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## A Mixed Method Exploration of Survivorship among Chinese American and Non-Hispanic White Breast Cancer Survivors: The Role of Socioeconomic Well-Being

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### Abstract

**Purpose**—Cancer-related stress is heavily influenced by culture. This study explored similarities and differences in survivorship care concerns among Chinese American and Non-Hispanic White (NHW) breast cancer survivors.

**Methods**—A sequential, mixed-method design (inductive/qualitative research-phase I and deductive/quantitative research-phase II) was employed. Eligible women identified from the Greater Bay Area Cancer Registry were age  $\geq 21$ , diagnosed with stage 0-IIa breast cancer between 2006–2011, and had no recurrence or other cancers. In phase I, we conducted 4 Chinese (n=19) and 4 NHW (n=22) focus groups, and 31 individual telephone interviews (18 Chinese immigrants, 7 Chinese US-born, and 6 NHW). Content analysis was conducted to examine qualitative data. In phase II, another 296 survivors (148 NHW age-matched to 148 Chinese cases) completed a cross-sectional survey. Descriptive statistics and linear regression analysis were conducted to examine quantitative data.

**Results**—Qualitative data revealed “socioeconomic wellbeing” (SWB) as a dominant survivorship concern, which was operationalized as a cancer survivor’s perceived economic and

social resources available to access care. Quantitative data showed that low-acclulturated Chinese immigrants reported the poorest SWB, controlling for covariates. Highly-acclulturated Chinese immigrants and the US-born Chinese/NHW group reported similar SWB. Women who had low income levels or chemotherapy had poorer SWB.

**Conclusions**—SWB emerged as an important aspect of breast cancer survivorship. Immigration stress, cancer care costs, and cultural values all contributed to immigrants' socioeconomic distress. Immigrant and US-born breast cancer survivors experienced different socioeconomic circumstances and well-being following treatment. Our findings warrant further investigation of socioeconomic distress and survivorship outcomes.

### Keywords

Socioeconomic well-being; Mixed-method; Cancer survivorship; Ethnicity; Chinese Americans; Acculturation

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### Introduction

A cancer diagnosis can disrupt many aspects of a person's life by inducing physical, psychological, social and financial distress. Extensive research has examined the impact of stress on quality of life (QoL) among cancer survivors following the most widely used conceptual framework, the Transactional Model of Stress and Coping (TMSC) which delineates an individual's psychological and cognitive response to a stressor (e.g., living with breast cancer) [1]. This framework is based on Western perspectives with studies mainly including non-Hispanic Whites (NHW) [2, 3]. However, there is substantial evidence that people of color perceive illness in different ways and have varied responses to life-threatening diseases compared to Whites [4–6]. Although there has been recent interest in the relationship between culture and QoL among cancer survivors [7], overall little research has examined sociocultural influences on responses to cancer-related stress.

Cancer is the leading cause of death for Asian Americans [8]. The majority of Asian Americans are immigrants who are raised with cultural values quite different from NHW. For example, Chinese Americans are the largest Asian subgroup; 76% are immigrants [9] and tend to be oriented toward collectivism, which stresses interdependence and social responsibility [10, 11]. More Chinese Americans than NHW view cancer as a stigmatizing and fatal disease [12], which may have a negative impact on family prosperity (i.e., intergenerational health and wealth) [13, 14]. In contrast, NHW, particularly those with higher educational attainment, are likely to view health from an individualist perspective, stressing self-reliance and personal responsibility for well-being [15]. It is therefore likely that Chinese American breast cancer patients may have different survivorship concerns compared with NHW women, especially Chinese women born outside of the US, as they experience the added stress of immigration and retain traditional cultural values.

We conducted a mixed-method research study guided by the TMSC to investigate similarities and differences in breast cancer survivorship concerns among Chinese American and NHW survivors. Because prior research has found that Asian breast cancer survivors' QoL and survival rates varied by acculturation and immigration status [16, 17], our study

included both US-born and immigrant Chinese survivors. In this paper, we report on a set of financial concerns (i.e., cancer care costs and the burden on family finances with regard to immigration and acculturation factors) that are not part of the TMSC but were brought to light in the inductive phase of our research. We conceptualize these concerns as indicators of socioeconomic well-being. We report on the qualitative process that revealed this issue and the subsequent quantitative analysis that operationalized and further explored this concept.

## Methods

### Study Design

We employed a sequential, mixed-method research design [18] in two phases: qualitative/inductive research (phase I) followed by cross-sectional quantitative/deductive research (phase II). Phase I consisted of focus groups and in-depth individual interviews--two common qualitative approaches used in behavioral and social science--to elicit survivorship concerns in the two ethnic groups [19–21]. The qualitative results were used to inform the development of a structured telephone survey for phase II. Prior to phase II, we verified the face validity of new survey items through cognitive telephone interviews with five Chinese and five NHW women [22]. All participants were recruited from the Greater Bay Area Cancer Registry (GBACR) administered by the Cancer Prevention Institute of California (CPIC). Institutional Review Boards at Georgetown University Medical Center, the California Health and Human Services Agency, and the CPIC approved this study.

**Study population and setting**—This study randomly selected Chinese American and NHW breast cancer cases diagnosed during the period 2006–2011 from the GBACR to screen for eligibility according to the following criteria: age 21 years and older; diagnosed with stage 0-IIa breast cancer; primary treatments (surgery, radiation, chemotherapy) completed 1–5 years prior; and no recurrence or other cancers. In phase II, NHW cases were frequency-matched by age at diagnosis ( $\pm 5$  years) to the Chinese cases to achieve an age-comparable sample. An invitation letter including an opt-out form was mailed to potential participants; those who did not return the opt-out form were called. Phase I participants could not take part in phase II. In the following sections, we first describe the methods and findings of phase I followed by phase II.

### Phase I: Inductive Qualitative Methods and Findings

A semi-structured interview guide contained the domains of the TMSC including women's top concerns following treatment (stress), strategies for coping with those concerns, and indicators of physical, psychological, and social functioning. Interview guides were written in English and Chinese; the Chinese guides were back-translated to English to confirm semantic equivalence.

A total of 44 Chinese American (including 7 US-born Chinese) and 28 NHW women participated in the qualitative research. We oversampled Chinese women because their survivorship experiences have been understudied relative to NHW women. We conducted four Chinese immigrant and four NHW focus groups (each with 5–6 women). The Chinese focus groups (two in Mandarin and two in Cantonese) were conducted at CPIC and

community centers in San Francisco's Chinatown. There were 31 women (6 NHW, 7 US-born Chinese, 18 Chinese immigrant) participating in individual telephone interviews because they were not able or willing to attend focus groups. Telephone interviews were conducted in the participants' preferred language (English, Mandarin, or Cantonese). Each interview method took 1.5–2 hours. Participants received \$35 in appreciation for their time. Interviews were audio-recorded and transcribed, and Chinese language interviews were translated into English for analysis.

Qualitative data procedures followed established content analysis methods [23]. A codebook taxonomy, consisting of broad categories and specific codes within the categories, was used to analyze transcripts. To ensure an unconstrained analysis [24, 25], two trained coders independently coded all interviews. Initial intercoder reliability was 86.1%; however, all text was discussed and ultimately coded to consensus.

### Phase I Results

While we did not pose any questions about financial concerns, and no related concepts were included in our interview guide, these issues emerged as an important survivorship issue, particularly among the Chinese immigrant survivors. Specifically, Chinese immigrant survivors (29.7%, 11 out of 37) expressed household financial worries more often than NHW survivors (3.6%, 1 out of 28) and US-born Chinese survivors (0 out of 7). More Chinese immigrant survivors reported challenges to accessing optimal cancer care because of financial constraints.

### Managing the cost of care and insurance coverage

All of the Chinese and NHW survivors were insured, but many expressed concerns about the price of insurance, insurance insecurity, and cancer care costs that were not covered by insurance (e.g., co-payments, out-of-network fees). NHW, US-born Chinese, and highly acculturated Chinese survivors more often reported that they could afford to pay for out-of-pocket expenses or private insurance (e.g., COBRA) when necessary. For example, when weighing the pros and cons of taking endocrine therapy, one NHW survivor who was concerned about how the drug would affect her bones, decided to pay for additional tests that her insurance did not cover. In another example, one highly acculturated Chinese woman who was already paying for COBRA also paid \$200 per visit to see one of her doctors because the doctor's location was "convenient" for her. Another NHW woman paid out-of-pocket for pre- and post-surgical visits with a ductal carcinoma in situ (DCIS) specialist who practiced in her area. In contrast, more Chinese immigrant survivors reported that due to economic constraints, their healthcare options were limited. For example, one Chinese immigrant stated that she drove two hours round-trip to get cancer care. When asked if she thought of a way to resolve this challenge, she responded:

"I haven't found any solution because currently I work for the county and use their insurance. I could choose other insurance, but those fees are too expensive..."

When another Chinese immigrant survivor was asked why she was so committed to her job, she simply stated, "Otherwise, I might lose my insurance." Yet another, disliked her insurance, but felt stuck:

“I’m using my husband’s insurance right now, but I don’t like that insurance company. I want to change to another one, but I will have to have a job first.”

### **Fears about loss of insurance**

While NHW and US-born Chinese survivors did not discuss financial problems independent of cancer care as did Chinese immigrant survivors, they did discuss the state of the economy and its impact on their insurance coverage for survivorship care. Quotes from two NHW women follow:

“I’m looking at the end of my COBRA. It ends this month. I’m due for another mammogram in two months, so I’m terrified. I think we all have fears about health insurance—I think, in this day and age, with the economy.”

“[B]etween the government and health insurance and Medicare and all of that... if it’s a life-threatening illness and this medication is going to help you, I don’t understand why they put you through such hell and make it so expensive... When I [reached my coverage limit], this particular medication cost \$350 a month. I just last month came out of the donut hole and I went and refilled the same prescription and it cost me \$17.00.”

One of the US-born Chinese survivors had recently been laid off from her job. She discussed insurance insecurity:

“I had to take COBRA because no other medical plan would take me because of the cancer... I’m hoping I’ll get my job back..., the insurance is the biggest concern for me. If I hadn’t had the COBRA plan, I don’t know what I would have done.”

### **Household finances and work**

While all of Chinese immigrant survivors stated that they were very satisfied with the care they received in the US, approximately half of them said that language barriers and the stress of immigration (e.g., change in socioeconomic status (SES), loss of social network) precluded their re-attainment of the standard of living they had in their homeland and the social and informational support needed to adapt to life after cancer treatment here in the US.

“Imagine the lifestyle in your country changes after coming here. Suddenly, it’s a huge turning point. Everything has changed... I think I lived pretty well in China. I had retirement annuity, etc. Here, you need to earn money. Speaking more directly, you need to work... The most difficult part is the language barrier. I don’t speak English and I don’t have time to learn it. Where can I earn money? I can only work by my physical strength.”

For Chinese immigrant survivors, financial insecurity was often an issue prior to their cancer diagnosis; the disease experience exacerbated these problems. Intergenerational wealth and security were important issues. Women worried about how their illness and possible death would impact their children. This was especially true of immigrant survivors whose children had not yet finished college or who were not in the workforce.

“To me, money is the most important thing... For instance, my goal can be to look after my daughter until she goes to college. Then, I will go back to China...”

With the exception of one NHW participant, NHW and US-born Chinese survivors did not mention financial hardship. These two groups did not report financial concerns related to caring for their children and elderly.

A few women in all three groups reported taking some time off during the treatment phase of their cancer; however, NHW and highly acculturated Chinese women were more likely to stay off for longer periods of time. For example, one semi-retired NHW survivor took a six-month leave from her part-time work at a hospital. A US-born Chinese patient quit working to prepare for treatment. Chinese immigrants were more cautious about taking time off from work to avoid any possibility of losing their jobs, which were necessary for covering household necessities and cancer care needs.

“I took half-day leave because I only had 10 days leave in a year... Thus, I went to work and felt tired and stressed. I reduced my loads of housework and lived simply... I have to get my work done in order to live my life. Otherwise, I can't pay all the bills at the end of each month.”

### Self-care and the associated costs

NHW and highly acculturated Chinese women were more likely to report having discretionary income to support self-care (e.g., having organic foods). Similarly, Chinese immigrant participants believed that consuming proper foods was of vital importance to reduce their risk of recurrence. The majority expressed a desire to incorporate more traditional Chinese therapeutic foods and medicines into their post-diagnosis diet. Many were unable to do so because the costs of seeing a Traditional Chinese Medicine (TCM) practitioner for treatment (e.g., herbal prescriptions to be cooked with foods for yin-yang balance, acupuncture) or purchasing the medicines were unaffordable.

### Phase II: Quantitative Data Collection

We developed a cross-sectional structured telephone survey based on our qualitative findings and guided by the TMSC. As summarized above, the qualitative findings revealed that socioeconomic resources were important for survivors' well-being and insufficient financial resources were notable sources of stress. Therefore, we adapted the construct of socioeconomic well-being (SWB, defined below) for inclusion in our survey, which goes beyond traditional measures of socioeconomic position such as income and education [26]. We report survey findings from a total of 296 survivors (148 Chinese Americans and 148 NHW matched pairs). The English survey was translated into Chinese written language for administration verbally in Cantonese and Mandarin.

### Measures

**Socioeconomic well-being (SWB, Dependent Variable)**—We adapted eight items from the 17-item SWB scale developed by Head and Faul (2008), which measures patients' subjective experience of, and satisfaction with, their socioeconomic circumstances [26]. This scale is characterized by two subscales: 1) material capital, which refers to the economic

resources that facilitate or restrict access to healthcare services (e.g., I have enough money to take care of my cancer care needs), and 2) social capital, which refers to the resources to which one has access due to his/her position within a social system (e.g., I can easily get information about healthcare). The selection of eight items (4 items from each subscale) reflected our qualitative findings on ethnic variation in socioeconomic circumstances and consideration of participant burden. Responses to all items ranged from 1=*not at all* to 5=*very much*. Higher mean scores indicate higher SWB. The abbreviated scale was reliable at .89 for Chinese and .80 for NHW in our study sample.

**Ethnicity and acculturation status**—Chinese immigrants were classified as low or high acculturation based on their English ability and length of residency in the US. We assessed Chinese immigrants' English ability in speaking, listening, reading, and writing [27], which was reliable at .97 in multiple Chinese American samples [28, 29]. Self-rating of all four aspects as “well” or “very well” was defined as having good English ability. Immigrants responding to “not at all,” “not very well,” or “just fine” to any of the four items classified as limited English ability. Low-acculturation included Chinese immigrants who had limited English ability and resided in the US for less than 25 years (median US residency of this study). All other Chinese immigrants were categorized as high-acculturation. In quantitative analysis, acculturation was categorized into three groups: 1) low-acculturated Chinese immigrants, 2) high-acculturated Chinese immigrants, and 3) US-born Chinese/NHW group.

**Socio-demographic variables**—Self-reported measures for age, educational attainment, marital status, annual household income, and insurance status were assessed. All but age were dichotomized into two categories for analysis.

**Clinical variables**—Patient clinical characteristics including stage at diagnosis, type of primary treatment, and time since diagnosis were provided by the GBACR.

### Quantitative data analysis

We first conducted chi-square tests and t-tests to examine ethnic differences in socio-demographic and clinical variables. Second, we used Cronbach's Alpha to ascertain the reliability of the SWB scale and conducted factor analysis to determine the factor loadings of its two subscales. We also examined ethnic differences in mean values of all items in the SWB scale. Third, we conducted bivariate analyses to examine associations between independent variables and the SWB.

Lastly, we used linear regression models to determine the association of ethnicity and acculturation status with the SWB and examined any interaction (e.g., ethnicity and income) that modified the associations. We used a backward elimination procedure to include only those covariates that kept their statistical significance in the multivariable models. We performed pairwise comparisons to investigate significant mean difference between groups. We tested ethnicity and acculturation level in separate multivariable models to avoid multicollinearity. Listwise deletion of missing values was employed. We reported adjusted

mean scores and 95% confidence intervals (CI) for the final regression models. All analyses were conducted using SAS version 9.2.

## Phase II Results

**Sample characteristics**—Chinese immigrant survivors had significantly lower educational level than US-born Chinese and NHW survivors ( $p < .0001$ , see Table 1). Approximately 37% of Chinese immigrant survivors had annual household incomes less than \$30,000 relative to about 5% of NHW and 5% of US-born Chinese survivors ( $p < .0001$ ). More Chinese immigrants were insured by government plans ( $p < .0001$ ). These demographic differences were also found in our study sample at phase I (Table 1). There were no ethnic differences in all of the clinical variables.

**Associations of SWB with ethnicity and acculturation**—The SWB scale was highly reliable across groups and the items loaded on the expected two dimensions (i.e., material capital and social capital) (Table 2). Chinese American survivors had significantly lower mean scores on each item on the SWB scale than NHW survivors (Table 2). Additionally, bivariate analyses (Table 3) revealed that there were statistically significant differences in SWB between Chinese and NHW women, educational attainment categories, birthplace, income categories, insurance coverage, acculturation status (all  $p < .0001$ ), and chemotherapy status ( $p < .05$ ). Birthplace was not included in the multivariable models due to its high correlations with ethnicity and acculturation status

In the final multivariable models (Table 4), education and insurance coverage were no longer significantly associated with SWB and were dropped from the model. Annual household income was strongly associated with SWB. Women with household incomes lower than \$30k had the worst SWB compared to middle- and high-income levels (both  $p < .0001$ ) after adjusting for covariates. Women who had chemotherapy had poorer SWB than those who did not have chemotherapy ( $p = .05$ ).

Ethnicity and acculturation status each were significantly associated with SWB, even in fully adjusted models controlling for annual household income and receipt of chemotherapy. Chinese American survivors had lower adjusted mean scores on SWB (adjusted mean=29.64, 95%CI 28.65, 30.64) than NHW survivors (adjusted mean=32.02, 95%CI 30.90, 33.13) after adjusting for covariates. However, in the model using acculturation status as a main predictor, a statistically significant adjusted mean difference was noted in SWB only between the low-acculturation group (adjusted mean=28.48, 95%CI 27.26, 29.70) relative to the high-acculturation group (adjusted mean=31.61, 95%CI 29.59, 33.62) and the US-born Chinese/NHW group (adjusted mean=32.25, 95%CI 31.19, 33.32), both  $p < .05$ . No difference in adjusted mean was found between the high-acculturation group and the US-born/NHW group. There was no significant interaction effect.

## Discussion

In the inductive phase of this study, SWB emerged as a potentially important aspect of quality of life among breast cancer survivors, and there appeared to be considerable variability by race/ethnicity and acculturation status. Our quantitative analyses revealed that

while Chinese American survivors were more likely to experience poorer SWB compared with NHW survivors, the low-acculturated Chinese immigrants (78%) had the lowest SWB scores across all items of the material and social capital subscales. These results confirm our qualitative findings suggesting that Chinese immigrants had financial concerns and experiences that were different from their US-born Chinese and NHW counterparts. Despite evidence of a higher mortality rate among Chinese immigrant breast cancer patients compared with their US-born counterparts [17, 30], research has thus far failed to examine the role of socio-economic distress in this poor outcome.

Consistent with prior research [31, 32], access to quality or supplementary care is more difficult for socio-economically disadvantaged groups such as immigrants and low-income households. For example, our low- to middle-income Chinese immigrant survivors spent time traveling to obtain necessary care because they were unable to pay for conveniently located healthcare services that were not completely covered by insurance. In contrast, US-born survivors had more economic resources to pay for quality care, although they remained concerned about the loss of insurance. Overall, Chinese immigrant survivors in both of our research phases had much lower socioeconomic status than NHW and US-born Chinese survivors. While some research reports that Asian Americans generally have good socioeconomic status, which leads to better than average health status [9, 33], the results of this study reveal potential disparities in SWB among Chinese immigrant compared with NHW breast cancer survivors. Thus, for these individuals, poor SWB can intensify and prolong the stresses associated with coping with cancer. When breast cancer patients perceive an inability to afford care, fear regarding the loss of economic resources and insurance coverage increases, which can result in uncertainty regarding access to long-term follow-up care and prospects for survival. Moreover, there is growing evidence that prolonged stress influences cancer recurrence and metastasis [34, 35].

Among low-acculturated Chinese immigrant survivors, considerable socioeconomic disadvantage is likely related to the stress of immigration. Research shows that Asian immigrants perceived a lower social status after immigrating to the US [36]. Our qualitative data indicates that Chinese immigrant survivors had greater concerns about costs associated with cancer care, decreased productivity at work, and possible loss of job opportunities relative to their US-born counterparts. While our NHW and US-born survivors linked their financial concerns with the recent US recession and expected that any problems would subside when the economy improves, our immigrant survivors rarely attributed their financial distress to current economic difficulties. This may be because immigrants in the US have more unrelenting financial insecurity and fewer economic opportunities compared to native-born [37].

Furthermore, Chinese immigrants worried that the healthcare expenditures associated with chronic illness would negatively impact their household income and add to their family burdens. The combination of breast cancer care costs, challenges of immigration, and cultural emphasis on family responsibility and prosperity may help explain Chinese immigrant survivors' greater likelihood of experiencing low SWB. Additionally, low-acculturated Chinese survivors with limited English ability had trouble understanding

healthcare information that is not provided in their language contributing to persistent unfamiliarity with the mainstream healthcare system [38].

Finally, our data have shown that some Chinese survivors turned to TCM when their needs were not met through biomedicine [39]. As there is still debate about the appropriate use of TCM [40, 41], costs for TCM are typically not reimbursed such that may have impacted Chinese immigrant survivors' evaluation of affordability and accessibility of healthcare information and services when responding to our SWB items. The use of alternative medicine is increasing among cancer survivors [42]; future investigation of socio-economic circumstances including the ability to access alternative care may be needed.

This study has several caveats. First, this study sample was not representative of all breast cancer survivors in the US, as we enrolled women from one geographic area (the Greater San Francisco Bay area) which is highly diverse in terms of race/ethnicity and culture and has rich healthcare resources available to Chinese American survivors (e.g., Chinese community hospitals and health organizations). The differences in SWB between NHW and Chinese who live in areas with fewer culturally and linguistically appropriate resources might be even greater. Second, this study excluded women with late-stage breast cancer diagnoses or long-term survivorship. Their socio-economic circumstances and concerns may vary from what we have found in this study for early stage breast cancer survivors.

Quality of life is a key survivorship outcome [43, 44]. Our exploratory findings through the mixed-method approach revealed the significant role of SWB in the QoL of breast cancer survivors. Our findings demonstrate that financial distress caused by cancer diagnosis and treatment is a significant survivorship concern that goes beyond level of household income, especially for minority and immigrant populations. However, current measurements of QoL do not include the domain of SWB. Future investigation of the associations among stress, SWB, and QoL across racial/ethnic groups may be necessary to address cancer survivorship.

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Sample Characteristics of Chinese American and Non-Hispanic White (NHW) Breast Cancer Survivors

Table 1

|   | Qualitative Phase |                          |                     |                      | Quantitative Phase |                           |                      |                      |
|---|-------------------|--------------------------|---------------------|----------------------|--------------------|---------------------------|----------------------|----------------------|
|   | NHW<br>(N=28)     | Chinese Americans (N=44) |                     | P-value <sup>‡</sup> | NHW<br>(N=148)     | Chinese Americans (N=148) |                      | P-value <sup>‡</sup> |
|   |                   | US-Born<br>(n=7)         | Immigrant<br>(n=37) |                      |                    | US-Born<br>(n=23)         | Immigrant<br>(n=125) |                      |
| <b>Average Age (S.D.)</b>               | 58.5 (9.8)        | 58.3 (6.3)               | 56.9 (9.2)          | –                    | 56.8 (10.3)        | 53.9 (13.4)               | 57.5 (9.3)           | –                    |
| <b>Married (vs. single)</b>             | 46%               | 86%                      | 78%                 | .0037                | 71%                | 57%                       | 72%                  | .7699                |
| <b>College (vs. high school)</b>        | 86%               | 100%                     | 49%                 | .0104                | 93%                | 96%                       | 59%                  | <.0001               |
| <b>Employed (vs. unemployed)</b>        | 61%               | 14%                      | 59%                 | .4822                | 60%                | 74%                       | 54%                  | .6367                |
| <b>Annual household income</b>          |                   |                          |                     | .0016                |                    |                           |                      | <.0001               |
| < 30k                                   | 0                 | 0                        | 31%                 |                      | 5%                 | 5%                        | 37%                  |                      |
| 30k-99K                                 | 33%               | 50%                      | 53%                 |                      | 39%                | 41%                       | 33%                  |                      |
| >=100k                                  | 67%               | 50%                      | 16%                 |                      | 56%                | 54%                       | 30%                  |                      |
| <b>Language ability<sup>†</sup></b>     |                   |                          |                     | <.0001               |                    |                           |                      | –                    |
| Chinese only/Limited English ability    | 0                 | 0                        | 36%                 |                      | –                  | –                         | 68%                  |                      |
| Bilingual/Good English ability          | 4%                | 57%                      | 64%                 |                      | –                  | –                         | 32%                  |                      |
| Native English-speakers                 | 96%               | 43%                      | –                   |                      | –                  | –                         | –                    |                      |
| <b>Average years in the US</b>          |                   |                          |                     | –                    |                    |                           |                      | –                    |
| 1–10 years                              | –                 | –                        | –                   |                      | –                  | –                         | 6%                   |                      |
| 11–24 years                             | –                 | –                        | –                   |                      | –                  | –                         | 42%                  |                      |
| 25 years or more                        | –                 | –                        | –                   |                      | –                  | –                         | 52%                  |                      |
| <b>Acculturation status<sup>‡</sup></b> |                   |                          |                     | –                    |                    |                           |                      | –                    |
| Low-acculturated immigrants             | –                 | –                        | –                   |                      | –                  | –                         | 78%                  |                      |
| High-acculturated immigrants            | –                 | –                        | –                   |                      | –                  | –                         | 22%                  |                      |
| US-born Chinese/NHW group               | –                 | –                        | –                   |                      | 100%               | 100%                      | –                    |                      |
| <b>Insurance coverage</b>               |                   |                          |                     | .0023                |                    |                           |                      | <.0001               |

|                                       | Qualitative Phase        |                  |               |                  | Quantitative Phase        |                   |                |                   | P-value <sup>‡</sup> |
|---------------------------------------|--------------------------|------------------|---------------|------------------|---------------------------|-------------------|----------------|-------------------|----------------------|
|                                       | Chinese Americans (N=44) |                  | NHW (N=28)    |                  | Chinese Americans (N=148) |                   | NHW (N=148)    |                   |                      |
|                                       | US-Born (n=7)            | Immigrant (n=37) | US-Born (n=7) | Immigrant (n=37) | US-Born (n=23)            | Immigrant (n=125) | US-Born (n=23) | Immigrant (n=125) |                      |
| Government plan                       | 14%                      | 42%              | 11%           |                  | 9%                        | 30%               | 7%             |                   |                      |
| Private insurance                     | 86%                      | 58%              | 89%           |                  | 91%                       | 70%               | 93%            |                   |                      |
| No insurance                          | 0                        | 2%               | 0             |                  | 0                         | 0                 | 0              |                   |                      |
| <b>Stage of cancer</b>                |                          |                  |               |                  |                           |                   |                |                   | .0553                |
| 0                                     | 71%                      | 78%              | 68%           |                  | 43%                       | 28%               | 44%            |                   |                      |
| I                                     | NR                       | 16%              | 25%           |                  | 52%                       | 54%               | 43%            |                   |                      |
| IIa                                   | NR                       | NR               | NR            |                  | NR                        | 18%               | 13%            |                   |                      |
| <b>Type of treatment</b>              |                          |                  |               |                  |                           |                   |                |                   |                      |
| <b>Surgery</b>                        |                          |                  |               |                  |                           |                   |                |                   | .9024                |
| Mastectomy                            | NR                       | 38%              | 21%           |                  | 22%                       | 37%               | 34%            |                   |                      |
| Lumpectomy                            | 71%                      | 62%              | 79%           |                  | 78%                       | 63%               | 66%            |                   |                      |
| <b>Chemotherapy</b>                   |                          |                  |               |                  |                           |                   |                |                   | .3594                |
| Yes                                   | NR                       | NR               | NR            |                  | 17%                       | 20%               | 16%            |                   |                      |
| No                                    | 100%                     | 97%              | 93%           |                  | 83%                       | 80%               | 84%            |                   |                      |
| <b>Radiation</b>                      |                          |                  |               |                  |                           |                   |                |                   | .8160                |
| Yes                                   | 71%                      | 41%              | 57%           |                  | 48%                       | 47%               | 49%            |                   |                      |
| No                                    | 29%                      | 59%              | 43%           |                  | 52%                       | 53%               | 51%            |                   |                      |
| <b>Time since diagnosis in months</b> |                          |                  |               |                  |                           |                   |                |                   | .7910 <sup>£</sup>   |
| 0-12 months                           | NR                       | NR               | NR            |                  | NR                        | NR                | NR             |                   |                      |
| 13-24 months                          | 57%                      | 54%              | 57%           |                  | 30%                       | 32%               | 27%            |                   |                      |
| 25-36 months                          | NR                       | 22%              | NR            |                  | 30%                       | 34%               | 30%            |                   |                      |
| 37-48 months                          | 32%                      | 24%              | 32%           |                  | 22%                       | 22%               | 24%            |                   |                      |
| 49-60 months                          | NR                       | NR               | NR            |                  | NR                        | 10%               | 13%            |                   |                      |
| >60 months                            | NR                       | NR               | NR            |                  | NR                        | NR                | NR             |                   |                      |

Note. SD=Standard Deviation. Clinical data including stage of cancer, type of treatment, and time since diagnosis were provided by GBACR.

<sup>†</sup>The qualitative phase only assessed the spoken language in Chinese and/or English. Only the quantitative phase II measured English ability among Chinese immigrants.

<sup>‡</sup>The acculturation status was quantified in the quantitative phase II by English ability and length of the US residency. High acculturation is defined as living in the US for > 25 years and having good English ability.

<sup>§</sup>The p-value was a comparison between Chinese American (including US-born Chinese) women and NHW women.

NR means non-reportable cases because the number of cases in the cell was less than 5 per the California Cancer Registry policy.

<sup>£</sup>The p value was based on the Fisher exact test as several cells had cases less than 5.

**Table 2**  
Mean Scores on Socioeconomic Well-Being (SWB) by Ethnicity and Reliabilities of the SWB scales

| SWB scale/ items  | Chinese American (N= 148) | NHW (N=148) | P value | Chinese American (N= 148) | NHW (N=148)        | Factor loadings <sup>‡</sup> |
|---|---------------------------|-------------|---------|---------------------------|--------------------|------------------------------|
|   | Mean (SD)                 | Mean (SD)   |         | Cronbach alpha=.89        | Cronbach alpha=.80 |                              |
| <b>Material capital</b>                                     |                           |             |         | 0.8925                    | 0.8365             |                              |
| 1. I am able to make enough money to pay for my cancer care | 3.74 (1.50)               | 4.54 (0.93) | <.0001  |                           |                    | <b>0.71</b> 0.16             |
| 2. I have to pay more for my cancer care than I can afford  | 4.27 (1.31)               | 4.56 (1.01) | .0375   |                           |                    | <b>0.70</b> – 0.11           |
| 3. I am able to pay my medical bill                         | 3.77 (1.50)               | 4.69 (0.73) | <.0001  |                           |                    | <b>0.84</b> 0.08             |
| 4. I have enough money to take care of my cancer care needs | 3.56 (1.55)               | 4.61 (0.79) | <.0001  |                           |                    | <b>0.82</b> 0.12             |
| <b>Social capital</b>                                       |                           |             |         | 0.8415                    | 0.7019             |                              |
| 5. I can easily get information about cancer care           | 3.73 (1.29)               | 4.55 (0.80) | <.0001  |                           |                    | 0.01 <b>0.78</b>             |
| 6. I know how to get the cancer care services I need        | 3.64 (1.28)               | 4.46 (0.77) | <.0001  |                           |                    | – 0.02 <b>0.82</b>           |
| 7. I understand the healthcare system                       | 3.33 (1.22)               | 4.08 (0.93) | <.0001  |                           |                    | 0.12 <b>0.59</b>             |
| 8. Cancer care services are easy to get in my neighborhood  | 3.71 (1.30)               | 4.34 (1.08) | <.0001  |                           |                    | 0.06 <b>0.62</b>             |
| Total mean score  | 29.76(8.26)               | 35.82(4.61) | <.0001  | –                         | –                  | –                            |

Note. Higher mean scores indicate higher socioeconomic well-being. SD=standard deviation

<sup>‡</sup>The values were above .40 indicating a good loading value.

**Table 3**

Bivariate Associations of SWB with Demographic and Clinical Variables

| Variables                      | Socioeconomic Well-Being (SWB) |              |         |
|--------------------------------|--------------------------------|--------------|---------|
|                                | N <sup>‡</sup>                 | Mean (SD)    | P value |
| <b>Age</b>                     |                                |              | 0.3860  |
| 50 years                       | 75                             | 31.95 (7.93) |         |
| 51–64 years                    | 149                            | 32.83 (6.94) |         |
| 65 years                       | 70                             | 33.63 (7.49) |         |
| <b>Ethnicity</b>               |                                |              | <.0001  |
| Chinese American               | 147                            | 29.76 (8.26) |         |
| NHW                            | 147                            | 35.82 (4.61) |         |
| <b>Married</b>                 |                                |              | 0.5879  |
| Yes                            | 205                            | 32.69 (7.54) |         |
| No                             | 88                             | 33.19 (6.73) |         |
| <b>Education</b>               |                                |              | <.0001  |
| High school or lower           | 62                             | 27.02 (9.01) |         |
| College and higher             | 232                            | 34.34 (5.95) |         |
| <b>Birthplace</b>              |                                |              | <.0001  |
| US-born                        | 162                            | 35.86 (4.57) |         |
| Foreign-born                   | 131                            | 28.99 (8.31) |         |
| <b>Employed</b>                |                                |              | 0.0921  |
| Yes                            | 174                            | 33.39 (6.62) |         |
| No                             | 120                            | 31.93 (8.22) |         |
| <b>Annual household income</b> |                                |              | <.0001  |
| 30k                            | 50                             | 23.20 (7.38) |         |
| 30k-99k                        | 102                            | 34.20 (5.59) |         |
| 100k                           | 124                            | 36.08 (3.91) |         |
| <b>Cancer stage</b>            |                                |              | 0.2394  |
| 0                              | 109                            | 33.73 (6.72) |         |
| I                              | 142                            | 32.26 (7.71) |         |
| IIa                            | 43                             | 32.14 (7.48) |         |
| <b>Insurance coverage</b>      |                                |              | <.0001  |
| Government plan                | 49                             | 25.27 (8.69) |         |
| Private insurance              | 245                            | 34.30 (6.01) |         |
| <b>Chemotherapy</b>            |                                |              | 0.0312  |
| Yes                            | 52                             | 30.81 (8.93) |         |
| No                             | 242                            | 33.21 (6.89) |         |

| Variables                               | Socioeconomic Well-Being (SWB) |              |         |
|---|--------------------------------|--------------|---------|
|   | N <sup>‡</sup>                 | Mean (SD)    | P value |
| <b>Radiation</b>                        |                                |              | 0.9057  |
| Yes                                     | 142                            | 32.85 (7.64) |         |
| No                                      | 152                            | 32.74 (7.06) |         |
| <b>Lumpectomy</b>                       |                                |              | 0.9794  |
| Yes                                     | 195                            | 32.78 (7.28) |         |
| No                                      | 99                             | 32.81 (7.47) |         |
| <b>Mastectomy</b>                       |                                |              | 0.7834  |
| Yes                                     | 98                             | 32.96 (7.36) |         |
| No                                      | 196                            | 32.71 (7.34) |         |
| <b>Acculturation status<sup>‡</sup></b> |                                |              | <.0001  |
| Low-acculturated Chinese immigrants     | 96                             | 26.94 (8.31) |         |
| High-acculturated Chinese immigrants    | 28                             | 35.00 (4.94) |         |
| US-born Chinese/NHW group               | 170                            | 35.79 (4.65) |         |

Note. Higher mean scores indicate higher socioeconomic well-being

<sup>‡</sup>The sample size did not add up to 296 due to few missing values in different variables.

<sup>‡</sup>High and low acculturation only accounts for Chinese immigrants

**Table 4**

Adjusted Mean Scores on Socioeconomic Well-Being by Ethnicity and Acculturation Status

| Independent variables                | Dependent variable: Socioeconomic Well-Being |                                |                      |                         |
|--------------------------------------|--|--------------------------------|----------------------|-------------------------|
|                                      | Final Model 1                                |                                | Final Model 2        |                         |
|                                      | Mean (95% CI)                                | M (95% CI)                     | Mean (95% CI)        | M (95% CI)              |
| <b>Annual household income</b>       |  |                                |                      |                         |
| 100k                                 | 35.23 (34.15, 36.31)                         | 11.58 (9.39, 13.77)****        | 34.69 (33.50, 35.88) | 10.28 (7.92, 12.64)**** |
| 30k- 99k                             | 33.61 (32.48, 34.74)                         | 9.96 (7.76, 12.16)****         | 33.24 (32.04, 34.45) | 8.83 (6.51, 11.16)****  |
| 30k                                  | 23.65 (22.07, 25.22)                         | Ref.                           | 24.41 (22.68, 26.13) | Ref.                    |
| <b>Chemotherapy</b>                  |  |                                |                      |                         |
| Yes                                  | 31.61 (30.88, 32.35)                         | 1.56 (0.04, 3.16) <sup>†</sup> | 31.60 (30.72, 32.49) | 1.65 (0.07, 3.22)*      |
| No                                   | 30.05 (28.60, 31.50)                         | Ref.                           | 29.95 (28.46, 31.45) | Ref.                    |
| <b>Ethnicity</b>                     |  |                                |                      |                         |
| Chinese American                     | 29.64 (28.65, 30.64)                         | -2.38 (-3.69, -1.06)***        | -                    | -                       |
| NHW                                  | 32.02 (30.90, 33.13)                         | Ref.                           | -                    | -                       |
| <b>Acculturation status</b>          |  |                                |                      |                         |
| US-born Chinese/NHW group            | -  | -                              | 32.25 (31.19, 33.32) | 3.77 (1.91, 5.65)****   |
| High-acculturated Chinese immigrants | -  | -                              | 31.61 (29.59, 33.62) | 3.13 (0.33, 5.92)*      |
| Low-acculturated Chinese immigrants  | -  | -                              | 28.48 (27.26, 29.70) | Ref.                    |

Note. Ref=reference group. Mean difference ( M) score = the mean scores of a comparison group – the mean scores of the reference group. Higher SWB mean scores indicate greater SWB. Pairwise comparisons were conducted among all levels; however, there were no significant mean differences between women with annual household income larger than 100k and 30–99k and between high-acculturated Chinese immigrants and US-born Chinese/NHW group. Both initial linear regression models included education, insurance coverage, and interaction terms between ethnicity (or acculturation status) and income categories, all of which were not significant in the final models.

<sup>†</sup> p=.055;

\* p<.05;

\*\* p<.01;

\*\*\* p<.001;

\*\*\*\* p<.0001