CHAMBER: A Regional Performance Improvement CME Initiative for Breast Cancer Health Care Providers

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Abstract

CHAMBER was a regional educational initiative for providers of care to patients with HER2+ breast cancer. The study goals were to (1) enhance testing for HER2/neu overexpression in patients with invasive breast cancer; (2) increase the appropriate use of targeted therapy for patients with HER2+ breast cancer; and (3) enhance patients' coping ability. This Performance Improvement Continuing Medical Education (PI-CME) initiative included clinical practice assessment, educational activities, and reassessment. Chart review revealed a high rate of HER2 testing (98%) before and after education. Targeted therapy for patients with HER2+ breast cancer declined after the program (from 96% to 61%), perhaps attributable to an increase in awareness of medical reasons to avoid use of targeted therapy. Assessment for patients' emotional coping ability increased after education (from 55% to 76%; $P=.01$). Rates of testing for HER2 amplification and assessment of emotional well-being after education were consistent with ASCO Quality Oncology Practice Initiative benchmark values. Documentation of actions to address emotional problems remained an area for improvement. (*J Natl Compr Canc Netw* 2015;13:1005–1011)

Breast cancer is second only to lung cancer as the most common cause of cancer death in women in the United States. Approximately 227,000 new cases of invasive breast cancer occurred among women in the United States in 2012.¹ Approximately 20% of breast tumors overexpress human epidermal growth factor receptor-2 (HER2),^{2,3} and targeted therapies for patients with HER2+ breast cancer have been developed.^{4,5} Supportive care remains an unmet need in cancer management; only a small fraction of emotional issues are identified and addressed.^{6,7}

CHAMBER (Collaborations for HeAlth IMprovements in HER2+ Breast Cancer) was a Performance Improvement Continuing Medical Education (PI-CME) initiative for clinicians managing patients with invasive breast cancer. CHAMBER's goals were to (1) improve the rate of use and interpretation of tests for HER2/neu gene overexpression in patients with invasive breast cancer; (2) increase the appropriate use of targeted therapy

for patients with HER2+ breast cancer; and (3) increase provider practices that enhance patients' coping ability. Quality metrics from the ASCO Quality Oncology Practice Initiative (QOPI)⁸ and gaps in provider performance guided the initiative's learning objectives, educational program design, content, and evaluation tools (Table 1).

Recent large PI-CME initiatives in smoking cessation,⁹ diabetes,¹⁰ and acute coronary syndromes¹¹ have demonstrated improvement in clinical practice conforming to guidelines. Although much education in breast cancer is available, a paucity of data exists regarding the impact of these initiatives. This article presents an analysis of rates of HER2 testing, appropriate use of anti-HER2 therapy, and rates of attention to patients' coping with cancer, comparing information from chart reviews before and after the PI-CME activity.

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Table 1 CHAMBER Clinical Gaps, Corresponding Learning Objectives, Performance Metrics, and Comparators

Clinical Practice Gap	Learning Objective	Performance Metric	Comparator
Diagnosis: Recommended testing to determine HER2/neu gene overexpression is not being routinely performed in patients with invasive breast cancer	Demonstrate that a recommended test for HER2/neu gene overexpression has been performed and its status determined for all patients with invasive breast cancer	Test for HER2/neu gene overexpression	ASCO QOPI Breast Cancer Measure #53
Therapy: HER2/neu gene expression results are often misinterpreted and/or inappropriate therapeutic decisions are made	Use current treatment guidelines and available clinical evidence to make appropriate treatment decisions for patients with breast cancer who test positive for HER2/neu gene overexpression	Administer HER2-directed therapy for patients with HER2/neu+ breast cancer based on current guidelines and available clinical evidence	No comparator available
Coping: Adherence to appropriate therapy is often negatively impacted by multiple factors, including assessment for toxicities and psychosocial issues that are commonly not addressed	Integrate a toxicity assessment during each patient visit	Toxicity assessment during each visit	No comparator available
	Integrate a psychosocial assessment plan for each patient and address any barriers to adherence that may be identified	Emotional well-being assessed by the second visit	ASCO QOPI Core Measure #24
		Action taken to address problems with emotional well-being by the second office visit	ASCO QOPI Core Measure #25

Abbreviation: QOPI, Quality Oncology Practice Initiative.

Methods

Target Audience

CHAMBER was designed to bring education to clinical sites associated with the Duke Cancer Network (DCN). Five of the 10 sites are in North Carolina; the remainder are in the Southeastern United States. CHAMBER was designed for the following health care professionals who manage HER2+ breast cancer: medical oncologists, medical oncology physician assistants, medical oncology nurse practitioners, oncology nurses, and breast surgeons.

Educational Design

The Duke University School of Medicine’s Division of Medical Oncology, the DCN, the Duke School of Medicine’s Office for Continuing Medical Education, and The France Foundation collaborated to design and implement the initiative.

The need for a curriculum related to the management of patients with HER2+ breast cancer was determined through a review of the literature, expert interviews, and results of the 2010 ASCO QOPI survey. The clinical gaps identified formed the basis for the development of the educational PI-CME strategy. A steering committee of 9 experts drawn from Duke

University Medical Center and the DCN, and supplemented by content experts from around the country, created the educational content, data collection tools, and tactics. CHAMBER was designed as a 3-step PI-CME–certified activity based on AMA guidelines.¹²

Stage A: Learner clinical practice was measured with a review of patient charts. Charts were reviewed and entered by a DCN staff member, with a goal of 10 charts at stages A and C per participant. Inclusion criteria for charts were (1) diagnosis of invasive breast cancer, (2) diagnosis of metastatic cancer occurred after January 1, 2009, (3) at least 2 office visits were recorded, (4) history of treatment for metastatic breast cancer (detectable metastases at distant sites, including chest wall, but not in-breast or axillary tumors),¹³ and (5) (for stage C only) diagnosis of metastatic cancer occurred after the provider completed stage B. If a chart contained a medical reason to avoid targeted therapy, such as cardiac dysfunction, this was noted. A self-assessment survey probed the same areas as the chart review and the availability of resources and use of guidelines. Baseline data were summarized into a personalized report for each learner. The DCN is a QOPI participant and was able to furnish 2010 reference values.

Stage B: An action plan template was provided to help learners focus on education and their practice gaps discovered in stage A. Educational interventions aligned to the goals of the initiative included the CHAMBER summit, live mentorships, and Web-based educational activities. The CHAMBER Summit was an all-day symposium that was broadcast live and later archived as a Web-based activity. The lectures covered diagnosis, treatment, and coping aspects of HER2+ breast cancer. Ten live clinical site mentorships brought outside experts to participating DCN sites. A steering committee member presented a lecture on a topic that the site identified, with question-and-answer sessions and case reviews. The CHAMBER Web portal housed educational modules, the PI-CME activity, and links to clinical resources. CME activities were followed by an evaluation probing participant demographics and effectiveness and fairness of the activity, and the offering of intent-to-change options to help translate learning into action.

Stage C: Participants repeated the self-assessment and new patient charts were reviewed. Stages A and C data were compared for practice improvements and a report was provided to participants.

Participants received 20 AMA PRA Category 1 Credits for completing the entire PI-CME activity.

Institutional Review Board

Institutional Review Board (IRB) consent was obtained from Duke University. CHAMBER qualified as a quality improvement initiative and was granted IRB exemption as a program with the specific conditions: (1) all standard HIPAA-compliant measures were taken to protect the confidentiality of all patient information; (2) specific individual participant information was only reported to the individual, and overall data were only reported anonymously and in aggregate; and (3) staff attested to the protection of patient and participant confidentiality.

Data Analysis

Results for each individual patient chart item were averaged for each provider and then combined. *P* values were calculated with a paired 1-tailed Student *t* test except where noted.

Timeline

The design and implementation plan for CHAMBER started at the end of 2010. The technology platform and educational content were completed in

mid 2011. Educational interventions were available from mid 2011 through the end of 2012.

Results

The CHAMBER Summit kicked off the educational initiative and had 53 attendees. More than 50% of the summit and mentorship participants specialized in oncology, medical oncology, or hematology/oncology. The mentorship activities at the 10 CHAMBER clinical sites (North Carolina, 4; South Carolina, 4; West Virginia, 1; and Virginia, 1) were attended by 177 learners, including 8 of the PI-CME learners. Eighteen learners registered for the PI-CME activity. Fifteen learners completed stage A of the PI-CME and 14 of them completed stage C. Half the mentorship participants and all the PI-CME completers were physicians.

Eighteen registrants entered self-assessments at PI-CME stage A and 15 of them had assessed charts. A total of 208 patient charts were entered at stage A (Table 2). The 14 learners who completed stage C entered 196 charts (mean, 14) at stage A and 154 charts (mean, 11) at stage C. Eleven of the 14 participants entered self-assessments at both stages. These participants said they test patients with invasive breast cancer for HER2 overexpression an average of 99% to 100% at both stages. This agreed with the testing rate documented in patient charts both before and after CHAMBER education and with the QOPI benchmark (Table 3).

More than 90% of respondents at stage A and C said that they treat patients with HER2-overexpressing breast cancer with HER2-directed therapy (lapatinib and trastuzumab were available at the time).⁴ Chart reviews revealed some changes in clinical practice in this area. At stage A, 53 of the 196 patients were HER2+ and 52 of these patients received targeted therapy. At stage C, 28 of the 154 patients had positive test results; 17 of them were treated, 8 had medical reasons they should not (and did not) receive targeted therapy, and 3 did not receive targeted therapy, although there was no documented medical reason they should not. At stage A, 2 of the 25 patients with equivocal HER2 test results received targeted therapy; at stage C, 4 of 24 such patients also received targeted therapy. At stage A, 64 of 196 patient charts (33%) contained a medical reason the patient should not receive HER2-directed therapy. At stage C, 85 of 154 charts (55%) had

Table 2 CHAMBER Participants and Charts Reviewed at 2 Stages of A and C		
	Stage A	Stage C
PI-CME participants	15	14
Total patient charts entered	208	154
Average charts per participant	14	11
Range of charts per participant	3–38	2–23

Abbreviation: PI-CME, Performance Improvement Continuing Medical Education.

a medical reason the patient should not receive HER2-directed therapy (χ^2 , $P<.001$). At neither stage was any patient with a medical reason to avoid HER2-directed therapy treated with trastuzumab or lapatinib. At stage A, all 64 patients (100%) with such a reason were tested for HER2+; at stage C, 79 (93%) were tested for HER2+ over-expression.

Review of 196 stage A charts and 154 stage C charts revealed that toxicity was assessed at a high rate for both stages (98% and 97%; Table 3). Toxicities and emotional well-being were assessed as part of a standard nursing assessment, including a 12-point review of systems used at every patient vis-

Table 3 Chart Review Results for the 14 Participants Who Completed Both Stage A and Stage C			
Chart Review Data by Area	Stage A (N=196 Charts)	Stage C (N=154 Charts)	QOPI Benchmark
Diagnosis			
Patients tested for HER2 amplification	99%	98%	98%
Therapy			
Patients with HER2+ breast cancer receiving appropriate targeted therapy	98%	89%	No comparator
Coping			
Toxicity assessment during each patient visit	98%	97%	No comparator
Emotional well-being assessed	55%	76% ^a	75%

Abbreviation: QOPI, Quality Oncology Practice Initiative.
^a $P=.01$.

it. Documented assessment of emotional well-being increased from 55% to 76% ($P=.01$); the QOPI benchmark level was 75%. Figure 1 shows the rate of documented assessment of emotional well-being at the 2 stages for individual providers. Twelve participants increased their rate of assessment, whereas only 2 decreased. The steps taken to address problems with emotional well-being were inconsistently recorded in patient charts, precluding conclusions, except for the need for better documentation of these interventions.

The self-assessment probed treatment toxicity, emotional well-being, and breast cancer medication adherence. Approximately 90% of the 11 respondents at each stage reported assessing adverse medication effects, and more than 80% used open-ended questions and asked about specific symptoms. At both stages, an average of 75% reported assessing patients for emotional well-being by the second office visit, most commonly by asking about specific issues or using open-ended questions. The number who reported documenting emotional well-being assessment in the patient chart increased from 36% to 67% ($P=.018$). At both stages, approximately 75% of participants reported addressing the issue by the second office visit if a problem with emotional well-being was identified, and 66% documented the steps taken. One participant who addressed issues only 10% of the time and never documented the steps in the reviewed stage A charts increased both of these behaviors to 80% at stage C. In assessing patient adherence to oral breast cancer medications, asking the patients general questions was used approximately twice as often as other methods, such as asking specific questions, checking pill bottle dates, counting pills, or other methods.

The self-assessment also asked whether clinical support tools, such as systems, processes, or protocols, were available in the participant's practice (Figure 2). Participants reporting "No process" decreased from 75% at stage A to 48% at stage C ($P<.001$). Participants were also asked which guidelines they use in their practice. All reported using the NCCN Guidelines.¹⁴ At stage A, 64% responded that they use ASCO guidelines¹⁵ and 18% reported using College of American Pathologists (CAP) guidelines.¹⁶ At stage C, these responses were 55% and 27%, respectively; 1 participant cited using institutional guidelines. Approximately 60% of the respondents at each stage said they used multiple guidelines.

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Figure 1 Percent of patients assessed for emotional well-being. Averages for the 14 individual participants with patient charts entered at both stages are shown. Black horizontal bars indicate the average rate of assessment at each stage, which increased from 55% to 76% ($P=.011$).

Discussion

In a comprehensive review of the literature on translating best evidence into best practice, Grol and Grimshaw¹⁷ concluded that various strategies are needed to change clinician behavior and that data on the most effective strategies are limited. The CHAMBER curriculum attempted to incorporate multiple strategies to ensure that patients with HER2+ breast cancer received care in accordance with best evidence.

CHAMBER was a clinic-based PI-CME activity in the Southeastern United States focused on 3 clinical practice gaps, seeking to (1) enhance the use and interpretation of tests for HER2/neu gene overexpression in patients with invasive breast cancer, (2) increase the appropriate use of targeted therapy for patients with HER2+ breast cancer, and (3) increase provider practices that enhance patients' coping ability (Table 1). Learner demographics showed that the distribution of medical specialization among summit and mentorship attendees matched the target audience and the profile of health care providers who treat patients with invasive breast cancer. More than 80% of patients with cancer in the United States are treated in community settings, such as the cancer network clinics.¹⁸

The CHAMBER curriculum demonstrated high rates of HER2 testing and toxicity assessment rates before and after educational activities. At stage C, there was more judicious use of targeted therapies and an increase in documentation of assessment of emotional well-being.

Data available during the design of CHAMBER (before the ASCO/CAP recommendation for universal testing of patients with invasive breast cancer¹⁹) suggested a HER2 testing rate 50% or less.²⁰ However, both self-assessment and chart reviews suggest that HER2 testing was performed for most patients at stages A and C, and these high levels are similar to QOPI benchmarks and subsequent reports.^{21,22} Regional differences or evolution of clinical practice may have influenced the baseline testing rate; this finding emphasizes the importance of matching the subjects in the needs assessment as closely as possible to the educational target group.

There was a change in the use of targeted therapy for patients with HER2+ breast cancer. The number of these patients with documented medical reasons for not receiving targeted therapy increased from 33% at stage A to 55% at stage C. The higher rate at stage C could be due to a different group of incident patients or to increased knowledge of targeted treatments. The risk/benefit evaluation for individual patients was not investigated. Only 1 of the 53 patients with HER2+ breast cancer at stage A was not given targeted therapy, whereas 11 of the 28 patients with HER2+ breast cancer at stage C did not receive targeted therapy. This suggests increased discrimination in the use of targeted therapy at stage C. All patients with medical reasons to not receive targeted therapy at stage A and 93% of them at stage C were tested for HER2 overexpression, adding unknown diagnostic value.

Despite a high rate of screening for toxicity, the self-reported use of validated tools to explore emotional well-being increased to only approximately 30% at stage C. Documentation of emotional well-being assessment improved during CHAMBER, suggesting that education can improve assessment, documentation, or both. Clinicians reporting a system, process, or protocol for a variety of procedures in their practice increased from 26% to 55% after stage B education, perhaps due to new resources or new awareness of existing ones.

A comparison of subjective self-assessments and objective chart reviews revealed that participants

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Figure 2 Percent of Performance Improvement Continuing Medical Education self-assessment respondents indicating support tools in their practice. Nonpaired t test significance was calculated by comparing the presence of some system, process, or protocol with “No process” at stage A (n=18) and stage C (n=11).

had realistic views of their performance in diagnosis and therapy. Providers reported addressing patients' emotional well-being at a rate of approximately 75% at both stages, although chart review revealed inconsistent documentation of this action despite the use of a standard nursing assessment tool at every visit. Jacobsen et al⁶ examined medical records of 1660 patients with cancer. They found that emotional well-being was assessed at a rate of 52%, a problem with emotional well-being was documented in 13% of records, and action taken to address the problem was documented in 58% of these cases. In a PI-CME activity for providers treating patients with colorectal cancer, Marshall et al⁷ found that quantified assessments of pain increased by 30% and psychological assessments increased by 34% after completion of the program. These changes are similar to the increase in assessment of emotional well-being observed in CHAMBER. An electronic medical record with embedded flags for the presence of psychosocial distress might help ensure that all providers are aware of and address emotional well-being.

Perhaps overshadowing the findings of CHAMBER were the limitations appreciated in retrospect that provide significant insights for future efforts. First, information available at the time of initial development suggested larger clinical practice gaps than were observed in the study.²¹ The schedule of the project dictated collection of stage A data and educational ac-

tivity creation in parallel. High baseline performance rates left scant room for improvement. Nonetheless, the authors feel it is important to communicate their findings as a caution to other investigators to use needs assessment data that are closely matched in time, place, and situation to the target audience. Even though the findings are discordant with the original needs assessment, the information relating to a high rate of HER2 testing at baseline may help guide others contemplating education in this area.

Second, learners were strongly encouraged to participate in 3 educational events during stage B, but actual participation in educational activities was self-reported, not objectively tracked. Third, it is likely that an ongoing program with multiple faculty visits would have a stronger educational impact than the one-time mentorships. Fourth, CHAMBER measured surrogate parameters such as HER2 testing and treatment rates instead of clinical outcomes (hospitalization, quality of life, mortality), although improvements in clinical performance are expected to translate into better patient health. Finally, PI-CME participation was low; although 20 CME credits could be earned and a staff member extracted patient charts, CHAMBER PI-CME had only 14 completers. This may be due to the participants not embracing the need for such an educational approach or to the high baseline compliance with clinical practice guidelines.

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