# Black/White Differences in Type of Initial Breast Cancer Treatment and Implications for Survival

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**Abstract:** The relation between race, type of initial treatment, and survival with breast cancer were investigated using 36,905 cases reported to nine registries in the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute in the years 1978–82 and followed for survival through 1984. Using the crude treatment categories of surgical/nonsurgical/untreated, Blacks were found to have received less aggressive therapy. They were more likely than Whites to be treated nonsurgically (OR = 1.4; 95% CI = 1.2–1.7) or have no cancer-directed therapy (OR = 1.7; 95% CI = 1.3–2.3), even after adjusting by logistic regression for differences in age, stage, and histology. These treatment variables strongly affected five-year survival, after adjusting for age, stage, race, and histology. This finding of racial differences in survival-associated treatment patterns demonstrates the need to consider treatment variables in studies of race and cancer survival. (*Am J Public Health* 1987; 77:1515–1517.)

## *Introduction*

Decreased survival of Black patients with breast cancer relative to White patients has been reported in a number of recent publications.[1–4] Several factors have been implicated as contributing to this racial survival difference. Black patients have consistently been diagnosed at a more advanced clinical stage than Whites.[1,4,5] Socioeconomic factors have been reported as mediating some of the racial differences.[5] Tumor differentiation and hormone receptor status have been noted to differ in the two racial groups.[6] However, treatment differences have received little attention.

We have noted racial differences in the type of breast cancer treatment reported by registries in the SEER program; the potentially curative modality of surgery was reported less frequently for Black patients, and both non-surgical treatment and no treatment were reported more frequently in Black patients.

We sought to answer the question of whether there continued to be a Black/White difference in treatment after adjusting for age, tumor stage, and histology. If race is an independent factor in predicting general treatment type, is this difference in treatment likely to play a role in the Black/White survival differential? The answers to these questions may influence the direction of efforts to increase breast cancer survival in Black patients.

## *Methods*

This study was based on data from 36,905 Black and White (Caucasian) female breast cancer patients diagnosed January 1978 through December 1982; the data were collected by nine population-based tumor registries* participating in the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute. Only patients with newly-diagnosed breast cancer as a single or first primary tumor were considered. Rural Blacks were somewhat underrepresented in this sample of 38,898 selected cases.

Excluded were 1,993 cases diagnosed only by death certificate or autopsy report, cancers involving tissues other than the breast gland itself (sarcomas, sweat gland tumors, bone tumors, carcinoids, skin tumors, and Paget's disease), cases without microscopic confirmation, and patients with either unknown first course of therapy or unknown follow-up for survival.

First course of therapy is determined in the SEER registries by review of hospital, clinic, radiation therapy facility, private laboratory, private practitioner, and nursing home records for therapy received after diagnosis. Treatment variables collected in SEER include, both singly and in combination, the modalities of surgery, radiation, chemotherapy, hormonal therapy, biological response modifiers, and other therapies. These were combined in this study into three general treatment types: surgical (with or without other types of therapy); non-surgical (any of the other types of therapy, singly or in combination); and untreated (no recorded cancer-directed therapy). Even though these categories represent only a crude indicator of therapy, we felt that limitations of the diagnostic and treatment data did not permit a thorough evaluation of multiple specific treatment programs.

Cases are routinely followed by the SEER registries for outcome after diagnosis; follow-up data are available through December 1984, an average of approximately five years after diagnosis.

Data on extent of disease at diagnosis were summarized to correspond to stages I through IV as described in the American Joint Committee Manual for the Staging of Cancer.[7] After considering the age distribution of the cases, age at diagnosis was grouped into five categories; under 50, 50–59, 60–69, 70–79, and 80 and over. After considering the distribution of histologic types, these were grouped into four categories: ductal, medullary, lobular, and other (mostly unspecified carcinomas and adenocarcinomas).

Pathologic grade was not available for the large majority of cases; hormone receptor and socioeconomic status information were not collected.

Regression analyses were done using the PROC LOGIST procedure available through SAS Institute, Inc.[8]

## *Results*

The characteristics of the 36,905 cases which were analyzed are summarized in Table 1. The 1,993 excluded cases were more likely to be elderly, to have later stage disease, and to have "other" histologies, but were not more likely to be Black.

There were racial differences in the types of treatment given: Blacks were less likely to be treated surgically than

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*Atlanta, Connecticut, Detroit, Hawaii, Iowa, New Mexico, San Francisco-Oakland, Seattle, and Utah.

**TABLE 1—Characteristics of Study Cohort**

| Factor | Number | Per Cent |
|---|---|---|
| Race | | |
| White | 34219 | 92.7 |
| Black | 2686 | 7.3 |
| Age (years) | | |
| <50 | 8593 | 23.3 |
| 50–59 | 8529 | 23.1 |
| 60–69 | 9134 | 24.8 |
| 70–79 | 6853 | 18.6 |
| 80+ | 3796 | 10.3 |
| Stage | | |
| I | 4327 | 11.7 |
| II | 21383 | 57.9 |
| III | 4879 | 13.2 |
| IV | 2718 | 7.4 |
| unknown | 3598 | 9.7 |
| Histology | | |
| Ductal | 26406 | 71.6 |
| Medullary | 1235 | 3.3 |
| Lobular | 2881 | 7.8 |
| Other | 6383 | 17.3 |

Whites, and more likely to be untreated or to have nonsurgical treatment. The unadjusted odds ratio for Blacks having other than surgical treatment was 1.81 (95% CI = 1.57–2.08) compared to Whites.

However, several variables were potential confounders of these associations. Differences in race and treatment for various age, stage, and histology strata are given in Table 2. These comparisons show that Blacks tended to be younger at diagnosis than Whites, to be diagnosed at a later stage, and to have more medullary and "other" histologies. Certain groups were less likely to be treated surgically: older patients, those with more advanced stages, and those with "other" histologies.

Logistic regression was used to examine the relation of race to treatment, simultaneously adjusting for the potential confounding factors of age, stage, and histology. This showed that even after adjusting for these factors, Black patients were more likely than Whites to be untreated (odds ratio 1.7, 95% CI:1.3–2.3) and to be treated by non-surgical methods (odds ratio 1.4, 95% CI:1.2–1.7).

**TABLE 2—Race and Treatment Type vs Age, Stage, and Histology**

| Factor | % Black | % Non-surgical and No Treatment |
|---|---|---|
| Total | 7.3 | 5.6 |
| Age (years) | | |
| <50 | 10.9 | 3.9 |
| 50–59 | 7.5 | 5.4 |
| 60–69 | 6.4 | 5.5 |
| 70–79 | 5.2 | 5.9 |
| 80+ | 4.3 | 9.1 |
| Stage | | |
| I | 4.9 | 1.7 |
| II | 6.7 | 1.2 |
| III | 10.2 | 6.1 |
| IV | 11.2 | 39.1 |
| Unknown | 6.5 | 9.6 |
| Histology | | |
| Ductal | 6.8 | 4.0 |
| Medullary | 14.7 | 1.7 |
| Lobular | 4.9 | 4.2 |
| Other | 8.9 | 13.1 |
| Race | | |
| Black | | 9.1 |
| White | | 5.3 |

**TABLE 3—Adjusted Association of Race and Treatment; Stratified Analyses**

| Stratum | Black/White Odds Ratio for No Treatment/Surgery (95% CI) | Black/White Odds Ratio for Non-surgical/Surgery (95% CI) |
|---|---|---|
| Age (years) | | |
| Less than 50 | 1.4 (0.8–2.7) | 1.2 (0.8–1.7) |
| 50–79 | 1.4 (0.9–2.1) | 1.4 (1.1–1.7) |
| 80+ | 2.6 (1.5–4.7) | 2.6 (1.5–4.6) |
| Stage | | |
| I–II | 2.3 (1.4–4.0) | 2.2 (1.4–3.3) |
| III–IV, unstaged | 1.5 (1.0–2.1) | 1.5 (1.2–1.8) |
| Registry | | |
| Atlanta | 3.2 (1.6–6.5) | 2.4 (1.6–3.8) |
| Connecticut | 1.9 (0.9–4.4) | 1.5 (0.8–2.7) |
| Detroit | 1.3 (0.7–2.3) | 1.4 (1.0–1.9) |
| San Francisco-Oakland | 1.6 (0.9–2.8) | 1.2 (0.8–1.8) |

Only registries with >250 Black cases presented. Adjusted by logistic regression for age, stage, and histology (where applicable).

We looked to see whether this racial difference in treatment was uniformly true in younger as well as older patients, in earlier as well as later stages, and within each SEER registry. The results of these stratified analyses, summarized in Table 3, showed that there was a consistent effect, varying somewhat in magnitude.

Logistic regression was used to see whether the above treatment types were associated with five-year survival, after adjusting for the known survival factors of age, stage, race, and histology. The results are shown in Table 4. For this analysis, only the cases followed for at least five years (i.e., diagnosed January 1, 1978–January 1, 1980) were considered. This analysis shows that treatment type was an independent predictor of survival.

**TABLE 4—Predictors of Death from Breast Cancer within Five Years of Diagnosis; Analysis by Logistic Regression**

| Factor | Death Odds Ratio | 95% CI |
|---|---|---|
| Treatment | | |
| Surgical | 1.0 | |
| Nonsurgical | 1.9 | 1.5–2.3 |
| No Treatment | 1.5 | 1.0–2.1 |
| Age Group (years) | | |
| Under 50 | 1.0 | |
| 50–59 | 1.0 | 0.9–1.1 |
| 60–69 | 0.8 | 0.7–0.9 |
| 70–79 | 0.7 | 0.6–0.8 |
| 80+ | 0.7 | 0.6–0.8 |
| Stage | | |
| I | 1.0 | |
| II | 3.9 | 3.0–5.0 |
| III | 13.3 | 10.2–17.2 |
| IV | 47.8 | 35.9–63.6 |
| unknown | 5.5 | 4.2–7.2 |
| Race | | |
| White | 1.0 | |
| Black | 1.4 | 1.2–1.7 |
| Histology | | |
| Other | 1.0 | |
| Ductal | 1.1 | 1.0–1.3 |
| Medullary | 1.1 | 0.9–1.4 |
| Lobular | 0.7 | 0.6–0.8 |

(Based on 13,172 cases followed at least five years; 3,119 deaths.)

*Discussion*

This study found a difference in the general type of breast cancer treatment given Blacks compared to Whites, even after adjusting for patient age, clinical stage, and tumor histology. This difference in treatment was present over several age, stage, and registry strata, although the magnitude varied somewhat.

A number of possible factors could account for the racial differences in treatment that we found. The adjustment variables could be incomplete; Blacks could be seen to have more severe breast cancers, even within the categories we used for adjustment, and tumor factors not adjusted for (e.g., hormone receptor status) could play a part. Coexisting disease may be a confounding factor; Blacks may have had more conditions contra-indicating surgery or other forms of therapy. There may be racial differences in patient acceptance of recommended treatment, because of attitudes, economics, or other factors. Finally, there may actually be differences in the types of treatment available to Blacks compared to Whites, independent of the factors above. We could not address the relative contributions of these factors with the available data.

The treatment types used in this study were independently associated with survival, after taking into account the known survival factors of age, stage, and histology. However, caution is warranted in inferring causal relationships, because of the incomplete adjustment and coexisting disease possibilities mentioned above.

For treatment variables, this study was limited to the fairly crude indicator categories of surgical/nonsurgical/untreated. Because of the relatively few cases overall who did not receive surgery, we did not expect these indicator treatment categories to explain much of the overall racial survival difference. Further studies with more complete diagnostic and treatment data are needed to investigate this issue more thoroughly. The National Cancer Institute is currently sponsoring a multicenter investigation of Black/White cancer differences which will contribute to our understanding of these issues.

The various factors affecting treatment and survival have complex relationships. However, the relatively crude treatment indicators used here suggest that treatment differences may be found in the future to play a role in the Black/White survival differential.

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## UAB and Samford Offer Joint JD/MPH Degree

The University of Alabama at Birmingham School of Public Health, and Samford University's Cumberland School of Law launched a new program this fall offering a joint Juris Doctor and Master of Public Health degree. The distinctive program, only the second one of its kind in the nation, is designed to equip graduates with the tools necessary to deal with the complex interrelationship between the legal system and the promotion, organization and delivery of public health services.

It will take students about three-and-one-half years to complete the coordinated JD/MPH dual degree program. The combined teaching and research resource tools from both schools will be used to help prepare graduates for leadership roles in dealing with important legal issues related to policy formulation, promotion and delivery of public health services. The dual degree should be of interest to legal professionals, particularly those wishing to specialize in health law, risk assessment, administration, malpractice litigation or corporate council, in addition to achieving a grounding in the field of public health.