short latency, the reduced use of HRT is unlikely the only primary reason for the breast cancer incidence decline among Illinois women. It is possible that increased screening in the 1990s helped identify many early stage cases that would be diagnosed late if not screened, leading to breast cancer incidence peaking in the late 1990s when the prevalence of mammography reached high levels. For example, recent data have shown that in 2006, Illinois women age 40 and older who report having had a mammogram within the last two years reached to 74.6 percent (statehealthfacts.org). The further decline in breast cancer incidence after 2002 might be largely due to the decreased HRT use.

Breast cancer rates have been shown to vary by race and ethnicity, with the highest incidence seen in white women, followed by African-American women, Asian American/Pacific Islanders, Hispanics/Latinas, and American Indians/Alaska Natives.[17] The present report only examined the breast cancer temporal trends for white, African-American, and Hispanic women. Our results are consistent with the national data. However, we noticed that the incidence gap between white and African-American

women has narrowed down substantially in recent years. It is of interest to note that breast cancer incidence peaked in African-American women in 1998, while in 2001 for white women. Additionally, white women had a much sharper rate decline than African-American women after peaking.

Although African-American women have been reported less likely to receive adequate mammographic screening than white women,[18] by 2003, the usage of mammography is similar among whites and African Americans (71 percent vs. 70 percent).[17] The sharper incidence decline in white women might be due to the fact that, before the Women's Health Initiative reports, white women were more likely to use HRT than other races,[16] thus the HRT use reduction after 2002 would have a greater impact on breast cancer incidence in white women.

It has been long noted that breast cancer is associated with SES. Women with high SES have a greater risk for breast cancer than those with low SES. High SES is associated with other established breast cancer risk factors, including lower parity and later age at childbearing.[19;20] Marin County, California, one of the richest counties in the United States has been called "the breast cancer capital of the world" and the average incidence rates in Marin County were 72 percent higher than in other urban California counties (Clarke CA, 2002).[21] Lower SES levels also were found to be associated with higher breast cancer incidence in Illinois women. From 1990 to 1999, the breast cancer incidence was 5 percent to 11 percent higher in the High SES group as compared to the Up-middle SES group. However, this difference was no longer evident since 2000 and the rates between them were almost identical in 2003 and 2004. Nevertheless, relative to

the Middle SES, rates in the High and Up-middle SES were still 3 percent to 7 percent higher. Rates in the Low SES were unstable due to small sample size.

The reducing disparity in Illinois' female breast cancer incidence among different SES groups is noteworthy and encouraging. It may suggest that the differences among the SES groups in factors affecting the breast cancer incidence, such as mammography use, HRT treatment, and breast cancer related life-style factors, have been diminishing, probably as a result of increased awareness of breast cancer risk among all SES groups and the promotion of mammograms and breast exams among women with low SES by programs such as Illinois Breast and Cervical Cancer Program, which provides access to free screenings for breast cancer to uninsured Illinois women older than the age of 40. So far, 78,000 women in Illinois have already received free screenings (cancerscreening.illinois.gov/). In addition, the Illinois Project for Local Assessment of Needs (IPLAN) has been in place since 1990. The IPLAN is a community health assessment and planning process that is conducted every five years by local health jurisdictions in Illinois (app.idph.state.il.us/). Many county health departments have identified breast cancer as one of their top priorities, providing the county residents with increased access to screening and education on breast cancer risk. These measures could have contributed to the decreasing disparity in breast cancer incidence among SES groups. It should be noted that since the percentage poverty line at county level was used as a surrogate measure of individual SES, further investigation with direct measure of SES from the cases is needed to confirm the diminishing trend between SES groups and breast cancer incidence.

As discussed earlier, white women had the highest breast cancer incidence. However, we noted in our data that, although with 95.7 percent of the population being white, the rural counties had consistently the lowest incidence rates of breast cancer. In contrast, Urban (Cook County) and Suburban (collar counties) have the most diversified population but it experienced the sharpest decline in breast cancer incidence. The Collar County had consistently the highest rates throughout the 90s. They fell more sharply and were lower than Small Urban after 2002. Similar to the rate convergence observed among SES groups, the variation of breast cancer incidence among ISCR defined population density groups also was narrowed down in the recent years to about 8 percent, with Urban and Rural having the rate of about 115/100,000 and Suburban and Small Urban of 124/100,000.

Variations in breast cancer incidence of different urbanity levels also might be attributable to their difference in screening rates. As data for female breast cancer diagnosed in the in situ stage that correlates highly with mammography screening usage, we present the percentage distribution of breast cancer in situ diagnosis in Table 3. Among all four ISCR defined population density groups, the percentages of in situ diagnosis had increased consistently, almost doubled from around 10 percent in 1990 to more than 20 percent in 2004 for all groups except Rural. Since 2000, the gap in percentage of breast cancer in situ diagnosis was closing among Suburban, Small Urban, and Urban, but there were still appreciable differences between them and Rural, suggesting a relatively low screening rate for Rural. Efforts promoting screening for breast cancer in Rural are therefore justified. Variations in the environmental and other modifiable breast cancer risk factors among ISCR defined population density groups also

could contribute to the breast cancer incidence difference but they are beyond the scope of this descriptive report.

In conclusion, this report examined invasive breast cancer incidence among Illinois women over the period of 1990 to 2004. Overall trends in Illinois incidence rates of breast cancer were consistently similar to those with SEER 9 Registries. Among Illinois women older than 50 years, breast cancer incidence had gone through an upward course during the 1990s, peaked in African-American women in 1999 and white women in 2001, and then a downward trend occurred. Increased breast cancer incidence was associated with high SES and the suburban setting. Breast cancer incidence in Hispanic women was significantly lower than in white and African-American women. Continued surveillance at population level to monitor breast cancer incidence is therefore warranted.

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Table 1. Age-specific invasive breast cancer incidence trends among Illinois women 1990 – 2004: Results from Joinpoint regression analysis

Age Group	Period I	APC[1] (95 percent CI)	Period II	APC[1] (95 percent CI)
35 - 44	1990 - 2004	-0.3 (-0.8, 0.2)	n/a	n/a
45 - 54	1990 - 1999	**1.0 (0.2, 1.9)[2]**	1999 - 2004	**-3.0 (-4.7, -1.2)**
55 - 64	1990 - 2001	**2.1 (1.5, 2.8)[2]**	2001 - 2004	**-6.6 (-10.7, -2.3)[2]**
65 - 74	1990 - 2001	0.4 (-0.1, 1.0)	2001 - 2004	**-6.6 (-10.6, -2.4)[2]**
75+	1990 - 1998	1.2 (-0.1, 2.5)	1998 - 2004	**-3.3 (-5.1, -1.4)[2]**

[1] APC: Annual Percentage Change

[2] Indicates statistical significance ($p < 0.05$)

Table 2. Breast cancer in situ incidence in Illinois women, 1990 – 2004 (1/100,000)

Year of Diagnosis	Incidence Rate[1]
1990	13.8
1991	16.0
1992	17.4
1993	16.8
1994	17.6
1995	20.1
1996	22.2
1997	23.8
1998	27.5
1999	27.2
2000	30.5
2001	30.9
2002	28.9
2003	28.4
2004	30.4

[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.

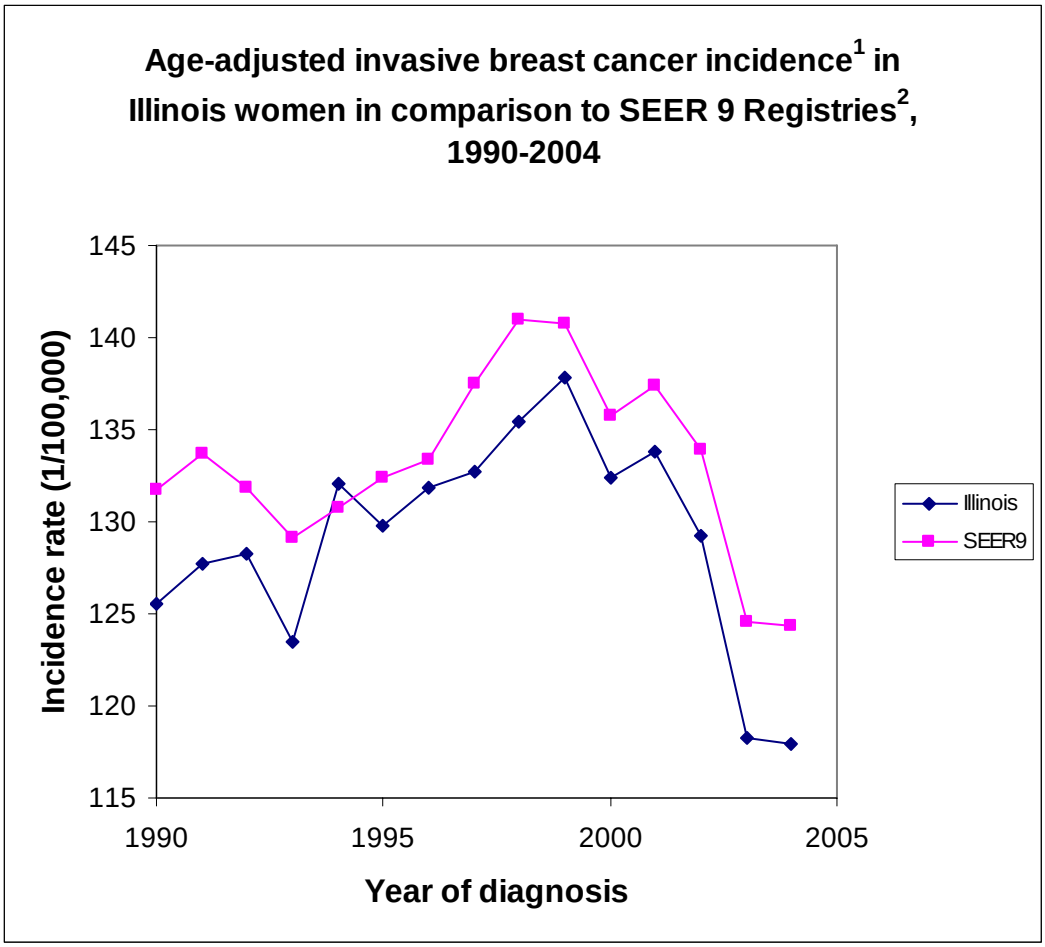
Table 3. Percentage distribution of breast cancer in situ diagnosis by ISCR[1] defined population density group,[2] 1990 – 2004

	Illinois	Urban	Suburban	Small Urban	Rural
1990	9.5	8.7	10.2	11.5	9.1
1991	10.7	10.3	11.6	11.2	10.2
1992	11.4	10.5	14.2	12.1	10.6
1993	11.4	11.4	12.1	12.5	9.6
1994	11.4	11.2	12.1	13.0	9.6
1995	13.0	12.8	14.8	13.9	11.2
1996	14.0	14.5	15.5	13.8	11.4
1997	14.8	15.2	16.7	13.6	13.2
1998	16.4	16.2	17.6	18.3	14.2
1999	16.2	15.7	18.0	18.2	13.3
2000	18.3	19.0	20.5	18.8	13.9
2001	18.4	18.3	20.7	19.1	14.7
2002	18.0	18.1	19.4	19.4	14.7
2003	19.1	18.9	21.3	19.9	16.2
2004	20.2	20.4	21.2	21.5	17.3

[1] ISCR: Illinois State Cancer Registry

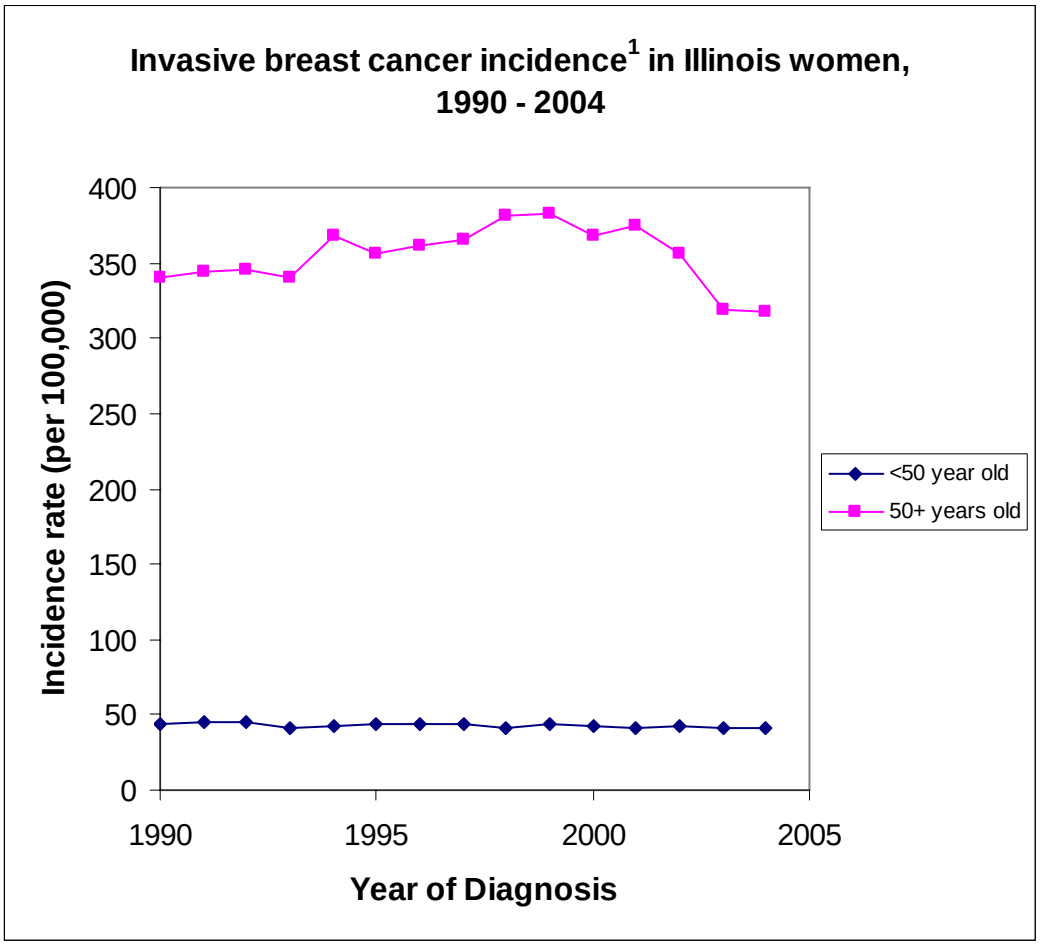
[2] ISCR defined population density grouping system is based on population density, rate of growth, and Beale codes. Of note, suburban consists of the five collar counties (Lake, McHenry, DuPage, Will, and Kane) and urban consists of Cook County.

Figure 1



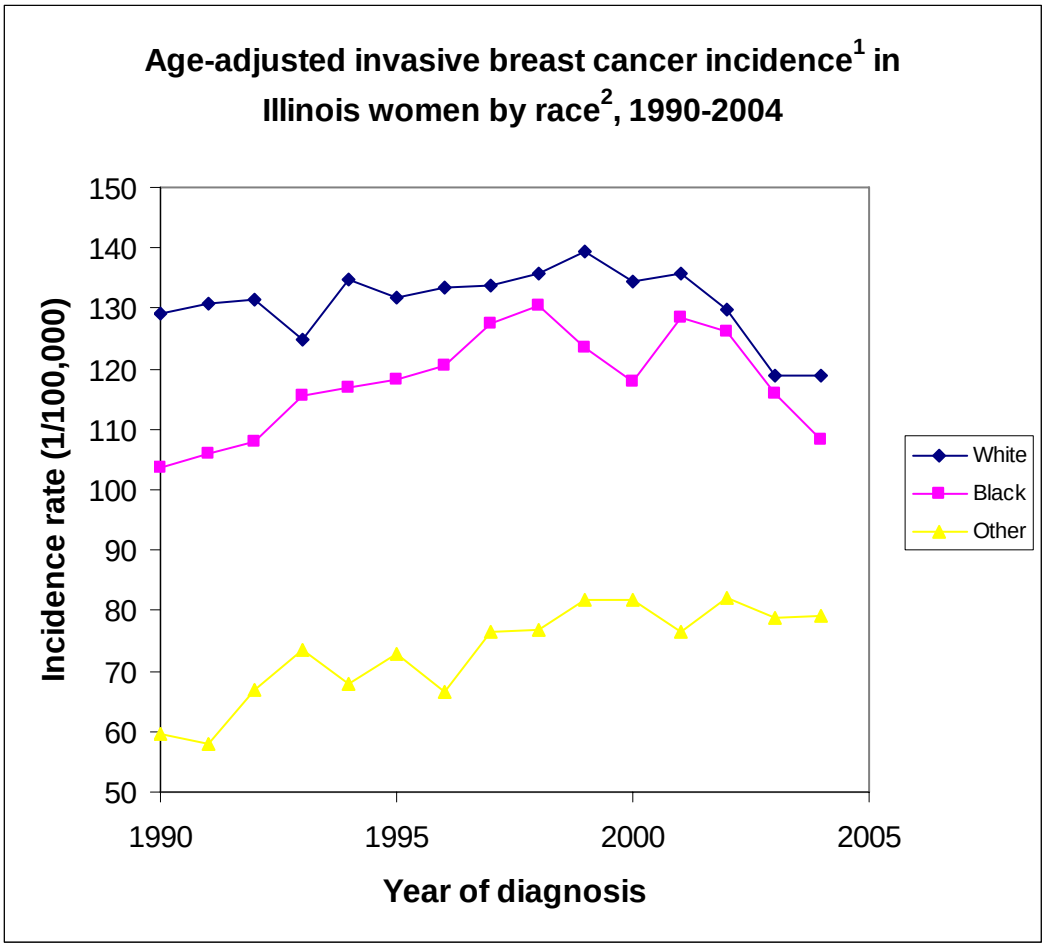
[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.
[2] SEER 9 registries are Connecticut, Iowa, New Mexico, Utah, Hawaii, Detroit, San Francisco-Oakland, Atlanta, Seattle-Puget Sound.

Figure 2



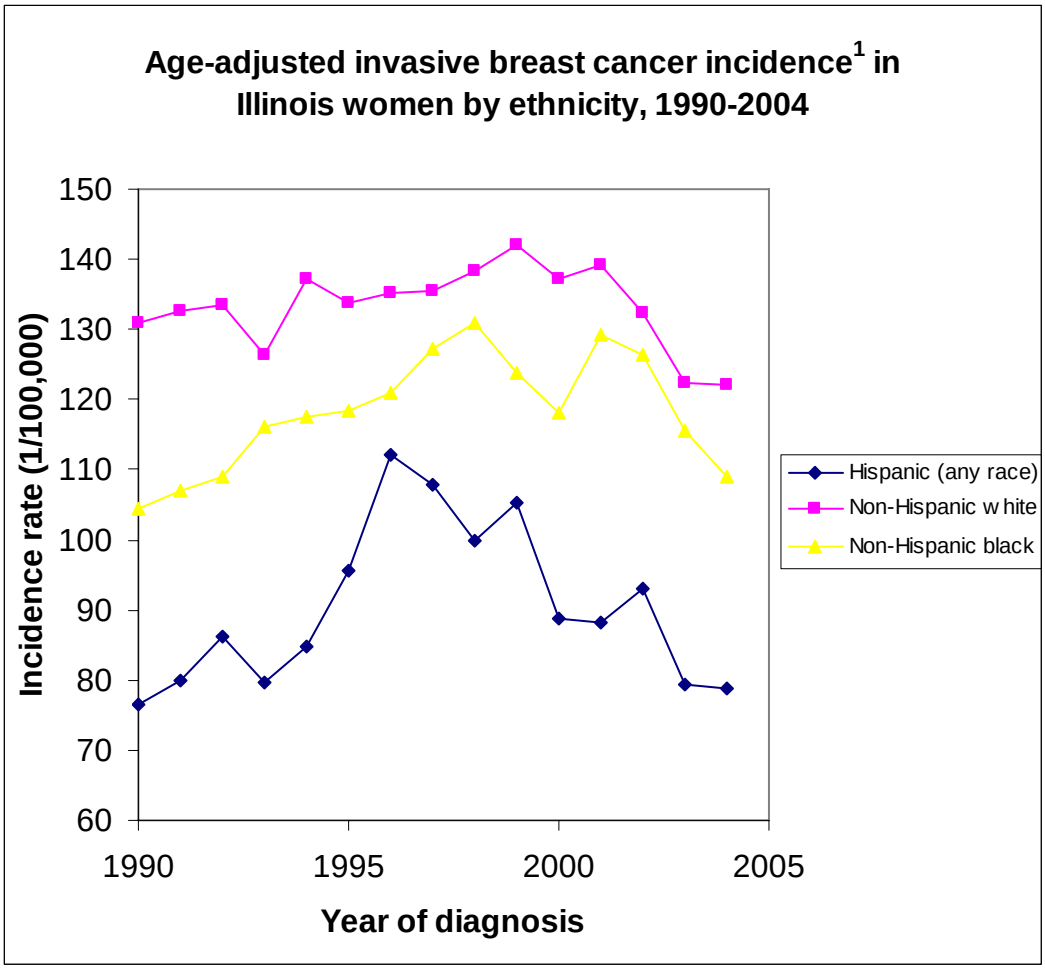
[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.

Figure 3



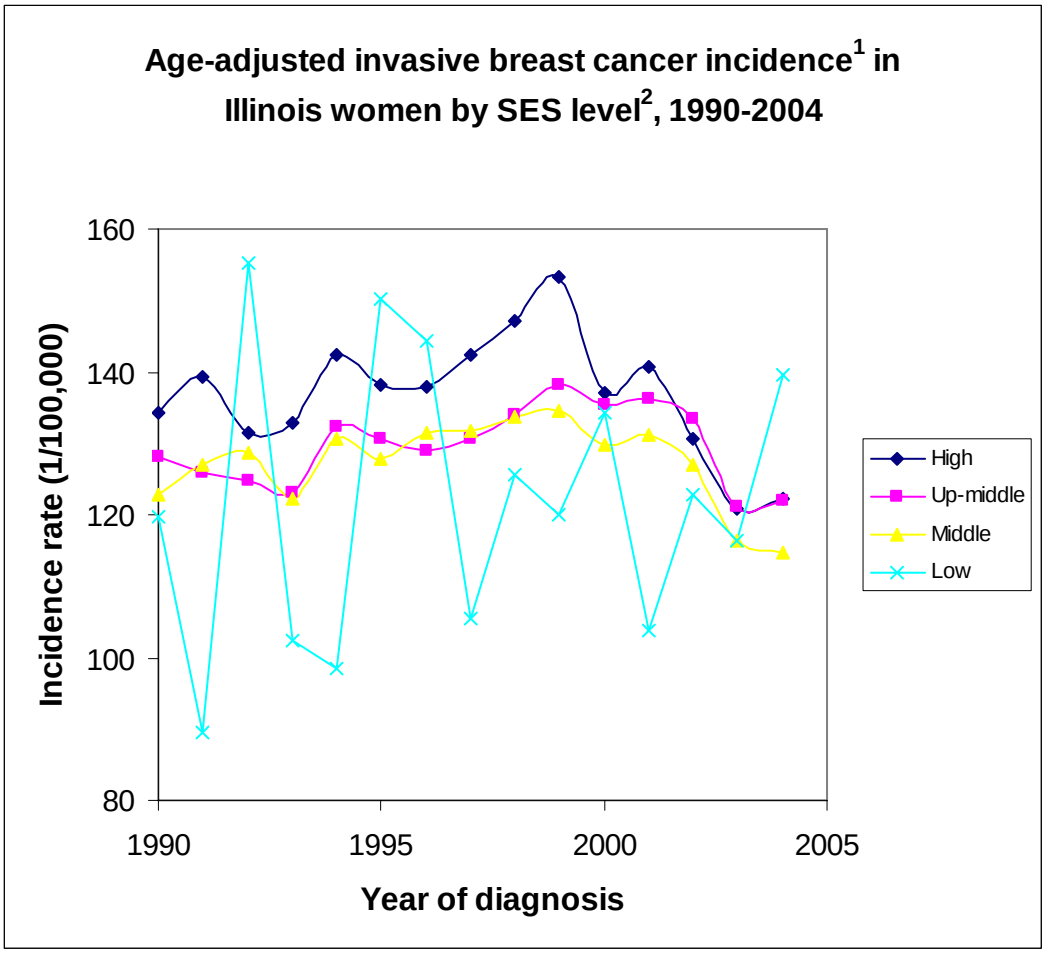
[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.
[2] Other race includes American Indians, Asian or Pacific Islanders, and other unspecified.

Figure 4



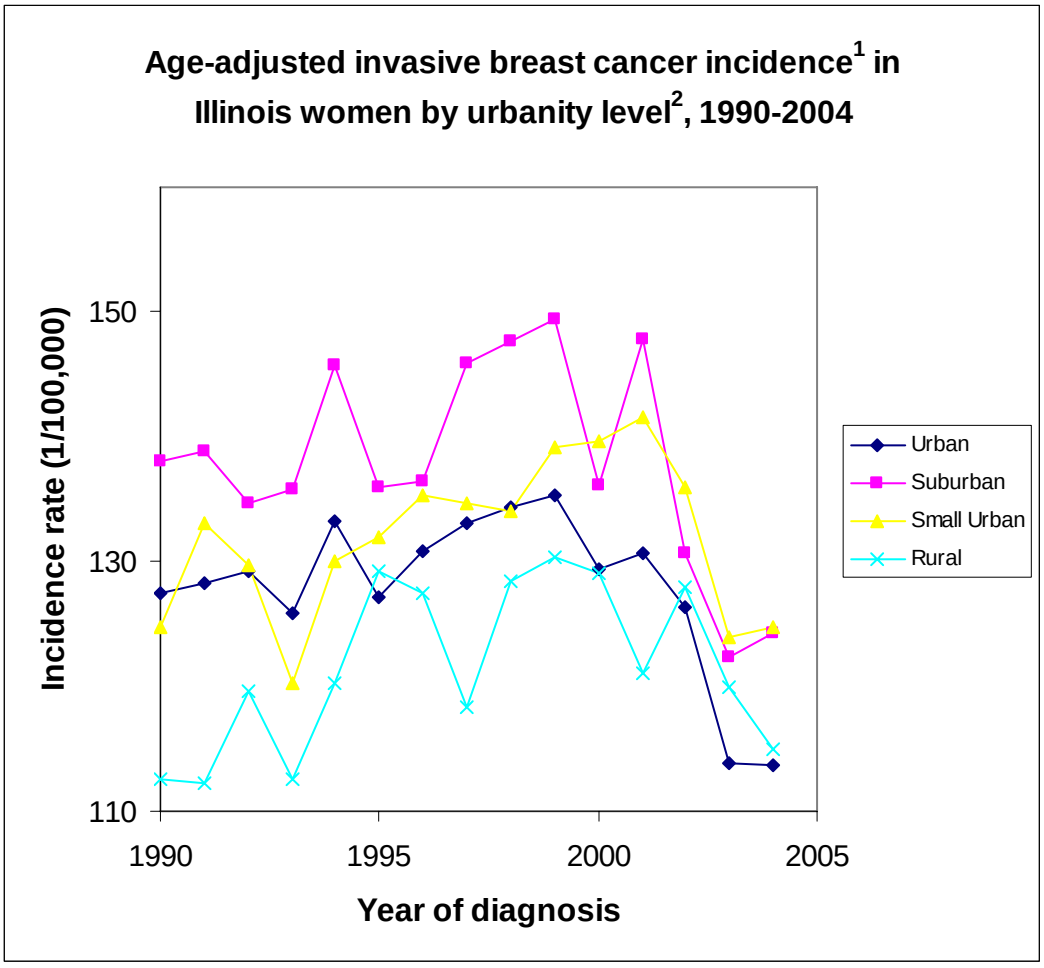
[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.

Figure 5



[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.
[2] SES level is defined as high, up-middle, middle, or low if a case resided in a county with percent of persons below poverty line is <5, 5-9.9, 10-19.9, or ≥20, correspondingly.

Figure 6



[1] Rates are per 1,000,000 and are age-adjusted to the 2000 U.S. standard population.
[2] Urbanity level is defined using the Illinois State Cancer Registry (ISCR)'s population density grouping system that is based on population density, rate of growth, and Beale codes.