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Breast Cancer Screening at the Breast Examination Center of Harlem

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Synopsis

Here we describe patient, disease, and treatment characteristics of women diagnosed with breast cancer at the Breast Examination Center of Harlem to determine if these characteristics have changed in comparison to an earlier study period. The BECH continues to serve a population of ethnic minorities. The majority of breast cancer cases diagnosed in this population are now of early stage with good prognosis; however, compliance with follow-up and patient outcomes remain poor.

Background—To describe patient, disease, and treatment characteristics of women diagnosed with breast cancer at the Breast Examination Center of Harlem (BECH), and determine if these characteristics have changed over time.

Methods—Retrospective chart review of women diagnosed with breast cancer at BECH from 2000-2008 was performed. Comparisons were made to data from an earlier study period (1995-2000).

Results—From 2000-2008, 339 women were diagnosed with breast cancer following attendance at BECH—55% were Black, 39% Hispanic, 5% of other race/ethnicity. 52% had no health insurance. Hispanic patients were significantly more likely to have no health insurance compared with Black patients ($p=.0091$). 29% of patients had pre-invasive disease; 36.5% had stage I disease. Almost 40% of the entire group was followed for <1 year. 5-year overall survival for the entire group was 83% (95% CI, 75-89%) and 79% for 188 Black women (95% CI, 68-87%).

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Compared to the earlier study period (1995-2000), fewer patients presented with palpable masses (45.4% versus 67%) and more had either stage 0 or stage I disease (65.6% versus 46%).

Conclusions—Women diagnosed with breast cancer at BECH are predominantly Black and Hispanic, and most of these patients do not have health insurance. An increasing proportion of women diagnosed with breast cancer are presenting with non-palpable, early-stage disease. Despite improved access to breast cancer screening, early stage at diagnosis, and access to appropriate management, these ethnic minorities continue to have poor outcomes and are poorly compliant with follow-up.

Keywords

breast cancer screening; health care disparity; African-American; Hispanic; inner-city

Introduction

Data from the Surveillance, Epidemiology, and End Results (SEER) program reveals that the incidence of breast cancer continues to be higher among White women, but mortality is higher among Black women.¹ A recent meta-analysis reported lower adherence to screening mammography guidelines among ethnic minority women in the United States.² These at-risk groups continue to bear a disproportionate burden of breast cancer mortality. It is also likely that these disparities are underestimated in studies, as claims-based data do not capture the experience of uninsured women. The most significant disparities in screening mammography are based on insurance status, access to care, and socioeconomic status. Consequently, access-enhancing strategies, which are the most effective type of patient-targeted intervention, are important components of health care delivery. Here we report on the Breast Examination Center of Harlem (BECH), a breast screening and diagnostic facility outreach program of Memorial Sloan Kettering Cancer Center (MSKCC) in Harlem, New York, NY, that was initially founded in 1979 and that has screened more than 200,000 women. As a follow up to an earlier report of the BECH's initial experience from 1995-2000³; we now report on the subsequent experience from 2000-2008 and enquire whether the presence of this long-standing program in the New York City community of Harlem has made a significant impact in earlier detection of breast cancer.

Methods

Facilities and Protocols

Until the 1980s most breast carcinomas in Harlem, NY were diagnosed in hospitals, the largest of which was the Harlem Hospital Center. The BECH was established in 1979 to combat the high breast carcinoma mortality rates in Harlem with a mission to provide ready access to early detection, diagnosis and treatment and is an outreach program of MSKCC.

Screening mammography is performed for asymptomatic women 40 years of age and older, and physical examination is performed by a nurse practitioner. Symptomatic women also see one of the physicians specializing in breast surgery affiliated with BECH, and they will also undergo mammography. For women who have medical insurance, the insurance is billed for services rendered at BECH. The staff at the center assist women who do not have insurance

in applying for insurance (usually Medicaid) if they qualify; otherwise, services are provided free of charge with financial support provided by the Healthy Women's Partnership (part of the National Breast and Cervical Cancer Detection Program) of the New York State Department of Health and by MSKCC.

The mammograms are performed at BECH and interpreted the next working day by an attending radiologist specializing in breast imaging at MSKCC. If additional studies are needed or if stereotactic or ultrasound-guided biopsies are warranted, they are performed at MSKCC. If surgery is needed, it is usually performed by one of the attending surgeons affiliated with BECH; patients can also have surgery at MSKCC or be referred elsewhere if they so choose. On-site patient navigators help patients after diagnosis and also obtain records regarding surgical and/or other treatments

A description of facilities and protocols used for screening at BECH has been previously published.³

Data Collection and Analysis

After obtaining institutional board approval, the medical records of women diagnosed with breast carcinoma at BECH from 2000-2008 were reviewed. Self-reported data regarding race/ethnicity and insurance status were recorded. Data on presentation, time from presentation to diagnosis, time to surgery, tumor characteristics and disease stage (in accordance with the criteria of the American Joint Committee on Cancer⁴) were recorded. Follow-up data were recorded when available. Data on adjuvant treatment were not available, as complete treatment records are not kept at BECH. Comparison between this study period and the prior study period at BECH was performed. Wilcoxon rank-sum and Fisher's exact tests were used for comparison of groups; Kaplan-Meier analysis was used for overall survival.

Results

There were 340 new breast cancers diagnosed in 339 women who attended BECH between January 2000 and August 2008. During this time period, 80,502 screening mammograms were performed (an average of 9289 screenings per year; range, 8106-10,813 per year).

Race/Ethnicity and Insurance Information

The majority of the 339 women diagnosed with breast cancer at BECH during this period self-identified as being of Black/African-American race/ethnicity (55%). The second most common answer was Hispanic (39%). The remaining 5% consisted of 7 Asian and 9 White women (Table 1). Table 1 also shows insurance information according to race/ethnicity for the 339 breast cancer patients, including type of insurance coverage. Only 48% of the patients diagnosed with breast cancer had medical insurance coverage. Hispanic women were significantly less likely to have insurance compared with Black women (41% versus 56%; $p<0.001$). A similar proportion of Black and Hispanic women had government insurance (26% and 32%, respectively); however, Black women were more likely to have commercial or private insurance compared to Hispanic women (30% versus 9%).

Presentation, Diagnosis and Previous Screening (Table 2)

The most common presentation was abnormal mammography (55%), followed by abnormal mammography with a palpable mass and/or abnormal physical examination (43%). The remaining 2% had a palpable mass only, with normal mammography. The median time from presentation to tissue diagnosis was 35 days (range, 0-454 days). The most common method of diagnosis was percutaneous biopsy (89% of patients). For patients who had both biopsy and surgery, the median time interval from biopsy to first surgical procedure was 42 days (range, 0-342 days). There was no association between race/ethnicity or presence/absence of insurance and time interval from initial presentation to tissue diagnosis or surgery. Almost all (84%) patients claimed to have had previous mammography at the BECH. 63% of patients had a mammogram during the 2-year period prior to their diagnosis, and 49% of patients had 2 or more mammograms in the preceding 5-year period.

Clinicopathological Characteristics and Management (Table 2)

The median age at diagnosis was 54 years (range, 23-97), and the median tumor size was 1.5 cm (range, 0.11-10 cm). Ninety-five patients had pre-invasive breast cancer (DCIS). The invasive cancers were invasive ductal carcinoma (89%), invasive lobular carcinoma (10.2%), and medullary carcinoma (0.8%). The majority of invasive cases were node negative (67%). Nearly all patients (93.8%) had surgery as part of their management. Of these patients, 67% had lumpectomy and 33% had mastectomy. Six patients refused surgical treatment, and surgery was not indicated in 2 patients with stage IV disease (Table 2).

Follow-up and Survival

Follow-up for this group of patients was very poor, with almost 40% of surviving patients followed for less than 1 year. There was a noticeable drop-out rate difference between groups, with Hispanic patients being lost to follow-up at a faster rate than Black patients (Fig 1). One year from diagnosis, only 69% of Black and 61% of Hispanic patients remained in follow-up. Five-year overall survival for the entire group was 83% (95% confidence interval [CI], 75-89% Fig 2a), and 5-year overall survival for Black patients was 79% (95% CI, 68-87%, Fig 2b). A comparison of survival rates between Black and Hispanic patients did not show a significant difference, but is unreliable due to the high drop-out rate of Hispanic patients. Our survival analysis is limited by many patients being lost to follow-up; reasons for their failure to follow up are likely multifactorial and were not identifiable in this study.

Comparison to Previous Study Period (Table 3)

The results of this review were compared to the previously published review of breast cancer diagnosis at BECH between 1995-2000.³ The number of screening mammograms performed per year increased in this recent 199 study, possibly reflecting the increasing population in Harlem. There was a higher rate of cancer diagnosis in the later period (39 cancers per year versus 32 cancers per year). On average, 275 mammograms were performed per cancer diagnosis from 1995-2000 compared to 236 mammograms per cancer diagnosis from 2000-2008. The percentage of diagnosed patients who were Black or

Hispanic increased (89% to 95%), as did the percentage of patients with no health insurance (45% to 52%).

There was a large decrease in the percentage of patients presenting with palpable tumors: 67% in the earlier study versus 45% in the current study. The percentage of patients diagnosed with *in situ* disease increased from 23% to 29%. In the current study, the majority (65.6%) of patients were diagnosed with stage 0 or stage I disease compared to only 46% in the earlier period. Most patients (89%) in the more-recent time period were diagnosed following percutaneous biopsy, usually performed with image guidance (87%). In the earlier study, only 24% of patients had image-guided biopsy, and 49% were diagnosed following surgical excision biopsy. The majority of patients had breast-conserving therapy in both time periods; however, the percentage of patients undergoing mastectomy increased from 20% to 33%. We were not able to determine the reasons why mastectomy rates increased, an occurrence unlikely related to tumor size, as the majority of patients in the current study period were diagnosed with stage 0 and stage I disease.

Follow-up and Survival

Follow-up for this group of patients was very poor, with almost 40% of surviving patients followed for less than 1 year; therefore, our interpretation of survival data is limited. There was a noticeable drop-out rate difference between groups, with Hispanic patients being lost to follow-up at a faster rate than Black patients (Fig 1). One year from diagnosis, only 69% of Black and 61% of Hispanic patients remained in follow-up. Based on available data, 5-year overall survival for the entire group was 83% (95% confidence interval [CI], 75-89%; Fig 2a), and 5-year overall survival for Black patients was 79% (95% CI, 68-87%).

Discussion

Racial and ethnic disparities in breast cancer mortality have been well documented in recent years, with African-American women having the poorest breast cancer survival of any racial/ethnic group. The BECH is now well established in this underprivileged and predominantly African-American New York City neighborhood. The BECH has provided breast cancer screening and coordinated appropriate cancer treatment for newly diagnosed breast cancer patients for more than 30 years in this community that previously was known to have an exceptionally high breast cancer mortality rate among its female residents. Although many factors may contribute to the disparity in breast cancer mortality rates, it is widely reported that difficulties with access to breast cancer screening and lack of medical insurance have an important role.⁵ The incorporation of a state-of-the-art breast cancer screening service into this underserved community allows for a useful analysis to further study the underlying causes of this disparity.

According to the U.S. Census Bureau, the racial/ethnic composition of New York City's population in 2010 was 44% White, 25.5% Black/African-American, and 28.6% Hispanic or Latino.⁶ The self-reported race/ethnicity percentage composition of patients in this study group was 56% Black and 39% Hispanic; therefore, this study relates almost exclusively to those two minority groups. More than half of those patients had no health insurance at time of diagnosis. The overall percentage of adults 18 to 64 years of age in New York State with

no health insurance between 2007-2009 was only 14.6%, and was highest among Hispanics (29.1%) and Blacks (16.7%) in comparison to White non-Hispanics (9.8%).⁷ The finding in this study that 52% of women diagnosed with breast cancer at BECH had no health insurance (59% among Hispanics) is a very strong indication of the socioeconomic austerity of the area served by the BECH.

Several reports have shown that compliance with mammographic screening guidelines is lower among ethnic minorities compared to White non-Hispanic women^{8, 9}, and a meta-analysis has shown that this relationship is significantly affected by socioeconomic status.⁵ Current American Cancer Society guidelines recommend annual mammography for women 40 years of age and older.¹⁰ This study has shown that 63% of women diagnosed with breast cancer at BECH had at least 1 mammogram in the preceding 2-year period. This is not very different from the national uptake of breast cancer screening, as available data show that in 2010, 67.1% of women 40 years of age and older claimed to have had mammography within the preceding 2 years. Of note, only 36% of uninsured women claimed to have had mammography during that time.¹¹ In our data, 71.6% of insured women and 55.3% of uninsured women reported having a mammogram within the preceding 2 years. The relatively high uptake of screening mammography among the largely uninsured and underprivileged population attending BECH is therefore quite impressive and is an encouraging sign of the success of the BECH program.

The percentage of breast cancers diagnosed at a pre-invasive stage is often regarded as a reflection of the intensity of breast cancer screening, with considerable variation in this across the United States.¹² The impact of the outreach program at BECH is evident not only by the number of mammograms performed per year (see Table 3; increase of 6% when compared to earlier period, possibly representing the increasing population of Harlem), but also by the large percentage of patients diagnosed with ductal carcinoma *in situ* (DCIS) during this 10-year period (28%; 95 of 340 cases). This is higher than the rate among all New York women for both African-American (22%) and non-Hispanic White women (24.4%) diagnosed between 2006 and 2010.¹² Furthermore, the majority of patients diagnosed with invasive cancer at BECH had node-negative disease (67%), and only 2 patients were diagnosed with stage IV disease, suggesting that this group should have had a favorable prognosis.

When comparing our results to the earlier experiences at BECH (Table 3)³, the most obvious difference is the earlier stage at diagnosis in the more recent study period and a lower percentage of patients presenting with clinically palpable tumors. Additionally, the majority of patients in this study period were diagnosed via percutaneous biopsy, reflecting the greater percentage of patients diagnosed via screening. However, despite the high percentage of *in situ* and early-stage invasive breast cancers diagnosed in this cohort of patients, the observed overall survival was poor. As the BECH is primarily a diagnostic unit, facilitating further cancer treatment when necessary, our data on management, follow-up, and survival are somewhat limited. We know, however, that just 1 year from diagnosis, a significant percentage of surviving patients were lost to follow-up. According to recent SEER data, overall survival in the United States for female breast cancer diagnosed between 2003-2009 was 90.3% (91.7% for White women and 79.1% for Black women). Our patient

group had a 5-year overall survival of 83% and, similarly to the national data, a 5-year overall survival of 79% for Black women. It therefore appears that the successful introduction of breast cancer screening into this population has not resulted in an improvement in the breast cancer mortality above the expected national average for Black women.

Despite the earlier stage at diagnosis, we noted that a larger percentage of patients were treated with mastectomy in the later study period (33%), in comparison to the earlier study period (20%) (see Table 3). The median tumor size in the earlier study period was 2.0 (0.1-8cm), and a higher percentage of patients presented with palpable lumps during that time (Table 3). Median tumor size in the later study is 1.5 cm, and most patients had non-palpable disease (Table 2). The increasing mastectomy rate is therefore not related to tumor size, but probably reflects a national variation in mastectomy rate during that time. Surveillance, Epidemiology, and End Results (SEER) data show that the national mastectomy rate in the United States for women with early-stage breast cancer between 2000 and 2008 was 37.5%¹³, higher than the rate seen at BECH during this period. SEER data also show that the national mastectomy rate changed during this time period, decreasing from 40.1% in 2000 to 35.6% in 2005, and then increasing again to 38.4% in 2008.¹³ It is therefore unsurprising that we have also shown a variation in mastectomy rate over time unrelated to tumor size. The mastectomy rate of 20% in the earlier study was low, perhaps related to the high percentage of patients (49%) undergoing surgical excision biopsy (rather than core biopsy) for diagnosis. It is possible that patients in this group were more likely to choose breast-conserving therapy rather than completion mastectomy if the tumor had been completely excised on the primary excision. In comparison, most patients (89%) in the later study group were diagnosed by percutaneous biopsy, following which a detailed discussion regarding the options of breast conservation versus mastectomy would have taken place when appropriate.

It is possible that more aggressive tumor biology and pre-existing co-morbidities outweigh the advantages of early-stage disease in our patients. We know for example that triple-negative breast cancer is almost twice as prevalent in African-American women compared to White women in the United States, occurring in up to 40% of premenopausal African-Americans.¹⁴ With regard to co-morbidities, the 2012 New York State Minority Health Surveillance Report states that African-Americans have higher rates of diabetes, cardiovascular disease, colorectal cancer, and many other illnesses compared to other ethnic groups. In 2009 a larger proportion of New York African-Americans visited Emergency Departments for asthma care than any other ethnic group, and 6 times more frequently than White non-Hispanics. New York Hispanics reported the highest percentages of fair or poor health compared to all ethnic groups.⁷ It is therefore not surprising that our 94% African-American and Hispanic study population continues to have relatively poor overall survival despite the successful implementation of breast cancer screening.

It is important to note that there is a large disparity in overall mortality rate for Harlem residents compared with New York City residents, which has not changed despite decrease in the disparity in breast cancer mortality. Data from NYC.gov on Central Harlem reports that death rate due to cancer has remained fairly steady in Central Harlem during the past

decade, but remains higher than in Manhattan and New York City overall (30 % higher than the rate in Manhattan and 40 % higher than the rate in New York City overall). The death rate for breast cancer in Central Harlem is 27/100,000 women compared to 26/100,000 in New York City. However, it was noted in a recent New York City community health survey that 78% of women in Central Harlem had had mammogram within the past 2 years (40+ yrs), a rate which is similar to that for New York City women overall (76%). Similarly, our study suggests that women in Harlem are adhering to breast cancer screening guidelines when centers are available to provide the service and when breast cancer is being diagnosed at an early stage; however, these women continue to have poor survival. It is likely that interventions addressing high rates of co-morbidities and poor compliance with follow-up will be necessary to impact on this ongoing disparity. Screening alone is not enough, and economic and cultural factors are additional critical determinants of who develops and survives cancer, and of the quality of life of cancer survivors. Despite the existence of programs such as BECH, further research is necessary to increase understanding of the factors behind why some women avail themselves of treatment, and why some do not. Programs such as the patient navigation program established through the BECH help to address the disparities in breast cancer mortality among minority women in the community. More programs such as these will help patients navigate the complexities of not only access to care, but also to public health assistance programs.

In 2005 President George W. Bush signed the Patient Navigator Outreach and Chronic Disease Prevention Act, based on the Harlem model, which provided funds for these programs. In 2012 the American College of Surgeons made patient navigation a standard of care that is required for cancer centers seeking accreditation. The Patient Protection and Affordable Care Act of 2010 requires that patient navigators be used to help Americans obtain insurance. The future impact of such patient navigation programs will help us to possibly understand and address the health care disparities that are still present despite access to screening services for breast cancer.

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FIG 1.
Number of patients still alive and followed over time for Black and Hispanic women following breast cancer diagnosis at the Breast Examination Center of Harlem.

FIG 2.

(a) Overall survival among all patients and (b) among Black patients only. OS, overall survival; CI, confidence interval

TABLE 1
Self-reported Race/Ethnicity and Insurance Information by Race/Ethnicity for 339
Women Diagnosed with Breast Cancer at the Breast Examination Center of Harlem
Between January 2000 and August 2008

Race/Ethnicity:			
	n (%)		
Black	188 (55)		
Hispanic	133 (39)		
Other*	17 (5)		
Not reported	1		
Total	339		

Insurance Status by Race/Ethnicity:			
Insurance	Yes n (%)	No n (%)	Total n
Black	105 (56)	83 (44)	188
Hispanic	54 (41) [†]	79 (59) [†]	133
Other/not reported	5 (28)	13 (72)	18
Total	164 (48)	175 (52)	339

Type of Insurance by Race/Ethnicity:				
	Commercial/Private n (%)	Government n (%)	None n (%)	Total n
Black	57 (30)	48 (26)	83 (44)	188
Hispanic	12 (9)	42 (32)	79 (59)	133
Other/not reported	0 (0)	5 (28)	13 (72)	18
Total	69 (20)	95 (28)	175 (52)	339

* The "Other" category comprises 7 self-reported Asian women, 9 White women, and 1 Black-Hispanic woman.

[†] p = 0.0091 for insurance status (yes/no) between Hispanic and Black women with no insurance

TABLE 2
Presentation, Clinicopathological Characteristics, and Type of Surgical Intervention for 340 Breast Cancer Cases Diagnosed in 339 Patients at the Breast Examination Center of Harlem Between January 2000 and August 2008

Presentation	n (%)
Palpable lump + abnormal mammogram	147 (43.4)
Abnormal mammogram only	185 (54.6)
Palpable lump / normal mammogram	7 (2)
Unknown	1
Total	340
Median Time from Presentation to Bx or Surgery (days)	35 (0-454)
Median time from Bx to Surgery (days)	42 (0-342)
Tumor Type	n (%)
Invasive Ductal Carcinoma (IDC)	218 (64.1)
Invasive Lobular Carcinoma (ILC)	25 (7.4)
Metaplastic Carcinoma	2 (0.6)
Ductal Carcinoma In Situ (DCIS)	95 (27.9)
Total	340
Tumor Size (cm)	
Median tumor size	1.5 (0.11-10)*
T stage	(n=340)
Tis	95
T1	157
T2	67
T3	8
T4	1
Unknown	12
Total	340
Nodal Status (invasive cancers)	n (%) (n=230)
Node negative	154 (67)
Node positive	76 (33)
N stage	
N0	154
N1 (1-3)	42
N2 (4-9)	22
N3 (10)	12
(data available for 230 of 245 pts with invasive disease)	
Stage	(n=328)
0	95
I	120

<i>Presentation</i>	n (%)
II	78
III	33
IV	2
<hr/>	
<i>Type of Surgery</i>	n (%)
Lumpectomy	214 (65.4)
Mastectomy	105 (32.1)
No Surgery (refused or not indicated)	8 (2.4)
missing	13
Total	340
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<i>Axillary Procedure (invasive cancer)</i>	n (%)
Sentinel Lymph Node Biopsy only (SLNBx)	122 (49.8)
ALND	103 (42.0)
None	17 (6.9)
Missing	3
Total	245
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<i>Axillary Procedure (in situ disease)</i>	n (%)
Sentinel Lymph Node Biopsy	12 (12.6)
ALND	3 (3.2)
None	78 (82.1)
Missing	2
Total	95

Abbreviations: Bx, biopsy

* Tumor size available for n=239 patients

TABLE 3
Comparison of Data from Current Study with Data from Earlier Study³ of Patients
Diagnosed with Breast Cancer at the Breast Examination Center of Harlem

	Earlier Study Period (January 1995 – August 2000)	Current Study Period (January 2000 – August 2008)
Length of study period (months)	68	104
No. of breast cancers diagnosed	181 (31.9 per year)	340 (39.2 per year)
No. of women diagnosed	178	339
Median age at diagnosis	51 (27 – 87)	54 (23 – 97)
No. of screening mammograms	49,750 (8,779 per year)	80,502 (9,289 per year)
No. of mammograms performed per cancer diagnosis	275	237
Data on Race/Ethnicity	147 / 178 (82.6%)	338/339 (99.7%)
Black	80 (54.4%)	188 (55.6%)
Hispanic	51 (34.7%)	133 (39.3%)
White	14 (9.5%)	9 (2.7%)
Other	2 (1.4%)	7 (2.4%)
Data on Insurance	163/181 (90%)	339/339 (100%)
Insurance	90/163 (55%)	164/339 (48.4%)
No insurance	73/163 (45%)	175/339 (51.6%)
<i>Examination findings at diagnosis</i>		
Palpable lump	122/181 (67%)	154/339 (45.4%)
Screening mammo	59/181 (33%)	185/339 (54.6%)
<i>Diagnosis</i>		
Percutaneous biopsy	92/181 (51%)	300/338 (88.8%)
Clinical (TruCut) core	49 (27%)	7 (2.1%)
ultrasound core	22 (12.2%)	223 (66.0%)
stereotactic core	21 (11.6%)	70(20.7%)
Surgical excision	89/181 (49%)	38/338(11.2%)
Median time to histological diagnosis (days)	34 (0 – 298)	35 (0-454)
<i>Breast cancer stage</i>		
Data available on Stage	167/181 (92.3%)	328/340 (96.5%)
Stage 0	38 (23%)	95 (29.0%)
Stage I	38 (23%)	120 (36.6%)
Stage II	63 (38%)	78 (23.8%)
Stage III	24 (14%)	33 (10.1%)
Stage IV	4 (2%)	2 (0.6%)

	Earlier Study Period (January 1995 – August 2000)	Current Study Period (January 2000 – August 2008)
<i>Surgical Management</i>		
Data on treatment	166 (181)	327/340
Therapeutic surgery	153/166	319/327
Lumpectomy	123/153 (80%)	214/319 (67.1%)
Mastectomy	30/153 (20%)	105/319 (32.9%)