Original Investigation

Social and Clinical Determinants of Contralateral Prophylactic Mastectomy

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IMPORTANCE The growing rate of contralateral prophylactic mastectomy (CPM) among women diagnosed as having breast cancer has raised concerns about potential for overtreatment. Yet, there are few large survey studies of factors that affect women's decisions for this surgical treatment option.

OBJECTIVE To determine factors associated with the use of CPM in a population-based sample of patients with breast cancer.

DESIGN, SETTING, AND PARTICIPANTS A longitudinal survey of 2290 women newly diagnosed as having breast cancer who reported to the Detroit and Los Angeles Surveillance, Epidemiology, and End Results registries from June 1, 2005, to February 1, 2007, and again 4 years later (June 2009 to February 2010) merged with Surveillance, Epidemiology, and End Results registry data (n = 1536). Multinomial logistic regression was used to evaluate factors associated with type of surgery. Primary independent variables included clinical indications for CPM (genetic mutation and/or strong family history), diagnostic magnetic resonance imaging, and patient extent of worry about recurrence at the time of treatment decision making.

MAIN OUTCOMES AND MEASURES Type of surgery received from patient self-report, categorized as CPM, unilateral mastectomy, or breast conservation surgery.

RESULTS Of the 1447 women in the analytic sample, 18.9% strongly considered CPM and 7.6% received it. Of those who strongly considered CPM, 32.2% received CPM, while 45.8% received unilateral mastectomy and 22.8% received breast conservation surgery (BCS). The majority of patients (68.9%) who received CPM had no major genetic or familial risk factors for contralateral disease. Multivariate regression showed that receipt of CPM (vs either unilateral mastectomy or breast conservation surgery) was significantly associated with genetic testing (positive or negative) (vs UM, relative risk ratio [RRR]: 10.48; 95% CI, 3.61-3.48 and vs BCS, RRR: 19.10; 95% CI, 5.67-56.41; $P < .001$), a strong family history of breast or ovarian cancer (vs UM, RRR: 5.19; 95% CI, 2.34-11.56 and vs BCS, RRR: 4.24; 95% CI, 1.80-9.88; $P = .001$), receipt of magnetic resonance imaging (vs UM RRR: 2.07; 95% CI, 1.21-3.52 and vs BCS, RRR: 2.14; 95% CI, 1.28-3.58; $P = .001$), higher education (vs UM, RRR: 5.04; 95% CI, 2.37-10.71 and vs BCS, RRR: 4.38; 95% CI, 2.07-9.29; $P < .001$), and greater worry about recurrence (vs UM, RRR: 2.81; 95% CI, 1.14-6.88 and vs BCS, RRR: 4.24; 95% CI, 1.80-9.98; $P = .001$).

CONCLUSIONS AND RELEVANCE Many women considered CPM and a substantial number received it, although few had a clinically significant risk of contralateral breast cancer. Receipt of magnetic resonance imaging at diagnosis contributed to receipt of CPM. Worry about recurrence appeared to drive decisions for CPM although the procedure has not been shown to reduce recurrence risk. More research is needed about the underlying factors driving the use of CPM.

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A patient's decision to undergo contralateral prophylactic mastectomy (CPM) as part of initial treatment for breast cancer is a growing challenge in the management of the disease. Removal of the unaffected breast in most patients diagnosed as having breast cancer has not been shown to prolong survival.[1] Additionally, the widespread use of adjuvant therapy even for small node-negative breast cancers has resulted in a decrease in the incidence of contralateral breast cancer of approximately 3% per year since 1985.[2] Subgroups of patients with breast cancer at increased risk for development of contralateral cancer, and in whom having the nonaffected breast removed could improve survival, have been identified. Indeed, the Society of Surgical Oncology suggests that CPM should be considered in the minority of patients at higher than average risk for developing contralateral breast cancer, specifically those patients with either: (1) a genetic mutation of *BRCA1* or *BRCA2* or another known mutation or (2) a strong family history of at least 2 first-degree relatives with breast or ovarian cancer with no demonstrable mutations.[3] It is estimated that fewer than 10% of women with newly diagnosed unilateral breast cancer have 1 or both of these clinical indications.[4-6] Despite the cautious approach to CPM outlined in these recommendations, rates have been steadily increasing during the past decade.[4,7-10]

This situation has raised concerns about overtreatment and questions about why women are choosing the procedure.[4,9] The growing use of magnetic resonance imaging (MRI) as part of the diagnostic workup in patients with breast cancer has contributed to these concerns, as it may detect occult lesions for which treatment is not likely to improve outcomes for patients.[11-13] Two review articles have noted that unnecessary CPM is one of the potential harms possible from the use of preoperative MRI.[12,13] Studies that have examined factors associated with receipt of CPM provide insight regarding the decision-making process but are limited by relatively select and homogeneous single-institution clinic populations.[14-16] Larger studies using population-based registry data or large, multi-institutional convenience samples are limited by lack of information about the use of preoperative MRI and patient attitudes.[7,8,10]

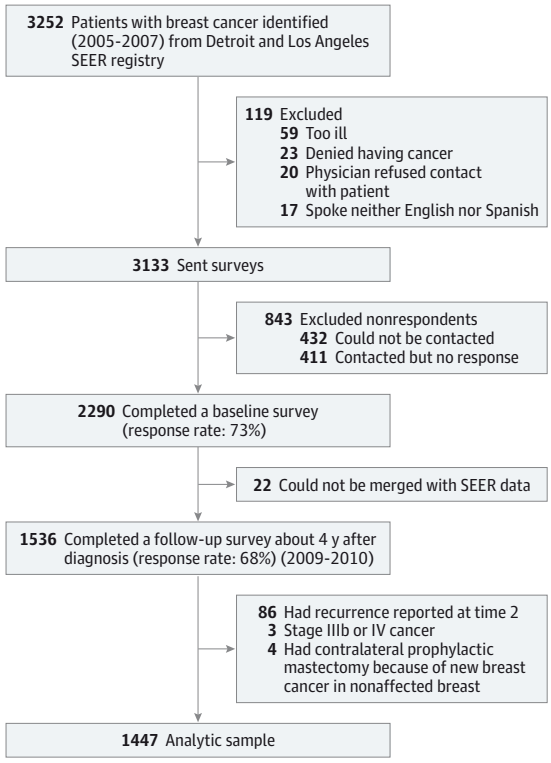
We used data from a large survey of a diverse population-based sample of patients to evaluate factors associated with receipt of CPM. The objectives were to describe rates of CPM compared with unilateral mastectomy (UM) and breast conservation surgery (BCS) and to evaluate factors associated with receipt of CPM, including key clinical indicators of an increased risk of contralateral cancer development, use of MRI, and patient worry about recurrence.

Methods

Study Population

We conducted a population-based survey of women aged 20 to 79 years at diagnosis with a first incident case of primary ductal carcinoma in situ or invasive breast cancer (stages I-IIIa), reported to the Surveillance, Epidemiology, and End Results (SEER) registries of the metropolitan areas of Los Angeles, California, or Detroit, Michigan, from June 1, 2007, to February 1, 2007.[17] Details have been published elsewhere.[18-25] We oversampled Latina patients in Los Angeles and African American patients in Detroit and Los Angeles. Asian women in Los Angeles were excluded because they were being recruited for another SEER study. Patients were excluded if they had stage IV breast cancer or could not complete a questionnaire in English or Spanish.

Figure 1. Study Flow Diagram



SEER indicates Surveillance, Epidemiology, and End Results.

Data Collection

Patients were identified via rapid case ascertainment and surveyed a mean of 9 months (time 1) and again approximately 4 years (time 2) later. The Dillman method[26] was used to encourage response, including a small cash incentive. In Los Angeles, study packets were sent in both English and Spanish to those with Spanish surnames.[27]

Time 1 and time 2 data sets were combined and merged with SEER data to create a single data set. The evolution of the sample is detailed in **Figure 1**.

The study protocol, including all patient involvement, was approved by the institutional review boards of the University of Michigan, the University of Southern California, and Wayne State University. All participants received information about the study's purpose, the risks and benefits of participation, and patient confidentiality. A waiver of documentation of written informed consent was obtained from participating sites.

Main Outcome Measures

Questionnaires were developed based on theoretical models, including measures previously developed to assess relevant constructs. The primary outcome variable was the initial surgical treatment the patient received obtained from patient self-report; UM and BCS data were collected at time 1 and CPM data at time 2. Women who indicated their double mastectomy was done because of a new breast cancer were excluded (n = 4). We also assessed whether women had considered CPM.

Independent Variables

The primary independent variables were measures of the 2 main clinical indications for CPM, obtained at time 2, including a positive genetic test result indicating a *BRCA1* mutation, *BRCA2* mutation, or a family history of 2 or more first-degree relatives with breast or ovarian cancer.[3,28,29] Genetic testing was described in the survey, and respondents were asked whether they had undergone a test. Response options included having had no test or having had a test with a negative result, an unclear or unknown result, or a deleterious *BRCA1* or *BRCA2* mutation (ie, a positive result). Respondents were asked to indicate their family history for breast and ovarian cancers with response options of none, 1 first-degree relative, or 2 or more first-degree relatives (defined as a strong family history for analysis). Genetic testing and family history were evaluated separately in models; however, for some analyses, respondents who had a positive genetic test and/or a strong family history were defined as having clinical indication(s) for CPM, while respondents without these factors were considered not to have a clinical indication.

To assess worry about recurrence, we evaluated 2 questions from time 1 asking respondents to rate how important 2 issues were in making their surgical decision (from not at all to very important): (1) keeping them from worrying about the cancer coming back and (2) reducing the chances of the cancer coming back. These questions were averaged and then dichotomized to create a binary variable reflecting the overall importance of worry (less vs very important) at the time of treatment decision making.[20] The MRI test was described in the survey, and its use as part of the diagnostic workup was assessed by asking, "Did you have an MRI when you were first diagnosed with breast cancer?" (yes, no, or don't know). Breast size was assessed through self-reported bra cup size at time 2 (small, A or B cup; large, C cup or larger).

We controlled for patient-reported demographic factors from time 1, including age at diagnosis (≤49, 50-64, and ≥65 years), education level (up to high school graduate, at least some college), marital status, annual household income (≤$49 000, $50 000-$89 000, ≥$90 000, and unknown/missing), and race/ethnicity (Latina, African American, white, or other). Tumor stage was obtained from SEER.

Statistical Analysis

We generated descriptive statistics for all variables and evaluated associations between the primary outcome variable (BCS, UM, or CPM) and independent variables. We used χ^2 tests to test for differences in surgical treatment and categorical independent variables and analysis of variance for continuous variables, with Wald F tests used for group variables. We compared receipt of CPM by clinical indications using χ^2 tests. All statistical tests were 2-sided, and $P < .05$ was considered statistically significant.

We conducted multinomial logistic regression (MNL) to evaluate factors associated with our 3-category outcome measure and to generate relative risk ratios (RRRs). The MNL method is recommended in cases with categorically distributed dependent variables that are not naturally ordered, and it allowed us to compare factors associated with receipt of CPM to both BCS and UM.[30] The first model used BCS as the base category against which we compared UM and CPM.[30] To allow for comparison of CPM with UM, we ran a second MNL model using UM as the base category. Each model controlled for all demographic and clinical factors.

We used the results of the 2 MNL models to generate predicted probabilities for each type of surgery for women with each category of genetic testing, family history, and both levels of worry about recurrence. All analyses were done in Stata version 11.0 statistical software (StataCorp LP) and were weighted using survey procedures to account for differential probabilities of sample selection and nonresponse.

Results

Description of the Sample

The sample had a mean age of 59.1 years (range, 25-79 years) and was racially and ethnically diverse. Slightly more than half the participants (57.1%) were married or partnered and had at least some college (58.8%). About half the respondents (57.6%) received BCS, one-third (34.4%) received UM, and 7.9% received CPM (**Table 1**). Approximately 19.0% of patients who received any mastectomy elected to undergo CPM. Many more women considered CPM than those who ultimately received it; 18.9% of the full sample of respondents reported considering CPM "quite a bit or very strongly." Of those who strongly considered CPM, 32.2% received CPM while 45.8% ultimately received UM and 22.8% received BCS. Among women who received CPM, 80.0% indicated it was done to prevent breast cancer from developing in the other breast. Most women who opted for CPM received breast reconstruction (85.9% vs 54.0% of those who received UM; $P < .001$).

About 10.1% of respondents had a clinical indication for CPM. Most women (78.1%) indicated that worry about recurrence was very important at the time of treatment decision making. The bivariate comparisons found significant differences in receipt of CPM according to patient age, race/ethnicity, education, income, genetic testing, strong family history, receipt of MRI, and greater worry about recurrence ($P < .05$). Interestingly, of those with a clinical indication (n = 136), 24.3% received CPM while 75.7% did not. Of the 106 women who received CPM, 31.1% had a clinical indications, while the remaining majority of women (68.9%) did not ($P < .001$).

Table 1. Description of 1447 Surveyed Women Newly Diagnosed as Having Breast Cancer

Variable	Weighted, No.[a] (%)	Weighted % With CPM	*P* Value
Type of surgery			
CPM	106 (7.9)		
UM	458 (34.4)		
BCS	879 (57.6)		
Considered CPM			
Not at all, a little, or somewhat	1147 (81.2)	2.1	<.001
Quite a bit or very strongly	251 (18.9)	32.2	
Patient demographic and clinical factors			
Age at diagnosis, y			
≤49	370 (25.9)	12.3	<.001
50-64	660 (44.8)	7.1	
≥65	417 (29.3)	4.9	
Race/ethnicity			
White	672 (46.8)	11.6	
African American	321 (21.0)	3.4	<.001
Latina, low acculturation	221 (15.6)	3.0	
Latina, high acculturation	201 (14.6)	8.7	
Other	32 (2.0)	3.1	
Education			
High school graduate or less	546 (41.1)	2.7	<.001
Some college or more	901 (58.8)	11.8	
Marital status			
Married or partnered	615 (57.1)	6.3	.151
Not married	832 (42.9)	9.3	
Annual family income, $			
≤49 000	610 (42.7)	5.4	
50 000-89 999	314 (20.7)	8.2	.001
≥90 000	262 (17.3)	14.9	
Missing or do not know	261 (19.2)	6.9	
Patient demographic and clinical factors (continued)			
Cancer stage			
0, DCIS	365 (19.3)	6.9	.07
I	525 (34.6)	6.9	
II	400 (32.9)	8.3	
IIIa	85 (7.1)	12.4	
Unknown	72 (6.1)	9.3	
Receipt of MRI			
Yes	588 (41.5)	10.9	.001
No or do not know	840 (58.5)	5.3	
Worry about recurrence			
Low	309 (21.9)	2.7	.001
High	1085 (78.1)	10.0	
Breast size, based on bra cup size			
Small	448 (31.3)	7.6	.12
Large	992 (68.7)	8.0	
Genetic testing result			
Not tested	1056 (80.5)	5.4	
Positive	22 (1.8)	51.4	<.001
Negative	160 (12.5)	20.8	
Unknown	68 (5.2)	6.8	
Family history of breast or ovarian cancer			
0 First-degree relatives	919 (63.7)	6.6	.001
1 First-degree relative	398 (27.6)	7.4	
≥2 First-degree relatives	124 (8.6)	20.5	
Clinical indication(s) for CPM, positive genetic test result and/or ≥2 first-degree relatives with breast or ovarian cancer			<.001
Yes	136 (9.4)	24.3	
No	1314 (90.6)	5.8	

Abbreviations: BCS, breast conservation surgery; CPM, contralateral prophylactic mastectomy; DCIS, ductal carcinoma in situ; MRI, magnetic resonance imaging; UM, unilateral mastectomy.

[a] All numbers do not total 1447 owing to missing values on some survey questions.

Factors Associated With Receipt of Surgery for Breast Cancer

Table 2 shows the MNL results comparing CPM with UM, CPM with BCS, and UM with BCS. Compared with UM, women who received CPM had higher educational attainment (RRR: 5.04; 95% CI, 2.37-10.71), had a positive or negative genetic test result (RRR: 10.48; 95% CI, 3.61-30.48 and RRR: 2.17; 95% CI, 1.13-4.15, respectively), had a strong family history of breast or ovarian cancer (RRR: 5.19; 95% CI, 2.34-11.56), had received a diagnostic MRI (RRR: 2.07; 95% CI, 1.21-3.52), and reported that worry about recurrence was very important (RRR: 2.81; 95% CI, 1.14-6.88). All these factors were also statistically significantly associated with receipt of CPM relative to BCS (see Table 2 for RRRs); however, African American women were significantly less likely to receive CPM vs BCS relative to white women (RRR: 0.25; 95% CI, 0.11-0.56). We ran 2 sensitivity analyses with different MNL model specifications. The first excluded patients with stage IIIa cancer to account for the possibility that some of those women may have been recommended mastectomy. The second allowed for a broader definition of family history (≥1 first-degree relative). Neither analysis showed any substantive differences from the results presented in Table 2. Our MNL model also produced results comparing UM with BCS (Table 2).

Figure 2 shows the predicted probabilities of receipt of type of surgery (CPM, UM, and BCS) separately according to each clinical indication and worry about recurrence, adjusted for demographic and clinical factors. Not all women at higher than average risk for contralateral breast cancer opted for CPM; the probabilities of BCS and UM among those with a positive genetic test were 24.0% and 28.1%, respectively. Among those

Table 2. Multinomial Logistic Regression Model Results of Factors Associated With Surgery for 1447 Women

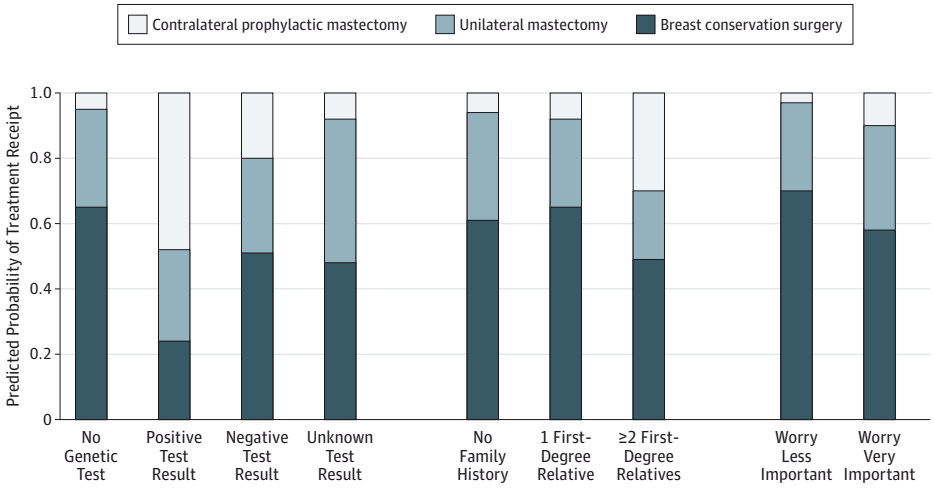
Factor	RRR (95% CI)		
	CPM vs UM	CPM vs BCS	UM vs BCS
Age, y			
≤49	1.56 (0.67-3.61)	2.42 (1.08-5.44)	1.55 (1.07-2.33)
50-64	1.11 (0.50-2.47)	1.31 (0.60-2.84)	1.18 (0.84-1.69)
≥65	1 [Reference]	1 [Reference]	1 [Reference]
Wald *F* test	1.31	9.74	13.80
P value	.14	.008	.001
Race/ethnicity			
White	1 [Reference]	1 [Reference]	1 [Reference]
African American	0.34 (0.11-1.02)	0.25 (0.11-0.56)	2.65 (1.68-4.17)
Latina	0.39 (0.19-0.97)	0.81 (0.28-2.31)	1.25 (0.86-3.94)
Other	0.16 (0.05-4.92)	0.19 (0.02-2.42)	1.26 (0.61-3.28)
Wald *F* test	15.30	13.08	24.18
P value	.004	.01	<.001
Education, some college or more vs high school or less	5.04 (2.37-10.71)	4.38 (2.07-9.29)	0.87 (0.62-1.12)
Marital status, not married vs married or partnered	1.02 (0.58-1.81)	0.87 (0.51-1.53)	0.86 (0.63-1.16)
Income, $			
≤49 000	1 [Reference]	1 [Reference]	1 [Reference]
50 000-89 999	0.99 (0.45-2.15)	0.69 (0.33-1.45)	0.70 (0.46-1.05)
≥90 000	0.95 (0.42-2.16)	0.97 (0.45-2.12)	1.02 (0.71-1.60)
Missing or do not know	1.23 (0.54-2.82)	1.32 (0.59-2.96)	1.07 (0.76-1.66)
Wald *F* test	0.76	3.32	4.71
P value	.52	.76	.25
Cancer stage			
0	1 [Reference]	1 [Reference]	1 [Reference]
I	0.66 (0.33-1.32)	0.56 (0.29-1.07)	0.85 (0.59-1.22)
II	0.52 (0.25-1.07)	0.93 (0.45-1.79)	1.75 (1.22-2.53)
IIIa[a]	0.51 (0.21-1.27)	2.21 (0.91-5.40)	4.28 (2.32-7.89)
Unknown	0.32 (0.04-2.31)	0.58 (0.07-4.54)	1.82 (0.86-4.27)
Wald *F* test	0.72	14.38	45.50
P value	.46	.006	<.001
Worry about recurrence, high vs low/moderate	2.81 (1.14-6.88)	4.24 (1.80-9.98)	1.50 (1.07-2.14)
MRI receipt, yes vs no or do not know	2.07 (1.21-3.52)	2.14 (1.28-3.58)	1.04 (0.79-1.38)
Breast size, larger vs smaller	1.59 (0.94-2.70)	1.08 (0.65-1.78)	0.66 (0.51-0.90)
Genetic testing result			
Not tested	1 [Reference]	1 [Reference]	1 [Reference]
Positive	10.48 (3.61-30.48)	19.10 (5.67-56.41)	1.81 (0.50-6.42)
Negative	2.17 (1.13-4.15)	2.26 (1.25-4.07)	1.05 (0.66-1.69)
Unknown	0.72 (0.22-2.39)	1.32 (0.41-4.23)	2.10 (1.00-4.10)
Wald *F* test	15.95	28.74	6.60
P value	.004	.001	.08
Family history of breast or ovarian cancer			
No family history	1 [Reference]	1 [Reference]	1 [Reference]
1 First-degree relative	1.40 (0.78-2.51)	0.98 (0.57-1.71)	0.70 (0.51-0.98)
≥2 First-degree relatives[b]	5.19 (2.34-11.56)	4.24 (1.80-9.88)	1.00 (0.58-1.65)
Wald *F* test	19.32	25.93	5.21
P value	<.001	<.001	.13

Abbreviations: BCS, breast conservation surgery; CPM, contralateral prophylactic mastectomy; MRI, magnetic resonance imaging; RRR, relative risk ratio; UM, unilateral mastectomy.

[a] When models were run with stage IIIa cancer excluded (n = 1362), there were no substantial changes to the results presented.

[b] When models were run considering a broader definition of family history, there were no substantial changes to the results presented. Family history of 1 or more first-degree relatives remained associated with CPM relative to UM (RRR: 2.03; 95% CI, 1.24-3.42) and to BCS (RRR: 1.62; 95% CI, 1.05-2.76).

Figure 2. Predicted Probabilities of Receipt of Treatments by Clinical Indications and Worry About Recurrence



Adjusted for age, race/ethnicity, education, income, stage, and study site.

women with a strong family history, the probabilities of BCS and UM were 49.0% and 21.0%, respectively. Figure 2 shows the probability of surgery according to level of importance placed on worry about recurrence; among those reporting worry to be very important, the probability of BCS was 58.1%; UM, 32.1%, and CPM, 10.0%.

Of the 251 women who strongly considered CPM, we found that those who ultimately received CPM (n = 81) were significantly different from those who ultimately received UM or BCS (n = 170). The former group was significantly more often white (71.6% vs 22.9%) ($P < .001$), highly educated (88.9% vs 44.9%) ($P < .001$), and very worried about recurrence (93.8% vs 80.1%) ($P = .001$). This concordant group also more often had a clinical indication for CPM (27.2% vs 6.5%) ($P < .001$).

Discussion

Rates of CPM have been increasing during the past decade, despite the fact that very few women with a new diagnosis of breast cancer are likely to experience a survival benefit from electing this procedure. We found that many women in our population-based sample from 2 geographic areas reported that they strongly considered having their nonaffected breast removed as part of their initial treatment for breast cancer. Consistent with other studies, we found that about 8% of newly diagnosed patients (18.7% of mastectomy-treated patients) actually received CPM[7,8] and that this rate was higher for women with more education.[10,16] Reflective of concerns about the impact of testing on overtreatment, women in our sample who had received an MRI at diagnosis more often received CPM than other surgical procedures. While other studies have suggested that increased MRI use during diagnosis may contribute to higher rates of CPM,[11-13] to our knowledge, this is the first population-based study to confirm this based on the reports of patients with breast cancer themselves.

Our finding that clinical indications that elevate the risk of developing a new primary breast cancer (ie, positive genetic mutation or a strong family history) in the nonaffected breast were associated with receipt of CPM is consistent with other studies.[14-16] However, our results also distinctly contribute to the CPM literature. First, we found that most women who received CPM (68.9%) did not have either of the clinical indications evaluated and in fact some (20.8%) had a negative test result. Perhaps even more interestingly, nearly a fifth of our sample strongly considered CPM, yet many who did so ultimately received either UM (45.8%) or BCS (22.8%). In addition, although women who strongly considered but did not receive CPM less often had clinical indications, they more often had higher worry about recurrence. These results suggest that both clinical and nonclinical factors motivate many patients to consider the operation.

One such prevalent and powerful nonclinical factor illustrated in our results and those of others is the fear of disease recurrence.[15,31] A patient's decision to undergo CPM based on a strong fear of recurrence in the absence of clinical indications presents an important clinical challenge for surgeons.[32] Patients at average risk for developing contralateral cancer who are considering CPM should clearly understand the potential adverse consequences of CPM, including lengthy recovery time and increased risk for serious operative complications,[33-35] and should weigh them against the lack of empirical evidence that the procedure improves disease-free survival from the cancer, which is already present.[36] Growing literature supports the notions that patients have a difficult time assessing and interpreting their own risk and that fear and anxiety related to disease recurrence often supersede accurate risk perceptions to drive health decisions.[37,38]

Our results provide evidence that decisions about CPM represent a clear case in which better strategies to increase patient knowledge about their own risk of developing contralateral cancer as well as the net benefit of treatment are needed and should be made only after patients are accurately informed about these issues.[39] Educational materials and decision tools for average-risk patients making initial breast cancer treatment decisions typically do not include information

about CPM, actual risk of contralateral breast cancer, or interpretation of genetic test results. Such information could be useful for women making these decisions.[31,40] However, our findings that CPM was strongly associated with higher educational attainment suggests that improved knowledge may not be sufficient to address patient factors, such as worry about recurrence, motivating strong consideration of the procedure. Furthermore, the association found between diagnostic MRI and receipt of CPM indicates a need to consider strategies for educating both patients and clinicians about the impact of extensive testing on treatment decision making. Strategies should also include ensuring clinicians have better understanding about the strong role of patient attitudes, including worry about recurrence, in choice of treatment.[32]

Some limitations of the study merit comment. Although population based, our data came from 2 urban geographic areas and likely cannot be generalized to other areas. Many of our variables were obtained from patient self-report and may be subject to recall bias. In particular, inaccurate patient recall of genetic testing results could have underestimated the proportion of patients with positive tests who underwent CPM and overestimated the proportion with negative tests who received CPM. We cannot be sure whether the timing of patient reports of genetic testing happened prior to or following surgery. Although we excluded women who reported that CPM was done because of a new breast cancer, we cannot be totally sure that other women who received CPM did not have bilateral breast cancer. Additionally, we did not evaluate history of radiotherapy to the chest region or the finding of atypia on benign breast biopsies, which are known to increase breast cancer risk, nor did we determine whether the use of CPM varied with estrogen receptor status. Although we had information about receipt of breast reconstruction, we were not able to assess whether women decided to get CPM to have bilateral reconstruction. Finally, although response rates were high, we lost respondents from baseline to follow-up survey, which may have influenced the results.

Conclusions

A woman's decision to have her nonaffected breast removed at the same time as her affected breast represents the most extensive surgical option available for patients with patients, because most women who undergo CPM also receive bilateral breast reconstruction. Indeed, our study shows that many women who opted for CPM were candidates for BCS. The growing rate of CPM has motivated some surgeons to question whether performing an extensive operation that is not clinically indicated is justified to reduce the fear of disease recurrence.[35] Increased attention by surgeons coupled with decision tools directed at patients to aid in the delivery of risk and benefit information and to facilitate discussion could reduce the possibility of overtreatment in breast cancer.

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Study concept and design: Hawley, Janz, Katz.
Acquisition, analysis, or interpretation of data: Hawley, Jagsi, Janz, Hamilton, Graff.
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Invited Commentary

Contralateral Prophylactic Mastectomy
An Opportunity for Shared Decision Making

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Most women who have contralateral prophylactic mastectomy (CPM) do not have clear clinical indications for undergoing the procedure, fueling concerns about overuse, as highlighted in the article by Hawley and colleagues.[1] Focusing on improving informed decision making is one starting point. However, breast cancer surgical decisions are made at an emotional time when fully understanding and weighing the true risks (eg, surgical complications, self-image, and sexual effects) and benefits (eg, reduced risk of contralateral cancer) associated with CPM might be difficult for some patients. Anxiety and fear certainly hamper optimal decision making,[2,3] and greater psychological and emotional support may prove invaluable in this setting. Further complicating informed decision making is the tendency for people to not believe that risk estimates apply to them personally.[4]

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An underlying tension exists between "do no harm," viewing CPM as medically unnecessary given the lack of demonstrated benefit on recurrence and survival, and respect for patient preferences and autonomy. While CPM might be considered overtreating women without clinical indications, it might still be the right choice for some women for risk reduction, cosmetic, and/or emotional reasons. The Institute of Medicine[5] recently categorized shared decision making in the context of cancer care as suboptimal, underscoring a need for better patient-clinician communication. Decision making surrounding early breast cancer, with respect to CPM in particular, provides an opportunity to encourage a supportive, shared decision-making approach. Not only should pros and cons of different treatment options be communicated, but there needs to be consideration of the patient's personal circumstances and perceptions, all the while addressing anxiety and concerns about breast cancer recurrence and new primary disease (and the distinction between the two). Finding balance around this issue, like the decision process itself, should be a goal shared by patients and clinicians alike.