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Jennifer V. Campbell, M.S.P.H., and Tiefu Shen, M.D., Ph.D

Mammography Surveillance Indicator
Breast Cancer *in situ* Incidence in Illinois Females, 1986 to 1997

Mammography can identify breast cancer in its earliest, most curable stage of development. The *in situ* stage classification is assigned when the tumor is small and has not spread to the surrounding breast tissue. Surveillance of breast cancer *in situ* can be used to determine the prevalence of mammographic screening in a geographic area. An increase in the incidence rate of these early tumors, combined with a decline in the rate for more advanced tumors, indicates that tumors are being detected earlier. Early diagnosis followed by appropriate treatment can have a positive impact on reducing breast cancer mortality rates. This surveillance indicator can be calculated for intervention trials, small geographic areas, or even diagnostic facilities and compared with the state rate. It can be a useful indicator even in the absence of population denominator data.

Table 1 shows the number of cases of breast cancer *in situ* diagnosed from 1986 to 1997.

Table 1 **Number of Breast Cancer *in situ* Cases, Females, Illinois, 1986-1997**

	1986	1987	1988	1989	1990	1991	1992	1993	1994 *	1995 *	1996 *	1997 *
All Women	541	582	700	689	785	918	1,004	981	1,063	1,212	1,338	1,430
Race												
White	494	535	625	632	716	816	899	863	931	1,047	1,118	1,198
Black	36	37	53	39	54	72	83	97	97	110	144	148
Asian/other	3	3	14	8	7	12	13	14	18	21	28	30
Ethnicity												
Hispanic	n/a	n/a	n/a	10	18	10	17	33	25	43	41	41
Non-Hispanic	n/a	n/a	n/a	679	767	908	987	948	1,038	1,169	1,297	1,389

Source: Illinois Department of Public Health, December 1999
*Death certificate clearance instituted.

The age-adjusted incidence rates of breast cancer *in situ* among Illinois women are shown in Table 2. Since the completeness of the Illinois State Cancer Registry has increased steadily since its inception, from an estimated 86 percent

in 1986 to 99 percent in 1997, rates in earlier years are likely to have been higher than presented here. Therefore, the observed increase in Illinois is partially attributable to improved reporting to the state cancer registry. Since 1986, the first year statistics were available for Illinois, the incidence of breast cancer *in situ* appears to have increased from 8.6 cases per 100,000 to 20.2 cases per 100,000 in 1997.

To account for the increase in registry completeness in the trend analysis, incidence rates were adjusted for estimated percent completeness. These adjusted rates were used in the calculation of estimated annual percentage change (EAPC). As shown above, Illinois women in all race groups had a 6.2 percent per year increase in the incidence of breast cancer *in situ*, which was statistically significant ($p<0.05$). The last column demonstrates that women of all race groups represented in the SEER program experienced a significant increase of 5.7 percent per year ($p<0.05$).

White women in Illinois had a 5.5 percent annual increase of breast cancer *in situ* incidence, while white women in SEER had a 5.3 percent per year increase. Both of these increases were statistically significant at $p<0.05$.

There was a 11.1 percent annual increase in the incidence of breast cancer *in situ* among black women in Illinois, which was statistically significant ($p<0.05$), while among black women in the SEER program there was a 8.1 percent statistically significant increase ($p<0.05$).

An EAPC was not calculated for Asian/other women due to the low case count from 1986-1993. Within SEER, Asian/other women experienced a 6.8 percent annual increase in breast cancer *in situ* incidence, which was statistically significant at $p<0.05$.

An EAPC was not calculated for Hispanic women in Illinois due to the low case count in 1989 and 1991. Non-Hispanic women in Illinois had a statistically significant 5.7 percent annual increase. Information on Hispanic ethnicity is not available in SEER.

Table 2 Breast Cancer *in situ* Age-adjusted Incidence Rates* and Estimated Annual Percentage Change^ (EAPC), by Race and Ethnicity, Females, Illinois and SEER,^^ 1986-1997

													EAPC	
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Illinois§	SEER
All Women	8.6	9.3	10.9	10.7	11.8	13.7	14.9	14.6	15.4	17.3	19.0	20.2	+6.2**	+5.7**
Race														
White	9.1	10.1	11.4	11.6	12.8	14.4	15.7	15.2	15.9	17.7	19.0	20.2	+5.5**	+5.3**
Black	4.7	4.8	6.6	4.8	6.4	8.8	9.6	11.1	11.0	12.4	15.8	16.2	+11.1**	+8.1**
Asian/other	^	^	^	^	^	^	^	^	9.2	11.4	14.2	12.9	^	+6.9**
Ethnicity														
Hispanic	n/a	n/a	n/a	^	6.6	^	6.2	10.7	8.4	13.9	10.1	11.3	^	n/a
Non-Hispanic	n/a	n/a	n/a	11.0	12.0	14.2	15.3	14.7	15.7	17.6	19.4	20.7	+5.7**	n/a

Sources: Illinois Department of Public Health, December 1999; Surveillance, Epidemiology and End Results (SEER) program, August 1999

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

^Estimated annual percentage change (EAPC) was determined by fitting a regression line to the natural logarithm of the rates using calendar year as a regression variable, i.e., $y= mx + b$ where $y= \ln(\text{rate})$ and x = calendar year. The EAPC was calculated as $100*(e^m - 1)$. The null hypothesis stated that the slope of the line in the above equation was equal to zero or that the rate was not changing.

^^The SEER program designates nine U.S. geographic areas to monitor the impact of cancer in the general population.

§For the Illinois EAPC calculations, expected age-adjusted incidence rates for years the registry had less than 95 percent reporting completeness (1986-1993)were used.

**These data were statistically significant at $p<0.05$.

^Rates based on fewer than 15 cases were not calculated due to instability of the results.

The percentage of *in situ* breast tumors has risen during this 11-year period, from 7.5 percent in 1986 to 14.8 percent in 1997 (Table 3). This increase can be seen across all race and ethnicity groups and is an indication of improved early detection of breast cancer. It is also apparent that the gap in early detection between race and ethnic groups is narrowing. The percentage of cases diagnosed in the *in situ* stage in 1986 was 50 percent higher for whites than for blacks; this percentage difference decreased to 12 percent in 1997. Unlike incidence rates, the percentage of breast cancer *in situ* would not be affected by changes in registry completeness as long as reporting was consistent across cancer stages. An increase in the rate of early tumors, combined with a decline in the rate of more advanced tumors, will have a positive impact on reducing the rates of mortality for breast cancer.

Table 3 **Percentage of All Breast Cancer Cases Diagnosed in the *in situ* Stage, by Race and Ethnicity, Females, Illinois, 1986-1997**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
All Women	7.5	7.5	8.7	8.9	9.6	10.7	11.4	11.4	11.5	13.1	14.0	14.8
Race												
White	7.8	7.8	8.8	9.3	9.8	10.8	11.6	11.6	11.5	13.2	13.7	14.7
Black	5.2	5.3	6.5	4.9	7.0	8.6	9.5	10.1	10.0	10.8	13.3	13.1
Asian/other	4.6	3.8	17.1	8.7	8.4	14.1	12.0	12.8	17.7	14.2	18.7	17.2
Ethnicity												
Hispanic	n/a	n/a	n/a	5.8	9.5	5.3	8.1	13.3	10.1	14.8	13.1	12.2
Non-Hispanic	n/a	n/a	n/a	9.0	9.6	10.8	11.5	11.4	11.5	13.1	14.0	14.9

Source: Illinois Department of Public Health, December 1999

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