Int. J. Radiation Oncology Biol. Phys., Vol. 74, No. 5, pp. 1506–1512, 2009
Published by Elsevier Inc.
Printed in the USA.
0360-3016/09/$–see front matter

ELSEVIER

doi:10.1016/j.ijrobp.2008.10.012

**CLINICAL INVESTIGATION** **Breast**

# BASELINE UTILIZATION OF BREAST RADIOTHERAPY BEFORE INSTITUTION OF THE MEDICARE PRACTICE QUALITY REPORTING INITIATIVE

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**Purpose: In 2007, Medicare implemented the Physician Quality Reporting Initiative (PQRI), which provides financial incentives to physicians who report their performance on certain quality measures. PQRI measure #74 recommends radiotherapy for patients treated with conservative surgery (CS) for invasive breast cancer. As a first step in evaluating the potential impact of this measure, we assessed baseline use of radiotherapy among women diagnosed with invasive breast cancer before implementation of PQRI.**

**Methods and Materials: Using the SEER-Medicare data set, we identified women aged 66–70 diagnosed with invasive breast cancer and treated with CS between 2000 and 2002. Treatment with radiotherapy was determined using SEER and claims data. Multivariate logistic regression tested whether receipt of radiotherapy varied significantly across clinical, pathologic, and treatment covariates.**

**Results: Of 3,674 patients, 94% (3,445) received radiotherapy. In adjusted analysis, the presence of comorbid illness (odds ratio [OR] 1.69; 95% confidence interval [CI], 1.19–2.42) and unmarried marital status were associated with omission of radiotherapy (OR 1.65; 95% CI, 1.22–2.20). In contrast, receipt of chemotherapy was protective against omission of radiotherapy (OR 0.25; 95% CI, 0.16–0.38). Race and geographic region did not correlate with radiotherapy utilization.**

**Conclusions: Utilization of radiotherapy following CS was high for patients treated before institution of PQRI, suggesting that at most 6% of patients could benefit from measure #74. Further research is needed to determine whether institution of PQRI will affect radiotherapy utilization. Published by Elsevier Inc.**

**Breast neoplasms, Breast conserving therapy, Radiotherapy, Quality of care, Pay-for-performance.**

## INTRODUCTION

In 2006, Congress passed the Tax Relief and Health Care Act, which mandated the Centers for Medicare and Medicaid Services (CMS) to develop a pay-for-performance system whereby physicians would be reimbursed for their quality reporting efforts (1). In response to this legislation, CMS developed the Practice Quality Reporting Initiative (PQRI) (2). When introduced on July 1, 2007, the PQRI included 74 quality measures for physician reporting. Physicians who maintain at least 80% compliance with reporting their performance on three quality measures receive a 1.5% bonus payment from Medicare.

When initially introduced, the only PQRI measure directly applicable to radiation oncology was measure #74, which states ''radiation therapy recommended for invasive breast cancer patients who have undergone breast conserving surgery'' (2). This measure refers to the ''percentage of female cancer patients aged 18 through 70 years old who have undergone breast conserving surgery and who have received recommendation for radiation therapy within twelve months of the first office visit.''

Currently, data supporting the ability of pay-for-performance programs to improve the quality of health care are both limited and inconclusive (3, 4). The introduction of the PQRI program thus represents a unique social experiment whereby the impact of this pay-for-performance program on physician behavior can be prospectively studied. The first step in evaluating the potential impact of PQRI is to determine

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This study was presented at the 2008 ASCO/ASTRO/SSO Breast Cancer Symposium, Washington, DC, on September 6, 2008.

Dr. Benjamin Smith was supported by the American Society of Clinical Oncology Young Investigator Award and the Breast Cancer Research Foundation. This study used the linked SEER-Medicare database. The interpretation and reporting of these data are the sole responsibility of the authors. The authors acknowledge the efforts of the Applied Research Program, NCI; the Office of Research, Development and Information, CMS; Information Management Services (IMS); and the Surveillance, Epidemiology, and End Results (SEER) Program tumor registries in the creation of the SEER-Medicare database.

Conflict of interest: none.

Received Aug 7, 2008, and in revised form Oct 11, 2008. Accepted for publication Oct 14, 2008.

baseline compliance with PQRI measures before their implementation. Further, quantification of compliance with this quality indicator in the U.S. population will serve as a benchmark for other countries with different health care systems who seek to measure and improve quality of breast cancer care (5–7). Therefore, we determined baseline utilization of radiotherapy before implementation of PQRI in a cohort of Medicare beneficiaries for whom breast radiotherapy is recommended. In addition, we examined clinical-pathologic factors associated with omission of radiotherapy to identify potential barriers to improving utilization of radiotherapy.

## METHODS AND MATERIALS

### *Data source*

The SEER (Surveillance, Epidemiology, and End Results)-Medicare database tracks incident malignancies in Medicare beneficiaries residing within a SEER geographic region. From 2000 through 2002, the program included 16 registries accounting for 26% of the U.S. population (8).

### *Study sample*

In the SEER-Medicare data set, 7,208 women aged 66–70 years were treated with conservative surgery for invasive breast cancer between 2000 and 2002. The lower age limit was selected as 66 years, because individuals become eligible for Medicare at age 65, and 1 year of Medicare data is required to calculate the patient's comorbidity score before a breast cancer diagnosis. The upper age limit was selected as 70 years, because measure #74 only recommends radiotherapy for women aged 18 to 70. Conservative surgery was determined from both SEER and Medicare claims (Table 1) (9–13). The most extensive surgical procedure reported by SEER or Medicare during the first 12 months following diagnosis was considered the definitive surgery.

Of the initial sample, 420 patients were excluded for the following reasons: history of prior cancer, histology not consistent with epithelial origin, distant metastasis or unknown stage at diagnosis, and/or no pathologic confirmation. To facilitate use of Medicare billing claims, we then excluded 219 patients with any second cancer diagnosed within 12 months of the index breast cancer, because billing records could not discriminate between procedures performed for the index cancer versus the second cancer. We also excluded 767 patient without Part A and B coverage and 2,349 patients without fee-for-service coverage during an interval spanning 12 months prediagnosis to 9 months postdiagnosis. Finally, we excluded 73 patients who died within 12 months of diagnosis because they may not have lived long enough to receive radiotherapy, leaving 3,674 patients for the analysis.

### *Outcome*

The primary outcome was receipt of radiotherapy following conservative surgery. Receipt of radiotherapy was determined using both SEER and Medicare claims (Table 1) (10–15). Patients were considered to have received radiotherapy if either SEER or Medicare reported treatment with radiotherapy within 12 months of the date of diagnosis.

### *Treatment-related variables*

Receipt of chemotherapy within 6 months of diagnosis was determined from Medicare claims (Table 1) (16, 17). Adjuvant endocrine therapy is not reported by SEER or Medicare claims.

### *Patient-related variables*

Patient characteristics included age at diagnosis, race, marital status (18, 19), SEER registry, urban vs. rural residence, and median income of census tract or zip code (20). A modified Charlson comorbidity index (21–23) was calculated using Part A and B claims spanning an interval of 12 months to 1 month before diagnosis. To enhance specificity, Part B diagnosis codes were included only if they appeared either more than once over a time interval exceeding 30 days or in Part A claims as well (24, 25). A comorbidity score of 0 was considered absent comorbidity, 1 was considered mild comorbidity, and 2 or higher was considered moderate-to-severe comorbidity. If patients did not access or encounter the medical system in the year preceding diagnosis, then comorbidity could not be computed, and such patients were classified as having ''unknown'' comorbidity.

### *Tumor-related variables*

Tumor characteristics as reported by SEER include size, grade, and estrogen receptor (ER) status, and histology (26). Histology was coded as either tubular or nontubular, consistent with prior literature (27). Margin status and lymph-vascular space invasion are not reported.

### *Statistical analysis*

Bivariate associations between covariates and receipt of radiotherapy were tested using Pearson's chi-square. Covariates associated with receipt of radiotherapy at $\alpha < .10$ were then included in a multivariate logistic regression model, with unknown values entered as dummy variables. Goodness of fit was assessed using the Hosmer and Lemeshow test in which a $p$ value $> 0.05$ indicates an acceptable fit. All statistical analyses were two-tailed using an alpha level equal to 0.05 and were conducted using SAS version 9.1 (SAS, Cary, NC). The Wilford Hall Medical Center Institutional Review Board approved use of the SEER-Medicare database for this analysis.

Table 1. Claims codes used in this study

| Treatment | ICD-9 procedure codes | ICD-9 diagnosis codes | CPT/HCPCS codes | Revenue center codes |
|---|---|---|---|---|
| Radiation therapy | 92.21 – 92.27, 92.29 | V58.0, V66.1, V67.1 | 77401 – 77525, 77761 – 77799 | 0330, 0333 |
| Conservative surgery | 85.20, 85.21, 85.22, 85.23, or 85.25 | | 19110, 19120, 19125, 19160, or 19162 | |
| Chemotherapy | 99.25 | V58.1, V66.2, V67.2 | 96400 – 96549, J9000 – J9999, Q0083 – Q0085 | 0331, 0332, 0335 |

*Abbreviations:* ICD = International Classification of Diseases; CPT = Common Procedural Terminology; HCPCS = Healthcare Common Procedural Coding System.