Receipt of Guideline-Recommended Work-up Tests among Female Breast Cancer Patients in Louisiana

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Background

The National Comprehensive Cancer Network (NCCN) provides practice guidelines on work-up tests for staging and planning treatment breast cancer. Because data on work-up tests are not routinely collected by cancer registries, the use of guideline-recommended work-up tests in the community and the correlation of their receipt with socio-demographic factors are unknown.

Purpose

This study assesses the dissemination of guideline-recommended work-up tests and examines the association of socio-demographic characteristics with use of the work-up tests among women with stage 0, I, II, and III breast cancers.

Materials and Methods

Data Sources: Data were collected by Louisiana Tumor Registry for the Centers of Disease Control and Prevention's National Program of Cancer Registries (CDC-NPCR)-funded Patterns of Care study. A total of 1,772 Louisiana women diagnosed with microscopically confirmed breast cancer in 2004 were randomly selected through race-stratified sampling. Data were re-abstracted from hospital and non-hospital medical records and verified with treating physicians. Information on census tract-level socioeconomic status (SES) (poverty and education) was obtained from the 2000 US census.

After excluding 44 patients of other race and ethnicity, and 158 cases with unknown or stage IV disease, 1,570 non-Hispanic whites and non-Hispanic blacks with derived AJCC stages 0, I, II, and III breast cancers were included. The stage-specific work-up tests were defined according to the NCCN Clinical Practice Guidelines for breast cancer (see Table 1). Work-up tests marked as optional in the NCCN guidelines were not analyzed.

Table 1. Stage-Specific Work-up Tests Recommended by NCCN Guidelines

	Stage 0	Stage I	Stage II	Stage III
Chest X-ray or CT Scan	No	Yes	Yes	Yes
Liver Function Test	No	Yes	Yes	Yes
ER	No	Yes	Yes	Yes
PR	No	Yes	Yes	Yes
Her2	No	Yes	Yes	Yes
Bilateral Mammogram	Yes	Yes	Yes	Yes

Statistical Analysis: The Chi-square test was used to examine the correlation of the work-up tests with stage and comorbidity. Logistic regression analysis was used to assess the association of socio-demographic factors with use of work-up tests adjusting for the stage and comorbidity. The odds ratios correlated the explanatory variables of interest (race, age, insurance, census-tract poverty and education) with the outcome variable, receipt of work-up test (Yes, No) , were computed. P-value <0.05 was considered statistically significant.

All estimates were weighted to reflect the population from which the sample was drawn. Data analysis was performed using the SAS-survey procedures.

Results

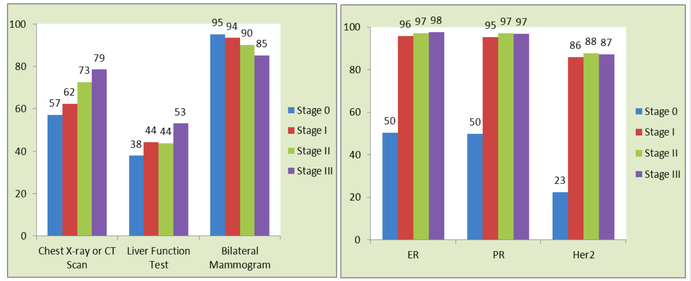
Of the 1,570 cases, the majority were non-Hispanic whites (71%), privately insured (53%), resided in low- poverty areas (61%), high education areas (52%), stage I, II, or III (84%), and either no or mild comorbid conditions (86%) .

Table 2. Patient Demographics and Clinical Characteristics

	Count	Weighted %
Race		
Non-Hispanic Whites	928	71.1
Non-Hispanic Blacks	642	28.9
Age		
≤49	410	25.1
50-64	569	36.3
65-74	328	21.4
75+	263	17.2
Insurance		
Private	803	53.0
No insurance	79	4.6
Medicaid	236	12.8
Medicare/other public	441	29.0
Unknown	11	0.7
Census-tract poverty *		
Low	883	61.4
High	686	38.6
Census-tract education †		
High	764	52.4
Low	805	47.6
Derived AJCC stage		
Stage 0	253	16.2
Stage I	593	39.0
Stage II	511	31.7
Stage III	213	13.1
Comorbidity		
No	687	45.4
Mild	669	41.2
Moderate	124	7.6
Severe	42	2.5
Unknown	48	3.3

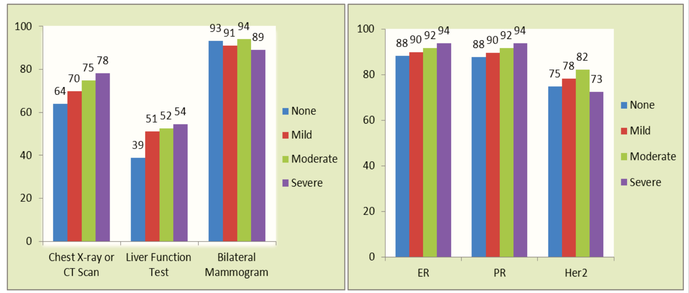
* High poverty was defined as at least 20% of persons with an income below the the federal-defined poverty level
† Low education was defined as at least 25% of adults (age 25 years and older) with less than a high-school education

Figure 1. Weighted Percentage for Receipt of Work-Up Tests by Derived AJCC Stage



With increasing stage, the proportion of use of x-ray/CT scan or liver function test increased (Figure 1). The proportion of cases receiving ER, PR, or Her2 test was about the same across stages I-III, which was much higher than that of stage 0.

Figure 2. Weighted Percentage for Receipt of Work-Up Tests by Comorbidity



The proportion of cases receiving x-ray/CT scan or liver function test was positively associated with the severity of comorbid conditions (Figure 2). No difference in receipt of other work-up tests was observed by comorbid condition .

Table 3: After adjusting for stage and comorbidity, the lack of insurance or residence in a low- education area predicted a lower likelihood of receiving an x-ray or CT scan. Medicaid-insured women were less likely to receive an ER/PR test than privately insured. Black race, old age, Medicaid or Medicare insurance, and living in high poverty areas were related to a lower use of bilateral mammograms

Table3: Odd Ratios After Adjustment for Derived AJCC Stage and Comorbidity

	Chest X-ray or CT Scan	Liver Function Tests	ER	PR	HER2 Status	Bilateral Mammo-gram
Race						
Non-Hispanic Whites	1.00	1.00	1.00	1.00	1.00	1.00
Non-Hispanic Blacks	0.91	0.94	1.16	1.22	1.07	0.55*
Age						
≤49	1.00	1.00	1.00	1.00	1.00	1.00
50-64	1.09	1.98	1.13	1.12	1.26	1.06
65-74	1.14	1.00	1.32	1.34	1.28	0.83
75+	0.91	0.94	0.97	0.86	0.76	0.50*
Insurance						
Private	1.00	1.00	1.00	1.00	1.00	1.00
No insurance	0.44*	1.38	0.89	0.93	2.16*	0.65
Medicaid	0.93	1.17	0.39*	0.42*	1.03	0.27*
Medicare/other public	0.87	0.97	1.04	0.99	1.05	0.40*
Unknown	0.62	0.96	0.60	0.63	2.77	0.27
Census-tract poverty †						
Low	1.00	1.00	1.00	1.00	1.00	1.00
High	0.87	0.95	0.94	1.00	1.07	0.62*
Census-tract education ‡						
High	1.00	1.00	1.00	1.00	1.00	1.00
Low	0.71*	0.92	0.94	1.02	1.13	0.75

† High poverty was defined as at least 20% of persons with an income below the federal-defined poverty level
‡ Low education was defined as at least 25% of adults (age 25 years and older) with less than a high-school education
* Statistically significant

Conclusions

1. The majorities (85%-98%) of the patients with derived AJCC stage I, II and III breast cancers received a guideline-recommended bilateral mammogram as well as ER/PR and Her2 tests. The use of liver function test and chest x-ray/CT scan was relatively low (51%-78%). For stage 0 cases, chest x-ray/CT scan, liver function test, ER or PR, and Her2 tests were not recommended by NCCN guidelines, but nearly 50% of the women received a chest x-ray or CT scan and/or ER/PR tests; 23% received Her2 test.

2. Comorbidity and stage were associated with the use of X-ray or CT scan and liver function tests, but not with other work-up tests, such as ER/ PR tests, Her2 and bilateral mammogram.

3. After controlling for stage and comorbidites, socio-demographic factors (age, health insurance, census tract-level SES) still contribute to the percentage of women receiving the appropriate work up tests, such as chest x-ray or CT scan, ER/PR, and bilateral mammogram.

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