






# Primary Care Provider–Reported Involvement in Breast Cancer Treatment Decisions

Lauren P. Wallner, PhD, MPH <sup>1,2</sup>; Yun Li, PhD<sup>3</sup>; M. Chandler McLeod, PhD, MS<sup>3</sup>; Joan Gargaro, MPH, MBA<sup>1</sup>; Allison W. Kurian, MD, MSc <sup>4,5</sup>; Reshma Jagsi, MD, DPhil <sup>6,7</sup>; Archana Radhakrishnan, MD, MHS <sup>1</sup>; Ann S. Hamilton, PhD, MA<sup>8</sup>; Kevin C. Ward, PhD, MPH, CTR<sup>9</sup>; Sarah T. Hawley, PhD, MPH <sup>1,10,11</sup>; and Steven J. Katz, MD, MPH<sup>1,10</sup>

**BACKGROUND:** Treatment decisions for patients with early-stage breast cancer often involve discussions with multiple oncology providers. However, the extent to which primary care providers (PCPs) are involved in initial treatment decisions remains unknown. **METHODS:** A stratified random sample of PCPs identified by newly diagnosed patients with early-stage breast cancer from the Georgia and Los Angeles Surveillance, Epidemiology, and End Results registries were surveyed (n = 517; a 61% response rate). PCPs were asked how frequently they discussed surgery, radiation, and chemotherapy options with patients; how comfortable they were with these discussions; whether they had the necessary knowledge to participate in decision making; and what their confidence was in their ability to help (on 5-item Likert-type scales). Multivariate logistic regression was used to identify PCP-reported attitudes associated with more PCP participation in each treatment decision. **RESULTS:** In this sample, 34% of PCPs reported that they discussed surgery, 23% discussed radiation, and 22% discussed chemotherapy options with their patients. Of those who reported more involvement in surgical decisions, 22% reported that they were not comfortable having a discussion, and 17% did not feel that they had the necessary knowledge to participate in treatment decision making. PCPs who positively appraised their ability to participate were more likely to participate in all 3 decisions (odds ratio [OR] for surgery, 6.01; 95% confidence interval [CI], 4.16-8.68; OR for radiation, 8.37; 95% CI, 5.16-13.58; OR for chemotherapy, 6.56; 95% CI, 4.23-10.17). **CONCLUSIONS:** A third of PCPs reported participating in breast cancer treatment decisions, yet gaps in their knowledge about decision making and in their confidence in their ability to help exist. Efforts to increase PCPs' knowledge about breast cancer treatment options may be warranted. *Cancer* 2019;125:1815-1822. © 2019 American Cancer Society.

**KEYWORDS:** breast cancer, cancer care, cancer treatment decisions, primary care provider, treatment decision making.

## INTRODUCTION

Women diagnosed with early-stage breast cancer are faced with multiple complex treatment decisions. During this treatment decision-making process, they often discuss their treatment options with a number of cancer physicians as well as family and friends.<sup>1-8</sup> Patients may also increasingly consult their primary care providers (PCPs) about treatment decisions, particularly as the cancer population ages<sup>9</sup> and collaborative care models<sup>10,11</sup> are adopted in practice. Prior studies suggest that PCP involvement in collaborative cancer care often begins as early as diagnosis, and they support the idea that many PCPs remain engaged during the acute treatment phase.<sup>12,13</sup> In addition, population-based surveys of patients with early-stage cancer suggest that patients perceive their PCPs to be participating in their treatment decisions, with approximately one-third of patients with breast cancer reporting that their PCP participated in their treatment decisions.<sup>12</sup> Yet, we know little about the extent to which PCPs perceive that they are participating in multimodal treatment decisions, and how they appraise their ability to effectively participate in shared decision making in this context remains unclear.

**Corresponding author:** Lauren P. Wallner, PhD, MPH, University of Michigan, 2800 Plymouth Road, Building 16-409E, Ann Arbor, MI 48109; lwallner@med.umich.edu

<sup>1</sup>Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan; <sup>2</sup>Department of Epidemiology, University of Michigan, Ann Arbor, Michigan; <sup>3</sup>Department of Biostatistics, University of Michigan, Ann Arbor, Michigan; <sup>4</sup>Department of Medicine, Stanford University, Stanford, California; <sup>5</sup>Department of Health Research and Policy, Stanford University, Stanford, California; <sup>6</sup>Department of Radiation Oncology, University of Michigan, Ann Arbor, Michigan; <sup>7</sup>Center for Bioethics and Social Sciences in Medicine, University of Michigan, Ann Arbor, Michigan; <sup>8</sup>Department of Preventive Medicine, University of Southern California Keck School of Medicine, Los Angeles, California; <sup>9</sup>Department of Epidemiology, Emory University Rollins School of Public Health, Atlanta, Georgia; <sup>10</sup>Department of Health Management and Policy, University of Michigan, School of Public Health, Ann Arbor, Michigan; <sup>11</sup>Department of Health Behavior and Education, University of Michigan, School of Public Health, Ann Arbor, Michigan.

The last 2 authors contributed equally to this article.

Additional Supporting Information may be found in the online version of this article.

**DOI:** 10.1002/cncr.31998, **Received:** November 9, 2018; **Revised:** December 14, 2018; **Accepted:** December 24, 2018, **Published online** February 1, 2019 in Wiley Online Library (wileyonlinelibrary.com)

Therefore, the goals of this study were to evaluate to what extent PCPs report that they participate in surgical, radiation, and chemotherapy decisions for early-stage breast cancer and to characterize PCPs' perspectives on their ability to participate in these decisions. We also examined whether PCPs' appraisal of their ability to participate in these decisions was associated with their participation in treatment decision making. Finally, we explored whether the PCP-reported level of involvement in the 3 treatment decisions was concordant with patients' reports of their PCPs' involvement in their treatment decisions.

## MATERIALS AND METHODS

### **Study Population**

The Individualized Cancer Care (iCanCare) study is a large, population-based survey study of women with early-stage breast cancer and their providers; it has been described previously.<sup>14-16</sup> We identified and accrued women aged 20 to 79 years with newly diagnosed early-stage breast cancer (stages I and II) as reported to the Surveillance, Epidemiology, and End Results (SEER) registries of Georgia and Los Angeles County, California, from 2013 to 2015 (n = 5080; a 70% response rate).

Women who participated in the iCanCare study were asked to identify via survey their attending physicians, including their PCPs. Participants identified 2946 unique PCPs. PCPs were considered to be ineligible if they were of a different specialty, were unable to be located, were retired, or were deceased (n = 150). A stratified sample of eligible PCPs were then surveyed about their experiences in caring for patients with breast cancer. High-volume PCPs (identified by more than 1 patient in the iCanCare study; n = 618) were first selected for inclusion, and then a 10% random sample of low-volume PCPs (identified by only 1 patient in iCanCare; n = 234) were selected for inclusion. Survey packets contained the PCP survey, a \$40 incentive, a study brochure, an introductory letter, a prestamped return envelope, and informed consent information (physicians were not required to sign and return it with the completed survey). To encourage responses, we provided a \$40 cash incentive and again used a modified Dillman approach by including reminders to nonrespondents. Of the 852 eligible PCPs who were mailed surveys, 518 completed them, and this resulted in a 60.8% response rate. Included in this analysis were 517 PCPs who were linked to 1077 eligible patients in the iCanCare patient

sample. This study was approved by the University of Michigan institutional review board and the state and institution institutional review boards of the SEER registries.

### **Measures**

Questionnaire content was developed on the basis of our prior work,<sup>12,16</sup> a literature review, and a conceptual framework hypothesizing that PCP involvement leads to improved primary care quality. We used standard techniques to assess content validity, including a systematic review by design experts, cognitive pretesting with clinicians, and pilot studies in selected clinician populations.

### **PCP-reported level of involvement in treatment decision making**

We ascertained the PCP-reported level of involvement in treatment decision making by asking the respondent PCPs how often they discussed 1) which type of surgery a patient should have, 2) whether or not a patient should have radiation therapy, and 3) whether or not a patient should have chemotherapy. Response categories included *never to always* (on a 5-point Likert-type scale), and they were categorized into *more involvement* (sometimes, often, or always) or *less involvement* (rarely or never) for each of the 3 treatment modalities (surgery, radiation, and chemotherapy).

### **PCP-reported ability to participate in treatment decision making**

We then ascertained PCPs' ability to participate in treatment decision making by asking respondent PCPs how comfortable they were in discussing specific breast cancer treatments (surgery, radiation, and chemotherapy), with the response options ranging from *not at all comfortable* to *extremely comfortable* (on 5-point Likert-type scales). We also asked participants whether they had the knowledge necessary to participate in treatment decision making and whether they were confident in their ability to help patients with treatment-related decision making, with the response options for both ranging from *strongly disagree* to *strongly agree* on 5-point Likert-type scales. An overall score of PCPs' ability to participate was then created with the mean responses to the 3 items, with higher scores reflecting a more positive appraisal for each specific treatment decision (surgery, radiation, and chemotherapy).

### **PCP-reported characteristics**

The PCP-reported covariates in this analysis included demographic and practice factors. Demographic char-

acteristics collected via survey included the age at survey (in 10-year increments), sex (male or female), and race (white, black, Hispanic, Asian, or other/unknown). Practice characteristics included the specialty (general/internal medicine, family medicine, obstetrics/gynecology, or other), breast cancer volume (patients per year), and practice type (physician practice vs other practice type).

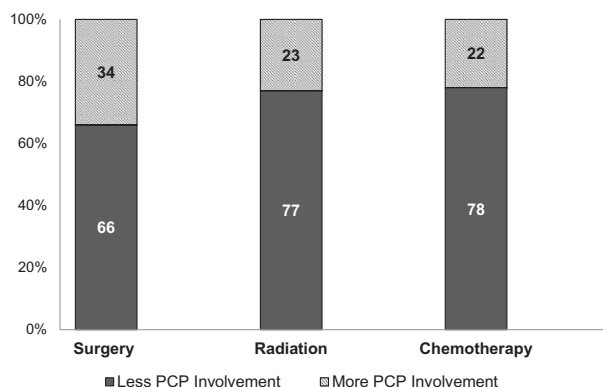
### Statistical Analyses

We first evaluated the overall proportion of PCPs who reported being more involved versus less involved in surgical, radiation, and chemotherapy decisions among the respondent PCPs. The bivariate associations of PCP-reported characteristics with PCP-reported involvement in surgery, radiation, and chemotherapy decisions were then evaluated in the PCP sample with 2-sided *t* tests and chi-square tests where appropriate. The bivariate associations between PCP-reported scores of their ability to participate in treatment decision making and PCP-reported involvement in surgical, radiation, and chemotherapy decisions were examined with 2-sided *t* tests. Multivariate logistic regression was then used to characterize the association between the PCP-reported ability to participate in treatment decision making and PCP involvement in the 3 treatment decisions with 3 separate models, which were adjusted for age, race, patients with breast cancer per year, practice type, and SEER site. All multivariate analyses incorporated weights to account for differential probabilities of survey responses across characteristics of these PCPs.

Using the linked PCP-patient data set (517 PCPs linked to 1077 patients), we then explored whether the PCP-reported level of involvement in the 3 treatment decisions was associated with patient reports of PCP involvement in their treatment decisions. All analyses were performed with SAS 9.4 (SAS Institute, Cary, North Carolina), and  $P < .05$  was considered statistically significant.

### RESULTS

Overall, 34% of the respondent PCPs reported more involvement (somewhat, often, or always) in surgical treatment decisions of their patients with breast cancer rather than less involvement (never or rarely). Approximately one-quarter reported more involvement in radiation decisions (23%) and chemotherapy decisions (22%; Fig. 1).



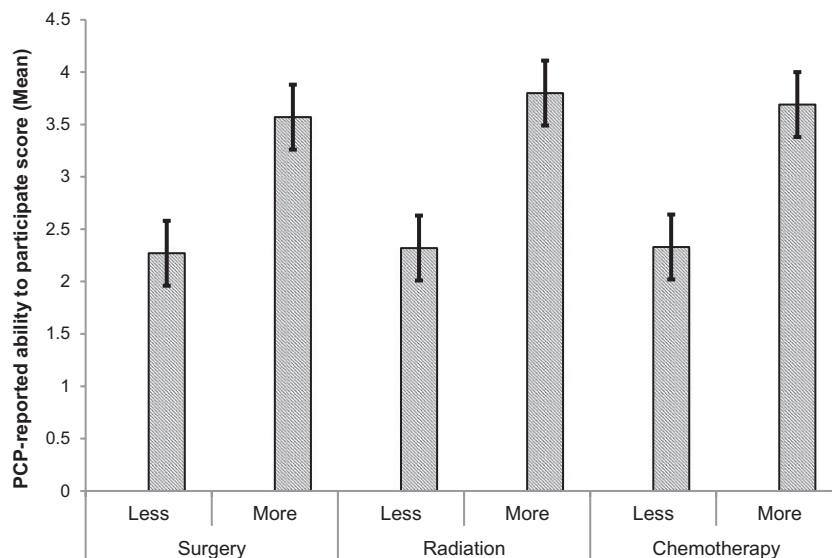
**Figure 1.** Distributions of PCP-reported involvement (more vs less) in surgery, radiation, and chemotherapy decisions (n = 517). PCP-reported involvement was defined as *more involvement* (sometimes, often, or always) or *less involvement* (rarely or never) for each of the 3 treatment modalities (surgery, radiation, and chemotherapy). Respondents were asked how often they discussed the following: 1) which type of surgery a patient should have, 2) whether or not a patient should have radiation therapy, and 3) whether or not a patient should have chemotherapy. Response categories ranged from *never* to *always* (on a 5-point Likert-type scale). PCP indicates primary care provider.

Table 1 displays the distribution of more PCP involvement in surgery, radiation, and chemotherapy decisions by levels of PCP-reported demographic and practice characteristics. The median age at survey was greater among PCPs who reported more involvement in the treatment decisions across all 3 treatment types (all  $P$  values  $< .01$ ). PCP-reported race was significantly associated with PCP-reported involvement in surgery and radiation decisions, with nonwhite PCPs composing a greater proportion of those who reported more involvement versus less involvement in surgery (39.6% vs 32.7%;  $P < .01$ ), radiation (45.1% vs 32.3%;  $P = .02$ ), and chemotherapy decisions (44.3% vs 32.7%;  $P = .03$ ). PCPs in private practice (vs other practice types) composed a greater proportion of those who reported more involvement in surgery (75.0% vs 63.8%;  $P = .01$ ), radiation (78.0 vs 64.5%;  $P < .01$ ), and chemotherapy decisions (75.5% vs 64.3%;  $P = .05$ ) in comparison with those who reported less involvement in these decisions. A higher breast cancer volume was also significantly associated with more PCP involvement in radiation and chemotherapy decisions (both  $P$  values =  $.02$ ). Medical specialty and PCP sex were not found to be associated with the extent of PCP involvement in any of the 3 treatment decisions (Table 1).

**TABLE 1.** Distributions of PCP-Reported Characteristics by PCP-Reported Involvement in Breast Cancer Surgery, Radiation, and Chemotherapy Treatment Decisions (n = 517)

PCP Characteristic	Surgery Decision			Radiation Decision			Chemotherapy Decision		
	Less Involvement	More Involvement	<i>P</i>	Less Involvement	More Involvement	<i>P</i>	Less Involvement	More Involvement	<i>P</i>
PCP age, mean (SE), y	52.7 (0.5)	55.9 (0.8)	<.01	53.0 (0.5)	56.6 (1.0)	<.01	53.1 (0.5)	56.2 (1.0)	<.01
PCP sex, No. (%)			.19			.85			.54
Male	181 (57.3)	83 (50.9)		205 (55.3)	58 (54.2)		203 (54.3)	60 (57.7)	
Female	135 (42.7)	80 (49.1)		166 (44.7)	49 (45.8)		171 (45.7)	44 (42.3)	
PCP race/ethnicity, No. (%)			.14			.02			.03
White	202 (67.3)	93 (60.4)		239 (67.7)	56 (54.9)		241 (67.3)	54 (55.7)	
Nonwhite	98 (32.7)	61 (39.6)		114 (32.3)	46 (45.1)		117 (32.7)	43 (44.3)	
Breast cancer volume, No. (%)			.08			.02			.02
≤10/y	280 (89.5)	134 (83.8)		330 (89.4)	84 (80.8)		335 (89.3)	79 (80.6)	
≥11/y	33 (10.5)	26 (16.2)		39 (10.6)	20 (19.2)		40 (10.7)	19 (19.4)	
Practice type, No. (%)			.01			<.01			.05
Physician practice	203 (63.8)	123 (75.0)		240 (64.5)	85 (78.0)		245 (64.3)	80 (75.5)	
Other practice type	115 (36.2)	41 (25.0)		132 (35.5)	24 (22.0)		130 (34.7)	26 (24.5)	
Specialty, No. (%)			.51			.14			.36
General/internal medicine	148 (46.7)	79 (47.9)		168 (45.2)	58 (53.2)		170 (45.3)	56 (52.8)	
Family medicine	142 (44.8)	66 (40.0)		170 (45.7)	38 (34.9)		169 (45.1)	39 (36.8)	
Obstetrics/gynecology	17 (5.4)	14 (8.5)		24 (6.4)	7 (6.4)		25 (6.7)	6 (5.7)	
Other	10 (3.2)	6 (3.6)		10 (2.7)	6 (5.5)		11 (2.9)	5 (4.7)	
Site, No. (%)			<.01			.32			.34
Georgia	197 (59.9)	77 (46.1)		218 (56.6)	(51.4)		220 (56.6)	55 (51.4)	
California	132 (40.1)	90 (53.9)		167 (43.4)	(48.6)		169 (43.4)	52 (48.6)	

Abbreviations: PCP, primary care provider; SE, standard error.



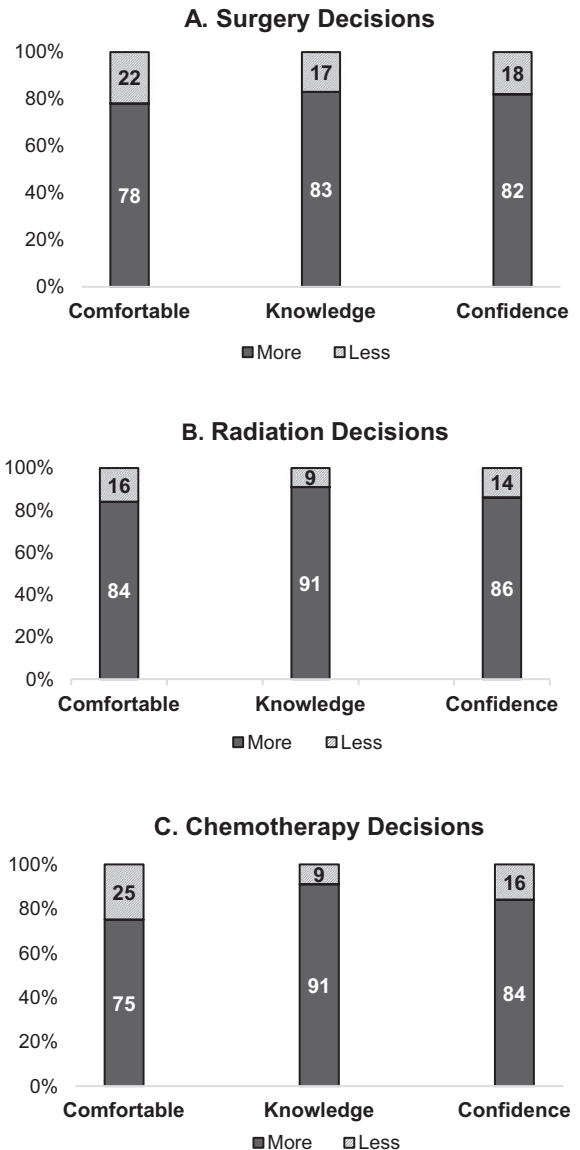
**Figure 2.** Mean PCP ability-to-participate scores (along with 95% confidence intervals) for surgery, radiation, and chemotherapy decisions by levels of PCP-reported involvement in each decision. All *P* values for associations between the PCP-reported ability-to-participate scores and the PCP-reported involvement in treatment decisions were <.001. PCP indicates primary care provider.

Figure 2 displays the mean scores for the PCP-reported ability to participate in decision making across levels of PCP-reported involvement in each of the 3 treatment decisions. The PCP-reported ability to participate was positively associated with the level of participation in all 3 treatment decisions. PCPs with higher mean ability-to-participate scores were more likely to report more involvement (vs less involvement) in surgical decisions (mean, 3.6 vs 2.3), radiation decisions (mean, 3.8 vs 2.3), and chemotherapy decisions (mean, 3.7 vs 2.3; all  $P$  values  $< .001$ ).

We also assessed the distribution of the individual components of the PCP-reported ability-to-participate scores among those who reported that they were involved in the treatment decisions. Of the 34% of PCPs who reported more involvement in surgery decisions, 22% reported that they were not comfortable having these discussions, and 17% reported that they did not have the necessary knowledge to participate in treatment decision making. Of the 23% who reported more involvement in radiation decisions, 16% reported that they were not comfortable having these discussions, and 14% reported that they lacked the confidence to help with these decisions. Similar gaps in comfort, knowledge, and confidence were seen among those who reported that they were more involved in chemotherapy decisions also (Fig. 3).

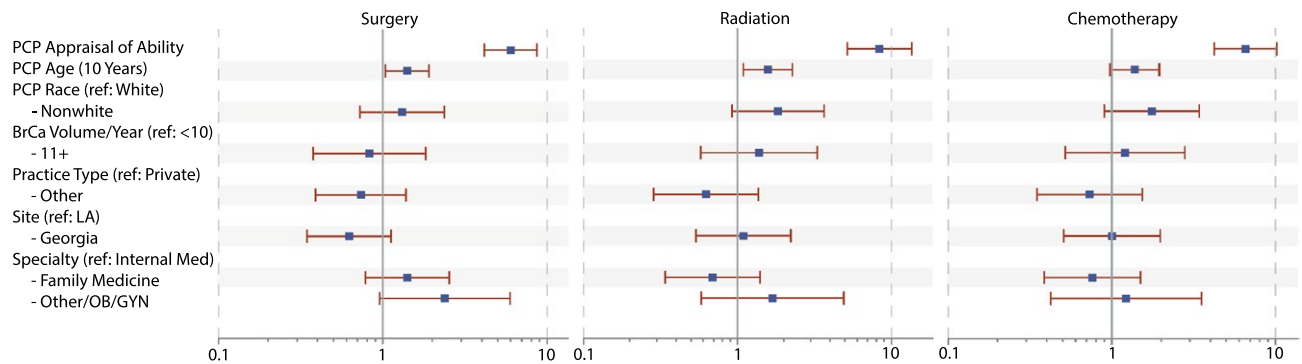
Figure 4 displays the multivariate-adjusted associations between the PCP-reported ability to participate in treatment decision making and their level of involvement in surgery, radiation, and chemotherapy decisions. The odds of PCPs reporting more involvement in surgical treatment decisions increased more than 6-fold for each unit increase in their ability-to-participate scores (odds ratio [OR], 6.01; 95% confidence interval [CI], 4.16-8.68; Fig. 4). Similar statistically significant and positive associations were seen for the radiation and chemotherapy decisions (OR for radiation, 8.37; 95% CI, 5.16-13.58; OR for chemotherapy, 6.56; 95% CI, 4.23-10.17; Fig. 4). PCP age was positively associated with more PCP-reported involvement in surgery and radiation decisions (OR for surgery, 1.41; 95% CI, 1.04-1.91; OR for radiation, 1.58; 95% CI, 1.09-2.28) but not chemotherapy decisions (OR, 1.38; 95% CI, 0.98-1.95; Fig. 4).

We also examined the validity of PCPs' reports of their participation in the treatment decisions by comparing them with patients' reports of their PCPs' participation in their breast cancer treatment decisions



**Figure 3.** Distributions of the components of the PCPs' ability-to-participate scores among PCPs who reported that they were more involved in treatment decisions: (A) surgery decisions ( $n = 167$ ), (B) radiation decisions ( $n = 107$ ), and (C) chemotherapy decisions ( $n = 111$ ). PCP indicates primary care provider.

(517 PCPs linked to 1077 patients). There was a clear pattern of concordance for all 3 decisions, which are displayed in Supporting Table 1. PCPs' reporting of their participation in surgery and radiation decisions was concordant with patients' reporting of the PCPs' involvement in their treatment decisions (both  $P$  values  $< .01$ ).



**Figure 4.** Multivariate-adjusted odds ratios and 95% confidence intervals estimating the odds of more PCP involvement in surgery, radiation, and chemotherapy treatment decisions. BrCa indicates breast cancer; LA, Los Angeles; OB/GYN, obstetrics/gynecology; PCP indicates primary care provider.

## DISCUSSION

Our findings from this sample of PCPs who treat women with early-stage breast cancer in general practice settings suggest that up to a third of PCPs report that they are involved in multimodal breast cancer treatment decisions, including surgical, radiation, and chemotherapy decisions. In addition, older PCPs and those who more positively appraise their ability to participate in these decisions are more likely to be involved in these decisions. However, little variation is seen in PCP-reported involvement in these decisions across PCP-reported practice factors. To our knowledge, this is one of the first studies to assess the extent to which PCPs are involved in these complex treatment decisions and to examine factors associated with their level of involvement.

Our results suggest that up to a third of PCPs participate in breast cancer surgery decisions, but they participate less often in radiation and chemotherapy decisions. Prior literature suggests that PCPs may be increasingly called upon to engage in cancer treatment decision making.<sup>12,13</sup> Our prior work with the iCanCare study patient participants found that more than one-third of women reported that their PCP was involved in their breast cancer treatment decisions, and this participation was greatest among minority women, those with less education, and those with more comorbidities.<sup>12</sup> In addition, prior research suggests that more than one-third of men with prostate cancer report that their PCP helped them with their treatment decision.<sup>13</sup> Our findings expand upon this prior work by investigating PCPs' reports of involvement in different cancer treatment decisions. As initial treatment options for early-stage breast cancer increasingly become more nuanced, PCPs may be more often consulted by their patients for

their input. As such, efforts to educate PCPs about the specifics of the various treatment options so that they can effectively support patients in making high-quality decisions appear warranted.

Our findings also suggest that PCP involvement in these treatment decisions is more common among PCPs who positively appraise their ability to participate in these decisions. Although the majority of PCPs in this sample positively appraised their ability to participate in these decisions, a notable minority of PCPs reported gaps in their ability to participate despite also reporting that they were involved in these treatment decisions. This included PCPs who reported that they were not comfortable with participating in these decisions, did not have the knowledge necessary to do so, and were less confident in their ability to help with these decisions. We also assessed whether PCPs' appraisal of their ability to participate varied across patient demographic characteristics such as age, race, education, and insurance status, and we found very little variation (data not shown). Thus, our findings highlight that opportunities exist to improve PCPs' knowledge about breast cancer treatment options as well as their confidence in their ability to participate in cancer treatment decision making more broadly.

Because PCPs are typically the providers that manage patients' other comorbidities and general medical care, they often have more established relationships with their patients. As a result, they may be more attuned to the preferences and values of their patients than cancer specialists whom patients have only recently met.<sup>17</sup> Yet, discussions about how to best support PCPs' involvement in team-based cancer care often focus on their involvement after the initial treatment process is complete, and they often do not encompass their involvement both before and during

treatment. A growing body of evidence supports the idea that PCPs want to be involved in the care of patients with cancer throughout the continuum.<sup>18-21</sup> If PCPs are engaged during the active-treatment phase already, involving them in initial treatment decisions may provide an additional opportunity for shared decision making.

Our prior work suggests that engaging other individuals who provide decision support and using online communication tools during the breast cancer decision process lead to more deliberative treatment decisions.<sup>1,2</sup> It is, therefore, plausible that additional provider engagement in the decision-making process may lead to a more deliberative and preference-sensitive decision. However, prior research suggests that receiving help from a PCP did not influence treatment patterns in men with localized prostate cancer.<sup>13</sup> Therefore, the extent to which PCP involvement in the treatment decision may influence a patient's appraisal of the decision-making process and the ultimate treatment decision itself remains poorly understood.

This study has a number of strengths, including the sampling of primary care physicians who care for patients with breast cancer, a high response rate for a primary care survey, and the validation of PCP reports of engagement against patient experiences. However, there are limitations that merit comment. First, we do not have a direct measure of clinician involvement in decision making. However, we did find that clinician and patient reports were concordant. Second, the study was cross-sectional, so our ability to make inferences about the temporality of these associations is limited. Third, we do not have information on the content of these conversations, nor do we know whether the patient or PCP initiated them. Fourth, because this was an observational study, we are unable to account for unmeasured confounders. Finally, our population included PCPs in Los Angeles County, California, and Georgia; thus, generalizability to other populations may be limited.

In conclusion, up to one-third of PCPs report participating in multimodal breast cancer treatment decisions. Yet, gaps exist in PCPs' self-reported knowledge about these treatment options and in their confidence in their ability to help patients with these decisions. Efforts to better incorporate and communicate with PCPs and to educate them about the specifics of cancer treatments may be warranted to promote collaborative cancer care.

## FUNDING SUPPORT

This work was funded by grant P01CA163233 from the National Cancer Institute to the University of Michigan and by a research grant from

the University of Michigan Rogel Cancer Center. Lauren P. Wallner's time was also supported by grant K07 CA201052 from the National Cancer Institute. Cancer incidence data collection was supported by the California Department of Public Health pursuant to California Health and Safety Code Section 103885; by the Centers for Disease Control and Prevention's National Program of Cancer Registries under cooperative agreement 5NU58DP003862-04/DP003862; and by the National Cancer Institute's Surveillance, Epidemiology, and End Results Program under contract HHSN261201000140C awarded to the Cancer Prevention Institute of California, under contract HHSN261201000035C awarded to the University of Southern California, and under contract HHSN261201000034C awarded to the Public Health Institute. Cancer incidence data collection in Georgia was supported by the National Cancer Institute under contract HHSN261201300015I (task order HHSN26100006) and by the Centers for Disease Control and Prevention under cooperative agreement 5NU58DP003875-04-00. The ideas and opinions expressed herein are those of the authors. The State of California, the Department of Public Health, the National Cancer Institute, and the Centers for Disease Control and Prevention and their contractors and subcontractors had no role in the design or conduct of the study; in the collection, management, analysis, or interpretation of the data; or in the preparation, review, or approval of the manuscript.

## CONFLICT OF INTEREST DISCLOSURES

Allison W. Kurian reports a research grant to her institution from Myriad Genetics outside the submitted work. Reshma Jagsi reports grants from the National Institutes of Health, the Doris Duke Charitable Foundation, the Komen Foundation, and the Greenwall Foundation; personal fees from Vizient and Amgen for consulting; and stock options from Equity Quotient outside the submitted work. The other authors made no disclosures.

## AUTHOR CONTRIBUTIONS

**Lauren P. Wallner:** Conceptualization (including questionnaire design), methods, data collection, data analyses, and writing and editing of the original and final manuscripts. **Yun Li:** Statistical and formal data analyses and visualization. **M. Chandler McLeod:** Statistical and formal data analyses and visualization. **Joan Gargaro:** Analysis, administration, visualization, and editing. **Allison W. Kurian:** Methods and review and editing. **Reshma Jagsi:** Methods and review and editing. **Archana Radhakrishnan:** Methods and review and editing. **Ann S. Hamilton:** Data collection and methods. **Kevin C. Ward:** Data collection and methods. **Sarah T. Hawley:** Conceptualization, methods, review and editing, funding, and supervision. **Steven J. Katz:** Conceptualization, methods, review and editing, funding, and supervision.

## REFERENCES

1. Wallner LP, Li Y, McLeod MC, et al. Decision-support networks of women newly diagnosed with breast cancer. *Cancer*. 2017;123:3895-3903.
2. Wallner LP, Martinez KA, Li Y, et al. Use of online communication by patients with newly diagnosed breast cancer during the treatment decision process. *JAMA Oncol*. 2016;2:1654-1656.
3. Maly RC, Umezawa Y, Ratliff CT, Leake B. Racial/ethnic group differences in treatment decision-making and treatment received among older breast carcinoma patients. *Cancer*. 2006;106:957-965.
4. Maly RC, Umezawa Y, Leake B, Silliman RA. Determinants of participation in treatment decision-making by older breast cancer patients. *Breast Cancer Res Treat*. 2004;85:201-209.
5. Hawley ST, Griggs JJ, Hamilton AS, et al. Decision involvement and receipt of mastectomy among racially and ethnically diverse breast cancer patients. *J Natl Cancer Inst*. 2009;101:1337-1347.
6. Stiggelbout AM, Jansen SJ, Otten W, Baas-Thijssen MC, van Slooten H, van de Velde CJ. How important is the opinion of significant others to cancer patients' adjuvant chemotherapy decision-making? *Support Care Cancer*. 2007;15:319-325.

7. Ohlen J, Balneaves LG, Bottorff JL, Brazier AS. The influence of significant others in complementary and alternative medicine decisions by cancer patients. *Soc Sci Med*. 2006;63:1625-1636.
8. Gilbar R, Gilbar O. The medical decision-making process and the family: the case of breast cancer patients and their husbands. *Bioethics*. 2009;23:183-192.
9. American Cancer Society. Breast Cancer Facts & Figures 2016-2017. Atlanta, GA: American Cancer Society; 2017.
10. Levit LA, Balogh EP, Nass SJ, Ganz PA, eds. Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis. Washington, DC: National Academies Press; 2013.
11. Cohen HJ. A model for the shared care of elderly patients with cancer. *J Am Geriatr Soc*. 2009;57(suppl 2):S300-S302.
12. Wallner LP, Abrahamse P, Uppal JK, et al. Involvement of primary care physicians in the decision making and care of patients with breast cancer. *J Clin Oncol*. 2016;34:3969-3975.
13. Radhakrishnan A, Grande D, Ross M, et al. When primary care providers (PCPs) help patients choose prostate cancer treatment. *J Am Board Fam Med*. 2017;30:298-307.
14. Hawley ST, Janz NK, Griffith KA, et al. Recurrence risk perception and quality of life following treatment of breast cancer. *Breast Cancer Res Treat*. 2017;161:557-565.
15. Jaggi R, Abrahamse PH, Lee KL, et al. Treatment decisions and employment of breast cancer patients: results of a population-based survey. *Cancer*. 2017;123:4791-4799.
16. Wallner LP, Li Y, Furgal AKC, et al. Patient preferences for primary care provider roles in breast cancer survivorship care. *J Clin Oncol*. 2017;35:2942-2948.
17. Roorda C, de Bock GH, Scholing C, et al. Patients' preferences for post-treatment breast cancer follow-up in primary care vs. secondary care: a qualitative study. *Health Expect*. 2015;18:2192-2201.
18. Del Giudice ME, Grunfeld E, Harvey BJ, Piliotis E, Verma S. Primary care physicians' views of routine follow-up care of cancer survivors. *J Clin Oncol*. 2009;27:3338-3345.
19. Lawrence RA, McLoone JK, Wakefield CE, Cohn RJ. Primary care physicians' perspectives of their role in cancer care: a systematic review. *J Gen Intern Med*. 2016;31:1222-1236.
20. Potosky AL, Han PK, Rowland J, et al. Differences between primary care physicians' and oncologists' knowledge, attitudes and practices regarding the care of cancer survivors. *J Gen Intern Med*. 2011;26:1403-1410.
21. Smith SL, Wai ES, Alexander C, Singh-Carlson S. Caring for survivors of breast cancer: perspective of the primary care physician. *Curr Oncol*. 2011;18:e218-e226.