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Primary care provider attitudes about and tendency to use non-recommended surveillance tests after curative breast cancer treatment

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Abstract

Purpose: Little is known about factors contributing to receipt of non-recommended surveillance testing among early-stage breast cancer survivors. We assessed primary care providers (PCP) attitudes about and tendency to order non-recommended surveillance testing for asymptomatic early-stage breast cancer survivors post-adjuvant chemotherapy.

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Author Contributions: LPW developed the study concept and all authors contributed to the design. PA conducted statistical analyses with input from LPW and MAM. MAM wrote the first draft of the manuscript. All authors contributed to the interpretation of data, critically revised the manuscript for important intellectual content, and approved of the final manuscript for submission.

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Methods: A stratified random sample of PCPs identified by early-stage breast cancer survivors were surveyed (N=518, 61% response rate). PCPs were asked how likely they would be to order bone scans, imaging and/or tumor marker testing using a clinical vignette of an early-stage asymptomatic patient where these tests are non-recommended. A composite tendency to order score was created and categorized by tertiles (low, moderate, high). PCP-reported factors associated with high and moderate tendency to order non-recommended testing (vs. low) were estimated using multivariable, multinomial logistic regression.

Results: In this sample, 26% reported a high tendency to order non-recommended surveillance tests during survivorship for early-stage breast cancer survivors. PCPs who identified as family practice physicians and PCPs reporting more confidence in ordering surveillance testing were more likely to report a high tendency to order non-recommended testing (vs. low) ((aOR family practice 2.09, CI 1.2, 3.8; aOR more confidence 1.9, CI 1.1, 3.3).

Conclusions: In this population-based sample of PCPs caring for breast cancer survivors, over a quarter of PCPs reported they would order non-recommended surveillance testing for asymptomatic early-stage breast cancer survivors. Efforts to better support PCPs and disseminate information about appropriate surveillance for cancer survivors are warranted.

Keywords

surveillance; breast cancer; survivorship; primary care

INTRODUCTION

Despite the growing population of cancer survivors and existence of multiple survivorship care guidelines to support the delivery of high-quality survivorship care, gaps remain in the quality of care for patients with breast cancer who have completed initial treatment for curative intent. Importantly, many women with a history of breast cancer receive non-recommended surveillance services post-treatment.[1] For example, many breast cancer survivors receive biomarker tests and advanced imaging for recurrence in the absence of symptoms despite recommendations against these practices by the American Society of Clinical Oncology (ASCO)[2] and the National Comprehensive Cancer Network (NCCN) [3–11]. The rationale for these recommendations is that these practices can lead to more unnecessary testing, may expose patients to radiation, increase patient anxiety, and can lead to invasive procedures without improving survival.[12–14] Although Potosky et al. previously found PCPs were slightly more likely to order non-recommended testing than oncologists, [15] this study predated efforts to highlight and reduce the use of low-value services after breast cancer treatment (for example, Choosing Wisely) [16]. As a result, PCP attitudes about and tendency to order these non-recommended tests remain poorly understood in the modern era of survivorship care when PCPs are becoming increasingly involved in this care.[15] Therefore, the goal of this study was to characterize PCPs' attitudes about and tendency to order non-recommended surveillance tests for survivors after curative breast cancer treatment, and identify factors associated with their tendency to order these tests for survivors of early-stage breast cancer.

METHODS

Study Population

Previously described elsewhere, the Individualized Cancer Care (iCanCare) Study is a large, population-based survey study of women with early-stage breast cancer and their providers.[17–19] Women aged 20 to 79 with newly diagnosed, early-stage breast cancer (stages 0-II) as reported to the SEER registries of Georgia and Los Angeles County, California, in 2013 to 2015 were identified and surveyed (N=5080, 70% response rate). Participants were asked to identify their attending physicians, including their PCPs. Patient participants identified 2,946 unique PCPs, and, in some cases, a physician who did not have a PCP specialty was mentioned (e.g., patient reported their oncologist was their PCP). These PCPs with a different specialty, and those unable to be located, retired, or deceased were ineligible for the PCP survey (n=150).

The PCP survey sampling has been described previously.[20] Briefly, beginning with high volume PCPs (identified by >1 patient in the iCanCare Study, n=618), a stratified sample of eligible PCPs was surveyed about their practices when caring for breast cancer patients. Then a 10% random sample of low-volume PCPs (identified by only 1 patient in iCanCare, n=234) were selected for inclusion. A modified Dillman approach, including a $40 up front cash incentive, and reminders to non-respondents was utilized.[21] Of the 852 eligible PCPs who were mailed surveys, 518 completed them, resulting in a 60.9% response rate. This study was approved by the University of Michigan Institutional Review Board (HUM 00109990) and the state and institutional review boards of the SEER registries.

Measures

The measures were informed by both our prior work in survivorship care delivery and quality, and literature review.[19,22] The questionnaire content was rigorously piloted, as done in prior survey studies, and included: demographic and practice information; attitudes about survivorship care delivery, and scenario-based queries of attitudes about surveillance testing and PCP participation in survivorship care.

PCP-reported tendency to order surveillance testing

PCP tendency to order non-recommended surveillance testing was derived from a clinical vignette about an asymptomatic early-stage breast cancer survivor who is post-adjuvant chemotherapy with no evidence of disease. PCPs were asked “In a case like this, would you order the following? (1) Mammogram (2) Breast MRI (3) Bone scan (4) Other imaging tests, e.g., chest x-ray, CT scan, or PET scan (5) Serum tumor markers (e.g., CA-125, CA 15–3, CEA).” Item response categories ranged from “definitely yes” to “definitely no”, using a 4-pt. Likert-type scale. Bone scans, other imaging tests and serum tumor markers would be considered to be non-recommended based on ASCO and NCCN guidelines, while mammograms, and for higher than average risk individuals, breast MRI, would be recommended (and thus not considered non-recommended in this analysis) (Supplemental file 2).[2,9] Responses to items 3–5 were scored 1(definitely no) to 4(definitely yes) and averaged to create a composite score focused on non-recommended surveillance testing, which was categorized into tertiles based on the distribution of scores across PCPs with

responses (n=491) (low (mean score 1.0–1.99), moderate (mean score 2.0–2.49), high (mean score 2.5–5.0)), representing PCP's tendency to order non-recommended testing.

PCP-reported attitudes about and experience with survivorship care

We assessed PCPs' confidence in discussing surveillance testing by asking respondents "How confident are you about your knowledge or discussing the following aspects of follow-up care for breast cancer survivors? A) Appropriate surveillance testing to detect recurrent cancer" with response options "not at all confident" to "extremely confident" on a 4-pt. Likert type scale, which was categorized as more (score >=3) vs. less confidence for analyses (Supplemental File 2).

PCP-reported frequency of survivorship care experiences

PCPs were asked "After your patients are finished with their primary treatment for breast cancer, how often do you: receive an explicit survivorship care plan that documents recommendations for future care and surveillance?; experience difficulties transferring patient care responsibilities between you and the oncologist?" Involvement in breast cancer surveillance was measured by asking "How often are you currently involved in the following aspects of your breast cancer survivors' care: follow-up for breast cancer (mammogram)?" We assessed the frequency of challenges in caring for breast cancer survivors by asking PCPs "When caring for breast cancer survivors in your practice, how often are the following things a problem?:" The surveillance related challenge presented was: "Patients request to see me for aggressive cancer surveillance testing." PCP-reported communication with the oncologist was defined by asking "How often do you communicate with your breast cancer patient's oncologist about who will manage their care after their primary treatment is finished?" Frequency response options ranged from never to always on 5-point Likert-type scales and were categorized as often/always vs. never/rarely/sometimes for all the PCP-reported experience measures (Supplemental File 2).

PCP-reported characteristics

The PCP-reported characteristics included demographics and practice factors, collected via survey including: age at survey (in 10 year increments), gender (male/female), specialty (General/Internal Medicine, Family Medicine, OB/GYN or other), breast cancer patient volume (patients/year), SEER-region (Georgia, California), and practice type (physician practice, academic medical center, staff-mode l HMO, other).

Statistical Analysis

In this sample, 417 PCPs had complete information for the outcomes measures listed above and thus were included in the analyses. We first evaluated the distribution of PCP-reported tendency to order non-recommended testing and assessed the bivariate associations of PCP-reported attitudes and characteristics with PCP-reported tendency to order non-recommended testing (low, moderate, high) using chi-square tests and Fisher's exact test in cases where expected cell sizes are too small for chi-square. Multivariable multinomial logistic regression was then used to characterize the association between PCP characteristics (age, breast cancer patients/year, practice type, and SEER site), physician confidence in

discussing surveillance, and PCP-reported tendency to order non-recommended testing. The dependent variable was the 3 levels of test selectivity: low (reference category), moderate, and high. All analyses were conducted in SAS version 9.4 and a two-tailed p-value of <0.05 was considered statistically significant.

RESULTS

In our sample of PCPs who care for early-stage breast cancer survivors in LA County, California and Georgia, most PCPs were below age 60, white, had 10–30 years in practice, saw 1–5 new patients with breast cancer in the prior year, were in general internal medicine or family medicine, and practiced in a private practice setting (Table 1).The median tendency to order score was 2.0, which reflects an average response of “probably no” across the three test type questions. At the extremes, about 15% of PCPs reported they definitely would not order any of the non-recommended surveillance testing, and around 2% reported they definitely would order each non-recommended type of surveillance. Figure 1 illustrates PCP reported tendency to order by each type of non-recommended test. Serum tumor markers had the largest proportion of definitely/probably yes responses (31.5%) and bone scans had the largest proportion of definitely/probably no responses (77%) (p<0.01) (Figure 1).

The bivariate association of PCP-reported practice type with PCP tendency to order non-recommended testing is shown in Figure 2. The largest proportion of PCPs reporting a high tendency to order was in the other practice types group (31%, n=5/16), and the lowest proportion reporting high tendency was among PCPs practicing at academic medical centers (27%, n=76/284). PCPs in private practice settings had the largest proportion with a moderate tendency to order (46%, n=130/284), and the PCPs practicing in academic medical centers had the greatest proportion who reported a low tendency to order (53%, n=10/19)(p=0.01). Despite the association between PCP practice location and tendency to order, reported PCP attitudes and experiences did not vary significantly by practice location except for the frequency of patients requesting a PCP for aggressive surveillance testing. PCPs outside large medical groups, academic medical centers, and physician practices (other practice group) had the largest proportion reporting patients often request them for aggressive surveillance (p=0.03) (Supplemental Table 1).

Table 2 presents odds ratios and confidence intervals from the multinomial multivariable-adjusted model. Wide confidence intervals reflect the large amount of variation seen in the associations between physician characteristics and their tendency to order non-recommended surveillance testing for early-stage breast cancer survivors. Compared to general internal medicine PCPs, family medicine PCPs had twice the odds (OR 2.09 CI 1.16–3.76) of having a high tendency to order non-recommended surveillance tests. Compared to PCPs with lower confidence in ordering surveillance, PCPs reporting high confidence in ordering surveillance testing had nearly twice the odds of a high tendency to order non-recommended surveillance testing (OR 1.89 CI 1.08–3.29). (Table 2)

DISCUSSION

In this sample of PCPs caring for women with early-stage breast cancer during the survivorship period, over a quarter of PCPs reported a high tendency to order non-recommended surveillance testing for an asymptomatic early-stage breast cancer survivor. PCP-reported tendency to order non-recommended testing was highest for serum tumor markers and lowest for bone scans. PCPs reporting more confidence in ordering surveillance testing, and those trained in family medicine were more likely to report a high tendency to order non-recommended surveillance testing. To our knowledge, this is the first study to examine PCP-reported factors associated with a higher tendency to deliver these low-value surveillance services in the era of shared cancer survivorship care.

The clinical vignette presented to PCPs in the questionnaire illustrated an early-stage patient who had no symptoms and previously received chemotherapy, yet only 15% of physicians said they would definitely not order any non-recommended imaging or tumor marker tests. These non-recommended tests not only create unnecessary financial and time burden for patients,[23,24] they can lead to anxiety, additional testing, may expose patients to unnecessary radiation, and can lead to invasive procedures, all without improving survival.[[12,12,13,25] This finding is in line with other studies showing that both PCPs and oncologists deviate from cancer surveillance guidelines, despite many physicians acknowledging that these tests were not clinically useful for surveillance.[5,14,15] Prior studies have mixed findings as to whether oncologists or PCPs are more likely to order non-recommended surveillance testing. Keating et al. [6] found that women seeing medical oncologists for survivorship care had the highest rates of non-recommended tests (19 vs. 9.2 % had bone scans; 45.6 vs. 15.4 % had tumor antigen tests; 14.9 vs. 7.9 % had abdominal/chest imaging; and 64.3 vs. 54.7 % had chest X-ray; $p > 0.001$). Risendal et al. also found higher odds of receiving tumor marker and other blood tests among survivors seeing oncologists.[7] Although not evaluated in our study, in a sample of oncologists, beliefs about consequences of non-recommended biomarker testing such as increasing patient anxiety with false positives, and a culture of following guidelines were related to low use.[14] In contrast, findings from the landmark Survey of Physician Attitudes Regarding the Care of Cancer Survivors (SPARCCS) study suggest PCPs may be more likely to order these non-recommended tests.[6,7,15] At a California academic medical center, physician variation (individual practice patterns) accounted for around 20% of variation in receipt of non-recommended testing.[5] This finding is in line with the variation we found across physician characteristics, and this individual level variation could explain mixed findings across specialty groups. Our study builds upon these findings by examining PCPs' tendency to order these tests when guidelines now clearly state that these tests are not recommended for early-stage breast cancer survivors.

In addition, our findings suggest PCP confidence in ordering these tests also influenced their tendency to order these tests. While PCPs may be confident in ordering these types of tests potentially due to their common use in surveillance for other cancers, increased efforts to improve PCP knowledge about inappropriate testing for early-stage breast cancer specifically is needed. While survivorship care plans have been promoted as a tool for communicating and coordinating survivorship care, the templates which are commonly

used do not specifically list tests that should not be ordered because they are low-value, but rather solely focus on testing that cancer survivors need to receive. Despite producing high satisfaction among patients and PCPs, the uptake of survivorship care plans has been limited,[26,27] and they have not been found to improve care coordination and quality of survivorship care.[28,29] Therefore, interventions aimed towards PCPs need to not only focus on the aspects of guideline-recommended survivorship care that patients with a history of cancer should receive during survivorship, but they should also specify the low-value services that patients should not receive. Future efforts to reduce low-value surveillance testing in this context might be better focused towards disseminating information to PCPs that they can readily access at the point of care, and which fit into their existing workflows.

It is possible that some of the PCP's tendency to order these tests is being driven by patients requesting objective measures of their disease status to alleviate worry about recurrence, which has been shown to be a persistent and common issue amongst breast cancer survivors. [17,30] Ensuring PCPs have the resources and information necessary to effectively communicate about survivorship care services is essential to supporting the delivery of high-quality, team-based cancer care. Therefore, interventions that help support PCPs in communicating with their patients about non-recommended testing and disseminate information about low-value testing directly to patients might help to reduce the use of these tests during survivorship.

Our study has a number of strengths, including a sample of PCPs derived from a population-based sample of women with early-stage breast cancer, ensuring we are capturing the attitudes and experiences of a cohort of practicing PCPs who are actively caring for breast cancer survivors in their practice. In addition, sampling from two geographic areas of the United States, our high response rate for a physician survey, and rigorous validity testing of our measures are also strengths. However, there are some potential limitations that warrant comment. First, our outcome captured PCP tendency to order surveillance testing based on responses to a clinical vignette, and therefore does not directly measure what they regularly order in their practice. However, clinical vignettes have been validated against chart review and standardized patients as a useful tool for assessing care quality.[31,32] We also found concordance between PCP and patient reports for other items in our study, suggesting alignment between survey response and practice patterns.[20] Second, we could not account for patient preferences or requests for receipt of surveillance testing, and this may in part be influencing PCPs tendency to order these tests. However, less than 5% of PCPs reported that patients commonly request to see them for aggressive surveillance testing. Third, this study was cross-sectional, therefore our ability to make inferences about the temporality of these associations is limited. Fourth, our sample of PCPs are from LA County, California and Georgia, so the generalizability of our findings to other populations may be limited. Finally, we were unable to account for any cancer survivorship training the PCPs had, and this may influence their tendency to order these tests. However, many studies have shown that PCPs want more training in survivorship, highlighting an important mechanism for education on non-recommended surveillance.[33]

CONCLUSION

Many PCPs in this sample reported they would order non-recommended surveillance testing for women with a history of early-stage breast cancer, with over a quarter reporting a high tendency to order these tests during survivorship. Efforts to improve PCP education and communication about appropriate surveillance testing for breast cancer may help to reduce the overuse of these low-value services during survivorship.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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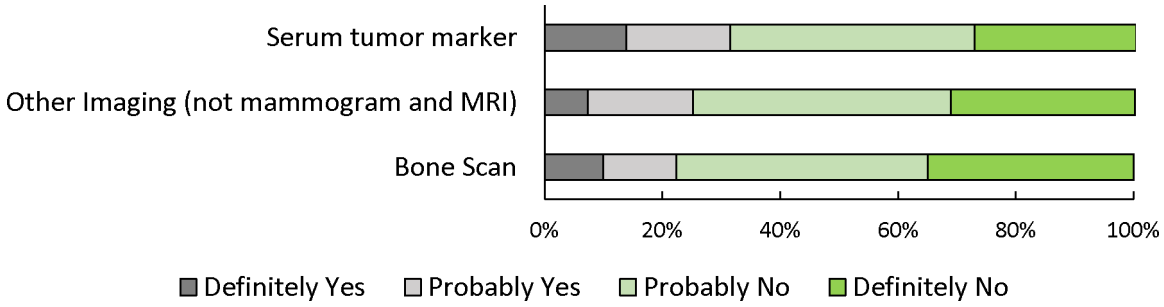

Figure 1:
Distribution of PCP-reported tendency to order non-recommended testing by test type ($p<0.05$)

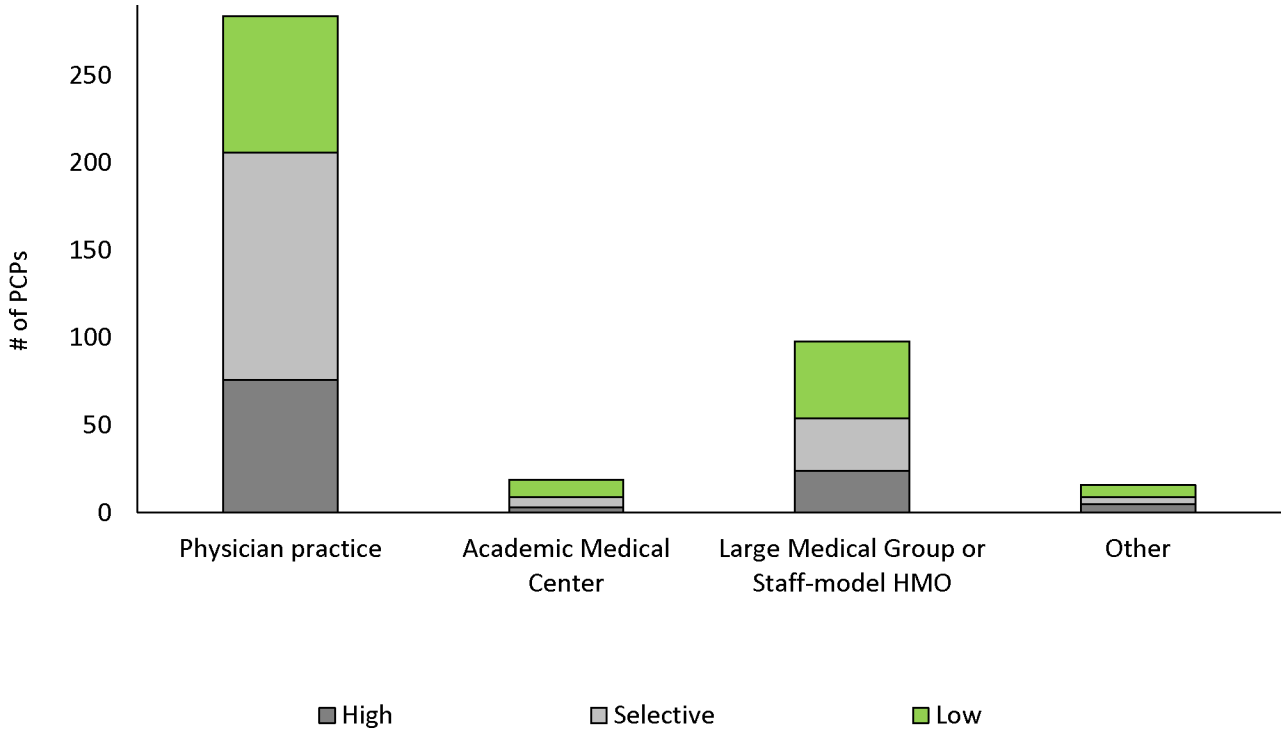

Figure 2:
Distribution of tendency to order non-recommended testing composite scores by PCP practice type ($p<0.05$)

Table 1:

PCP Demographic and Practice Characteristics (N=417)

	N*	%
Age		
<50	157	37.7
50–59	147	35.3
60+	113	27.1
Years in Practice		
<10 yrs	28	6.8
10 - <20 yrs	144	35.1
20 - <30 yrs	147	35.9
>=30 yrs	91	22.2
Race		
White	255	65.4
Black	31	8
Asian	101	25.9
Hispanic	3	0.8
New Breast Cancer Patients in Past 12 Months		
None	11	2.6
1–5	217	52
6+	189	45.3
Specialty		
General internal medicine	200	48
Family medicine	177	42.5
Obstetrics/gynecology	27	6.5
Other	13	3.1
Setting		
Physician practice	284	68.1
Academic Medical Center	19	4.6
Large Medical Group or Staff-model HMO	98	23.5
Other	16	3.8
Site		
Georgia	230	55.2
Los Angeles	187	44.8

*May not sum to 417 due to missing values for covariates not in regression models.

Table 2:

Adjusted Odds Ratios and 95% Confidence Intervals of the association of PCP-reported attitudes and experiences and high and selective tendency to order non-recommended surveillance testing (vs. low) among PCPs caring for early-stage breast cancer survivors in LA County, California and Georgia between 2013 and 2015.

	Selective Tendency to Order	High Tendency to Order
Practice Type		
Physician Practice	2.50 (0.77, 8.11)	2.57 (0.57, 11.66)
Staff model HMO	0.75 (0.22, 2.63)	0.99 (0.2, 4.93)
Other practice	0.73 (0.12, 4.38)	1.37 (0.18, 8.61)
Academic Medical Center	REF	REF
Age (OR for 1 year change)	1.02 (0.99, 1.06)	1.02 (0.99, 1.04)
New Breast Cancer Patients in Past 12 Months		
None	REF	REF
1–5	3.21 (0.45, 22.89)	1.24 (0.3, 5.22)
6+	4.29 (0.58, 31.61)	1.51 (0.34, 6.59)
Specialty		
General internal medicine	REF	REF
Family medicine	1.28 (0.74, 2.19)	**2.09 (1.16, 3.76)**
Obstetrics/gynecology	0.69 (0.25, 1.87)	0.59 (0.16, 2.22)
Other	0.32 (0.06, 1.71)	1.59 (0.39, 6.46)
Site		
Georgia	0.67 (0.38, 1.18)	**0.41 (0.23, 0.75)**
Los Angeles	REF	REF
Confidence in Ordering		
Less confident (Not at all/a little/somewhat)	REF	REF
More confident (Quite/very)	1.48 (0.90, 2.44)	**1.89 (1.08, 3.29)**