

Measuring Opportunities to Improve Timeliness of Breast Cancer Care at Dana-Farber/Brigham and Women's Cancer Center

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Abstract

The authors sought to measure the timeliness of care for patients with breast cancer at Dana-Farber/Brigham and Women's Cancer Center throughout the treatment continuum, and to identify sources of variation that may serve as targets for improving care delivery. This report describes the methods that were developed to measure and analyze baseline performance. (*J Natl Compr Canc Netw* 2014;12[Suppl 1]:S5–S9)

Both ASCO and NCCN endorse time-dependent quality measures for specific treatment modalities.¹ An effective, multidisciplinary care model requires standardized processes and coordinated hand-offs to ensure timely care. The steering committee for this project identified 4 time intervals as key performance indicators (KPIs): new patient access, initial consult to first definitive surgery, last definitive surgery to initiation of chemotherapy, and time to radiation therapy. These indicators assist in assessing the quality of care coordination for patients with breast cancer.

The large number of providers, sites, and disciplines involved in breast cancer care at the Dana-Farber/

Brigham and Women's Cancer Center (DFBWCC) imposes challenges for developing measures of timely care. To address this challenge, the authors created a database that integrated information from multiple sources, which allowed for the identification and quantification of important process variations and for the selection of promising internal best practices. Based on subsequent analyses, the authors assembled teams to address delays in care and to create standardized workflows across sites and services.

Background

Unnecessary delays in care impose a psychological burden on patients and their families, increase the risk of suboptimal outcomes, and lead to reductions in completion of care.^{2–7} Furthermore, delays stemming from poor coordination of care adversely affect patient experience and satisfaction. At DFBWCC, patients with breast cancer are cared for by a multidisciplinary team, often including medical, surgical, and radiation oncologists. Other participating disciplines include breast imaging experts, pathologists, reconstructive surgeons, nurses, pharmacists, and various allied health professionals. Patient care may also involve a clinical trial infrastructure.

The institution's goals through the NCCN Opportunities for Improvement (OFI) initiative were to improve the timeliness of care and reduce unwarranted variability in care coordination. Standardization of care coordination is particularly important at DFBWCC because patients with breast cancer may potentially be seen by 26 medical oncologists, 12 surgical oncologists, and 6 radiation oncologists, and may access care at 6 ambulatory, 3 surgical, and 4 radiation therapy sites. With more

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Table 1 Criteria for Related NCCN Timeliness Measures

Inclusion Criteria	Exclusion Criteria
Diagnosis by Needle Biopsy to First Definitive Surgery	
Diagnosed by needle biopsy	Received neoadjuvant chemotherapy
Documented definitive surgery record	
≥90 days of quality follow-up after presentation	
Last Definitive Surgery to Adjuvant Chemotherapy	
Age <70 years at diagnosis	Received neoadjuvant chemotherapy
Documented definitive surgery record	<180 days of quality follow-up after presentation
Received adjuvant chemotherapy	
Last Definitive Surgery to First Adjuvant Therapy^a	
Age <70 years at diagnosis	Received neoadjuvant chemotherapy
Documented definitive surgery record	Received endocrine therapy as first adjuvant therapy with an estimated endocrine therapy initiation date
Received adjuvant therapy ^a	<270 days of quality follow-up after presentation

^aRadiation therapy, endocrine therapy, or chemotherapy.

than 3000 unique new patients with breast cancer in 2012, each of these patients could have been treated by any of the more than 1800 combinations of medical, surgical, and radiation oncologists.

Identifying KPIs

Several studies have shown variation in the timeliness of breast cancer care based on socioeconomic factors, ethnicity, race, age, and geography.^{8–12} However, few studies have examined the complex nature of cancer care and how internal processes within provider and administrative staff control may contribute to delays.¹³

In December 2011, DFBWCC initiated the OFI project by constituting a multidisciplinary steering committee comprised of physicians, nurses, and administrators. To identify improvement opportunities, the OFI Steering Committee analyzed NCCN data for patients receiving care between 2007 and mid-2010. The data included the following milestones: diagnosis by needle biopsy, first definitive surgery, last definitive surgery, and adjuvant therapy timing (chemotherapy, radiation therapy, or endocrine therapy). NCCN also provided benchmarking data for the average durations between milestones at other NCCN Member Institutions. A comparison between DFBWCC and its peer group showed that the benchmarks for the specified milestones were met based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines). However, the com-

mittee determined that an opportunity existed to expedite care, particularly focusing on access to and transitions of care, and prompting the development of the selected KPIs.

Developing an Internal Dataset

At project initiation, the NCCN data were approximately 2 years old, which was an inherent limitation because of having to manually abstract from patient charts. The abstraction process was specific regarding the inclusion and exclusion criteria for the patient cohort (Table 1). Thus, the NCCN dataset represents a significantly smaller sample of patients with breast cancer than the population of those patients served by DFBWCC. Although a separate internal chart audit from July to September 2011 revealed no statistically significant differences between NCCN data and the care rendered more recently, leadership at DFBWCC sought to use internal data to assess the timeliness of care to drive improvement efforts.

To establish an internal benchmark, the authors developed a database that captured the treatment timeline for a broader patient population than that represented by the NCCN data. The granularity of the data allowed for measurement of various operational parameters, including variations by provider and location.

The steering committee's clinical members determined inclusion and exclusion criteria for the patient population (Table 2). Electronic reports were extracted for all breast oncology and reconstruction

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Table 2 Patient Criteria for Data Extraction and Analysis

Inclusion Criteria	Exclusion Criteria
Received first definitive surgery in 2011	Receiving neoadjuvant chemotherapy
Matching DFCI and BWH or BWFH medical record numbers	No DFCI medical record number
Breast cancer diagnosis based on ICD-9 codes	Received first definitive surgery before 2011
Breast cancer procedures based on CPT codes	No consult date identified
	Male patients with breast cancer

Abbreviations: BWH, Brigham and Women's Hospital; BWFH, Brigham and Women's Faulkner Hospital; CPT, Current Procedural Terminology; DFCI, Dana-Farber Cancer Institute; ICD-9, International Classification of Diseases.

surgery appointments and procedures performed at Brigham and Women's Hospital (BWH) and affiliated sites at Brigham and Women's Faulkner Hospital (BWFH) and South Shore Hospital from January 2011 through February 2012. The authors integrated the surgical procedures with appointment scheduling, chemotherapy administration, and radiation appointments from 4 separate health information and scheduling systems (Table 3).

A timeline was generated for each patient that captured milestones, such as initial consult date, first definitive surgery date, last definitive surgery date, and subsequent adjuvant therapy dates. Random chart audits were conducted throughout the data-integration process to ensure the validity of the dataset. These chart audits revealed gaps in the data that the authors were able to address through iterative data extraction.

The initial dataset included 720 patients. However, to prioritize improvement interventions, the project focused on patients who underwent surgeries at 2 primary sites: BWH and BWFH. The final dataset used to drive improvement efforts included information from 584 patients with breast cancer (Table 4). Separate analyses were conducted to measure the time from the patient's initial contact with DFBWCC to the initial consultation.

Using Baseline Data to Drive Improvement

Many quality improvement models emphasize the importance of collecting baseline measures to assess changes after implementing an intervention. The DFBWCC database created a mechanism to measure

Table 3 Data Points Used

Patient Data	Data Source
BWH and DFCI medical record numbers	
Type of consult (medical oncologist, surgical oncologist, multidisciplinary appointment)	DFCI scheduling system
Consult date	BWH PO billing data, DFCI scheduling system
First definitive surgery date, procedure type, and breast surgeon	BWH PO billing data
Last definitive surgery date, procedure type, and breast surgeon	BWH PO billing data
Plastic surgeon consult date	BWH PO billing data
Same-day reconstruction for first definitive surgery date, procedure, and plastic surgeon	BWH PO billing data
Same-day reconstruction for last definitive surgery date, procedure, and plastic surgeon	BWH PO billing data
Surgical postoperative appointment date	DFCI scheduling system, BWH PO billing data
Medical oncology postoperative appointment date	DFCI scheduling system, BWH PO billing data
First date of chemotherapy before and after last definitive surgery	Chemotherapy order entry system
Radiation oncology consult date, simulation date, and treatment start date	Radiation oncology system

Abbreviations: BWH, Brigham and Women's Hospital; DFCI, Dana-Farber Cancer Institute; PO, physician organization.

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Table 4 Number of Patients by Transition in Care

Type of Transition	Patients (N)
Patient-scheduled date to appointment date	2674
Consultation to first definitive surgery	584
Last definitive surgery to adjuvant chemotherapy	192
Last definitive surgery to radiation	207
Chemotherapy to radiation	91

baseline and postintervention improvements along the 4 established KPIs. This comprehensive database will be critical for evaluating changes in timeliness of care at DFBWCC.

Creating this dataset allowed the team to analyze each transition in care and quantify the variability within those transitions. The dataset also generated discussions among providers and administrators about the causes for variations in timeliness of care. The data helped identify internal best practices, such as early referral to plastic surgery for potential mastectomy, and scheduling postoperative medical oncology appointments at the time of scheduling surgery. The DFBWCC Multidisciplinary Breast Leadership Team, consisting of providers from the surgical, medical, and radiation oncology departments, reviewed the data and set goals for each KPI (Table 5).

After target goals were set, work groups were created to improve the coordination of care transitions. For example, to expedite the timing of adjuvant chemotherapy, a team of front-line administrative staff from medical and surgical oncology departments was formed to develop new workflows for scheduling postoperative surgical and medical oncology appointments. The work group redesigned processes to facilitate earlier medical oncology follow-up, thereby

Table 5 Key Performance Indicator Goals

- 5 days from patient call to consult date
- 14 days from consult to first definitive surgery for mastectomy and lumpectomy
- 28 days from consult to first definitive surgery for mastectomy with immediate reconstruction
- 28 days from last definitive surgery to initiation of adjuvant chemotherapy
- 28 days from last chemotherapy treatment date to initiation of radiation therapy

shortening the time from completion of surgery to initiation of adjuvant chemotherapy.

An overarching principle has been that processes should be standardized and independent of individual providers. The interventions developed by the teams have been implemented over the previous year, and the new processes are currently being tested and validated to assess their value. Future reports are planned to discuss the outcomes of this effort.

Challenges to Creating a Dataset

The creation of a single dataset to capture the timeliness of patient care across DFBWCC has been challenging. This endeavor required close collaboration between clinicians, department administrators, information systems staff, and the data analytics team, and took nearly a year to complete. One of the main challenges was merging the data based on medical record numbers, because each DFBWCC site and radiation oncology treatment center assigns a unique medical record number to the same patient.

To ensure data accuracy and integrity, the authors conducted random chart audits. Records were also audited for all patients whose transitions between episodes of care were deemed exceptionally long. The need to audit data delayed the presentation of and acting on the data. Therefore, a time lag exists with internal data, although this lag is shorter than that for the NCCN data. Despite the complexities involved, the internal dataset has proven essential for process and quality improvement efforts.

Summary

Improving the timeliness of breast cancer care at DFBWCC is a complicated endeavor involving multiple disciplines and clinical sites. Various technical and administrative impediments were encountered due to the complexity of this broad-based initiative. Significant time was spent defining, collecting, validating, integrating, and analyzing multitudinous episodes of care. Analyses revealed several barriers to timely care and, in the coming months, the authors hope to share these key findings and the results of implementing novel approaches for reducing delays in care at a large, distributed, academic, multidisciplinary cancer center.

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