Development and Implementation of a Medical Oncology Quality Improvement Tool for a Regional Community Oncology Network: The Fox Chase Cancer Center Partners Initiative

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Key Words
Medical oncology, quality auditing, NCCN guidelines, quality improvement

Abstract
Fox Chase Cancer Center Partners (FCCCP) is a community hospital/academic partnership consisting of 25 hospitals in the Delaware Valley. Originally created in 1986, FCCCP promotes quality community cancer care through education, quality assurance, and access to clinical trial research. An important aspect of quality assurance is a yearly medical oncology audit that benchmarks quality indicators and guidelines and provides a roadmap for quality improvement initiatives in the community oncology clinical office setting. Each year, the FCCCP team and the Partner Medical Oncologists build disease site- and stage-specific indicators based on National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines in Oncology. Concordance with multiple indicators is assessed on 20 charts from each community practice. A report for each FCCCP medical oncology practice summarizes documentation, screening recommendations, new drug use, and research trends in a particular disease site. Descriptive statistics reflect indicators met, number of new cases seen per year, number of disease site cases from tumor registry information, and clinical trial accrual total. Education and documentation tools are provided to physicians and oncology office nursing staff. The FCCCP Clinical Operations Team, consisting of medical oncologists and oncology-certified nurses, has conducted quality audits in medical oncology offices for 7 years using NCCN-derived indicators. Successful audits comprising gastric, colorectal, and breast cancer have been the focus of recent evaluations. For the 2005 stage I/II breast cancer evaluation, mean compliance per parameter was 88%, with 15 of 16 practices achieving mean compliance greater than 80%. A large-scale quality assurance audit in a community cancer partner network is feasible. Recent evaluation of localized breast cancer shows high compliance with guidelines and identifies areas for focused education. Partnership between academic and community oncologists produces a quality review process that is broadly applicable and adaptable to changing medical knowledge. (UNCCN 2007;5:875-882)

Background
As medical treatment guidelines and quality measures for cancer care continue to develop, academic and community...
hospitals are challenged to assess, educate, implement, evaluate, and continuously monitor compliance. There is increasing pressure on the medical oncology community to practice evidence-based medicine, which includes the implementation of quality control measures, use of multidisciplinary decision-making, and standardization of care against quality benchmarks.¹⁻³ Hospitals expect oncologists and accrediting bodies to help guide quality development in their settings. In turn, oncologists rely on national consensus standards developed by academic centers, accrediting bodies, and payors to set the standard of care for the hospitals and private practices in which they work. The large number of quality measures developed by the American College of Surgeons, the National Quality Forum, and the joint collaboration by the National Comprehensive Cancer Network (NCCN) and American Society of Clinical Oncology (ASCO) has significantly influenced medical oncologists in both practice management and quality improvement.⁴⁻⁶ Of these, oncologists in practice most commonly use the NCCN treatment guidelines (the most recent guidelines are available on the Internet at www.nccn.org). Developed through a collaboration of 21 National Cancer Institute (NCI)-designated cancer centers and updated annually, these guidelines contain extensive algorithms for treatment decision-making and encompass 95% of cancer diagnoses.

As a founding member of the NCCN and the academic base for the nation’s first known cancer affiliate program, Fox Chase Cancer Center (FCCC) is uniquely positioned to promote quality assurance initiatives at the community level. Established in 1986 as Fox Chase Network, Fox Chase Cancer Center Partners (FCCCP) is a select group of 25 community-based hospitals throughout southeastern Pennsylvania and New Jersey whose cancer programs are affiliated with FCCC in Philadelphia, Pennsylvania (Figure 1). The program has several primary missions, including documenting quality care at affiliate sites and promoting community-based research.

Purpose
Through FCCCP, FCCC collaborates with community hospitals to translate NCCN guidelines to community-based medical oncologists and monitor guideline compliance in the private practice medical oncology office setting. Building on the authors’ pilot experience,¹ the FCCCP program developed a full quality implementation and monitoring plan to measure compliance with NCCN guidelines. This article reviews the evolving experience over the past 7 years in implementing this process. In addition, recent data generated during the last full audit for the evaluation and treatment of stage II/III breast cancer is presented in more detail.

Methods
Objectives
For the past 7 years, FCCC medical oncologists, the Medical Director and Associate Medical Director of FCCCP, 4 registered nurses (RNs), Oncology Certified Nurse clinical staff (including the Director for Clinical Operations and 3 Senior Project Managers), FCCC biostatisticians, and 16 private practice medical oncology offices representing more than 40 community hospital medical oncologists have worked jointly with FCCCP to develop a comprehensive approach to quality improvement and guideline implementation (Table 1).

Phase I: Education and Dissemination of NCCN Guidelines
Phase I of this process began with a routine discussion and dissemination of the NCCN guidelines at all FCCCP sites. This was accomplished by working with the cancer registrars, community hospital operations directors, and medical directors and chairpersons of each community partner cancer committee. Every year, the FCCCP Senior Project Manager or the Director of Clinical Operations delivered 5 CDs containing electronic versions of the NCCN guidelines (as documented on the NCCN Web site; www.nccn.org) to each community partner cancer committee meeting. NCCN guidelines were subsequently used during tumor board conferences, grand rounds, and disease-specific case conferences, and as a key component of every FCCC regional continuing medical education session held for FCCCP institutions. Continuing medical education programs were specifically planned each year to correspond to a quality improvement initiative in the FCCCP audit process.

Phase II: Selection of Annual Disease Site and Data Management Considerations
Each year, the FCCCP Clinical Operations team worked with the FCCC medical oncology staff and
community oncologists to select a disease site for a yearly audit. The specific disease site was chosen based on disease incidence and recent practice-altering changes to NCCN guidelines. An example is the selection of stage III colon cancer based on the recent incorporation of oxaliplatin into standard adjuvant therapy. An expert panel of FCCC oncologists then selected critical indicators for review and worked with the Director of Clinical Operations to develop a metrics tool that encompassed the patient's full course of therapy from staging through treatment and follow-up. This draft tool was then shared with FCCCP community medical oncologists in 3 formats for edits and comments. It was initially e-mailed directly for comment by replying to the Associate Medical Director. Secondly, the Associate Medical Director of FCCCP and the participating community medical oncologists have a teleconference to review the disease site, rationale for study, and indicators with evidence-based documentation. Thirdly, the medical directors at each Partner institution individually reviewed the draft tool. This process captured comments from all participants in formats acceptable to busy clinicians.

When the audit tool was defined and accepted, a data dictionary was constructed to discuss each indicator in detail to increase auditor comfort level with identifying accurate medical record information. An audit of FCCC charts to test the tool was conducted before dissemination at FCCCP sites. A relational database (PRESAGE) was used most recently by specific office practices and physicians to capture data.

Phase III: Audit Preparation, Audit Function, and Quality Controls

Before on-site review, the Operations Director and Associate Medical Director shared the approved
audit tool with Senior Project Managers. This team of 5 acts as the auditors for the on-site review. An internal education session reviewed critical features of the audit tool, including pathology, surgical excision terminology, review of systemic treatment regimens and dosing, tumor registry staging criteria, and discussion of current disease-specific clinical trials. To maintain audit reliability, the Director of Clinical Operations went on-site with the Senior Project Managers to jointly conduct the first audit. The Associate Medical Director, a treating oncologist, handled any discrepancies or questions that arose during or after the audit.

An initial letter of invitation was sent to all practicing medical oncologists within FCCCP asking them to participate in that year’s medical oncology audit. When the medical oncologists accepted the invitation, their Office Practice Manager and the associated...
hospital tumor registrar received information about data collection. The week before the audit, information was requested again so that information and charts were available on the actual audit day. The day of the audit, a Health Insurance Portability and Accountability Act Business Associate Agreement was signed so the team could have access to patient charts and conduct the audit. No patient identifiers were used for collection of data. The Director of Clinical Operations and/or the Senior Project Managers conducted the audit on-site in the medical oncology office in a single yearly review. The medical oncologists had the opportunity to continue using the audit tool if they so chose. Approximately 320 charts per year were reviewed in this manner throughout FCCCP.

The audit itself has included the following cancers in the past 7 years: breast (2001), lung (2002), prostate (2003), resectable esophageal/gastric (2004), stage II/III breast (2005), and stage III colon (2006-2007). Although different each year, the audit tool routinely contains key elements, summarized in Table 2.

### Phase IV: Audit Report, Implementation of Best Practice Methodologies

On the day of the audit, the team verbally reported the outcome to the medical director or medical oncologist who had approved the audit and the office practice manager or nurse coordinating the audit. Some medical oncologists shared the report with the Director of Operations at their affiliated hospital. They were then able to use the report as a cancer committee quality improvement measure for accreditation purposes, because it encompassed an evaluation of treatment decision-making and best practice methodologies to improve overall patient care. A written audit report was made available within 2 weeks. This provided an opportunity for the FCCCP Medical Director and Associate Medical Director to review the raw audit data for calculating quantitative analysis of guideline implementation and gathering the best practice methodologies for each standard for the final report. An example of an audit report is provided in Figure 2.

The audit team wrote individualized practice reports. In addition, a cumulative benchmark summary was provided that included all participants with blinded identifiers. The audit results assessed compliance to each indicator and provided a percentage of compliance.

Often FCCP, NCCN institutions, and community Partner sites share tools to improve documentation in certain areas of the audit. Policies and procedures are shared for development of an informed consent form and disease-specific indicators, such as genetic risk assessment and pain management documentation, and for assessing patients for clinical trials.

### Results from the 2005 Audit

During 2005, the authors evaluated compliance with NCCN guidelines for stage IIb/IIa breast cancer. Charts of 277 patients from 2002 through 2005 were assessed using the annual audit elements and breast-specific indicators noted in Table 3. Results were compared with corresponding NCCN guidelines and include the following:

**Medical Documentation:** Percent compliance with NCCN guidelines by parameter for documentation were: pathology report (90.2%), staging (100%), estrogen receptor/progesterone receptor (92.4%) and HER2/neu status (87.5%), menopausal status (92.3%), results of diagnostic mammogram (83.2%), and consultations of surgical and radiation oncologists (92.8% and 76%, respectively).

**Treatment:** After undergoing lumpectomy, 85.1% of women were treated with radiation therapy. Sentinel lymph node dissection with or without axillary lymph node dissection (ALND) was performed in 96% of

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Key Elements of the Annual FCCCP Medical Oncology Audit</th>
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<tbody>
<tr>
<td>Number of new patients on clinical trial</td>
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<td>Number of new office consults</td>
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<tr>
<td>Number of chemotherapeutic treatments</td>
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<tr>
<td>Total number of analytic/nonanalytic tumor registry cases</td>
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<tr>
<td>Number of disease-specific analytic/nonanalytic tumor registry cases</td>
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<tr>
<td>Number of patients accrued to clinical trials</td>
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<td>Disease-specific clinical trials accrual</td>
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<td>Staging of patient</td>
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<td>Multidisciplinary team opinion based on disease site</td>
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<td>Diagnostic workup based on disease site</td>
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<td>Treatment plan</td>
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<tr>
<td>Chemotherapeutic intervention and regimens given with cycles included</td>
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<tr>
<td>Follow-up plan of care recorded depending on disease site</td>
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*Detail for each indicator is by calendar year.
Abbreviation: FCCCP, Fox Chase Cancer Center Partners.
Medical Oncology Quality Improvement Analysis 2005
Site: Breast Cancer

Demographics:
Physician or group name: Dr. XX
Institutional affiliation: XX
Audit Date: 5-4-06
Auditors: Peg O’Grady and Bonnie Miller
Number of new patients on clinical trials for 2004: 54
Number of new office consults in 2004: 629/199 breast
Number of chemotherapeutic treatments in 2004: 5427 intravenous infusion, 1661 intravenous push
Total cancer cases analytic and nonanalytic numbers from tumor registry 2004: 1392 analytic, 431 nonanalytic
Number of breast cancer cases 2004 analytic and nonanalytic from your tumor registry: 260 analytic, 117 nonanalytic
Number of breast cases on clinical trials in 2004: 21 treatment accruals
Ratio of new patients to clinical trials accrual: 3.9%
Ratio of total breast cases (analytic) to breast patients on clinical trials: 8%, well above ACoS 4%.

Synopsis:
• 20 cases of breast cancer stages T2 through and including T3, N2, M0 stage II, III were reviewed utilizing a 26 point indicator quality improvement tool based on National Comprehensive Cancer Network guidelines (See attached data tool with chart detail).
• Please note an Electronic Medical Record (EMR) system was used to capture all of the data elements. We want to thank Dr. XX for saving us 3 hours of additional workload. The EMR was a great resource and incredibly easy to use.
• Compliance was noted in the following areas:
  ❍ Good documentation with staging, documentation of unilateral vs. bilateral disease, patient age at diagnosis, hormonal status, multidisciplinary consultation. As sentinel lymph node technique came into accepted practice of care noted less full axillary node dissections completed. Generally 8 nodes or more were examined if axillary dissection was completed. Good follow-up and family history documentation with referral to the high-risk genetic counseling program. We noted Adriamycin, Cytoxan, and Taxol as the drugs of choice for treatment with the beginning of aromatase inhibitors being offered beginning 2004, 2005 cases. Clinical trial treatment noted on 2 patients NSABP B-38 trial. Flow sheets are easy to follow have clinical trial performance status and follow-up information that is very useful to research staff.
• Variance to compliance was noted in the following areas:
  ❍ Diagnostic mammogram on the chart with 8 exceptions. (Note: EMR could have been transitioning so not all records made it to EMR.) No operating room reports to see exactly what procedure was done but excellent synopsis notes by Dr. XX on procedure. Follow-up GYN exam was not routinely reviewed. If patient was greater then 50, they were not routinely educated on screening colonoscopy. Pathology reports were difficult to interpret from 2003 backward but got significantly clearer with better-defined margins documented from 2004 forward. Limited documentation on reconstructive options discussed with patients as part of their plan of care.
• Tools that could be utilized include:
  ❍ Patient flow sheet additions to include screening colonoscopy question for any patient older than 50 years and GYN history at least annually.
  ❍ Since Dr. XX has led the way with an EMR, perhaps linking to the hospital system in some way could help to make sure hospital based diagnostics can be added easily to the system to complete the medical record.
  ❍ See below table of top accruing studies within FCCCP to give some additional studies you may wish to consider for your breast cancer patient population both treatment and high-risk.

Questions and comments may be directed to Peg O’Grady at Fox Chase Cancer Center Partners. Phone: 215-728-3832; E-mail: Peg.OGrady@fccc.edu

Figure 2 Sample audit report from 2005.
Abbreviation: NSABP, National Surgical Adjuvant Breast and Bowel Project.
surgeries, with full ALND performed in 99% of cases with positive sentinel lymph node. Eight or more lymph nodes were dissected in 71.9% of patients. Overall, 83.7% of patients were treated with adjuvant chemotherapy, with 78.7% administered NCCN-recommended regimens.

**Clinical Trial Accrual:** Accrual was 6.2%, which exceeded American College of Surgeons commendation standards for comprehensive community programs. Overall, mean percent compliance per NCCN parameter among practice groups was 87.8% (range, 41.6%-96%), with 15 of 16 hospitals achieving mean compliance greater than 80%.

**Lowest Compliance:** The lowest compliance was noted for dissection of 8 or more lymph nodes in patients who had positive sentinel lymph node biopsy (72.6%) and for documentation of radiation oncologist consultation (77.2%). In addition, health maintenance recommendations, such as screening colonoscopy and consultation of a gynecologist, were only documented in 24.6% and 35% of the charts, respectively. However, these variances may partially be affected by a short interval from diagnosis in some patients undergoing adjuvant treatment at audit.

After completion of the audit, all participants received the benchmarked information specific to breast cancer outcomes. They also received a survey asking how audit results impacted their practice. Among the 15 of 16 practices that responded, 53% reported that they used the tools provided to improve chart documentation; 13% initiated new clinical trials in that disease site; 13% conducted staff education; and 6% built indicators for their office electronic medical record. Some practices implemented no changes but suggested they are being discussed (6%). One had no changes implemented (6%). All changes were believed to benefit the overall coordination of care.

Other quality enhancement initiatives postsurvey included 3 regional continuing medical education programs solely dedicated to breast cancer screening, prevention, treatment, and high-risk patient populations. FCCC experts lectured on current treatment trends and offered tailored education to the needs identified from the NCCN guideline audit.

### Table 3 2005 Breast Cancer Audit Tool

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<th>Practice Name:</th>
<th>Audit Date: XXXX</th>
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<tbody>
<tr>
<td>Case #</td>
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**Staging on chart?**
- Pre- or postmenopausal documented on chart?
- Diagnostic mammogram report on chart?
- Gynecologic examination on chart for follow-up?
- If greater than 50 screening colonoscopy recommended?
- Consult with surgical oncology on chart?
- Consult with radiation oncology on chart?
- If lumpectomy, radiation?
- Axillary dissection following positive sentinel lymph node?
- Sentinel lymph node/axillary lymph node dissection
  - (1 = sentinel/full axillary; 2 = no lymph node bx)
- If full lymph node dissection, greater than 8 lymph nodes?
- Pathology on chart?
- Pathology with ER/PR status?
- Pathology with Her2/neu status?
- Use of chemotherapy?
- Accrual for clinical trials

**Future Directions, Discussion, and Conclusions**

As quality improvement is a continuous process, so is the development of FCCCP tools. Over the past 7 years, FCCCP has continually adjusted and improved the auditing tool to evaluate compliance with NCCN guidelines at FCCCP affiliates. What was a paper tracking system of chart audit is now an automated relational database (PREASGE) that will lead to more efficient real-time benchmarking among FCCCP sites. The future of the FCCCP Quality Program is to broadly disseminate and integrate into office practices the quality indicators according to disease site in a systematic manner that will assist physician practices as pay for performance becomes a reality. Eventually, the community medical oncology offices will be trained to independently audit yearly with education, quality control, and supervision by FCCCP staff. In the coming year, the authors plan to incorporate a formal cost analysis of this audit tool. One potential limitation of the current methodology is its reliance on medical oncology charts. Because cancer is increasingly a multidisciplinary endeavor, future audits will include surgery and radiation oncology documentation to encompass all aspects of cancer care. As a plethora of national guidelines, quality metrics, and standards for cancer care continue to be debated,
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Medical oncologists strive for continuous quality improvement in their practices. The FCCCP program has developed a collaborative model of quality improvement to support medical oncology and rigorously define metrics that can be realistically implemented and monitored. The authors’ most recent experience in stage II/III breast cancer suggests that although overall compliance is high, areas for education can be identified and improvements implemented to enhance patient care. More importantly, these metrics have been implemented and validated to be of proven benefit to practicing oncologists and the patients they serve.

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References