UNCOVERING FACTORS CONTRIBUTING TO UNDER-UTILIZATION OF BREAST CANCER SCREENING BY CHINESE AND KOREAN WOMEN LIVING IN THE UNITED STATES

Objective: This study investigated factors influencing breast cancer screening utilization by Chinese and Korean women, living in the United States, and examined similarities and differences between the 2 sub-populations.

Design: Population-based cross-sectional surveys were used for comparisons.

Methods: A random sample of 180 women (Chinese=117, Korean=63), aged 40 years and older, who resided in an urban county of Michigan participated in the mail survey. Existing English questionnaires were modified for cultural appropriateness, translated into Chinese and Korean, and pre-tested. Data analysis included descriptive statistics, testing differences between means/percentages, and logistic regression.

Results: The sample population, similar to the Asian American population in general, was composed predominantly of immigrants with varying socioeconomic and health status. Approximately 56% of the women had received mammograms in the past 2 years, about 21% lower than the statewide rate for Michigan. The logistic regression indicated that women's mammography use was significantly associated with their ability to speak English, availability of health insurance, and knowledge of mammography ($P<.05$). Similarities and differences between sampled Chinese and Korean women existed in terms of their socio-demographic characteristics and the factors influencing their use of breast cancer screening.

Conclusions: Understanding minority women's cancer screening behavior has implications for designing appropriate interventions to meet their unique healthcare needs, thereby increasing screening rates and reducing mortality. (*Ethn Dis*. 2003;13:213–219)

Key Words: Breast Cancer, Screening, Mammography, Chinese, Korean, Logistic Regression, Minority Populations

Mei-yu Yu, PhD, MD;
Oi-Saeng Hong, PhD, RN;
Amy D. Seetoo, AM, MLS, MBA

INTRODUCTION

The focus of this study was to investigate mammography use and factors that influence breast cancer screening behavior among Chinese and Korean women. The study investigated similarities and differences between these 2 Asian sub-populations in terms of demographic characteristics, socioeconomic status, and factors affecting their utilization of breast cancer screening.

Breast cancer is the most frequently diagnosed cancer among Asian American women, including Chinese and Koreans.[1] Breast cancer screening is known to be an effective early detection measure, but Asian American women have lower rates of mammography and clinical breast examination than those of other racial or ethnic female populations in the United States.[1–5] In 1998, a population-based telephone survey of 1,090 Korean Americans living in 2 California counties found that only 34% of the sample of women aged 50 and older had received a mammogram in the previous 2 years.[6] Another study, conducted by Yu, Seetoo, Tsai, and Sun, found that for Chinese women, aged 40 years and older, who had lived in the United States for less than 10 years, the mammography screening rate for the previous 2 years was only 40%.[7] The results of that study also indicated that non-English speaking participants had a utilization rate of 26%, and for those with no health insurance, the rate was only 15%.

Lower utilization of breast cancer screening is a contributing factor to the late-stage detection of breast cancer common among Asian American women.[8] A study conducted by Hedeen, White, and Taylor reported that breast cancer patients in the United States with tumors larger than 1 cm were 70% White women, 72% Chinese women born in the United States, and 81% Chinese women born in Asia.[9] Findings were similar among Japanese, Filipino, Korean, Asian Indian, and Pakistani American women. However, few studies have identified the factors influencing Asian women's breast cancer screening utilization. In particular, little is known about the similarities and differences among Asian sub-populations in terms of their health beliefs and behaviors.

Multiple factors influence Asian American women's breast cancer screening use. Reportedly, Asian women's breast cancer screening utilization is shaped by their culturally based beliefs and attitudes, socio-demographic characteristics, access to healthcare services, and knowledge of cancer screening.[2,4,7,8,10,11]

Asian Americans are one of the fastest growing minority groups in the United States. Boosted in large measure by the continuing strength of immigration from Asia in the 1990s, the Asian American population reached approximately 11 million in 2000.[12] According to the US Census statistical data, it is estimated that the Asian population will double by 2025, when it is projected to reach 22 million.[13] In Michigan, the population of Asian Americans rose dramatically from 103,501 in 1990, to 208,329 in 2000, a greater than two-

fold increase in 10 years.[12,14] However, specific health issues for Asian Americans have been overlooked by mainstream society, possibly due to a misconception that they are a "model" and trouble free minority. Consequently, Asian Americans remain one of the least understood ethnic groups.[8,15]

Approximately 58% of the Asians living in the United States reside in the states of California, New York, and Hawaii.[12] In these states, established social support structures, such as Chinatowns or Korean towns, help overcome the barriers of culture and language. In comparison, the relatively smaller Asian populations in Michigan and other states encounter greater challenges[7]; moreover, research is rarely conducted among these smaller Asian populations, so that their unique features are never reported.

One of the goals of *Healthy People 2010* is to eliminate health disparities among specific population segments.[16] There is an urgent need to study special health concerns of Asian Americans, thereby improving the cultural competency of health promotion and health care for medically under-served Asian Americans in the 21st century.

METHODS

The following sections address several issues related to the methods used for the study, including target populations and research site, sampling, questionnaire development, and data collection and analysis.

Target Populations and Research Site

Based on the recommendation of the American Cancer Society 2002[17] that women's mammography screening should begin at 40 years of age, this study targeted Chinese and Korean women aged 40 years and over. Due to the disproportionate number of recent Asian immigrants in the United States,[15,18] the term 'Chinese and Kore-

Breast cancer screening is known to be an effective early detection measure, but Asian American women have lower rates of mammography and clinical breast examination than those of other racial or ethnic female populations in the United States.[1–5]

an women' was used to refer to any woman who identified herself as such, regardless of citizenship.

The research site was a southeastern Michigan county, which was selected because of the following considerations: 1) this county had the highest density of Asians in all counties of the state, although the Asian population size is the third largest in the state[14]; 2) as a university town, the population was diverse, and included Chinese and Korean populations appropriately sized for the study; 3) the selection of the county, being the location of the project office, facilitated the project implementation and budget concerns. According to the US Census, it was estimated that the research site had approximately 1,000 Chinese and Korean women, aged 40 years and older, in 1999.[12,14]

Sampling

This study used random sampling, in which every member of the population has a known, non-zero probability of being included in the sample.[19] The list of eligible subjects, which was used to randomly select research participants, is referred to as the "sampling frame."[20–22] Identifying eligible Asian subjects was quite challenging, because no complete list by age existed, and the Asian pop-

ulation in Michigan is scattered. Based on the fact that every data source has its advantages and disadvantages, multiple data sources were used to generate comprehensive sample frames for both Chinese and Korean groups.

Four data sources were used to identify the targeted Chinese population. The first data source was a list of names, addresses and phone numbers of Chinese women, aged 40 years and over, residing in the targeted county, which was obtained from a commercial survey company. Based on the recommendation of a senior researcher at the University of Michigan Institute for Social Research, 2 survey companies were selected and contacted by telephone. Prompt response time and price determined our choice. The selected survey company developed the electronic data set in a week and sent it directly to researchers. The cost included a $100 setup fee, as well as 8 cents per name. The second data source was a list of eligible women obtained during the health promotion programs sponsored by the authors since 1997. The third data source was published membership directories of 10 local Chinese community organizations. The fourth data source was a list based on Chinese surnames, compiled from the local 1999 telephone directory. Brief telephone interviews were made to the households with identifiable Chinese surnames. Although the list generated from the telephone directory excluded those women who married individuals without Chinese surnames, the telephone survey was effective in identifying eligible women, especially when the telephone calls were conducted by bilingual interviewers with cultural knowledge, language ability, and familiar accents. Through the multiple data sources described in the preceding, a sample frame with 616 unduplicated eligible Chinese women was generated. (See a publication by Yu and her co-authors for further details on identifying respondents for studying breast cancer screening behavior among Asian American women.[23])

For the sample frame of Korean women, 3 data sources were employed: 1) a list of 92 Korean women living in the target county was obtained from the same commercial survey company used for the Chinese group; 2) because a large proportion (60%–70%) of Koreans are church members, leaders of women's groups at 5 Korean churches identified an additional 80 unduplicated names of eligible women; 3) the list containing already identified names was sent to cabinet members of local Korean American associations, who were able to contribute an additional 65 unduplicated names of eligible women. Consequently, 237 Korean women were included in the sampling frame.

For this study, 853 women (616 Chinese and 237 Korean) were used for the sampling frame. It was concluded that the sample frame generated for the study was fairly extensive and included approximately 85% of the projected, eligible population in 1999.

Of the 853 women in the sampling frame, approximately 50% (*N*=420) were randomly selected. A Women's Health Survey (WHS) questionnaire was sent to every selected woman.

Following the instructions of Salant and Dillman,[22] we attempted strategies to increase the response rate, including mailing the questionnaire with a cover letter and a stamped return envelope, making follow-up telephone calls, and mailing postcard reminders to the subjects. In addition, a gift valued at about $4 was mailed to those who returned questionnaires as a way for the investigators to express their appreciation.

Questionnaire Development

Because it was anticipated that a large percentage of the participants would be non-English speaking, it was important to develop language appropriate questionnaires. The WHS questionnaire was developed for this study, and was made available in English as well as in Chinese and Korean.

The 34 items in the WHS questionnaire were grouped into 3 categories: 1) women's socio-demographic characteristics; 2) access to health care, including availability of health insurance, transportation, and feelings about using English-speaking health care clinics; and 3) knowledge and beliefs about breast cancer screening. The questionnaire was then translated into Chinese and Korean, back translated, and finally sent to a focus group for discussion and pre-testing.

The items of the instrument were adapted from 3 well-developed questionnaires: 1) The standard California Behavioral Risk Factor Surveillance System (BRFSS) questionnaire, which had been modified for use among Asians in California[2–4]; 2) a questionnaire developed by Davis, et al,[24] regarding knowledge of mammography; and 3) the questionnaire used by the 1994 National Health Interview Survey: Access to Care Supplement.[25] Finally, the questionnaire was modified to contain items reflecting Asian women's culturally based beliefs and attitudes in terms of mammography use, drawn from existing literature.[5,8,10] For example, a question asked, "If you have not had a mammogram in the past 12 months, what were the 3 most important reasons?" Women had 16 choices to answer this question, including commonly seen barriers to breast cancer screening. These reasons included cultural barriers (eg, "felt uncomfortable about using English-speaking health care services"), linguistic barriers (eg, "speak a different language"), and economic barriers ("no health insurance"), as well as transportation difficulties ("no transportation to get there").

Another group of questions asked about Asian women's health beliefs/opinions about cancer and breast cancer screening. In light of literature review, 8 statements were generated to reflect women's concerns about mammography screening. Of the 8 statements, 2 addressed the influence of fatalism ("cancer is always fatal," and "there is little

one can do to prevent cancer"). Three statements are related to modesty ("it is difficult to be examined by a male or a strange doctor/nurse," and "it is embarrassing to take off clothes for a mammogram," or "it is uncomfortable to let strangers touch my breasts"). Finally, 3 statements related to concerns about side effects of mammograms and difficulties with English were included ("radiation from a mammogram is harmful," and "mammography is painful," or "it is uncomfortable to use English speaking healthcare services").

The study was approved by the University of Michigan Institutional Review Board (IRB). Subjects were informed that their participation was voluntary, and that data would remain confidential, and would only be reported by group. Participants were given the option of answering the questionnaire in English or their ethnic language. All Korean participants used the Korean questionnaire. Similarly, Chinese women, with only 2 exceptions, used the Chinese questionnaire.

Data Collection and Analysis

Data were collected by mail survey. Of the 420 women who received the survey, 192 (121 Chinese and 71 Koreans) returned questionnaires to investigators, a 46% response rate. Linguistically appropriate follow-up telephone calls were made to increase the response rate and to clarify missing information. Nonetheless, 12 surveys were excluded from the study due to missing data (4 Chinese and 8 Koreans). The final sample included in the data analysis comprised 180 participants (117 Chinese and 63 Koreans), aged 40 years and over.

SPSS Software version 9.0 for Windows, was chosen for data management and analyses. Data analysis included the use of descriptive statistics, testing differences between means/percentages, and logistic regression. The descriptive statistics were used to understand women's breast cancer screening behavior, de-

mographic characteristics, socioeconomic status, and knowledge of breast cancer early detection methods. Testing differences between means/percentages were used to assess similarities and differences between the Chinese and Korean groups. Logistic regression was utilized to analyze the factors affecting women's breast cancer screening, including women's socio-demographic background and knowledge of mammography.

RESULTS

This study tested 2 hypotheses: 1) Chinese and Korean women in the study site tend to under-utilize breast cancer screening services, similar to the utilization pattern of Asian Americans across the nation; and 2) multiple factors, including socioeconomic characteristics, language barriers, and lack of knowledge about mammography, influence Chinese and Korean women's breast cancer screening behavior.

Mammography use, measured as the percentage of women aged 40 years and over who had received mammograms in the past 2 years, was the dependent variable. Six independent variables were used to represent women's socio-demographic characteristics, access to health care, health beliefs, and knowledge about breast cancer screening. These independent variables are the following: 1) women's age; 2) years in the United States; 3) ability to speak English (yes or no); 4) availability of health insurance (yes or no); 5) knowledge about mammography screening (answered correctly or incorrectly the question "at what age should a woman have a mammogram regularly?"); and 6) degree of agreement with the statement that cancer is fatal (agree, neutral, and disagree).

The results of the data analyses were grouped into the following 2 categories: 1) socio-demographic characteristics and mammography screening utilization; and 2) factors influencing mammography use. The findings regarding

Table 1. Characteristics of the subject (N=180)

Characteristics	% of Women by Characteristic			Compare Chinese and Koreans Significance of Chi-Square-Test (2-tailed) *P*-value
	All Subjects (*N*=180)	Chinese (*N*=117)	Korean (*N*=63)	
Mammography use				.062
No mammogram in the past 2 years	44	50	35	
Had mammogram in the past 2 years	56	50	65	
Age				.877
<50 years old	47	46	48	
≥50 years old	53	54	52	
Language				.198
Asian language only	37	39	30	
English and Asian language	63	61	70	
Years in the United States				.001
<10 years	39	49	22	
≥10 years	61	51	78	
Health insurance				.190
No	14	17	10	
Yes	86	83	90	
Knowledge about mammogram				.379
Incorrect	36	35	38	
Correct	64	65	62	
If cancer is fatal				.437
Agree	74	77	68	
Neutral	11	9	15	
Disagree	15	14	17	

similarities and differences between Chinese and Korean women in terms of their mammography utilization patterns, and in factors influencing their use of breast cancer screening, are also presented.

Socio-demographic Characteristics and Mammography Screening

Table 1 presents results of descriptive analysis of the dependent variable and the 6 independent variables used in the data analysis. The participants were between 40 and 83 years old, with a mean age of 53 years. All respondents were foreign born women who had been living in the United States from 1 to 60 years. A significant proportion (37%) of women could not speak English, 14% had no health insurance, and 36% did

not know at what age a woman should begin receiving regular mammograms. The majority (74%) believed that cancer is always fatal.

Of the 180 sampled women, 56% had received a mammogram in the past 2 years. As expected, the statistical tests of association demonstrated that the women's use of mammography screening was significantly and positively related to their years in the United States, ability to speak English, access to health insurance, and knowledge about mammograms ($P \leq .025$).

Significant associations were found among the independent variables. Older women, for example, were less educated, spoke only their native language, and felt significant stress while visiting English-speaking clinics ($P \leq .02$). The women's number of years in the United

Table 2. Factors related to mammography utilization: bivariate logistic regression analysis (N=180)

	% of Women Who Had a Mammogram in the Past 2 Years, Odds Ratio, and Significance (*P*)					
	All (*N*=180)		Chinese (*N*=117)		Korean (*N*=63)	
Independent Variable	%	Odds Ratio (*P*)	%	Odds Ratio (*P*)	%	Odds Ratio (*P*)
Age		.860 (.616)		1.466 (.305)		.269 (.019)
<50 years old	54		56		50	
≥50 years old	57		46		79	
Language		.286 (<.001)		.168 (<.001)		.887 (.834)
Asian language only	36		26		63	
English	67		67		66	
Years in the United States		.303 (<.001)		.451 (<.05)		.130 (<.05)
<10 years	38		40		29	
≥10 years	67		60		76	
Health insurance		.077 (<.001)		.078 (<.001)		.085 (<.05)
No	12		10		17	
Yes	63		59		70	
Knowledge about screening		.270 (<.001)		.214 (<.001)		.345 (<.001)
Incorrect	35		27		50	
Correct	67		63		74	
If cancer is fatal		.842 (.523)		.929 (.853)		1.250 (.500)
Agree	55		51		63	
Neutral	50		46		56	
Disagree	65		56		80	

States was positively related to their ability to speak English (*P*=.001), while language ability was positively related to their level of education (*P*<.001) and their feelings about using English-speaking healthcare services (*P*<.001).

Comparisons between the Chinese and Korean women (columns 2 and 3 of Table 1) revealed that the 2 groups had similar socio-demographic characteristics. However, a significant difference (*P*=.001) in mean years lived in the United States was found between the Korean (22.4 ± 17.4) and Chinese participants (13.5 years ± 12.1).

Factors Influencing Mammography Use

The descriptive analysis demonstrated that the percentages of Chinese and Korean women who had received mammograms in the past 2 years were 50% and 65%, respectively. Mammography utilization also varied by women's socio-demographic characteristics.

As shown in Table 2, the percentage of women who had received a mammogram in the past 2 years was 38% among the participants who had lived in the United States for less than 10 years, 36% among those who could not speak English, and only 35% among those who lacked knowledge about mammography screening. Women without health insurance had the lowest (12%) mammography utilization.

Both bivariate and multiple logistic regression analyses were used to explore factors influencing mammography use. As presented in Table 2, the odds ratios of the bivariate logistic regression analysis between the dependent and the 6 independent variables are consistent with the findings of descriptive analysis and statistical tests of association. Participants who could not speak English, had lived in the United States for less than 10 years, had no health insurance, or no knowledge of mammography were less likely to have received mammography screening in the past 2 years (*P*<.001).

Table 3 summarizes the results of the multiple logistic regression analysis.

When all other predictors were statistically controlled, women's ability to speak English, availability of health insurance, and knowledge about mammography were 3 significant predictors of women's mammography screening use (*P*≤.015).

Multiple logistic regression analyses by sub-population (columns 2 and 3 of Table 3), indicated that when all other predictors were statistically controlled, the significant predictors of Chinese women's mammogram use were availability of health insurance and knowledge of mammography (*P*≤.004). Korean women's breast cancer screening behavior, however, was shown to be determined by the women's age, years in the United States, and availability of health insurance (*P*≤.05).

DISCUSSION

This study investigated factors influencing breast cancer screening utilization by Chinese and Korean American

Table 3. Factors related to mammography utilization: multivariate logistic regression analysis (N=180)

| | Odds Ratio and Significance of Multivariate Logistics Regression (P) | | | | | |
| | All (N=180) | | Chinese (N=117) | | Korean (N=63) | |
Independent Variable	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P
Age		.093		.668		.021
<50 years old	.518		.806		.185	
≥50 years old	1		1		1	
Language		.015		.065		.225
Asian language only	.358		.344		.342	
English	1		1		1	
Years in the United States		.137		.689		.033
<10 years	.554		.813		.185	
≥10 years	1		1		1	
Health insurance		<.001		.004		.050
No	.082		.084		.072	
Yes	1		1		1	
Knowledge about screening		<.001		.001		.080
Incorrect	.186		.182		.251	
Correct	1		1		1	
If cancer is fatal		.284		.353		.843
Agree	.787		2.659		1.542	
Neutral	.343		3.695		1.978	
Disagree	1		1		1	

Local Chinese community organizations, and local Korean churches, may provide the most attractive sites for conducting health promotion programs for Chinese and Korean women, respectively.

women living in an urban county of Michigan, and examined similarities and differences between the 2 sub-populations. A random sample of 180 women aged 40 years and older, including 117 Chinese and 63 Koreans, participated in the mail survey.

Multiple data sources were used to develop the sampling frames for the survey conducted among both Chinese and Korean groups. As every data source has its advantages and disadvantages, the use of diverse sources helped to offset the limitations of each individual one.[21] The data sources used for the Chinese and Korean groups have similarities and differences, reflecting the social structures of the 2 Asian sub-populations. Understanding the social structure of the sample populations benefits not only the sampling strategies of this survey, but also future community outreach programs. Local Chinese community organizations and local Korean churches may provide the most attractive sites for conducting health promotion programs for Chinese and Korean women, respectively.

The 46% response rate of the survey was lower than the expected 60% rate, as suggested by Salant and Dillman.[22(p43)] A possible reason for this relatively lower response rate is that the potential research participants were part of a transient population, typical of university towns, and did not receive the questionnaire. Another possible reason is that some older Chinese and Korean women were not accustomed to completing a long questionnaire with social-psychological questions. In addition, the strategies used for mail surveys may be improved upon in the future, including mailing an advance-notice letter prior to mailing the questionnaire to the research participants.

The results of this study demonstrated that the mammography utilization rate of the Asian women in the sample was 21% lower than that for all races in

Michigan's statewide statistics.[26] The logistic regression analyses indicated that multiple factors influenced women's cancer screening behavior. After adjusting for other confounding factors, the strongest predictors of mammography use in the past 2 years among the study participants were their ability to speak English, access to health insurance, and knowledge about mammography. These findings suggest a substantial challenge to mammography screening promotion among the women studied, since, in addition to their lack of health insurance, 37% of the sampled women could not speak English, and 36% of them lacked knowledge about mammography. Therefore, providing breast exam education and personalized assistance, such as interpretation, is important to promote mammography screening among medically under-served women, in addition to offering financial assistance for those who have no health insurance.

With regard to the findings of the statistical analysis, it should be noted that although speaking English is one component of acculturation, the research project did not elaborate on the role of acculturation in Asian women's breast cancer screening behavior. This is the topic of planned future studies.

Conclusion

Understanding the determinants of health behavior is critical for the devel-

opment of effective interventions.[27] Among recent immigrants who moved to the United States later in life, cultural, socioeconomic, and language barriers, as well as lack of knowledge about mammography screening, are serious deterrents to adequate use of health care. Culturally and linguistically appropriate health promotion programs, with an emphasis on personalized assistance, are urgently needed for increasing mammography screening utilization among the rapidly growing Asian population in the United States.

Similarities and differences between sampled Chinese and Korean women existed in terms of their socio-demographic characteristics, and the factors influencing their breast cancer screening. Since the Asian population includes a number of ethnic groups, diverse in language, culture, history, religion, and socioeconomic characteristics, the study suggested that designing appropriate breast cancer screening promotion programs for each of the specific Asian ethnic groups is critically important for increasing mammography screening utilization.

A goal of *Healthy People 2010* is that by 2010, 70% of women aged 40 years and older will have received a mammogram within the preceding 2 years.[16] The findings of this study benefit not only future larger-scale research, but also culturally appropriate breast cancer screening promotion in Asian communities, including those with Chinese and Korean populations.

REFERENCES

1. American Cancer Society. *Cancer Facts and Figures—1997.* American Cancer Society Inc; 1997.
2. Center for Disease Control. Behavioral risk factor survey of Chinese—California, 1989. *MMWR.* 1992a;41:266–270.
3. Center for Disease Control. Behavioral risk factor survey of Vietnamese—California, 1991. *MMWR.* 1992b;41:69–72.
4. Center for Disease Control. Behavioral risk factor survey of Korean Americans—Alameda County, California, 1994. *MMWR.* 1997;46: 774–777.
5. National Institute of Health (NIH). *Women of Color Health Data Book 1998.* Bethesda, Md: NIH. Publication NIH 98-4247.
6. Wismer BA, Moskowitz JM, Chen AM, et al. Mammography and clinical breast examination among Korean American women in two California counties. *Prev Med.* 1998;27:144–151.
7. Yu MY, Seetoo AD, Tsai CK, Sun C. Sociodemographic predictor of Papanicolaou smear test and mammography use among women of Chinese descent in Southeast Michigan. *Womens Health Issues.* 1998;8:372–381.
8. National Asian Women's Health Organization (NAWHO). *National Plan of Action on Asian American Women and Breast Cancer.* San Francisco, Calif: NAWHO; 1997.
9. Hedeen AN, White E, Taylor V. Ethnicity and birthplace in relation to tumor size and stage in Asian American women with breast cancer. *Am J Public Health.* 1999;89:1248–1252.
10. Mo B. Modesty, sexuality, and breast health in Chinese-American women. *West J Med.* 1992;157:260–264.
11. Maxwell AE, Bastani R, Warda US. Breast cancer screening and related attitudes among Korean-American women. *Women Health.* 1998;27:89–107.
12. US Bureau of the Census, Population Division. States ranked by Asian and Pacific Islander Population, July 1, 1999. Available at: http://www.census.gov/population/estimates/state/rank/api.txt. Accessed August 30, 2001.
13. US Bureau of the Census. *Statistical Abstract of the United States 1998.* 118th ed. Washington, DC: US Bureau of the Census; 1998.
14. US Bureau of the Census. *1990 Census of Population, Social and Economic Characteristics, Michigan.* Section 1 of 2. Washington, DC: US Bureau of the Census; 1993. Publication CP-2-24.
15. Lin-Fu JS. Population characteristics and healthcare needs of Asian Pacific Americans. *Public Health Rep.* 1988;103:18–27.
16. US Department of Health and Human Services (USDHHS). *Healthy People 2010.* Conference ed, 2 vol. Washington, DC: USDHHS; January 2000.
17. American Cancer Society. *Cancer Facts and Figures—2002.* American Cancer Society Inc; 2002.
18. Kent MM, Pollard KM, Haaga J, Mather M. First glimpses from the 2000 US Census. *Popul Bull.* 2001;56(2).
19. Mertens DM. *Research Methods in Education and Psychology: Integrating Diversity with Quantitative and Qualitative Approaches.* Thousand Oaks, Calif: Sage Publications Inc; 1998.
20. Burns N, Grove SK. *The Practice of Nursing Research: Conduct, Critique and Utilization.* 2nd ed. Philadelphia, Pa: WB Saunders Co; 1993.
21. Henry GT. Practical sampling. In: Bickman L, Rog DJ, eds. *Handbook of Applied Social Research Methods.* Thousand Oaks, Calif: Sage Publications Inc; 1998:101–126.
22. Salant P, Dillman DA. *How to Conduct Your Own Survey.* New York, NY: John Wiley & Sons Inc; 1994.
23. Yu MY, Seetoo AD, Qu M. Challenges of identifying Asian women for breast cancer screening. *Oncol Nurs Forum.* 2002;29:585–587.
24. Davis TC, Arnold C, Berkel HJ, Nandy I, Jackson RH, Glass J. Knowledge and attitude on screening mammography among low-literate, low-income women. *Cancer—Interdisciplinary Int J Am Cancer Soc.* 1996;78:1913–1920.
25. US Department of Health and Human Services, National Center for Health Statistics. *National Health Interview Survey, 1994: Access to Care Supplement.* Washington, DC: US Government Printing Office; 1995. Publication DHDS 96-1521.
26. Center for Disease Control. Trends in self-reported use of mammograms (1989–1997) and Papanicolau tests (1991–1997)—behavioral risk factor surveillance system. *MMWR.* 1999;48(suppl 6):4–12.
27. Pender N. *Health Promotion in Nursing Practicing.* 3rd ed. Stamford, Conn: Appleton & Lange; 1996.

AUTHOR CONTRIBUTIONS
Design and concept of study: Yu, Hong, Seetoo
Acquisition of data: Yu, Hong, Seetoo
Data analysis and interpretation: Yu, Hong
Manuscript draft: Yu, Hong, Seetoo
Statistical expertise: Yu, Hong
Acquisition of funding: Yu, Hong, Seetoo
Administrative, technical, or material assistance: Yu, Hong, Seetoo
Supervision: Yu