



## Factors associated with decision to undergo contralateral prophylactic mastectomy versus unilateral mastectomy



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### ABSTRACT

**Background:** Factors associated with the decision to pursue unilateral mastectomy (UM) versus contralateral prophylactic mastectomy (CPM) in unilateral breast cancer (UBC) patients, and satisfaction with this decision, remain to be elucidated.

**Methods:** UBC patients who underwent mastectomy were surveyed regarding factors affecting their surgical decision and satisfaction with the same.

**Results:** Both UM (n = 46) and CPM (n = 55) patients were satisfied with their surgical decision (mean 4.72 and 4.85 out of 5 on Satisfaction With Decision scale, respectively, p = 0.078). Most CPM patients cited the desire to lower their risk of contralateral breast cancer (96.4%) and the desire for peace of mind (94.5%) as “very important” drivers of their decision; whereas most UM patients felt not wanting to remove a normal breast (67.4%) was a “very important” driver for their decision.

**Conclusions:** Both UM and CPM patients reported high satisfaction with their surgical decisions, despite differing reasons for their respective surgeries.

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### Introduction

Many patients with unilateral breast cancer (UBC) opt for contralateral prophylactic mastectomy (CPM), a procedure where the unaffected breast is removed along with the affected breast. Multiple studies have shown that rates of CPM have increased rapidly in the past few decades.<sup>1–6</sup> Indeed, in a recent study, Nash et al. reported an increase in CPM between 2004 and 2012. Rates nearly tripled, regardless of age group – from 3.6% to 10.4% in patients 45 years or older, and from 10.5% to 33.3% in those aged 20–44 years old.<sup>7</sup> There are a multitude of reasons why a patient may choose to undergo CPM, despite no clear consensus as to whether CPM actually improves long-term survival.<sup>6,8–10</sup>

With this in mind, we sought to understand how patients make this decision, and their satisfaction with the same. Previous studies have found that younger patient age, family history of breast cancer, higher education, and white race are all factors associated with higher rates of CPM.<sup>4,5,11–17</sup> Fewer studies have explored the decision-making process among patients opting for CPM. For

instance, Rosenberg et al. conducted a survey of breast cancer patients aged 40 years or younger. They found that the most frequently cited reasons for choosing CPM included: the “desire to lower the chance of getting cancer in the other breast”, “desire for peace of mind”, “desire to improve survival or extend life”, “desire to prevent breast cancer from spreading to other parts of body”, and “feeling at increased risk for cancer in other breast”.<sup>18</sup> Similarly, Soran et al., in a survey study of CPM patients one year post-operation, found that 95.2% of patients cited “fear of recurrence” as a factor influencing their decision to undergo CPM.<sup>19</sup> In general, however, there are few studies investigating the CPM decision-making process, and even fewer that compare the reasoning of UBC patients who select unilateral mastectomy (UM) over CPM.

We surveyed UBC patients who chose to undergo CPM as well as those who chose to undergo UM, in order to better understand factors that may drive patients towards one surgical option or another. Further, we sought to determine the relative satisfaction with surgical decision-making between CPM and UM patients.

### Methods

From June to August 2017, all female UBC patients over the age of 18 who were seen at the Yale Breast Center and had undergone mastectomy surgery (either UM or CPM) were approached to

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participate in this Yale University Human Investigations Committee approved study. Participants were asked to complete a confidential survey and consent to data collection of clinicopathologic variables from their medical records.

In addition to querying patients regarding factors contributing to their surgical decision, we also assessed patients' satisfaction with this decision using the Satisfaction with Decision (SWD) scale, a validated instrument measuring satisfaction with healthcare decisions.<sup>20</sup> The SWD scale is composed of 6 questions that can be scored from 1 to 5, with 5 being the highest possible satisfaction rating.

Non-parametric statistical analyses were performed using SPSS version 24 (IBM; Armonk, NY).

**Results**

*Patient population*

A total of 109 eligible patients were approached regarding the survey; 101 ultimately completed the survey (response rate 92.7%). Patients who responded to the survey were similar to those who did not in terms of their rate of CPM (54.5% vs. 37.5%, respectively,  $p = 0.470$ ). The median age of the overall cohort of responders was 49 years, and the median time from surgery to survey collection was 13.8 months. CPM patients tended to be younger than UM patients (46 vs. 58.5 median age,  $p < 0.001$ ), further out from surgery at follow-up than UM patients (median 19.8 vs. 9 months,  $p = 0.042$ ), and were more likely to undergo reconstruction ( $p = 0.002$ ). In total, 69 patients (68.3%) had BRCA testing data done, with similar rates of CPM between patients who got BRCA testing (58.0%) and those who did not (46.9%) ( $p = 0.391$ ) (Table 1). Of patients who had BRCA testing results, only two patients came back positive. The frequency of confirmed BRCA positive patients did not differ significantly between CPM and UM patients (5.0% vs. 0.0%,  $p = 0.506$ ).

*Satisfaction with decision*

The average SWD score among our cohort was 4.79 out of 5. Both UM and CPM patients appeared equally satisfied with their surgical decisions, scoring a mean of 4.72 and 4.85 out of 5 on the SWD scale, respectively ( $p = 0.078$ ). In the overall cohort, age at time of surgery, number of months since surgery, and reconstruction type were not associated with SWD ( $p = 0.097$ ,  $p = 0.702$ , and  $p = 0.208$ , respectively) (data not shown). In addition, both UM and CPM patients reported that they would strongly recommend their respective surgical decisions to others (68.9% and 72.7%, respectively;  $p = 0.980$ ) (Table 2).

Among CPM patients, reconstruction and income correlated with an above average SWD ( $p = 0.018$  and  $p = 0.017$ , respectively) on bivariate analysis (Table 3), but neither factor remained an independent predictor of SWD on multivariate analysis ( $p = 0.104$  and  $p = 0.087$ , respectively) (Table 4). Among UM patients, we could find no factor associated with SWD ( $p > 0.05$  for all variables) (Table 5).

*Reasons to undergo CPM*

Of the 55 patients who underwent CPM, almost all listed the desire to lower the chance of contralateral breast cancer and desire for peace of mind (96.4% and 94.5%, respectively) as “very important” factors influencing their decision to undergo CPM. Other factors that were considered are shown in Table 6.

Given that all CPM patients felt that peace of mind was at least “somewhat” important to their decision, we asked patients

**Table 1**  
Patient characteristics.

Factor	UM (n = 46)	CPM (n = 55)	P-value
Median age at surgery (years)	58.5	46	<0.001
Median time since surgery (months)	9	19.8	0.042
Race/Ethnicity			0.666
White	37 (45.7%)	44 (54.30%)	
Hispanic/Latina	4 (50.0%)	4 (50.0%)	
Black	3 (42.9%)	4 (57.1%)	
Asian	1 (100.0%)	0 (0.0%)	
Other	1 (25.0%)	3 (75.0%)	
Reconstruction			0.002
None	15 (68.2%)	7 (31.8%)	
Implants	11 (26.2%)	31 (73.8%)	
Autologous	20 (54.1%)	17 (45.9%)	
Highest level of education <sup>a</sup>			0.659
Less than high school	2 (50.0%)	2 (50.0%)	
High school diploma/GED	11 (39.3%)	17 (60.7%)	
Associate's/Bachelor's degree	18 (43.9%)	23 (56.1%)	
Graduate/professional degree	15 (55.6%)	12 (44.4%)	
Income <sup>b</sup>			0.142
<\$25,000	6 (31.6%)	13 (68.4%)	
\$25,000–50,000	12 (63.2%)	7 (36.8%)	
\$50,001–75,000	3 (30.0%)	7 (70.0%)	
\$75,001–100,000	10 (62.5%)	6 (37.5%)	
>\$100,000	14 (42.4%)	19 (57.6%)	
Disease stage			0.965
Stage 0	6 (46.2%)	7 (53.8%)	
Stage I	15 (45.5%)	18 (54.5%)	
Stage II	18 (48.6%)	19 (51.4%)	
Stage III	6 (37.5%)	10 (62.5%)	
Stage IV	1 (50.0%)	1 (50.0%)	
Neoadjuvant chemotherapy			0.210
Yes	12 (36.4%)	21 (63.6%)	
No	34 (50.0%)	34 (50.0%)	
BRCA testing done			0.391
No	17 (53.1%)	15 (46.9%)	
Yes	29 (42.0%)	40 (58.0%)	
Family history of breast cancer <sup>c</sup>			0.167
No	24 (53.3%)	21 (46.7%)	
Yes	22 (39.3%)	34 (60.7%)	

CPM = contralateral prophylactic mastectomy, UM = unilateral mastectomy.

<sup>a</sup> 1 CPM patient did not report her education status.

<sup>b</sup> 1 UM patient and 3 CPM patients did not report income.

<sup>c</sup> 1<sup>st</sup> or 2<sup>nd</sup> degree relative.

whether the procedure actually provided the peace of mind for which they were hoping. At a median follow up from surgery of 19.8 months, 48 patients (90.6%) reported fully obtaining their anticipated peace of mind, four (7.5%) reported partially obtaining their anticipated peace of mind, and one (1.9%) reported not obtaining at all the peace of mind they were expecting; two patients did not provide a response to this question. Patients who reported fully obtaining their anticipated peace of mind had a similar mean SWD score compared to those who did not (4.89 vs. 4.60, respectively,  $p = 1.000$ ).

Of 41 patients who reported that breast symmetry was at least somewhat important to their decision to undergo CPM, 24 (61.5%) reported being very satisfied with the symmetry they ultimately obtained, 12 (30.8%) were somewhat satisfied, one (2.6%) was somewhat dissatisfied, and two (5.1%) were very dissatisfied; two patients did not provide a response to this question. Again, patients who were very satisfied with the symmetry of their breasts reported similar SWD as those who were less than very satisfied with the symmetry of their breasts (mean 4.97 vs. 4.92, respectively,  $p = 0.853$ ).

*Reasons to undergo UM*

Most UM patients reported that not wanting to remove a normal

**Table 2**  
Patient willingness to recommend their own surgical decision to others.

	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
UM	31 (68.9%)	2 (4.4%)	11 (24.4%)	1 (2.2%)	–
CPM	40 (72.7%)	2 (3.6%)	12 (21.8%)	1 (1.8%)	–

breast was a “very important” factor influencing their decision to have UM over CPM (67.4%). A minority of UM patients felt that the potential for increased length of surgery (15.2%), hospital stay (6.5%), and financial cost of CPM (6.5%) played a “very important” role in their decision-making (Table 7).

## Discussion

Prior studies have investigated factors that play into a patient's decision to undergo CPM, but there is limited data juxtaposing the decision-making process of UBC patients who chose CPM with those who chose UM. In this study, we evaluate factors influencing this decision among these populations, and how satisfied each was with their respective surgical decision.

UM and CPM patients reported similarly high satisfaction with their surgical decision. This observation is in line with reports from previous studies.<sup>18,19,21–26</sup> Both UM and CPM patients expressed a

strong willingness to recommend their own decision to other UBC patients. This finding is similar to previous studies as well. Soran et al., for example, found that 92.7% of CPM patients stated they would recommend their decision to others.<sup>19</sup> This is comparable to the 76.3% of our CPM patients who either agreed or strongly agreed that they would recommend their decision to others. Our study is one of the few that also investigates surgical decision-making and satisfaction for UBC patients who opt for UM instead of CPM. We found that patients who choose UM are equally satisfied with their surgical decision as those who opt for CPM, and are similarly willing to strongly recommend their decision to other patients.

We found that over 90% of CPM patients cited the desire to lower the chance of contralateral breast cancer, and/or the desire for peace of mind as “very important” factors for opting for CPM. These data closely reflect findings of previous studies. Rosenberg et al., for example, reported that the majority of patients in their cohort felt the desire to lower the chance of getting cancer in the other breast

**Table 3**  
Factors associated with SWD among CPM patients - Bivariate.

Factor	SWD score $\leq 4.85$ (n = 14)	SWD score > 4.85 (n = 41)	P-value
Median age at surgery (years)	45.5	46.0	0.555
Median time since surgery (months)	17.3	19.8	0.588
Race/Ethnicity			0.712
White	10 (71.4%)	34 (82.9%)	
Hispanic/Latina	2 (14.3%)	2 (4.9%)	
Black	1 (7.1%)	3 (7.3%)	
Asian	0 (0.0%)	0 (0.0%)	
Other	1 (7.1%)	2 (4.9%)	
Reconstruction			0.018
None	5 (35.7%)	2 (4.9%)	
Implants	5 (35.7%)	26 (63.4%)	
Autologous	4 (28.6%)	13 (31.7%)	
Highest level of education <sup>a</sup>			0.698
Less than high school	0 (0.0%)	2 (4.9%)	
High school diploma/GED	5 (38.5%)	12 (29.3%)	
Associate's/Bachelor's degree	5 (38.5%)	18 (43.9%)	
Graduate/professional degree	3 (23.1%)	9 (22.0%)	
Income <sup>b</sup>			0.017
<\$25,000	3 (23.1%)	10 (25.6%)	
\$25,000–50,000	4 (30.8%)	3 (7.7%)	
\$50,001–75,000	4 (30.8%)	3 (7.7%)	
\$75,001–100,000	1 (7.7%)	5 (12.8%)	
>\$100,000	1 (7.7%)	18 (46.2%)	
Disease stage			0.384
Stage 0	1 (7.1%)	6 (14.6%)	
Stage I	4 (28.6%)	14 (34.1%)	
Stage II	4 (28.6%)	15 (36.6%)	
Stage III	5 (35.7%)	5 (12.2%)	
Stage IV	0 (0.0%)	1 (2.4%)	
Neoadjuvant chemotherapy			0.755
Yes	8 (57.1%)	26 (63.4%)	
No	6 (42.9%)	15 (36.6%)	
BRCA testing done			0.169
No	6 (42.9%)	9 (22.0%)	
Yes	8 (57.1%)	32 (78.0%)	
Family history of breast cancer <sup>c</sup>			0.755
No	6 (42.9%)	15 (36.6%)	
Yes	8 (57.1%)	26 (63.4%)	

SWD=Satisfaction with Decision, CPM=Contralateral prophylactic mastectomy.

<sup>a</sup> 1 patient with a SWD score  $\leq 4.85$  had unknown education status.

<sup>b</sup> 1 patient with a SWD score  $\leq 4.85$  and 2 patients with SWD scores > 4.85 had unknown income.

<sup>c</sup> 1<sup>st</sup> or 2<sup>nd</sup> degree relative.

**Table 4**  
Factors associated with SWD among CPM patients – Multivariate.

Factor	OR (95% CI)	P-value
Reconstruction type		0.104
None	Referent	
Implants	34.623 (1.269–944.864)	
Autologous	5.616 (0.340–92.644)	
Income		0.087
<\$25,000	Referent	
\$25,000–50,000	0.031 (0.001–0.784)	
\$50,001–75,000	0.053 (0.003–1.014)	
\$75,001–100,000	0.652 (0.030–13.987)	
>\$100,000	1.409 (0.073–27.253)	

(98%), and for peace of mind (95%) were “very” or “extremely” important in their decision to choose CPM.<sup>18</sup>

We found that 87.3% of CPM patients who stated that desire for peace of mind was at least somewhat important to their surgical decision actually fully achieved the peace of mind that they sought prior to surgery. Interestingly, however, those who did not achieve peace of mind were equally as satisfied with their decision as those who did. Similarly, 61.5% of CPM patients who stated that breast symmetry was at least somewhat important to their surgical decision actually felt very satisfied with the symmetry after the operation. Again, we did not find an association between

postoperative satisfaction with breast symmetry and satisfaction with the decision to undergo CPM, even among those who stated that symmetry was a key driver in their decision-making process. These data suggest that other factors play into patients’ satisfaction with CPM beyond the fulfillment of peace of mind or breast symmetry alone, even for patients who felt these factors were very important in their surgical decision-making.

Few studies have reported on reasons why UM patients chose forego CPM. We found that most UM patients cited the desire not to remove a normal breast as the main motivator for their decision. While a substantial proportion of patients cited the increased chance of complications in CPM as a very important reason to choose UM, fewer patients felt that increased length of surgery, hospital stay, and financial cost associated with CPM were very important contributors to their decision.

Our study is one of the few in literature that provides data on why UBC patients choose UM instead of CPM, and their satisfaction with the same. Our data, however, must be interpreted in light of some limitations. First, our study was subject to recall bias; in the overall cohort, patients were a median of 13.8 months out from surgery, and were asked at one point in time what factors they considered in their decision-making and how satisfied they were at this point in time with their decision. Also, patients were not followed prospectively, nor were they queried on multiple occasions to evaluate for consistency of their responses. Nonetheless, this

**Table 5**  
Factors associated with SWD among UM patients – Bivariate.

Factor	SWD score ≤ 4.72 (n = 13) <sup>a</sup>	SWD score > 4.72 (n = 32) <sup>a</sup>	P-value
Median age at surgery (years)	55.0	60.0	0.754
Median time since surgery (months)	12.4	8.3	0.920
Race/Ethnicity			0.251
White	10 (76.9%)	27 (84.4%)	
Hispanic/Latina	2 (15.4%)	2 (6.3%)	
Black	0 (0.0%)	2 (6.3%)	
Other	0 (0.0%)	1 (3.1%)	
	1 (7.7%)	0 (0.0%)	
Reconstruction			0.803
None	4 (30.8%)	10 (31.3%)	
Implants	4 (30.8%)	7 (21.9%)	
Autologous	5 (38.5%)	15 (46.9%)	
Highest level of education			0.456
Less than high school	0 (0.0%)	2 (6.3%)	
High school diploma/GED	3 (23.1%)	8 (25.0%)	
Associate’s/Bachelor’s degree	7 (53.8%)	11 (34.4%)	
Graduate/professional degree	3 (23.1%)	11 (34.4%)	
Income			0.190
<\$25,000	2 (15.4%)	4 (12.5%)	
\$25,000–50,000	6 (46.2%)	6 (18.8%)	
\$50,001–75,000	0 (0.0%)	3 (9.4%)	
\$75,001–100,000	3 (23.1%)	7 (21.9%)	
>\$100,000	2 (15.4%)	12 (37.5%)	
Disease stage			0.820
Stage 0	1 (7.7%)	5 (15.6%)	
Stage I	5 (38.5%)	9 (28.1%)	
Stage II	5 (38.5%)	13 (40.6%)	
Stage III	2 (15.4%)	4 (12.5%)	
Stage IV	0 (0.0%)	1 (3.1%)	
Neoadjuvant chemotherapy			0.460
Yes	2 (15.4%)	10 (31.3%)	
No	11 (84.6%)	22 (68.8%)	
BRCA testing done			0.511
No	6 (46.2%)	11 (34.4%)	
Yes	7 (53.8%)	21 (65.6%)	
Family history of breast cancer <sup>b</sup>			1.000
No	7 (53.8%)	16 (50.0%)	
Yes	6 (46.2%)	16 (50.0%)	

SWD=Satisfaction with Decision, UM=Unilateral mastectomy.

<sup>a</sup> 1 patient did not report satisfaction with decision.

<sup>b</sup> 1<sup>st</sup> or 2<sup>nd</sup> degree relative.

**Table 6**  
Reasons for choosing CPM.

	Very important (%)	Somewhat important (%)	Not very important (%)
Desire to lower the chance of contralateral breast cancer	53 (96.4%)	2 (3.6%)	–
Desire for peace of mind	52 (94.5%)	3 (5.5%)	–
Desire for symmetry of breasts	29 (52.7%)	12 (21.8%)	14 (25.5%)
Desire to remove need for continued imaging	25 (45.4%)	11 (20.0%)	19 (34.5%)

**Table 7**  
Reasons for choosing UM.

	Very important (%)	Somewhat important (%)	Not very important (%)
Did not feel need or desire to remove normal breast	31 (67.4%)	9 (19.6%)	6 (13.0%)
Increased chance of complications in CPM	19 (41.3%)	6 (13.0%)	21 (45.7%)
Increased length of surgery for CPM	7 (15.2%)	5 (10.9%)	34 (73.9%)
Increased length of stay for CPM	3 (6.5%)	4 (8.7%)	39 (84.8%)
Increased financial cost for CPM and associated reconstruction	3 (6.5%)	3 (6.5%)	40 (87.0%)

study builds on existing literature, providing a more complete picture of the CPM decision-making process, covering not only patients who chose CPM but also those who had the option of CPM but chose UM instead.

### Conflicts of interest

The authors have no financial conflicts of interest.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amjsurg.2018.11.040>.

### References

- Tuttle TM, Habermann EB, Grund EH, et al. Increasing use of contralateral prophylactic mastectomy for breast cancer patients: a trend toward more aggressive surgical treatment. *J Clin Oncol*. 2007;25:5203–5209.
- Tuttle TM, Jarosek S, Habermann EB, et al. Increasing rates of contralateral prophylactic mastectomy among patients with ductal carcinoma in situ. *J Clin Oncol*. 2009;27:1362–1367.
- Yao K, Stewart AK, Winchester DJ, Winchester DP. Trends in contralateral prophylactic mastectomy for unilateral cancer: a report from the national cancer data base, 1998–2007. *Ann Surg Oncol*. 2010;17:2554–2562.
- King TA, Sakr R, Patil S, et al. Clinical management factors contribute to the decision for contralateral prophylactic mastectomy. *J Clin Oncol*. 2011;29:2158–2164.
- Jones NB, Wilson J, Kotur L, et al. Contralateral prophylactic mastectomy for unilateral breast cancer: an increasing trend at a single institution. *Ann Surg Oncol*. 2009;16:2691–2696.
- Wong SM, Freedman RA, Sagara Y, et al. Growing use of contralateral prophylactic mastectomy despite no improvement in long-term survival for invasive breast cancer. *Ann Surg*. 2017;265:581–589.
- Nash R, Goodman M, Lin CC, et al. State variation in the receipt of a contralateral prophylactic mastectomy among women who received a diagnosis of invasive unilateral early-stage breast cancer in the United States, 2004–2012. *JAMA Surgery*. 2017;152:648–657.
- Fayanju OM, Stoll CRT, Fowler S, et al. Contralateral prophylactic mastectomy after unilateral breast cancer: a systematic review & meta-analysis. *Ann Surg*. 2014;260:1000–1010.
- Yao K, Sisco M, Bedrosian I. Contralateral prophylactic mastectomy: current perspectives. *Int J Womens Health*. 2016;8:213–223.
- Gao X, Fisher SG, Emami B. Risk of second primary cancer in the contralateral breast in women treated for early-stage breast cancer: a population-based study. *Int J Radiat Oncol Biol Phys*. 2003;56:1038–1045.
- Arrington AK, Jarosek SL, Virnig BA, et al. Patient and surgeon characteristics associated with increased use of contralateral prophylactic mastectomy in patients with breast cancer. *Ann Surg Oncol*. 2009;16:2697–2704.
- Baptiste DF, MacGeorge EL, Venetis MK, et al. Motivations for contralateral prophylactic mastectomy as a function of socioeconomic status. *BMC Women's Health*. 2017;17:1–9.
- Fu Y, Zhuang Z, Dewing M, et al. Predictors for contralateral prophylactic mastectomy in breast cancer patients. *Int J Clin Exp Pathol*. 2015;8:3748–3764.
- Kim Y, McCarthy AM, Bristol M, Armstrong K. Disparities in contralateral prophylactic mastectomy use among women with early-stage breast cancer. *NPJ Breast Cancer*. 2017;3:1–6.
- King TA, Sakr R, Patil S, et al. Clinical management factors contribute to the decision for contralateral prophylactic mastectomy. *J Clin Oncol*. 2011;29:2158–2164.
- Yi M, Hunt KK, Arun BK, et al. Factors impacting the decision of breast cancer patients to undergo contralateral prophylactic mastectomy. *Cancer Prev Res*. 2010;3:1026–1034.
- Jagsi R, Hawley ST, Griffith KA, et al. Contralateral prophylactic mastectomy decisions in a population-based sample of patients with early-stage breast cancer. *JAMA Surg*. 2017;152:274–282.
- Rosenberg SM, Tracy MS, Meyer ME, et al. Perceptions, knowledge, and satisfaction with contralateral prophylactic mastectomy among young women with breast cancer: a cross-sectional survey. *Ann Intern Med*. 2013;159:373–381.
- Soran A, Ibrahim A, Kanbour M, et al. Decision making and factors influencing long-term satisfaction with prophylactic mastectomy in women with breast cancer. *Am J Clin Oncol*. 2015;38:179–183.
- Holmes-Rovner M, Kroll J, Schmitt N, et al. Patient satisfaction with health care decisions the satisfaction with decision scale. *Med Decis Making*. 1996;16:58–64.
- Montgomery LL, Tran KN, Heelan MC, et al. Issues of regret in women with contralateral prophylactic mastectomies. *Ann Surg Oncol*. 1996;6:546–552.
- Boughhey JC, Hoskin TL, Hartmann LC, et al. Impact of reconstruction and reoperation on long-term patient-reported satisfaction after contralateral prophylactic mastectomy. *Ann Surg Oncol*. 2015;22:401–408.
- Frost MH, Slezak JM, Tran NV, et al. Satisfaction after contralateral prophylactic mastectomy: the significance of mastectomy type, reconstructive complications, and body appearance. *J Clin Oncol*. 2005;23:7849–7856.
- Frost MH, Hoskin TL, Hartmann LC, et al. Contralateral prophylactic mastectomy: long-term consistency of satisfaction and adverse effects and the significance of informed decision-making, quality of life, and personality traits. *Ann Surg Oncol*. 2011;18:3110–3116.
- Anderson C, Islam JY, Elizabeth Hodgson M, et al. Long-term satisfaction and body image after contralateral prophylactic mastectomy. *Ann Surg Oncol*. 2017;24:1499–1506.
- Hooker GW, King L, VanHusen L, et al. Long-term satisfaction and quality of life following risk reducing surgery in BRCA1/2 mutation carriers. *Hered Cancer Clin Pract*. 2014;12:9.