

# Discontinuation of Radiation Treatment among Medicaid-Enrolled Women with Local and Regional Stage Breast Cancer

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■ **Abstract:** For women with nonmetastatic breast cancer, radiation therapy is recommended as a necessary component of the breast conserving surgery (BCS) treatment option. The degree to which Medicaid-enrolled women complete recommended radiation therapy protocols is not known. We evaluate radiation treatment completion rates for Medicaid enrollees aged 18–64 diagnosed with breast cancer. We determine clinical and socio-demographic factors associated with not starting treatment, and with interruptions or not completing radiation treatment. Using data from the Washington State Cancer Registry linked to Medicaid enrollment and claims records, we identified Medicaid enrollees diagnosed with breast cancer from 1997 to 2003 who received BCS. Among the 402 women who met inclusion criteria, 105 (26%) did not receive any radiation. Factors significantly associated with not receiving radiation included in situ disease and non-English as a primary language. Among those who received at least one radiation treatment, 65 (22%) failed to complete therapy and 71 (24%) patients had at least one 5 to 30 day gap in treatment. We found no significant predictors of interruptions in treatment or early discontinuation. A substantial proportion of Medicaid-insured women who are eligible for radiation therapy following BCS either fail to receive any treatment, experience significant interruptions during therapy, or do not complete a minimum course of treatment. More effort is needed to ensure this vulnerable population receives adequate radiation following BCS. ■

**Key words:** breast cancer, medicaid, radiation treatment discontinuation

More than 90% of the estimated 178,000 women diagnosed with breast cancer in 2007 have local-regional stage disease at diagnosis, and thus are potentially eligible for breast conserving surgery (BCS) followed by radiation therapy (1,2). Completion of planned radiation treatment following BCS is essential for local or regional disease management (or control)

to maximize a woman's chances for long term disease free survival following early stage breast cancer (3,4). Not receiving radiotherapy following BCS has been shown to adversely impact outcomes both in clinical trials (5) and in practice (6).

Previous studies have found that women with low incomes, low educational attainment, Medicaid as a primary health insurer, and those living in medically underserved regions are at risk for not receiving radiation therapy following BCS (7–9). Low income women facing barriers to obtaining health care, such as limited transportation options, child care issues, and difficulties affording the out of pocket costs

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associated with transportation to health care facilities, may have difficulty adhering to radiation therapy schedules. Thus, the barriers that prevent women from starting treatment also place them at risk for missing or not completing recommended courses of radiation therapy. To date, however, no study has examined the rate at which low income patients complete recommended courses of radiation therapy following BCS. In order to better understand nonadherence to adjuvant radiation therapy among low socioeconomic status women, we evaluated treatment completion rates among female Medicaid enrollees in Washington State who were diagnosed with local-regional stage breast cancer.

## METHODS

### Databases and Study Population

The study population consisted of Washington State Medicaid enrollees, ages 18 to 64, diagnosed with in situ, local, or regional stage breast cancer between January 1, 1997 and December 31, 2003. Women with breast cancer were identified using incidence data from the Washington State Cancer Registry (WSCR) and the Surveillance, Epidemiology, and End Results summary staging system (10). Washington State Cancer Registry is a statewide registry of all cancer incidence excluding nonmelanoma skin cancers. The WSCR has been funded since 1995 through the Centers for Disease Control and Prevention's National Program of Central Cancer Registries; the data for this analysis conforms to United States Cancer Statistics publication criteria.

To identify cases of breast cancer incidence among Medicaid enrollees the WSCR records were linked with Medicaid enrollment files from 1997 to 2003. To address the possibility of linking inaccuracies, missing data, and grouping of multiple individuals under the same insurance record, we used a probabilistic method to match the Medicaid and WSCR databases (11–13). Each linking variable is evaluated for degree-of-match and a weight is assigned which represents the informational content contributed by all linking information. The weights are used during the linking process to derive a total score that measures the statistical probability of a match. The matching process proceeds in blocks using social security number, last name, first name, year of birth, and day of birth. Incomplete or questionable matches identified by the program are checked by manual review.

After linkage of the Medicaid enrollment file and WSCR records, Medicaid insurance claims were obtained for those in the sample. Women were identified as having BCS by searching claims records for International Classification of Diseases (ICD-9) and Current Procedure Terminology (CPT) codes associated with BCS (see Appendix). Only women with in situ, local, or regional stage disease who were recorded as having a BCS on Medicaid claims records were included in the analysis. Women who had a mastectomy within 12 months following BCS were excluded.

We only used ICD-9 and CPT codes indicating radiation treatment (see Appendix) to identify patients who received radiation. We searched patient records for radiation therapy claims up to 12 months following the date of BCS. Similarly, we only counted patients who had one or more Healthcare Common Procedure Coding System (HCPC) code for chemotherapy agents (see Appendix) as receiving chemotherapy.

### Analysis

The primary objective of the analysis was to identify women who received less than the recommended radiation treatment courses, either due to interruptions in treatment or early discontinuation. To study treatment discontinuation it was necessary to define a minimum acceptable level of treatment using radiation therapy claims records. The National Cancer Institute recommends that BCS patients follow a standard course of radiation therapy consisting of "postoperative external-beam radiation therapy (EBRT) to the entire breast with doses of 45 Gy to 50 Gy, in 1.8 Gy to 2.0 Gy daily fractions over a 5-week period (4)." The precise implementation of this protocol varies depending on a number of factors, most notably whether or not the patient received chemotherapy prior to radiation treatment. If the patient does not receive chemotherapy, the recommended radiation dose is 5000 cGy in 200 cGy daily fractions (or 25 treatments) to the whole breast, followed by five tumor bed boost treatments of 1000 cGy in 200 cGy daily fractions. If the patient receives chemotherapy prior to radiation treatment, then the typical dose is 5040 cGy in 180 cGy daily fractions (or 28 treatments) followed by five tumor bed boost treatments of 1000 cGy in 200 cGy fractions.

Since dose information is not included in Medicaid claim forms, completion or non-completion of the

therapy was determined by the number of “units of service” (treatments) recorded and the time period over which these treatments were administered. Using the radiation dose information above, we assumed that the minimum number of individual claims for radiation was 30 for women not receiving chemotherapy and 33 claims for women receiving chemotherapy. The total number of treatments was counted from the initial radiation claim date. Interruptions in therapy were defined as a period of 5 to 30 calendar days without therapy, starting from the first claim until the minimum number of treatments had been administered. If an individual’s radiation claims record showed an interruption of 30 or more calendar days between radiation claims, the record was considered early discontinuation rather than interruption.

Ascertaining accurate dates of treatment to identify interruptions in therapy can be difficult. Multiple treatments over a period of time can be recorded as a single claim. In some cases the range of the service dates either exceeded or fell short of the time period that the number of treatments recorded on the single claim warranted. In these cases, we examined prior and subsequent claims to determine the actual dates of service. For instances where multiple treatments were recorded for a single date of service, the initial date of service for that claim was estimated by counting back (units of service  $\times 1.4$ ) days from the claim date of service. This algorithm assumes that billing was more likely to be retroactive and that therapy was not administered on weekends.

After identifying women who had interruptions or early discontinuation of radiation therapy, we used multivariate analyses to identify factors that were associated with (a) receipt of any radiation therapy following BCS, or (b) interruptions or early discontinuation following the initiation of radiation treatment. We hypothesized that the following are factors which increase the risk of both not starting radiation treatment and with having interruptions or early discontinuation from therapy: older age, higher number of non-cancer comorbidities as assessed by the Charlson comorbidity index; mental health disorders (not indexed in Charlson); substance abuse (see Appendix for a listing of mental health and substance abuse codes); primary language other than English; rural versus urban residence; administration of chemotherapy before or during radiation; and in situ tumor stage at diagnosis. Because mental health and sub-

stance abuse problems are common among Medicaid clients and these issues may interfere with adherence to treatment, we identified individuals as having mental health disorders and/or substance abuse issues if they had at least one of the diagnosis codes during the observation period.

A logistic regression model was used to evaluate the relationship between the factors noted above and receiving versus not receiving at least one radiation treatment session during 12 months following surgery. We used multivariate Cox proportional hazards models to determine whether the factors noted above were associated with early discontinuation or interruption prior to a full course of radiation therapy. Cox models were necessary to account for death, reaching age 65 and switching to Medicare as primary insurance coverage, and disenrollment from Medicaid during the follow-up period. As is necessary for Cox models, we tested the assumption of proportional hazards for each independent variable (14). The independent variable, indicating whether or not the patient received chemotherapy, violated the proportional hazards assumption; we therefore stratified the analysis on this variable.

## RESULTS

A total of 402 women met inclusion criteria for the study. The average age at diagnosis was 49.7 (SD 8.6), and 80% of the sample was white, which generally reflects the racial composition of Washington State (Table 1). Seventy-one percent (285 patients) had in situ or local stage disease at diagnosis.

Among those who met inclusion criteria, three patients (1%) died, eight patients (2%) “aged out” (i.e., turned 65 and therefore switched to Medicare), and 93 patients (23%) disenrolled from Medicaid prior to the end of the follow-up period. The remainder had at least 1 year of observation following the date of surgery. Of the 402 who had BCS, 21 patients (5%) only had claims for chemotherapy, 203 patients (50%) only had claims for radiation therapy, and 94 (23%) had claims for radiation therapy and chemotherapy, with the vast majority, 92 (98%) initiating chemotherapy prior to radiation. Eighty-four women (21%) had neither chemotherapy nor radiation recorded over the observation period. Of these women with no recorded treatment beyond surgery, 52 (62%) disenrolled from Medicaid or had large interruptions in Medicaid coverage (greater than 90 days) within one year of surgery.

**Table 1. Breast Cancer Patients with Breast Conserving Surgery Enrolled in the Washington State Medicaid Program, 1997–2003 (*n* = 402)**

| Demographic characteristics                            | <i>N</i> | % <sup>†</sup> |
|--------------------------------------------------------|----------|----------------|
| Age                                                    |          |                |
| <45                                                    | 107      | 27             |
| 45–54                                                  | 159      | 40             |
| 55–64                                                  | 136      | 34             |
| Race                                                   |          |                |
| Caucasian/Non-Spanish origin                           | 295      | 73             |
| Caucasian/Latin Hispanic origin                        | 30       | 7              |
| Black/Non-Spanish origin                               | 20       | 5              |
| American Indian                                        | 31       | 8              |
| Asian and Pacific Islander/Non-Spanish origin          | 16       | 4              |
| Unknown or other                                       | 10       | 2              |
| Location*                                              |          |                |
| Urban                                                  | 329      | 82             |
| Large rural city/town                                  | 31       | 8              |
| Small rural town                                       | 42       | 10             |
| Stage at diagnosis                                     |          |                |
| In situ                                                | 62       | 15             |
| Localized                                              | 223      | 55             |
| Regional                                               | 117      | 29             |
| Year of diagnosis                                      |          |                |
| 1997                                                   | 31       | 8              |
| 1998                                                   | 38       | 9              |
| 1999                                                   | 53       | 13             |
| 2000                                                   | 48       | 12             |
| 2001                                                   | 63       | 16             |
| 2002                                                   | 83       | 21             |
| 2003                                                   | 86       | 21             |
| Comorbidity score                                      |          |                |
| 0                                                      | 300      | 75             |
| 1                                                      | 76       | 19             |
| 2                                                      | 15       | 4              |
| 3                                                      | 11       | 3              |
| Mental health and alcohol/drug dependence <sup>‡</sup> |          |                |
| Mental health diagnosis only                           | 122      | 30             |
| Drug/alcohol dependence only                           | 9        | 2              |
| Both                                                   | 14       | 3              |
| Neither                                                | 257      | 64             |
| Primary language                                       |          |                |
| English                                                | 359      | 89             |
| Other                                                  | 43       | 11             |

\*Location categories were assigned by aggregating the 33 RUCA Data code definitions of the rural health.

Research Center at the University of Washington [http://depts.washington.edu/uwruca/codes.html]

<sup>†</sup>Percentages may not add up to 100% due to rounding.

<sup>‡</sup>One or more code recorded in the period prior to diagnosis (See Appendix).

### Time to Receipt of Radiation Treatment

Table 2 displays time in days between diagnosis and BCS, between BCS and radiation, and between the first and last radiation treatment. The average total number of days from diagnosis to initiating radiation therapy was 74.1 (SD 34.1) days among women with in situ disease, 132.3 (SD 84.3) days among women with localized disease, and 207.1 (SD 85.5) days for women with regional disease. Among those who received radiation therapy, the average number of radiation treatments was 32.5 (SD 12.3) for women

**Table 2. Time to Event**

| Time span                                                | <i>n</i> | Mean  | Days |     | SD    |
|----------------------------------------------------------|----------|-------|------|-----|-------|
|                                                          |          |       | Max  | Min |       |
| From diagnosis to treatment                              |          |       |      |     |       |
| Diagnosis to surgery ( <i>n</i> = 402)                   |          |       |      |     |       |
| In situ                                                  | 62       | 57.9  | 1183 | 0   | 175.1 |
| Local                                                    | 223      | 51.6  | 1635 | 0   | 165.1 |
| Regional                                                 | 117      | 65.9  | 1647 | 0   | 192.2 |
| Diagnosis to chemo ( <i>n</i> = 115)                     |          |       |      |     |       |
| In situ                                                  | 0        |       |      |     |       |
| Local                                                    | 52       | 74    | 296  | 7   | 49.8  |
| Regional                                                 | 63       | 69.7  | 232  | 23  | 43    |
| Diagnosis to radiation ( <i>n</i> = 297)                 |          |       |      |     |       |
| In situ                                                  | 33       | 74.1  | 147  | 19  | 34.1  |
| Local                                                    | 175      | 132.3 | 468  | 14  | 84.3  |
| Regional                                                 | 89       | 207.1 | 506  | 23  | 85.5  |
| Surgery to radiation* ( <i>n</i> = 274)                  |          |       |      |     |       |
| By chemotherapy status                                   |          |       |      |     |       |
| Chemo                                                    | 89       | 161   | 352  | 17  | 67.8  |
| No chemo                                                 | 185      | 80    | 344  | 12  | 67.5  |
| By stage                                                 |          |       |      |     |       |
| In situ                                                  | 29       | 43    | 105  | 12  | 24.9  |
| Local                                                    | 162      | 95    | 344  | 13  | 72.3  |
| Regional                                                 | 83       | 150   | 352  | 15  | 76.6  |
| From first to last radiation treatment ( <i>n</i> = 297) |          |       |      |     |       |
| Chemo                                                    | 94       | 50.5  | 92   | 1   | 14.8  |
| No chemo                                                 | 203      | 49    | 90   | 1   | 18.1  |
| All                                                      | 297      | 49.5  | 92   | 1   | 17.1  |

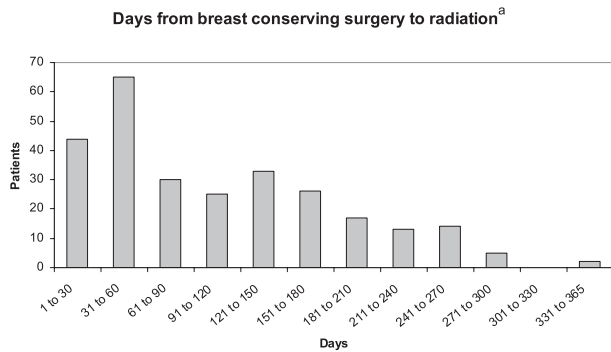
\*Patients who had radiation prior to surgery (*n* = 23) not included in analysis.

with in situ disease, 31.9 (SD 8.4) for women with local disease, and 32.2 (SD 7.1) for those with regional disease. There was no significant difference in number of radiation treatments for persons receiving versus not receiving chemotherapy across stages. The average number of calendar days from the first to last radiation treatment was 50.5 (SD 14.8) for women receiving chemotherapy and 49.0 (SD 18.1) for those not receiving chemotherapy.

Of the 297 patients who had any radiation, 23 (8%) initiated radiation treatment prior to surgery. The majority (60%) of the 274 who initiated radiation treatment following surgery did so within 4 months post-surgery (Fig. 1). The average number of days from BCS to first radiation treatment was 80 days (SD 67.5) for those who did not receive chemotherapy and 161 days (SD 67.8) for those who did.

### Incomplete or Discontinued Radiation Treatment

Among all patients who started radiation therapy, 65 (22%) failed to complete the expected course (Table 3). Of the 203 women who did not receive chemotherapy prior to radiation, 38 (18%) had less than the recommended number of treatments, while 27 (29%) of the patients who had chemotherapy failed to



<sup>a</sup>Does not include patients who had radiation prior to surgery

**Figure 1.** Frequency distribution of the number of days from the date of breast conserving surgery to the first recorded radiation therapy treatment ( $n = 274$ ). <sup>a</sup>Does not include patients who had radiation prior to surgery.

**Table 3. Total Number of Radiation Treatment Sessions Among those Receiving any Radiation ( $n = 297$ ). Radiation Therapy Sessions were Counted Between the First Date and the Final Date that Radiation Therapy was Recorded**

| Radiation treatments                                                                             | <i>n</i> | %   |
|--------------------------------------------------------------------------------------------------|----------|-----|
| Among those not receiving chemotherapy                                                           |          |     |
| 13 or less                                                                                       | 11       | 5   |
| 14 to 17                                                                                         | 7        | 3   |
| 18 to 21                                                                                         | 3        | 2   |
| 22 to 25                                                                                         | 7        | 3   |
| 26 to 29                                                                                         | 10       | 5   |
| 30* to 33                                                                                        | 89       | 44  |
| 34 to 37                                                                                         | 64       | 32  |
| 38 or more                                                                                       | 12       | 6   |
| Total                                                                                            | 203      | 100 |
| Among those receiving chemotherapy                                                               |          |     |
| 16 or less                                                                                       | 2        | 2   |
| 17 to 20                                                                                         | 4        | 4   |
| 21 to 24                                                                                         | 1        | 1   |
| 25 to 28                                                                                         | 3        | 3   |
| 29 to 32                                                                                         | 17       | 19  |
| 33† to 36                                                                                        | 62       | 66  |
| 37 or more                                                                                       | 5        | 5   |
| Total                                                                                            | 94       | 100 |
| Among all those receiving radiation, total receiving less than the standard course of treatments | 65       | 22  |

Minimum number of radiation treatment claims for recommended therapy:

\*30 for those not receiving chemo.

†33 for those receiving chemo.

See text for detailed description.

complete radiation treatment. Among all patients who started radiation therapy, 71 (24%) patients had at least one 5–30 day interruption in treatment. Among the 94 patients who also received chemotherapy, 20 (21%) had at least one interruption in treatment. Among those who did not have chemotherapy, 51 (25%) had at least one interruption in treatment. Of

**Table 4. Logistic Regression of Factors Associated with Receiving Radiation Therapy ( $n = 397$ , Five Subjects were Omitted from the Analysis Because Rural/Urban Information was Missing)**

| Factor                              | Odds ratio estimates |                            |       |
|-------------------------------------|----------------------|----------------------------|-------|
|                                     | Point estimate       | 95% Wald confidence limits |       |
| Proximity to provider*              | 0.694                | 0.359                      | 1.343 |
| Stage: in situ versus regional      | 0.429                | 0.203                      | 0.907 |
| Stage: localized versus regional    | 1.309                | 0.729                      | 2.350 |
| Caucasian                           | 0.506                | 0.254                      | 1.006 |
| Charlson comorbidity score          | 1.074                | 0.764                      | 1.510 |
| Rural urban†: rural versus urban    | 1.201                | 0.521                      | 2.764 |
| Rural urban: town versus urban      | 0.601                | 0.258                      | 1.400 |
| Age at diagnosis                    | 1.032                | 1.004                      | 1.062 |
| Chemotherapy: chemo versus no chemo | 1.630                | 0.875                      | 3.037 |
| Language: English versus other      | 1.419                | 0.691                      | 2.913 |
| Drug/alcohol dependence             | 1.300                | 0.239                      | 7.071 |
| Mental health diagnosis             | 1.037                | 0.620                      | 1.736 |

\*Provider facility and patient residence in same versus different zip codes.

†Location categories were assigned by aggregating the 33 RUCA data code definitions of the Rural Health Research Center at the University of Washington [<http://depts.washington.edu/uwrca/codes.html>]

those with one or more interruptions, 54 eventually received the recommended number of treatments.

### Relation of Radiation Therapy Discontinuation and Interruptions to Predictive Factors

In the logistic regression model, two factors were significantly associated with receiving any radiation treatment following BCS: in situ stage was negatively associated (OR = 0.43, 95% CI 0.20 to 0.91), and age at diagnosis was positively but only marginally associated (OR = 1.032, 95% CI 1.00 to 1.06) (Table 4). Among those who started radiation therapy, the Cox proportional hazards models did not identify factors that were significantly associated with either early discontinuation or experiencing one or more gaps in therapy (data not shown but available upon request).

## DISCUSSION

Medicaid enrollees have been shown to be at risk for not receiving key services when they develop serious diseases such as cancer. Medicaid-enrolled women with breast cancer have been shown to be less likely to receive adjuvant radiation following BCS than women with other types of insurance, and the factors influencing any receipt of radiation may also represent barriers to completing the recommended course of radiation therapy (7,9,15,16). In this study, we found

105 (26%) women undergoing BCS did not receive adjuvant radiation, and among those that started, more than 24% had one or more gaps in treatment, and 22% had less than what is considered a minimum necessary number of treatments. In multivariate analysis, we did not identify factors that were associated with interruptions or early discontinuation in treatment.

Consistent with prior studies, one clinical factor we found to be associated with lower likelihood of any adjuvant radiation was the diagnosis of ductal carcinoma in situ. Although trials comparing surgery alone with surgery plus radiation have demonstrated reduced rates of recurrence among those receiving adjuvant radiation therapy (17–20), experts do not agree whether there are subcategories of ductal carcinoma in situ patients who do not need radiation (21–23). We found that having a primary language other than English did not reduce the likelihood of receiving radiation treatment following BCS. A prior study found non-English speaking cancer patients reported more problems with coordination of, access to, and satisfaction with care (24).

Living farther from the treating facility (as measured by not living in the same zip code) and increasing levels of comorbidity were not associated with inadequate radiation treatment. This suggests that these were not major factors inhibiting treatment. Still, very few women in this comparatively young cohort had other illnesses, and few patients lived great distances from the treating facility, thus limiting our power to detect an association. Alternatively, women who have decided to begin radiation therapy may be more committed to completing the treatment course.

One unique aspect of our study was consideration of the relationship between mental health and alcohol or drug dependence problems and treatment attendance. We specifically examined mental health and substance abuse because they are not part of the Charlson comorbidity index, have relatively high prevalence among Medicaid clients, and may make women less willing or able to start or complete radiation. Although nearly 35% of the women in this sample had one or both of these problems, we did not find a significant association. It is possible that no association exists, or alternatively that we did not have sufficient sample size to detect it.

We found no single factor associated with experiencing an interruption in therapy. In our clinical experience, the most common reasons for interrup-

tions in treatment are: (a) the patient does not show up for the scheduled treatment; (b) the machines need servicing; and (c) skin reactions at the radiation site (most often moist desquamation or ulceration). Often, if the patient develops skin reactions, a lower dose will be administered rather than stopping treatment.

Interruptions in treatment may impact the effectiveness of the radiation therapy. Although there is no consensus regarding what constitutes a maximum acceptable gap between treatments, one retrospective study found decreased local control and overall survival for women with locally advanced breast cancer experiencing interruptions in treatment lasting more than 1 week (25).

We note several limitations to the analysis. First, we relied on administrative claims for evidence of inadequate radiation treatment. Claims have been shown to correlate well with chart records indicating whether radiation treatment was started (26), but may not be complete records of all treatments given. Diagnosis codes for substance abuse and mental health issues may also be inaccurate, most notably false negative coding (27). It should also be noted that the emergence of certain mental health disorders, especially anxiety and depressive states, are common following a breast cancer diagnosis (28) and therefore might be considered more the norm than a factor affecting treatment adherence. Chemotherapy studies indicate that women with depression are more likely to not complete prescribed therapy (29,30). It is not possible to know whether the 93 patients who disenrolled from Medicaid during follow-up completed treatment. Our Cox proportional hazards model treats these cases as censored, which avoids classifying them as receiving or not receiving treatment after the Medicaid claims records terminate. Finally, our sample size was comparatively small, perhaps limiting our statistical ability to find associations for some of the factors examined.

An additional potential limitation of our study includes the late recognition of stage IV disease in a patient following BCS, as a result of additional staging, performed for the discovery of positive lymph nodes at surgery, or by imaging done for radiation planning and simulation.

In addition to studies showing that Medicaid enrolled women with breast cancer have later stages of cancer at diagnosis and reduced rates of radiation therapy following BCS, we now find that a substantial

proportion of women do not complete recommended courses of radiation (8,31,32). These factors may explain why Medicaid-insured women with breast cancer have been found to have poorer survival compared to those with private health insurance (8,9). Studies have shown that programs of breast-conservation treatment for early-stage breast cancer can be implemented with good results, excellent treatment compliance, and 100% follow-up in a population of medically indigent women (33). A substantial proportion of women in this study did not receive recommended radiation treatment. Programs designed to improve adherence, such as patient navigation may be useful for this population and warrant further studies to determine their effectiveness (34,35).

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## APPENDIX

### Radiation treatment codes:

#### CPT4 codes

77401 – 77409, 77411 – 77414, 77416, 77418, 77422, 77423

#### ICD9 procedure codes

92.21 – 92.28

### BCS codes:

#### CPT4 codes

19120, 19125, 19126, 19160, 19162, 19301, 19302

#### ICD9 procedure codes

85.20, 85.21, 85.22, 85.23

### Behavioral health codes:

#### ICD9 diagnosis codes

290x, 294x, 295x, 296x, 297x, 298x, 298x, 299x, 300x, 301x, 3091, 30981, 310x, 311x

### Alcohol/substance abuse codes:

#### ICD9 diagnosis codes

303x, 304x