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The effect of system-level access factors on receipt of reconstruction among Latina and white women with DCIS

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Abstract

Treatment decisions associated with ductal carcinoma in situ (DCIS), including the decision to undergo breast reconstruction, may be more problematic for Latinas due to access and language issues. To help understand the factors that influence patients' receipt of reconstruction following mastectomy for DCIS, we conducted a population-based study of English- and Spanish-speaking Latina and non-Latina white women from 35 California counties. The objectives of this study were to identify the role of ethnicity and language in the receipt of reconstruction, the relationship between system-level factors and the receipt of reconstruction, and women's reasons for not undergoing reconstruction. Women aged 18 and older, who self-identified as Latina or non-Latino white and were diagnosed with DCIS between 2002 and 2005 were selected from eight California Cancer Registry (CCR) regions encompassing 35 counties. Approximately 24 months after diagnosis, they were surveyed about their DCIS treatment decisions. Survey data were merged with CCR records to obtain tumor and treatment data. The survey was successfully completed by 745 women, 239 of whom had a mastectomy and represent the sample included in this study. Whites had a higher completion rate than Latinas (67 and 55%, respectively). Analysis included descriptive statistics and logistic regression modeling. Mean age was 54 years. A greater proportion of whites had reconstruction (72%) compared to English-speaking Latinas (69%) and Spanish-speaking Latinas (40%). Multivariate analysis showed that women who were aged 65 and older, unemployed, and had a lower ratio of plastic surgeons in their county were less likely to have reconstructive surgery after mastectomy. The most frequent reasons mentioned not to receive reconstruction included lack of importance and desire to avoid additional surgery. Although ethnic/language differences in treatment selection were observed, multivariable analysis suggests that these differences could be explained by differential employment levels and geographic availability of plastic surgeons.

Keywords

Ductal carcinoma in situ; Latinas; Reconstruction; Treatment decisions

Introduction

Women diagnosed with ductal carcinoma in situ (DCIS) are faced with multiple surgical treatment options. Despite the large body of evidence demonstrating similar survival outcomes after mastectomy and after breast-conserving surgery with radiation, approximately one-third of women diagnosed with DCIS choose mastectomy [1, 2], and recent evidence shows that mastectomy rates are increasing in this group [3]. Women undergoing a mastectomy have the option of breast reconstructive surgery [4], which may include either implants and/or their own tissue. Surgery can be performed at the time of mastectomy or delayed until a later date. Examination of women with DCIS offers the opportunity to look at factors affecting the receipt of reconstruction without the confounding considerations of adjuvant chemotherapy and radiation, both of which could significantly impact the timing and decision to undergo reconstruction.

Cultural and language factors may affect a woman's choice of surgery. However, few studies have focused on Latinas, particularly those who are monolingual Spanish-speaking. Of those that have included Latinas, results are conflicting. Some suggest that Latinas are less likely than whites to undergo reconstructive surgery [5–7], while others have found no ethnic differences [8–10]. Although English language proficiency has been shown to influence the discussion of breast surgery options [6, 11, 12], its effect on the choice of reconstruction has not been firmly established.

Previous research among Latinas has shown that factors such as age [4, 6, 7], educational level [6, 13], insurance coverage [7], and family income [4] may affect the decision to undergo breast reconstruction. While these studies demonstrate that individual factors play a role in surgical decision-making, there is limited information regarding the role of wider, system-level factors affecting access to breast reconstruction. Research from Morrow et al. [4] suggests that receiving care in a National Cancer Institute (NCI)-recognized center is associated with receipt of reconstruction. In addition, physician data has shown that treatment at a cancer center is associated with increased likelihood of referral to a plastic surgeon for consultation [14]. These studies point to both the availability of plastic surgeons and the type of facility where physicians practice as facilitators of patients' receipt of reconstruction. Despite the relative importance of these system-wide access factors, their effect, along with patients' personal characteristics, has not been fully explored. These factors could be particularly relevant for Latinas, who may be less likely than white women to receive up-to-date treatments for breast cancer care [5].

To examine these issues, we conducted a population-based study of English- and Spanish-speaking Latina and non-Latina white women diagnosed with DCIS from 35 California counties. Latinas were grouped by language to identify possible effects of acculturation and access to care. The objectives of this study were threefold: (1) to identify the role of ethnicity and language in the receipt of reconstruction; (2) to establish the relationships between individual patient characteristics, access to care, system-level factors and receipt of reconstruction; and (3) to identify women's reasons for not undergoing reconstruction.

Methods

Study population

We selected women aged 18 and older, who self-identified as either Latina or non-Latino white, were diagnosed with DCIS between 2002 and 2005, and resided in one of eight California Cancer Registry (CCR) regions. Details of recruitment and participants have been described elsewhere [15].

Data collection

Data were collected via telephone interviews conducted in English or Spanish, according to the participant's preference. Participants received a \$20 gift certificate for completing the interview.

The CCR clinical data from hospital-based sources were merged with the survey data for all participants. All of the registries in the study were part of the Surveillance, Epidemiology, and End Results (SEER) reporting system. The University of California, San Francisco Committee on Human Research approved all research-related activities.

The original sampling frame consisted of 1,404 women. Of these, physicians objected to the participation of 21 patients. An additional 98 participants were deemed ineligible after initial contact, 54 had incorrect contact information, 167 were never reached, and 319 refused participation. The survey was successfully completed by 745 women, 239 of whom had a

mastectomy and represent the sample included in this study. Whites had a higher completion rate than Latinas (67 and 55%, respectively).

Measures

The main outcome variable was self-reported receipt of reconstructive surgery, both immediate and delayed up to the time of interview.

Demographic indicators—Based on self-identification, the patients were classified as either white or Latina. We further classified the Latinas by their language of interview: English-speaking Latinas (ESL) or Spanish-speaking Latinas (SSL).

Other indicators included age (less than 50, 50–64, 65 years and over), relationship status (not married vs. married or living with a partner), and education completed (high school or less vs. any college or higher).

Health-related indicators—Family history was a dichotomous variable consisting of those who had a close relative (mother, sister, daughter, grandmother, or aunt) with a history of breast cancer versus those who did not. To assess co-morbidities, participants were given a list of health conditions and asked to indicate for each one whether they had ever been diagnosed with that condition. Since major co-morbidities might impact surgical treatment decisions, we dichotomized co-morbidities in the following manner: Any participant with a personal history of lung, heart, kidney, or liver disease; blood clots; or strokes was considered to have a major health comorbidity, while those who did not have any of these conditions were classified as having no major comorbid condition. Other indicators included self-rated health (excellent/very good vs. good/fair/poor/very poor) and histological grade taken from the CCR (grade 1, grade 2, grade 3 or grade missing). Finally, we measured time from diagnosis to interview (in months) to control for recall bias.

Individual access to care—The participants were classified as having public insurance, (Medicare, MediCal, Veteran's Administration), no insurance, or unknown insurance versus private insurance (Kaiser, HMO, and non-HMO private) at the time of interview. Employment status (employed vs. unemployed) and self-reported income were also included.

System-wide access to care—Two system-wide measures were included: type of medical facility and availability of plastic surgeons. Facilities where patients received surgery were classified based on the Commission on Cancer (CoC) program accreditation classification provided by the American College of Surgeons (ACS) and included in the American Hospital Association 2005 data file. Based on information from the ACS website, these sites were further classified into three categories: (a) National Cancer Institute (NCI)-designated Cancer Centers, Teaching Hospital Cancer Programs, and Network Cancer Programs; (b) other CoC-accredited programs; and (c) non-accredited non-cancer program hospitals. Information on plastic surgeons was obtained from the Health Resources and Services Administration of the US Department of Health and Human Services. This data set included all non-federal plastic surgeons involved in patient care in 2005 in California counties. We then calculated the number of plastic surgeons per 100 breast cancer patients for each county as a measure of plastic surgeon availability. CCR registry data were used to estimate the average number of cancer patients per county.

Reconstructive surgery characteristics—The participants who had reconstruction reported whether they had initiated or completed reconstruction either at the same time as their mastectomy or subsequently. They were also classified based on whether autogenous

tissue was used in the reconstruction (i.e., latissimus dorsi flap or TRAM/DIEP flap) versus implants or both implants and autogenous tissue.

Reasons for choosing not to have reconstructive surgery—For women who did not have reconstruction, we presented ten items based on those developed by Katz and associates [7] that described potential reasons for not choosing reconstruction. Women were asked to indicate the extent to which each factor influenced their decision not to have reconstruction. We excluded items that were endorsed as influential by fewer than 10% of respondents. We then conducted a maximum likelihood factor analysis using tetrachoric correlations to handle the dichotomous data, resulting in two scales which were computed by adding up the items and dividing by the total number: (1) *surgery importance* scale, which was composed of “having breast reconstructed is not important to me” and “not planning to have reconstruction in future” ($\alpha = 0.63$) and (2) *concerned about consequences* scale, which included “too much time to recover,” “worried that MD will miss future problems,” and “concerned about what the breast would look or feel like” (Cronbach’s $\alpha = 0.67$). The two items that did not load on any factor were used as single items: *did not want more surgery* and *the doctor did not recommend it*.

Analysis

Statistical analysis was conducted using SAS software, Version 9.2. Descriptive statistics were used to characterize the total sample and subsamples of ethnic/language groups who were further categorized into ESL, SSL, and white subgroups. χ^2 tests or analysis of variance were used to evaluate the differences between the ethnic/language groups. Proportions for the receipt of reconstruction and reconstruction characteristics were reported by ethnic/language group adjusted for age and education.

Three logistic regression models that included successively added blocks of independent variables were utilized to identify factors associated with receipt of reconstruction. Responses were clustered on the patients’ hospital county using generalized estimating equations to account for possible correlations within counties. Variables for multivariable analysis were selected based on significant bivariate associations ($P < 0.20$). The first model included all demographic and health-related indicators. The second model added the effects of individual-level access variables, while the third model added the effects of system-level access factors (site type and availability of plastic surgeons).

Results

Sample characteristics (Table 1)

Based on CCR data, comparison of respondents versus non-respondents found no significant differences in mastectomy rates (29 vs. 27%, respectively). There was a significant difference by age. The mean age of respondents was 54 (SD 10.0) years compared to 56 (SD 10.5) for non-respondents ($P < 0.0001$). The majority of respondents (71%) were married or living with a partner. While 60% reported having a college education, fewer SSL had a college education as compared to whites and ESL.

With respect to health characteristics, 41% reported having a close relative with breast cancer, and 25% indicated having a major co-morbidity. Excellent or very good health was reported by 41% of the sample. A greater proportion of whites and ESL indicated excellent or very good health as compared to SSL.

The majority of whites and ESL were privately insured, while this was not the case for SSL. Almost 60% of the respondents were employed. Fewer SSL were employed than either

whites or ESL (39 vs. 63 and 71%, respectively). SSL reported lower household income compared to whites and ESL.

As for system-wide access variables, a greater proportion of whites received surgical procedures (mastectomy with or without reconstruction) in NCI-designated cancer centers, teaching institutions, and network programs compared to either ESL or SSL. Whites lived in counties with a higher ratio of plastic surgeons to breast cancer patients than either ESL or SSL.

Reconstructive surgery (Table 2)

A greater proportion of whites had reconstructive surgery (72%) compared to ESL (69%) and SSL (40%). Pairwise comparisons (not shown) indicated significant differences between SSL and whites ($P<0.0001$), and between SSL and ESL ($P<0.01$). Regardless of ethnic/language group, the majority of women who underwent reconstruction had it at the same time as their mastectomy (78%) and opted for implants (73%). The mean time from definitive surgery to interview was 24 months (SD 8.7).

Reasons for choosing not to have reconstructive surgery (Fig. 1)

Among women who elected to forgo reconstructive surgery ($n = 90$), the most often cited reasons were the *lack of importance* (85% whites, 80% ESL, and 70% SSL), followed by the *patient did not want more surgery* (74% whites, 67% ESL, and 65% SSL). Although there was not a statistically significant difference found between the groups on the item *the doctor did not recommend it*, it was cited more frequently by SSL (33%) compared to ESL (27%) and whites (13%). SSL cited *concerns about consequences* as a reason for not choosing reconstruction in greater proportion (40%) than whites (15%) or ESL (7%).

Multivariable analysis

Factors associated with receipt of reconstruction (Table 3)—In Model 1, we examined the demographic and health factors associated with receipt of reconstruction. Compared to white women, SSL were significantly less likely to undergo reconstruction (OR 0.35, 95% CI 0.16–0.75). The odds of having reconstruction were six times as high among women under aged 50 (OR 5.99, 95% CI 3.60–9.98) and almost three times as high among those age 50–64 (OR 2.81, 95% CI 1.50–5.28) compared to those aged 65 and over.

In Model 2, we added individual-level access indicators and found ethnicity was no longer significant. As in Model 1, younger women were more likely to undergo reconstruction than women 65 years and older. Compared to women who were unemployed, those employed were more likely to undergo reconstruction (OR 2.50, 95% CI 1.27–4.90).

System-level access indicators were introduced in Model 3. As in prior models, the relationships for age and employment persisted. In addition, a higher ratio of plastic surgeons to number of breast cancer cases in the county was significantly associated with having reconstruction (OR 1.17, 95% CI 1.02–1.34).

Discussion

Women who are diagnosed with DCIS and subsequently undergo a mastectomy have the option of breast reconstructive surgery. Our study focused on individual characteristics, individual-level access to care factors, and system-level factors that may influence the receipt of reconstruction following mastectomy among ESL, SSL, and white women.

In our sample of California women with DCIS who underwent a mastectomy, a substantial proportion chose reconstruction. The proportion of mastectomy is lower than what is reported in other studies. This may reflect trends observed in California, which has historically lower rates of mastectomy for DCIS than elsewhere in the country, aside from Connecticut [16]. Paralleling this finding, the rate of reconstruction is greater than previously reported in studies of invasive breast cancer (8.3–34.6%) [4, 17]. However, at least one previous publication has noted a much higher rate of immediate reconstruction in women with DCIS (62%), which is comparable to the rate seen in our population [9]. This higher rate may reflect recent improvements in reconstruction techniques and increased health insurance coverage of breast reconstruction. It may also reflect a greater likelihood of both the patients and providers to consider reconstruction in the patients whose care is not likely to be complicated by any other adjuvant therapy and who are therefore ideal candidates for a reconstructive procedure. The high rates of immediate reconstruction and the use of implants for those patients who had reconstruction are consistent with other studies.

Among the demographic and health indicators, we found that ethnicity and language were associated with receipt of reconstruction. At the bivariate level, SSL had lower rates of reconstruction than either ESL or whites, which is consistent with other studies [5]. While this finding persisted in the model assessing individual factors only, additional analysis that included individual-level access and system-level access factors revealed alternative possible explanations for these differences in reconstruction rates. Women who were employed were more likely to undergo reconstruction than the unemployed, and SSL were significantly less likely to have full or part-time employment. We can only hypothesize that the relative financial stability and additional health benefits afforded by employment may lead to improved access to specialty care and a greater willingness of physicians to discuss reconstruction with their patients [9]. It may also be possible that many employed women place greater importance on their appearance due to their professional and social interactions.

Our study also found a higher rate of reconstruction among younger women, with age being the only individual-level factor that remained significant in the full analysis (model 3). This is consistent with prior studies [17], which found lower odds of reconstruction with advanced age [18]. Ageism has been identified as a significant factor in reconstruction decisions for breast cancer patients, irrespective of the presence of serious co-morbidities that may hinder surgery [19]. This finding could reflect physicians' assumptions regarding older women's surgical preferences; it may also indicate older patients' preferences for avoiding additional surgeries or a prolonged post-surgery hospital stay, or placing less importance on the cosmetic benefits of reconstruction.

With respect to the system-level factors, availability of plastic surgeons was associated with receipt of reconstruction. As noted by Katz and colleagues, physicians who do not usually refer to plastic surgeons perceive that patients may lack the finances to obtain reconstructive procedures or have limited access to reconstructive surgeons [14]. Referral to a plastic surgeon for breast reconstruction requires detailed explanations, which may be more difficult for some surgeons to implement with monolingual Spanish-speaking patients. Breast surgeons and oncologists frequently do not have access to professional interpreters and report concerns that patients with a language barrier do not ask all of the questions they may have when discussing treatment options [20]. While studies have suggested a relationship between breast cancer survival and receiving care at an NCI-designated cancer center, type of medical facility accreditation was unrelated to likelihood of reconstruction in our sample. Breast reconstruction is fundamentally an elective procedure that appears to be

more heavily influenced by issues of access and availability than by level of facility specialization.

Our study also found that women who did not have reconstruction did not vary significantly by ethnicity and language in their reasons for not choosing the procedure. Women from all three groups cited the lack of importance placed on having reconstructive surgery and their desire to avoid additional surgery as their main reasons for not choosing reconstruction. Other reasons such as lack of physician recommendation appeared to be more prevalent among Latinas. Latinas were more likely to live in counties with fewer plastic surgeons; thus, physicians may recommend reconstruction less often to Latinas than white women because of this limited access to plastic surgeons. SSL were significantly more likely to report concerns about the consequences of surgery as a reason for not choosing reconstruction. One possible explanation could be language related, in that a lack of detailed information communicated in the patient's native language may result in reduced comprehension of options and risks. These findings highlight multiple factors that may be involved in a woman's decision to undergo breast reconstruction.

Although this was a population-based study covering 35 counties, we acknowledge several limitations. Since the study used retrospective information, patients' recall of factors that influenced their treatment decisions may have changed over time or been influenced by post-treatment experiences. This might have influenced mastectomy decision, but should have less bearing on reconstruction. In addition, information regarding pathologic characteristics of women's DCIS was limited to the contents of the registry data, as a centralized pathology review was not undertaken for this cohort. Although we limited the study to those patients treated in California, we acknowledge that these findings may not be generalizable to other groups in other states. Patients may also have opted for reconstruction at a later time, although most women who did not receive reconstruction did not think it was important. Other factors influencing receipt of reconstruction such as body image or patients' anxiety may have impacted our findings, but was not captured in this retrospective study design. Finally, age differences between respondents and non-respondents may account for some of the findings.

In summary, our study found that lower rates of reconstructive surgery among SSL who have had a mastectomy for DCIS compared to both ESL and whites may be the result of both individual-level and system-level access factors such as employment status and plastic surgeon availability. These results highlight that inequities in care are linked with limited individual resources, as well as limited access to specialty care among ethnically diverse populations.

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Fig. 1.
Reasons for choosing not to have reconstructive surgery

Table 1

Sample characteristics, by ethnicity/language group

	White N = 124 (%)	ESL N = 48 (%)	SSL N = 67 (%)	Total N = 239 (%)	P value
Background					
Age mean (SD)	54.5 (10.4)	53.1 (8.3)	54.3 (10.6)	54.2 (10.0)	0.72
Age					0.63
Less than 50	41.1	37.5	38.8	39.8	
50–64	41.1	50.0	38.8	42.3	
65 and over	17.7	12.5	22.4	18.0	
Relationship status					0.25
Married or living with partner	68.3	68.1	79.1	71.3	
Education level					<0.0001
Any college or higher	80.5	62.5	18.2	59.5	
Geographical region					0.27
Bay area	28.2	29.2	23.9	27.2	
Sacramento and Central California	18.6	29.2	25.4	22.6	
San Diego	7.3	2.1	7.5	6.3	
Los Angeles and Tri-Counties	30.7	16.7	32.8	28.5	
Riverside and San Bernardino	15.3	22.9	10.5	15.5	
Health-related indicators					
Family history of breast cancer					<0.01
Mom/sister/daughter/grandmother/aunt	46.8	47.9	23.9	40.6	
Major co-morbidity	24.2	27.1	25.4	25.1	0.92
Health status					<0.0001
Excellent/very good	52.0	47.9	14.9	40.8	
Histology grade					0.63
Grade 1	8.9	4.2	6.0	7.1	
Grade 2	23.4	27.1	34.3	27.2	
Grade 3	47.6	50.0	46.3	47.7	
Missing	20.2	18.8	13.4	18.0	
Months since diagnosis mean (SD)	25.8 (8.0)	23.9 (7.9)	23.3 (9.8)	24.8 (8.6)	0.12
Individual access to care					

	White <i>N</i> = 124 (%)	ESL <i>N</i> = 48 (%)	SSL <i>N</i> = 67 (%)	Total <i>N</i> = 239 (%)	<i>P</i> value
Insurance					<0.0001
Private insurance	84.7	85.4	43.3	73.2	
Employment					
Employed full or part time	63.4	70.8	38.5	58.1	<0.001
Income					<0.0001
\$20,000	7.3	14.6	26.9	14.2	
\$20,001–\$40,000	10.5	20.8	28.4	17.6	
\$40,001–\$70,000	17.7	25.0	7.5	16.3	
>\$70,001	46.8	33.3	1.5	31.4	
Don't know/unknown	17.7	6.3	35.8	20.5	
System-wide access to care					
Site type					<0.01
NCI-designated/teaching/network programs	22.6	16.7	10.5	18.0	
Other CoC-accredited program	46.0	33.3	32.8	39.8	
Non-CoC-accredited program	31.5	50.0	56.7	42.3	
Plastic surgeons per 100 breast cancer patients mean (SD)	5.1 (2.0)	4.2 (1.9)	4.2 (1.9)	4.66 (2.0)	<0.01

Table 2

Type and timing of reconstructive surgery received, by ethnicity/language group

	White N = 124 (%)	ESL N = 48 (%)	SSL N = 67 (%)	Total N = 239 (%)	P value
Had reconstruction	71.8	68.8	40.3	62.3	<0.0001
Type of reconstruction					0.77
Implants/both	71.9	69.7	77.8	72.5	
Own tissue	28.1	30.3	22.2	27.5	
Timing					
At same time as mastectomy	83.2	75.8	63.0	77.9	0.08

Table 3

Factors associated with selection of reconstruction (logistic regression)

	Demographic and health characteristics Model 1	Individual access factors added Model 2	System-wide access factors added Model 3
Background characteristics			
Language/ethnicity (ref = white)			
English-speaking Latina	0.94 (0.49–1.78)	1.01 (0.50–2.05)	1.20 (0.54–2.70)
Spanish-speaking Latina	0.35 (0.16–0.75) **	0.52 (0.22–1.23)	0.59 (0.23–1.52)
Age (ref = 65)			
<50	5.99 (3.60–9.98) ***	4.46 (2.28–8.73) ***	5.08 (2.73–9.42) ***
50–64	2.81 (1.50–5.28) **	2.06 (1.21–3.50) **	2.27 (1.37–3.78) **
Relationship status (ref = married or living with partner)			
Single	0.51 (0.19–1.42)	0.58 (0.22–1.52)	0.57 (0.22–1.48)
Education (ref = some college or more)			
High school completed or less	0.65 (0.30–1.4)	0.80 (0.35–1.81)	0.76 (0.32–1.80)
Health-related indicators			
Family history of breast cancer (ref = other relative/none)			
Mother/sister/daughter/grandmother/aunt/	1.00 (0.55–1.80)	1.18 (0.62–2.27)	1.11 (0.58–2.14)
Major co-morbidity	1.21 (0.80–1.83)	1.20 (0.76–1.92)	1.25 (0.76–2.05)
Health status (ref = excellent/very good)			
Good/fair/poor/very poor	0.68 (0.37–1.23)	0.80 (0.44–1.46)	0.96 (0.52–1.80)
Histology grade (ref = grade 1)			
Grade 2	0.81 (0.26–2.51)	0.56 (0.19–1.68)	0.51 (0.14–1.82)
Grade 3	0.97 (0.39–2.41)	0.72 (0.29–1.79)	0.66 (0.26–1.62)
Missing	0.63 (0.31–1.28)	0.49 (0.23–1.04)	0.45 (0.21–0.97) *
Individual access to care			
Insurance (ref = private)			
Public/no insurance/unknown		1.38 (0.72–2.65)	1.46 (0.75–2.85)
Employment (ref = unemployed)			
Employed		2.50 (1.27–4.90) **	2.59 (1.24–5.38) *
Income (ref =>\$70,000)			
\$20,000		0.27 (0.07–1.04)	0.29 (0.08–1.04)
\$20,001–40,000		0.38 (0.14–1.02)	0.40 (0.15–1.03)
\$40,001–70,000		0.49 (0.16–1.45)	0.56 (0.18–1.72)
Don't know/unknown		0.56 (0.17–1.79)	0.56 (0.17–1.85)
System-wide access to care			
Site type (ref = non-CoC-accredited programs)			
NCI-designated/teaching/network programs			1.62 (0.72–3.68)
Other CoC-accredited programs			1.00 (0.38–2.66)
Plastic surgeons 100 cases based on county			1.17 (1.02–1.34) *

Controlled for time since diagnosis

*
 $P < 0.05$,

**
 $P < 0.01$,

 $P < 0.0001$