

# Stage at Diagnosis in Breast Cancer: Race and Socioeconomic Factors

## ABSTRACT

Cancer incidence data from three US metropolitan areas were coupled with census tract indicators of education and income. The data suggest that both Black and White cancer patients living in census tracts with lower median education/income values are diagnosed in later disease stages than are patients in tracts with higher median education/income values. Within education and income strata, Black women had a less favorable stage of disease at diagnosis than Whites. The exception was in upper education/income levels, where the disadvantage for Blacks disappeared. These data provide additional evidence that women of low socioeconomic status could benefit from targeted screening. (*Am J Public Health*. 1992;82:1383-1385)

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### Introduction

Breast cancer has the highest incidence of any cancers among both Black and White women,<sup>1</sup> with about 181 000 new cases expected in 1992.<sup>2</sup> Although the incidence is higher among White women, breast cancer mortality is substantially greater among Black women,<sup>3,4</sup> reflecting their poorer survival experience.<sup>3,5</sup> Survival has differed by income<sup>6</sup> and socioeconomic status level, even when stage adjusted.<sup>7</sup> Stage at diagnosis strongly influences breast cancer survival and, in the few studies investigating socioeconomic status and stage at diagnosis, women of lower socioeconomic status with breast cancer were more likely to be diagnosed at a later stage.<sup>8</sup> In comparisons between Black and White women, proportional differences of metastatic breast cancer have been the greatest with the largest differences in income.<sup>9</sup> When Black-White differences in socioeconomic status are small, there are small differences in the distribution of stage at diagnosis.<sup>10</sup> We extend these smaller studies with data from a large population-based set of tumor registry data to investigate the effect of socioeconomic status on Black-White differences in stage of disease at diagnosis and the impact that levels of socioeconomic status have on stage distribution within race.

### Materials and Methods

This study used the population-based incidence data, including stage of disease at diagnosis, from the US National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. The SEER Program collects information on all cases of cancer diagnosed among geographically defined subsets of the US population.<sup>1,11</sup> Median values for education and family income at the census tract level were obtained from the 1980 US census and matched with SEER data. Cancers diagnosed from 1978 to 1982 were included to center around the census. The San Francisco-Oakland, Detroit, and Atlanta metropolitan areas were used for two reasons: they are census tracted and therefore could be matched with census

tract indicators of socioeconomic status, and they have sufficiently large numbers of Blacks for analysis.

There were 18 113 White and 2861 Black cases of invasive breast cancer reported in the three areas during our study period that could be matched with a census tract (2.1% of the total number of breast cancers could not be matched). Of these, 187 cases were incidental diagnoses at autopsy or the only evidence of their breast cancer was the death certificate with no indication of a prior diagnosis. After excluding these cases, 17 949 invasive breast cancer and 917 in situ cases among White women, and 2838 invasive and 126 in situ cases among Black women, were available for analysis.

The median family income strata were chosen so that each had enough persons of each race for meaningful analysis; \$15 000 also was approximately twice the poverty level for a family of four in 1979.<sup>12</sup> Race-specific indicators of median education and family income were used because Whites and Blacks living in the same census tract may have different education and/or income distributions.

The in situ and localized disease stages used here are defined as confined to the site/organ of origin, with the former not being able to metastasize. Cases spread by direct extension to adjacent organs/structures or to regional lymph nodes are considered regional stage. Distant stage includes disease cases involving distant organs or lymph nodes either by direct extension or through discontinuous metastasis.<sup>13</sup> The "other" stage contains those cases that could not be staged from the information contained in medical records or were otherwise unclassified.

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**TABLE 1—Stage Distribution of Breast Cancers among Women, by Race and Census Tract Indicators of Education, Three Areas,<sup>a</sup> 1978 to 1982**

	In Situ		Localized		Regional		Distant		Other		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Under 12 y												
Black	48	(3.9)	466	(37.2)	529	(42.3)	180	(14.4)	29	(2.3)	1252	(100.0)
White	85	(4.3)	902	(45.7)	770	(39.0)	171	(8.7)	47	(2.4)	1890	(100.0)
High school												
Black	64	(4.3)	654	(43.8)	590	(39.5)	142	(9.5)	42	(2.8)	1492	(100.0)
White	455	(4.6)	4583	(46.0)	4007	(40.2)	694	(7.0)	221	(2.2)	9960	(100.0)
13 y and over												
Black	14	(6.4)	110	(50.0)	80	(36.4)	9	(4.1)	7	(3.2)	220	(100.0)
White	377	(5.4)	3429	(49.5)	2623	(37.8)	371	(5.4)	131	(1.9)	6931	(100.0)
Total												
Black	126	(4.2)	1230	(41.5)	1199	(40.4)	331	(11.2)	78	(2.6)	2964	(100.0)
White	917	(4.9)	8914	(47.2)	7400	(39.2)	1236	(6.6)	399	(2.1)	18 866	(100.0)

*Note.* The results of the Spearman rank-correlation test of association between education and stage of disease were as follows: Black,  $t = -5.92$ ,  $P < .001$ , and White,  $t = -6.32$ ,  $P < .001$ .  
<sup>a</sup>The three areas are San Francisco–Oakland, Detroit, and Atlanta.

**TABLE 2—Stage Distribution of Breast Cancers among Women, by Race and Census Tract Indicators of Income, Three Areas,<sup>a</sup> 1978 to 1982**

	In Situ		Localized		Regional		Distant		Other		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
<\$15 000												
Black	73	(4.1)	702	(39.8)	720	(40.8)	230	(13.0)	40	(2.3)	1765	(100.0)
White	88	(4.1)	968	(45.4)	850	(39.8)	171	(8.0)	56	(2.6)	2133	(100.0)
\$15 000– \$24 999												
Black	38	(3.1)	417	(42.9)	399	(41.0)	92	(9.5)	27	(2.8)	973	(100.0)
White	345	(5.7)	3425	(47.0)	2860	(39.2)	528	(7.2)	135	(1.9)	7293	(100.0)
\$25 000+												
Black	15	(6.6)	111	(49.1)	80	(35.4)	9	(4.0)	11	(4.9)	226	(100.0)
White	484	(5.1)	4521	(47.9)	3690	(39.1)	537	(5.7)	208	(2.2)	9440	(100.0)
Total												
Black	126	(4.2)	1230	(41.5)	1199	(40.5)	331	(11.2)	78	(2.6)	2964	(100.0)
White	917	(4.9)	8914	(47.2)	7400	(39.2)	1236	(6.6)	399	(2.1)	18 866	(100.0)

*Note.* The results of the Spearman rank-correlation test of association between education and stage of disease were as follows: Black,  $t = -4.02$ ,  $P < .001$ , and White,  $t = -3.86$ ,  $P < .001$ .  
<sup>a</sup>The three areas are San Francisco–Oakland, Detroit, and Atlanta.

To test the relationship between stage of disease at diagnosis and income/education, the Spearman rank-correlation coefficient was computed.<sup>14</sup>

## Results

Our data indicate that Black women with breast cancer are diagnosed at a later stage of disease than are White women. Only 45.7% of Black women diagnosed in the more curable localized and in situ stages compared with 52.1% of White

women (Table 1). Over 11% of the Black women and less than 7% of Whites had breast cancers that had already metastasized beyond localized or regional into distant stage.

Among both Black and White women, there is a tendency toward a less advanced stage with increasing educational level or income ( $P < .001$ ) (Tables 1 and 2). The percentage of cases with distant disease decreases with increasing educational level or income among women of both racial groups.

Black women in both of the two lowest educational strata and income strata had a poorer stage of disease at presentation than did White women. This pattern was not present in either the upper educational strata or the upper income strata. In each of these two strata, Black women had a slightly better stage of disease at diagnosis than did White women.

The incidence of breast cancer is higher among both Black and White women in the upper education and income categories (Tables 3 and 4). This appears largely due to higher rates in the in situ and localized stages. In the distant stage, however, the pattern is the opposite for both races: incidence decreases with increasing education and income. The differences between educational and income strata are more striking among Black women.

## Discussion

The association between female breast cancer stage at diagnosis and socioeconomic status gives credence that those of lower income/education are less likely to participate in breast cancer early detection. This lack of participation is further supported by 1987 National Health Interview Survey findings.<sup>4,15</sup> People in lower income/education strata were less likely to have had a screening mammogram within the past year (9.2% with incomes of less than \$10 000, 20.9% with incomes of more than \$35 000) and were less likely to have heard of the test (24.6% vs 5.9%). Thus, it appears that the most immediate and practical implication of this investigation's results is that cancer screening programs are especially appropriate in populations of lower socioeconomic status, particularly among Blacks.

Offering breast cancer screening programs to those of lower socioeconomic status and Blacks is not without challenges, however. Women of lower socioeconomic status have less access to preventive and medical care, and asymptomatic persons of lower socioeconomic status may not make optimal use of preventive health services.<sup>16–19</sup> Among Blacks, there may be even less use of the medical system, as compared with Whites.<sup>20</sup> Office visit and screening procedure costs are reported barriers by many Black women,<sup>21</sup> as are physicians' failure to discuss mammography with women and women's perceptions of breast cancer and screening.<sup>22</sup> This complex assortment of challenges requires that early detection barriers of a population be precisely identified to design and maximize effective interventions. □

**TABLE 3—Age-Adjusted (1970 US Standard) Incidence Rates of Breast Cancers per 100 000 Women, by Stage, Education, and Race, Three Areas,<sup>a</sup> 1978 to 1982**

	In Situ Rate	Localized Rate	Regional Rate	Distant Rate	Other Rate	Total Rate
Under 12 y						
Black	2.5	26.1	29.0	9.8	1.3	68.7
White	4.6	36.8	32.6	7.5	2.1	83.6
High school						
Black	3.3	33.6	30.4	7.4	2.3	76.9
White	4.4	42.0	36.8	6.1	1.8	91.1
13 y and over						
Black	4.9	42.3	28.9	4.1	2.6	82.7
White	6.0	52.5	40.5	5.7	1.9	106.6
Total						
Black	3.2	31.2	30.1	8.2	2.0	74.7
White	4.9	45.4	37.8	6.1	1.8	96.1

<sup>a</sup>The three areas are San Francisco–Oakland, Detroit, and Atlanta.

**TABLE 4—Age-Adjusted (1970 US Standard) Incidence Rates of Breast Cancers per 100 000 Women, by Stage, Income, and Race, Three Areas,<sup>a</sup> 1978 to 1982**

	In Situ Rate	Localized Rate	Regional Rate	Distant Rate	Other Rate	Total Rate
<\$15 000						
Black	3.1	29.6	29.2	8.8	1.6	72.4
White	3.8	40.8	35.7	9.0	1.3	90.6
\$15 000–\$24 999						
Black	2.6	31.6	31.4	8.1	2.0	75.8
White	4.7	42.8	36.4	6.3	1.5	91.8
\$25 000+						
Black	5.6	41.1	26.4	4.6	4.4	82.0
White	5.2	47.7	39.2	5.6	2.1	99.8
Total						
Black	3.2	31.2	30.1	8.2	2.0	74.7
White	4.9	45.4	37.8	6.1	1.8	96.0

<sup>a</sup>The three areas are San Francisco–Oakland, Detroit, and Atlanta.

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