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ORIGINAL ARTICLE – BREAST ONCOLOGY

Variation in the Types of Providers Participating in Breast Cancer Follow-Up Care: A SEER-Medicare Analysis

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ABSTRACT

Background. The current guidelines do not delineate the types of providers that should participate in early breast cancer follow-up care (within 3 years after completion of treatment). This study aimed to describe the types of providers participating in early follow-up care of older breast cancer survivors and to identify factors associated with receipt of follow-up care from different types of providers.

Methods. Stages 1–3 breast cancer survivors treated from 2000 to 2007 were identified in the Surveillance, Epidemiology and End results Medicare database (n = 44,306). Oncologist (including medical, radiation, and surgical) follow-up and primary care visits were defined using Medicare specialty provider codes and linked American Medical Association (AMA) Masterfile. The types of providers involved in follow-up care were summarized. Stepped regression models identified factors associated with receipt of medical oncology follow-up care and factors associated with receipt of medical oncology care alone versus combination oncology follow-up care.

Results. Oncology follow-up care was provided for 80 % of the patients: 80 % with a medical oncologist, 46 % with a surgeon, and 39 % with a radiation oncologist after radiation treatment. The patients with larger tumor size, positive axillary nodes, estrogen receptor (ER)-positive status, and chemotherapy treatment were more likely to have medical oncology follow-up care than older patients with higher Charlson comorbidity scores who were not receiving axillary care. The only factor associated with increased likelihood of follow-up care with a combination of oncology providers was regular primary care visits (>2 visits/year).

Conclusions. Substantial variation exists in the types of providers that participate in breast cancer follow-up care. Improved guidance for the types of providers involved and delineation of providers' responsibilities during follow-up care could lead to improved efficiency and quality of care.

Almost 3 million breast cancer survivors are currently living in the United States, all of whom require follow-up care.[1–3] The current guidelines recommend frequent follow-up visits performed by a "physician experienced in the surveillance of patients with cancer and in breast examination"[1] or "members of the treatment team."[2] We and others have demonstrated that significant variation exists in how frequently patients receive follow-up visits during early follow-up care (defined as the first 3 years after completion of cancer treatment).[4–6]

In our study, this variation was strongly related to the intensity of treatment received, with women who received radiation, chemotherapy, or both more likely to have more frequent follow-up visits even after control was used for the patient's sociodemographic variables, tumor stage, and

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estrogen/progesterone receptor status. However, follow-up frequency also was associated with the number and types of oncologists involved in follow-up care,[6] which in turn was associated with the receipt of more "disordered" and potentially redundant care.[7] Because the current guidelines allow individual providers significant latitude in deciding whether to participate in ongoing follow-up care for a given breast cancer survivor or not, these findings suggest that challenges associated with coordinating care among multiple providers may contribute to increased frequency of follow-up visits.

Improving the efficiency of surveillance breast cancer care is an important component of improving overall quality of survivorship care.[8] Understanding patterns of care, as well as factors associated with different providers' participation in follow-up evaluation, can help to define the level of redundancy that currently occurs and identify opportunities to streamline care and optimize resource utilization. This streamlining is particularly critical given the high cost of providing cancer care[9] and the expected increase in demand for follow-up care (35 % increase by 2022) combined with a projected shortage of oncologists.[10]

This study aimed to describe the types and combinations of providers participating in the care of older breast cancer survivors within the first 3 years after a diagnosis and to identify factors associated with receipt of follow-up care from these different types of providers.

METHODS

This study was granted a waiver of consent by the University of Wisconsin Institutional Review Board.

Patient Selection

Using the linked Surveillance, Epidemiology and End Results (SEER)-Medicare database, we identified all female patients age 66 years and older with stages 1–3 invasive breast cancer diagnosed between 2000 and 2007. We focused on Medicare beneficiaries because they represent approximately 50 % of new breast cancer diagnoses.[11] Furthermore, these women most frequently have estrogen receptor (ER)-positive cancers with a favorable prognosis and often have competing comorbidities. Finally, because most women in this cohort undergo breast-conserving surgery (BCS) with radiation, they consult with multiple types of oncology providers. Consequently, they may be the most vulnerable to care coordination challenges and may benefit most from streamlined algorithms for care.

Patients were included in the study if they had undergone definitive breast surgery.[6] Continuous enrollment in Medicare parts A and B for 1 year before diagnosis was required to allow ascertainment of comorbidities through a minimum of 2 years after diagnosis, death, or 31 December 2009 (whichever came first) for an assessment of follow-up care received. Patients were excluded from the study if they were enrolled in a health maintenance organization (HMO) during the same period. Patients also were excluded if they had received a diagnosis of another malignancy 5 years before or after the date of the breast cancer diagnosis.

Primary Outcome Variable

The primary outcome variable in this study was the type of oncology provider involved in follow-up care. To ensure only follow-up care rather than active treatment, visits were captured. We defined the evaluable surveillance window as beginning 12 months after diagnosis or a minimum of 3 months after the last treatment, excluding endocrine therapy and reconstructive surgery.[12] We required that patients had a minimum surveillance period of 1 year. Our evaluable surveillance window ended at the earliest of the following events: (1) 4 years after diagnosis, (2) death, (3) 31 December 2009 (end of available data), or (4) 3 months before a new International Classification of Diseases (ICD)-9 diagnosis code for secondary cancer (excluding breast or unspecified site), a second SEER breast cancer diagnosis, or resumption of treatment after a 90-day gap.[13–15] Our surveillance window ended 3 months before these events to minimize bias associated with inappropriate capture of clinic visits for workup of recurrence or ongoing treatment.

All clinic visits with an appropriate evaluation and management code were assessed. Any visit with a surgical, medical, or radiation oncologist was considered to be an "oncologist visit." For the purposes of this study, we considered any general surgeon who performed breast cancer surgery (i.e., mastectomy or BCS) to be a surgical oncologist. We defined oncologist visits using the Medicare specialty provider code and linked American Medical Association (AMA) Masterfile.[16,17] In cases for which both the AMA Masterfile and Medicare specialty provider code were missing or did not indicate an oncology specialty, we evaluated physicians' claims to determine whether their clinical practice was consistent with that of an oncologist based on specified algorithms of case mix.[16] A breast cancer ICD-9 diagnosis code was required for any oncologist visits identified by these claims-based definitions.[16] Primary care physician (PCP) visits were defined using a similar strategy. Because identifying the reason for a PCP visit (cancer vs. non cancer) is not reliable through claims data, we report the total number of PCP visits rather than the number of cancer-related visits.

Patient-Related Variables

Basic demographics including date of birth, gender, race/ethnicity, and marital status, were obtained from the SEER patient entitlement and diagnosis summary file (PEDSF). Socioeconomic status was assessed using the census tract median level of household income and median level of education. Residence location was assessed using the Rural Urban Commuting Area codes. The Deyo implementation[18] of the Charlson Comorbidity Index[19] was used to assess patient comorbidities. The sixth edition of American Joint Committee on Cancer (AJCC) staging[20] was used to assign stage based on tumor size and number of positive nodes. In addition, ER, progesterone receptor (PR), and tumor grade were assessed using SEER. Definitions for treatment (type of surgery, chemotherapy, radiation) are included in the Appendix. Endocrine therapy could not be assessed because oral medications are not included in Medicare parts A and B.

Statistical Analysis

Summary statistics were used to describe patient demographic and disease characteristics for the entire cohort. We describe the proportion of patients who received follow-up care from an oncologist. To be considered as having received follow-up care by an oncology provider type, a patient needed to show at least two visits with that specialty during the surveillance period. We used univariate statistics (χ^2) to identify factors associated with receipt of follow-up care by an oncologist versus no follow-up care by an oncologist.

For the patients who had oncologist follow-up care, we summarized the types of oncology providers participating in follow-up care during the surveillance period. The vast majority of breast cancer survivors meet with medical and surgical oncology during their treatment course. However, whether patients are seen by a radiation oncologist varies based on the type of loco regional treatment received. To account for this, we conducted our analysis with four cohorts: (1) women treated with BCS alone ($n = 2357$), (2) women treated with BCS with radiation (XRT) ($n = 19{,}192$), (3) women treated with mastectomy alone ($n = 11{,}120$), and (4) women treated with mastectomy with XRT ($n = 2543$).

The findings for the BCS+XRT cohort and the mastectomy-alone cohort are presented in the body of the report. In general, similar trends were observed for the patients in the other two cohorts. We created stepped logistic regression models to identify factors associated with receipt of medical oncology follow-up care versus no medical oncology and to identify factors associated with medical oncology alone versus medical oncology in combination with radiation and/or surgical oncology accounting for patient demographic and disease characteristics. For the patients who did not receive radiation, the second model compared medical oncology alone and medical oncology in combination with surgical oncology.

RESULTS

Patient demographic, tumor, and treatment characteristics for the overall cohort ($n = 44{,}306$) are presented in Table 1. As shown, 80 % of the patients ($n = 35{,}212$) had follow-up care with an oncologist. The characteristics of the women with and without oncology follow-up care differed significantly (Table 1). The majority of the women without oncology follow-up care (63 %) were either older than 80 years, had a Charlson comorbidity score of 2 or higher, had not undergone axillary staging, or had an unknown ER status. During the follow-up period, 88 % of the patients without oncology follow-up care were seen by a PCP at least once.

Provision for Follow-up Evaluation by Oncology Providers

For the cohort of patients who had received follow-up care with an oncology provider, the types of providers participating in the follow-up care varied by the type of primary loco regional treatment administered (Fig. 1). The majority of the patients (66–90 %) had received at least some follow-up care from a medical oncologist, either alone or in combination with providers from other oncology specialties, with 46 % of the patients receiving follow-up care from a surgeon, and 39 % of the patients treated with radiation receiving follow-up care from a radiation oncologist. Of the patients treated with radiation, 12 % received follow-up care from all three specialties.

Factors Associated with Oncology Provider Follow-up Care

Table 2 describes the factors associated with medical oncology follow-up care (alone or in combination or other oncology providers) compared with follow-up care by a radiation oncologist, surgeon, or both. Larger primary tumor size, positive axillary nodes, ER-positive status (likely as a surrogate for receipt of adjuvant endocrine therapy), and chemotherapy treatment all were associated with at least some follow-up care by a medical oncologist. Conversely, older patients, those with higher Charlson comorbidity scores, and those not undergoing axillary staging were less likely to have received any follow-up care with medical oncology (i.e., followed up instead by a radiation oncologist and/or surgeon). In addition to these clinical characteristics, having clinic appointments with a

TABLE 1 Demographic and clinical characteristics of the overall cohort and by follow-up care with an oncologist

	Overall cohort ($n = 44,306$) % (n)	Follow-up with an oncologist ($n = 35,212$) % (n)	No follow-up with an oncologist ($n = 9094$) % (n)	p Value
Age (years)				<0.0005
66–70	25 (11,137)	28 (9858)	14 (1279)	
71–75	25 (11,244)	27 (9555)	19 (1689)	
76–80	25 (10,894)	25 (8701)	24 (2193)	
>80	25 (11,031)	20 (7098)	43 (3933)	
Race				<0.0005
White	90 (39,708)	90 (31,639)	89 (8069)	
Black	5 (2423)	5 (1825)	6 (598)	
Other	5 (2175)	5 (1748)	5 (427)	
Marital status				<0.0005
Married	45 (19,857)	48 (16,881)	33 (2976)	
Widowed	38 (16,823)	35 (12,409)	59 (4414)	
Single	14 (6252)	14 (4879)	15 (1373)	
Unknown	3 (1374)	3 (1043)	4 (331)	
Rural	9 (3944)	8 (2930)	11 (1014)	<0.0005
CCS				<0.0005
0	65 (28,795)	67 (23,443)	59 (5352)	
1	23 (10,072)	22 (7901)	24 (2171)	
≥2	12 (5242)	11 (3729)	17 (1513)	
Tumor size (cm)				<0.0005
≤2	73 (32,290)	74 (25.902)	70 (6388)	
2–5	24 (10,667)	23 (8279)	26 (2388)	
>5	3 (1349)	3 (1031)	4 (318)	
Node				<0.0005
Negative	68 (30,216)	69 (24,396)	64 (5820)	
Positive	20 (8881)	22 (7622)	14 (1259)	
No path evaluation	12 (5209)	9 (3194)	22 (2015)	
ER/PR				<0.0005
Positive	64 (28,175)	65 (22,732)	60 (5442)	
Negative	24 (10,849)	24 (8594)	25 (2225)	
Unknown	12 (5282)	11 (3886)	15 (1396)	
Locoregional therapy				<0.0005
BCS without XRT	10 (4405)	7 (2357)	22 (2048)	
Mastectomy without XRT	34 (15,041)	32 (11,120)	43 (2921)	
Lumpectomy with XRT	50 (22,005)	54 (19,192)	31 (2812)	
Mastectomy with XRT	6 (2855)	7 (2543)	3 (312)	
Receipt of chemotherapy	17 (7396)	19 (6822)	6 (574)	<0.0005
Average PCP visits per year				<0.0005
0	8 (3631)	7 (2533)	12 (1098)	
1–2	25 (11,265)	24 (8615)	29 (2650)	
2–4	28 (12,439)	29 (10,122)	25 (2317)	
>4	38 (16,971)	40 (13,942)	33 (3029)	

CCS Charlson Comorbidity Score, *ER* estrogen receptor, *PG* progesterone receptor. *BCS* breast-conserving surgery, *XRT* BCS with radiation, *PCP* primary care physician

PCP during the surveillance period was associated with a higher likelihood of receiving follow-up care from a medical oncologist.

A number of patient, tumor, and treatment characteristics were associated with a decreased likelihood of having combination follow-up care with multiple types of

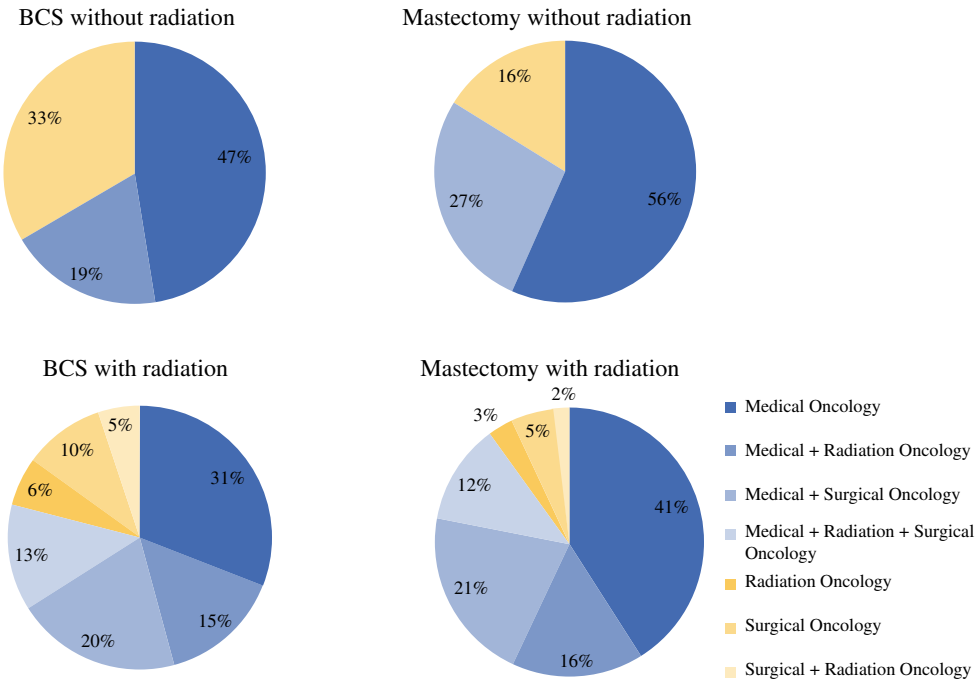

FIG. 1 Types of oncology providers participating in the follow-up care of older breast cancer survivors

oncologists (Table 3). The factor most consistently associated with a higher likelihood of receiving combination follow-up care with medical oncology and other oncologists (radiation oncology and/or surgery) was the number of PCP visits per year, with a higher number of PCP visits denoting a greater likelihood of receiving combination oncology follow-up care.

DISCUSSION

In this population-based cohort of older breast cancer survivors, we determined that substantial variation exists regarding the types of providers who participate in follow-up care. The vast majority (80 %) of the patients received follow-up care from an oncology provider. However, most of the patients also had regular visits with a PCP (93 %). The number of providers involved and the complexity of coordinating care among multiple providers creates the potential for significant redundancy and highlights an opportunity to improve both the efficiency and quality of breast cancer follow-up care.[8]

In our cohort, primary care was uncommonly the sole provider of follow-up care. This finding is consistent with prior studies suggesting that oncologists are reluctant to defer follow-up care completely to primary care in the first few years after a diagnosis.[21–25] However, the recognized importance of primary care involvement in the care of older breast cancer survivors for overall wellness also is reflected in our findings because the overwhelming majority of patients had regular primary care visits. These data highlight the need for a strong working relationship and good communication between oncologists and the PCPs with whom they share patients.

We observed that medical oncologists play a prominent role in follow-up care for older breast cancer patients. Our study showed that medical oncologists were more likely to follow patients who would be eligible for systemic therapy (i.e., patients with larger primary tumors, positive axillary nodes, or ER-positive status). Conversely, patients perhaps perceived as poor candidates for systemic therapy, due to age or comorbidities, were more likely instead to receive follow-up care by a surgeon, radiation oncologist, or both, together with their PCP. Overall, these observations are very consistent with the limited literature discussing reasons why different types of providers participate in breast cancer follow-up care.[26,27]

In our prior work, we determined that medical oncologists participated in follow-up care largely due to a sense of responsibility for ongoing therapy (i.e., endocrine therapy) and a perceived strong patient–physician relationship that developed during the course of chemotherapy.[27]

Although most patients received at least some follow-up care from a medical oncologist, 60 % additionally received follow-up care from a surgeon or radiation oncologist. The only factor consistently associated with receipt of combination follow-up care from multiple types of oncology providers was the number of PCP visits per year, with an increasing number of PCP visits related to a higher likelihood of also seeing a combination of oncology providers. Our data did not allow us to determine the etiology of this relationship. We hypothesize that this may reflect patients' ease of access to health care, a propensity for health care

TABLE 2 Demographic and clinical characteristics associated with follow-up care received from a medical oncologist (alone or in combination with other oncology providers) versus follow-up care by a radiation oncologist and/or surgeon only

	Mastectomy without radiation		BCS with radiation	
	(n = 11,120) (%)	OR (95 % CI)[a]	(n = 19,192) (%)	OR (95 % CI)[a]
Age (years)				
66–70	25	Reference	31	Reference
71–75	26	**0.9 (0.7–1.0)**	29	**0.8 (0.7–0.9)**
76–80	26	**0.7 (0.6–0.8)**	24	**0.7 (0.6–0.7)**
>80	23	**0.5 (0.4–0.6)**	15	**0.5 (0.4–0.5)**
Race				
White	88	Reference	91	Reference
Black	6	1.0 (0.8–1.2)	4	**0.8 (0.7–0.9)**
Other	6	1.0 (0.8–1.3)	5	1.2 (1.0–1.5)
Marital status				
Married	42	Reference	52	Reference
Widowed	42	**0.9 (0.8–1.0)**	31	**0.8 (0.9–1.0)**
Single	14	**0.8 (0.7–0.9)**	14	0.9 (0.8–1.0)
Unknown	3	0.9 (0.7–1.2)	3	1.0 (0.8–1.2)
Residency				
Rural	13	Reference	6	Reference
Urban	87	1.1 (1.0–1.3)	94	**1.2 (1.0–1.4)**
CCS				
0	64	Reference	69	Reference
1	23	1.0 (0.9–1.1)	22	1.0 (0.9–1.1)
≥2	13	**0.8 (0.7–0.9)**	9	**0.8 (0.7–0.9)**
Tumor size (cm)				
≤2	64	Reference	83	Reference
>2	36	**1.2 (1.0–1.3)**	17	**1.2 (1.1–1.3)**
Node				
Negative	70	Reference	76	Reference
Node positive	25	**1.7 (1.5–2.0)**	16	**1.9 (1.7–2.1)**
No path evaluation	5	**0.8 (0.6–0.9)**	8	**0.9 (0.8–1.0)**
ER/PR				
Positive	60	**1.4 (1.2–1.5)**	68	**1.3 (1.2–1.4)**
Negative	26	Reference	23	Reference
Unknown	14	1.0 (0.9–1.2)	9	1.0 (0.9–1.1)
Receipt of chemotherapy	21	**3.8 (3.2–4.5)**	16	**2.7 (2.4–3.0)**
Average PCP visits per year				
0	8	Reference	5	Reference
1–2	23	1.2 (1–1.4)	24	**1.2 (1–1.4)**
2–4	27	**1.3 (1.1–1.5)**	30	**1.4 (1.2–1.6)**
>4	42	**1.4 (1.2–1.6)**	41	**1.4 (1.2–1.6)**

BCS breast-conserving surgery, *OR* odds ratio, *CI* confidence interval, *CCS* Charlson comorbidity score, *ER* estrogen receptor, *PG* progesterone receptor, *PCP* primary care physician

[a] Bolded ORs have a $p < 0.05$. Model controls for income, education, tumor grade. OR > 1 reflects a greater likelihood of follow-up care received from medical oncology alone

utilization, or both.[28,29] However, it also may reflect uncertainty on the part of both oncologists and PCPs regarding their specific roles in follow-up care. This observation is worthy of further investigation because these results have important implications for coordination of care between specialists and PCPs.

TABLE 3 Demographic and clinical characteristics associated with follow-up care received from a medical oncologist in combination with other oncology providers versus medical oncologist alone

	Mastectomy without radiation ($n = 9345$)	BCS with radiation ($n = 15{,}054$)
	OR (95 % CI)[a]	OR (95 % CI)[a]
Age (years)		
66–70	Reference	Reference
71–75	**0.9 (0.8–1.0)**	0.9 (0.9–1.0)
76–80	**0.8 (0.7–0.9)**	**0.9 (0.8–0.9)**
>80	**0.6 (0.5–0.6)**	**0.8 (0.7–0.8)**
Race		
White	Reference	Reference
Black	1.1 (0.9–1.4)	0.9 (0.7–1.0)
Other	0.7 (0.6–0.9)	0.9 (0.7–1.0)
Marital status		
Married	Reference	Reference
Widowed	0.9 (0.8–1.0)	0.9 (0.9–1.0)
Single	0.9 (0.8–1.0)	**0.9 (0.8–1.0)**
Unknown	0.9 (0.7–1.2)	0.9 (0.7–1.2)
Residency		
Rural	Reference	Reference
Urban	1.1 (0.9–1.3)	**1.4 (1.2–1.7)**
CCS		
0	Reference	Reference
1	**0.8 (0.7–0.9)**	0.9 (0.9–1.0)
≥2	**0.7 (0.6–0.9)**	0.9 (0.8–1.0)
Tumor size (cm)		
≤2	Reference	Reference
<2	**0.9 (0.8–1.0)**	1.0 (0.9–1.1)
Node		
Negative	Reference	Reference
Node positive	1.1 (0.9–1.2)	1.0 (0.9–1.1)
No path evaluation	**0.8 (0.6–1.0)**	**0.8 (0.7–0.9)**
ER/PR		
Positive		
Negative	1.0 (0.9–1.1) Reference	0.9 (0.9–1.0) Reference
Unknown	0.9 (0.8–1.0)	1.0 (0.9–1.2)
Receipt of chemotherapy	**0.9 (0.8–1.0)**	1.0 (0.9–1.1)
Average PCP visits per year		
0	Reference	Reference
1–2	1.1 (0.9–1.4)	**1.2 (1.0–1.4)**
2–4	**1.4 (1.1–1.7)**	**1.4 (1.2–1.7)**
>4	**1.5 (1.2–1.8)**	**1.6 (1.4–1.9)**

BCS breast-conserving surgery, *CCS* Charlson comorbidity score; *ER* estrogen receptor, *PG* progesterone receptor, *PCP* primary care physician

[a] Bolded ORs have a $p < 0.05$. Model controls for income, education, tumor grade. OR > 1 reflects a greater likelihood of receiving combination oncology follow-up care

Very limited data exist in the literature examining why surgeons or radiation oncologists participate in breast cancer follow-up care. In a longitudinal study of breast cancer patients in Los Angeles and Detroit, only race was associated with surgeon follow-up care, with black women more likely to have follow-up care from a surgeon than from a medical oncologist.[26]

In our qualitative work, surgeons and radiation oncologists described a selective approach to their participation in breast cancer follow-up care.[27] This finding was driven

largely by what they perceived to be their specific skill set during follow-up care, namely, a potentially higher-quality physical exam to assess for locoregional recurrence. Surgeons and radiation oncologists were more likely to follow patients they thought may benefit most from such a focused exam, such as women with fat necrosis after radiation or women with a complicated postmastectomy exam. Importantly, radiation oncologists and surgeons also reported making their decisions whether to participate in follow-up care or not after determining what other providers were participating in follow-up care in an effort to minimize redundancy. Both of these cited reasons for surgeon and radiation oncologist follow-up care are very subjective and specific to the decision making of the individual provider. This likely contributed to the substantial variation in follow-up care observed in the current study.

Our study had the usual limitations associated with SEER-Medicare data, namely, that the findings cannot be generalized to a younger population. However, we hypothesize that the observed variation would be further exacerbated for younger patients because these patients are more likely to receive chemotherapy[30,31] and perhaps more likely to be selected by radiation oncologists and surgeons for follow-up care.[27]

The years of diagnosis included in our study were from 2000 to 2007 to allow for an adequate surveillance period for determining trends in practice. It is possible that trends in care, especially with regard to the role PCPs play, will have shifted. Furthermore, although we can report the number of PCP visits per year, we cannot report the reasons for those visits (i.e., breast cancer follow-up evaluation vs. other reasons). Consequently, our report may underestimate the amount of follow-up care (and potential redundancy in follow-up care) received by breast cancer survivors because we cannot know whether issues related to breast cancer follow-up care were addressed within the context of the PCP visits.

Finally, it was not possible in the claims data to assign mid-level providers to a specialty, so mid-level provider visits were not included in the analysis. This likely means we further underestimated the quantity of oncology-based follow-up care patients receive.

CONCLUSION

In this study of older breast cancer survivors, we determined that substantial variation exists in the type of providers participating in breast cancer follow-up care. Follow-up care is provided most commonly by a medical oncologist and driven by factors that would predict perceived appropriateness for receipt of systemic therapy. However, 60 % of patients receive follow-up care by other oncologists. No clear clinical predictors for participation by other oncologists were identified. In addition, 94 % of patients also were seen by their PCP for more general care, breast cancer follow-up care, or both.

The aforementioned findings, combined with our prior qualitative work,[27] suggest that improved guidance on what types of providers should participate in follow-up care and delineation of what each provider's responsibilities should be during follow-up care could help to decrease the observed variation in current clinical practice and redundancy in the system. Incorporation of such guidance into future clinical practice guidelines has the potential to improve both the quality and efficiency of breast cancer follow-up care.

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