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## Predictors of Breast and Cervical Screening in Vietnamese Women in Harris County, Houston, Texas

### KEY WORDS

Breast cancer screening  
BSE  
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Papanicolaou test  
Vietnamese

The Vietnamese are a quickly growing, important part of the Texas population. Breast cancer is known to have different biologic characteristics in Vietnamese women. In order to develop appropriate intervention and screening strategies, we conducted a study of barriers to cervical and breast screening in Vietnamese women in Harris County, Tex. Our objective was to characterize the demographic factors, beliefs, and barriers to cervical and breast cancer screening in our study population and test the effect of these on Papanicolaou test, breast self-examination (BSE), medical breast examination (MBE), and mammography use. The Health Belief Model Scales for Measuring Beliefs Related to Breast Cancer (Champion VL, *Nursing Research* 1993;42:139-143) was the framework used to assess attitudes regarding risk of breast cancer and to design a component assessing risk of cervical cancer. The questionnaire addressed susceptibility, seriousness, benefits, barriers, and health about screening for breast and cervical cancer. It was translated into Vietnamese and back-translated into English prior to use. The questionnaire was mailed to Harris County residents. Those returned were entered into a database. The data were analyzed for validity using Chronbach's alpha. Simple descriptive analyses and nominal logistic regression identified predictors of Papanicolaou test, BSE, MBE, and mammography use. Twelve hundred surveys were mailed out to Vietnamese

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women using the telephone directory and the church directories in Harris County; 209 were returned and entered into the database. Of the respondents, 67% had ever received a Papanicolaou test; of these, 89% had received a Papanicolaou test within the past year; 55% of respondents had performed a BSE, 45% of patients received an MBE, and 45% of respondents had ever received a mammogram (15% of respondents had a mammogram during the previous year). The most significant predictors of Papanicolaou test, BSE, MBE, and mammography use were marital status (being married), high educational level, lack of barriers, a family history of the cancer, older age, and increased perception of seriousness. Compared to other studies of Vietnamese women, the women in Texas are among the highest users of the Papanicolaou test, BSE, MBE, and mammography. Barriers and incentives to breast and cervical screening were similar to those in other studies.

The World Health Organization (WHO) reports 470,606 cases of cervical cancer, with 80% occurring in developing countries where the mortality rates are 2.4 times those in developed countries. While the rate of cervical cancer incidence is one third of that in the United States, the mortality rate is 2.24 times higher (Appendix). The WHO reports 1,050,346 cases of breast cancer worldwide, with 55% of them in more developed countries. The mortality is similar in both the developing and more developed world. The incidence of breast cancer in Vietnam is 3% lower than that in the United States and the mortality rate is 6% (<http://www.who.int/cancer/en/>).

The number of Vietnamese in the United States has nearly doubled between 1990 and 2000 (<http://factfinder.census.gov/servlet/QTTable?>). The Surveillance Epidemiology and End Results (SEER) database does not publish separate data on Vietnamese. They are currently classified as Asian and Pacific Islanders. The SEER data shows a slightly higher incidence of cervical cancer for Asian/Pacific Islander than for all races (10.2 versus 9.6 per 100,000) while mortality rates are equal. For breast cancer, the incidence is lower in Asian/Pacific Islanders compared to all races (97.2 versus 135 per 100,000) and mortality is also somewhat lower (12.5 versus 27.7) (<http://www.cdc.gov>).

Texas has the second largest Vietnamese population in the United States. Houston has the fourth largest Vietnamese population among US cities and has the largest population of any Southern city (<http://factfinder.census.gov/servlet/QTTable?>). The Texas Cancer Data Center has the Texas data on all Texans: Hispanic Texans, African-American Texans, and Texans of other races. The data for Vietnamese have not been subclassified in the database as of yet. In Texas, the incidence of cervical cancer is 10.3 per 100,000, similar to that in the United States, and mortality is higher (3.7 in Texas compared to 2.9 nationally). The incidence of breast cancer in Texas is higher than that in the United States (115 versus 12.5 in Asian/Pacific Islanders) and breast cancer mortality is lower (3.7 compared to 12.5 among Asian/Pacific Islanders) (<http://www.txcancer.org>; <http://www.tdh.state.tx.us/tcr/>).

Important differences in breast cancer stage, treatment, and survival by race and ethnicity have been demonstrated using data from the SEER in a cohort of 124,934 women. The cohort was notable for its 8834 Asian/Pacific Islanders coming

from 11 population-based tumor registries.<sup>1</sup> Li et al have used the registry to explore hypotheses related to the histopathologic and biologic behavior of cancers by race. Relative to non-Hispanic whites, African Americans, Native Americans, Filipinos, Chinese, Koreans, Vietnamese, Indians/Pakistanis, Mexicans, South/Central Americans, and Puerto Ricans living in the United States have been found to have a statistically significant increased risk of having estrogen receptor negative/progesterone receptor negative breast cancers. Similarly, the histologies of the cancers from these ethnic groups are of different types.<sup>2</sup> These findings are important for deciphering the important biologic, socioeconomic, and etiologic differences that may allow new insights and interventions for these populations. Receptor data, such as these, could lead to new therapies. Understanding attitudes toward therapy and biology could allow investigators to make therapies more palatable as they are developed.

Such studies of the SEER data and histopathology of cervical cancer would be welcome and to our knowledge have not been done. There are important barriers to both breast and cervical screening in Vietnamese immigrant women in the United States.

Our group is interested in studying the biology, technical feasibility, clinical effectiveness, patient satisfaction, and cost-effectiveness of new screening technologies that have the potential to move into the developing world. These technologies are optical technologies that can make a diagnosis in real time and can be constructed for \$3000–4000 and be placed in a backpack ([www.mdanderson.org/diseases/cervical/opticalprobe/](http://www.mdanderson.org/diseases/cervical/opticalprobe/)). The evaluation of new technologies must be culturally appropriate in order to correctly address the barriers that exist.<sup>3</sup>

In preparation for further studies involving acceptance of new screening technologies, we carried out this study of attitudes toward breast and cervical screening in the Vietnamese community. We sought to perform a survey (by mail back questionnaire) of an instrument that evaluated the use and barriers to use of mammography and Papanicolaou test in Vietnamese immigrant women in Harris County, Tex. Our objective was to characterize the demographic factors, beliefs, and barriers to cervical and breast cancer screening in our study population and test the effect of these on Papanicolaou test use, breast self-examination (BSE), medical breast examination (MBE), and mammography use.

## ■ Materials and Methods

### Instrument

The Health Belief Model Scales for Measuring Beliefs Related to Breast Cancer was the framework used to assess attitudes regarding risk of breast cancer and to design a component assessing risk of cervical cancer.<sup>4-7</sup> The questionnaire addressed susceptibility, seriousness, benefits, barriers, and health about screening for breast and cervical cancer, as well as the use of Papanicolaou test, BSE, MBE, and mammography.

The questionnaire contained 86 questions and took about 30 to 60 minutes to fill out. Twenty-seven of the questions used the Likert 5-point scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. There were 16 open-ended questions asking items like name, date of birth, province of birth, frequency of BSE, if no BSE why not, if a woman has no symptoms does she need a Papanicolaou test, etc. There were 43 multiple-choice questions focusing on knowledge about cervical and breast cancer.

The questionnaire was translated into Vietnamese and back-translated into English. A pilot test was conducted using the questionnaire on 30 employees, who were native Vietnamese speaking. The questionnaire was then revised according to their suggestions. There were 2 suggestions that were made repeatedly. One suggestion was to change the conjunction "or" to "but" and vice versa, depending on the meaning of the question. A second suggestion was that certain words that did not exist in Vietnamese be replaced with more detailed examples. An instance of this would be, for example, when asking if one ate a healthy diet; healthy diet in the United States was defined as high fiber and low fat. This question was initially translated to be a healthy diet, like the US concept, high in fiber and low in fat. The word *fiber* was a problem, as it did not translate well. It was replaced with the consumption of vegetables and fruits that are eaten raw. No source of bread or cereal translated well as examples. The final questionnaire was then revised in Vietnamese.

### Eligibility and Recruitment

All nonpregnant Vietnamese women 18 years and older living for more than 6 months in the United States, residing in Harris County at the time of the mailing, were eligible for the study. The target population was Vietnamese immigrant women. The questionnaire was mailed to all households listed in the Vietnamese telephone directory within Harris County and to all Vietnamese households listed in the memberships lists of all temples and churches in Harris County. While this recruitment strategy excluded those without telephones, it did provide for contacting individuals at all socioeconomic levels.

Contacting temple and church members, as well as those in the telephone directory, was in some cases redundant, and where noted, duplication was avoided. The churches provided another resource of Vietnamese-speaking participants. The church leaders were very supportive of the study and encour-

aged inclusion. The questionnaires were mailed out and returned over a 2-month period.

Duplicate addresses were addressed by omitting them in the mailing. To our knowledge, no household was mailed more than one questionnaire. There were 2 mailings to get the 1200 questionnaires out. Nonresponders were sent a second questionnaire. We did not ask how many women were in each household.

Table 1 • Sociodemographic Data Describing Participants

	Number	Percent
Age, y		
Mean	44.4	
Median	42	
Range	20-88	
Birthplace		
Vietnam	141	100
Outside	0	
Missing	20	
Marital status		
Married	164	79
Divorced	8	4
Separated	3	1
Widowed	11	5
Never married	23	11
	209	
Annual family income		
<\$15,000	70	34
\$15-19,999	34	16
\$20-29,999	45	22
\$30-39,999	26	12
\$40-90,000	24	12
Missing	10	
	209	
Length of time in the United States, y		
Mean	12	
Median	13	
Range	1-20	
Household language		
Mostly English	4	5
Mostly Vietnamese	73	94
Other	1	1
Missing	131	
	209	
Education		
None	4	2
1-8 y	23	11
9-11 y	19	9
High school	68	35
Tech/vocational	21	10
Some college	20	10
College graduate	45	22
Advanced degree	9	4
	209	

## Data Collection and Analysis

The questionnaires were returned and the results doubly entered into an Excel database. The data were cleaned and simple descriptive statistics were carried out. For each variable the number of responses was reported and used as the denominator of the response. For continuous variables, like age and number of years in the United States, mean, median, and range were calculated. For dichotomous variables, the number and frequency were reported. In those questions answered with the Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), results of the categories *agree* and *strongly agree* were the reported frequencies used in the Tables. A mean percentage for each category of the Health Belief Model was calculated for both the cervical and the breast cancer data.

All data were analyzed using the R Statistical Package®. Chronbach's alpha was computed for each Health Belief Model variable: susceptibility, seriousness, benefit, barrier, and health.

There were 4 outcomes of interest: if a patient has had a Papanicolaou test; if a patient checks her breasts regularly using BSE; if a patient has her breasts checked by a nurse or doctor (MBE); and if the patient has had a mammogram. To determine which factors help in predicting these health-related behaviors, we looked at a combination of Health Belief Model variables and age, marital status, education level, family income, and if a family member has ever had cervical or breast cancer.

The variables that maximized the Chronbach's alpha in their respective category were summed to construct an individual Health Belief Model score for each variable. The numbers of questions dropped are reported. A backward stepwise logistic regression was used to identify which variables were significant at the  $P < .05$  level and to reduce the number of variables. Owing to a high level of disagreement between the Likelihood Ratio and the Wald tests, we used a permutation test on the deviance of the removed variables that were not significant.

## Sample Size Calculation

The questionnaire was mailed to all households listed in the Vietnamese telephone directory within Harris County and to

all Vietnamese households listed in the memberships lists of all temples and churches in Harris County. No formal sample size was calculated, but our study is similar in size to many other published studies of this kind. We regarded this as a pilot study for participation and exploring the variability of response. Adequate sample sizes for future studies can be calculated from this work.

## Results

### Recruitment and Demographics

Twelve hundred questionnaires were mailed out and 209 (17.4%) were returned and entered into the database. There were no duplicate questionnaires from any address. The sociodemographics of the study population are detailed in Table 1.

There were 68 patients who did not report their birthplace but the remaining patients came from the South 69/209 (33%), Central 44/209 (21%), and North 28/209 (14%) Vietnam. The patients ranged in age from 20 to 88 with a mean age of 44 years. Most of the patients were married.

The patients were highly educated: 46/209 (22%) had less than a high school education, 68/209 (33%) had a high school diploma, and the remaining 95/209 (45%) had technical or vocational degrees or advanced college and graduate degrees. Household income also was well distributed, with 104/208 (54%) earning less than \$20,000 per annum and the remaining 95/208 (45%) earning more than that. The patients had been in the United States for 1 to 20 years, with a mean of 12 years. The reported household language was Vietnamese in most cases. When asked about the source of healthcare information, 79/208 (38%) stated they obtained information from newspapers and magazines, 31/208 (15%) from family members, and 31/208 (15%) from physicians.

### Instrument

Each of the 5 categories (susceptibility, seriousness, benefit, barrier, and health) was subjected to analysis for consistency with Chronbach's alpha. The Chronbach's alpha for these categories

 **Table 2 • Internal Consistency of the Health Belief Model (HBM) Questionnaire Used in this Study**

HBM Variable	Questions Removed to Improve HBM	Chronbach's Alpha	Mean Percentage for Each Category of the HBM for Cervical Questions	Mean Percentage for Each Category of the HBM for Breast Questions	
Susceptibility	0	.73	3	8	
Seriousness	0	.83	2	52	
Benefits	2	.79	32	72 BSE	Mammography
Barriers	0	.86	9	17 BSE	10
Health	1	.67	45	48	Mammography

 **Table 3 • Beliefs About Cervical Cancer Screening**

**Susceptibility**

- Had cervical cancer myself 4/206 (2%)
- Have family members who have had cervical cancer 10/206 (5%)
- I myself am at high risk for cervical cancer 4/206 (2%)

**Seriousness**

- I am afraid of cervical cancer 4/205 (2%)

**Benefits of the Pap smear**

- Believe the Pap smear is highly likely to detect cervical neoplasia at an early stage 110/199 (55%)
- I understand the current Pap smear screening guidelines 121/187 (64%) [could correctly articulate them]
- Believe the Pap smear is highly likely to detect cervical neoplasia at an early stage 110/199 (55%)
- Family member had cervical cancer 6/203 (3%)
- Friend had cervical cancer 16/193 (8%)
- Family member suggested to get Pap 11/198 (6%)
- Friend suggested to get Pap 15/194 (8%)
- My doctor suggested to get Pap 68/141 (48%)
- It was a routine part of a check-up exam 90/119 (76%)
- Heard from mass media to get a Pap 20/189 (11%)
- My age suggested I get a Pap 20/189 (11%)
- Getting a Pap brought me peace of mind 58/151 (38%)

**Barriers to the Pap smear**

- I'm a virgin 1/206 (1%)
- I always follow medical orders AGREE 183/206 (88%) DISAGREE (12%)
- I myself am at high risk for cervical cancer 4/206 (2%)
- I put it off 6/203 (3%)
- Not knowing I should go 13/196 (7%)
- Not knowing where to go 14/195 (7%)
- Not needed, unnecessary 9/200 (5%)
- It costs too much 13/196 (7%)
- I have no transportation 6/203 (3%)
- Not knowing the kind of doctor 12/197 (6%)
- I had no insurance coverage 15/194 (8%)
- I do not go to the doctor 8/201 (4%)
- I do not have a doctor for this 10/199 (5%)
- My doctor did not order the test 6/203 (3%)
- It is too embarrassing 11/198 (6%)
- I have not had any problems 22/187 (12%)
- I am afraid of cancer 4/205 (2%)
- I am afraid it is painful 6/203 (3%)
- My age 1/208 (<1%)

**Health**

- Ever had a pap 140/206 (68%)
- Have regular Pap smears 124/140 (89%)
- How often, yearly 84/209 (40%)
- Ever had an abnormal Pap, yes 5/209 (2%)
- Ever had a cervical biopsy 26/169 (12%)
- I take vitamins 98/206 (48%)
- I search for new health information 146/206 (71%)
- New health habits are difficult to add 56/206 (27%)
- Chance they'd have a Pap smear next year if their doctor highly recommended it 89/193 (46%)

range from .67 to .86. Details of this analysis are found in Table 2. To maximize the value, 2 questions were removed from benefit and 1 from health. No questions were removed from the other categories. These measures of Chronbach's alpha show good internal consistency using the instrument in Vietnamese.

**Cervical Cancer Screening Beliefs**

The questionnaire responses have been condensed and are reported in Table 3. We calculated a mean percentage for each category of Health Belief Model as a way of summarizing values in the table and these are shown in Table 2.

In this population, 68% of patients had ever had a Papanicolaou test and 89% reported having a Papanicolaou test this year. This demonstrated high use of the Papanicolaou test. When the results of Tables 2 and 3 are reviewed in detail, the mean score for susceptibility were 3%, seriousness 2%, benefits 32%, barriers 9%, and health 45%. This group of patients is unaware of the seriousness of cervical cancer; however, they are concerned about their health and do appreciate the potential benefit of the Papanicolaou test. The high health score probably reflects the high education level of the participants and is corroborated by their use of the Papanicolaou test. It seems there are few barriers and many perceived benefits of the Papanicolaou test. This patient population did not consider themselves at high risk of cervical cancer, nor the cervical cancer to be a serious problem for them.

The logistic model that was employed to predict the use of Papanicolaou test found 3 variables to be the predictors of Papanicolaou test use: educational level (higher), marital status (married), and lack of barriers. The model results are summarized in Table 4.

**Breast Cancer Screening Beliefs**

The questionnaire responses have been condensed and are reported in Table 5. We calculated a mean percentage for each category of Health Belief Model as a way of summarizing values in the table and these are shown in Table 2.

In this population, 55% of patients had performed BSE and 27% performed BSE monthly; 45% had had a yearly breast examination by a doctor, 20% by a doctor or nurse; 45% had had a mammogram in their lifetime and approximately 15% had had a mammogram this year. When the results of Tables 2 and 5 are reviewed in detail, the mean score for susceptibility were 8%, seriousness 52%, benefits of BSE 72% and of mammography 22%, barriers to BSE 17% and to mammography 10%, and health 48%.

The high health score probably reflects the high education level of the participants and is demonstrated to be approximately that seen with the cervical questionnaire. It seems there are some barriers and very high perceived benefits of BSE, slightly less beneficial than mammography. This patient population did not consider themselves at high risk of breast cancer, although they were at higher risk of breast cancer than they were for cervical cancer (8% compared to 3%). The barriers related to breast cancer, 17%

**Table 4 • Significant Predictors of Screening Tests and Behaviors Using the Regression Analysis**

Screening Test/Behavior	Variable in Regression Model	P value
Papanicolaou test	Education	.003
	Being married	<.0001
	Barriers present	.028
Regular BSE, MBE	Barriers present	<.001
	Education	.056
	Family history of breast cancer	.063
Ever had a mammogram	Being married	.001
	Barriers present	.005
	Age (older)	<.0001

to BSE and 10% to mammography, were similar to the 9% barrier rate seen for the Papanicolaou test. What is surprising is the seriousness of breast cancer in this population. For developing cervical cancer the seriousness was 2%, whereas for the breast cancer it was 52%. Clearly there was much greater fear of breast cancer than cervical cancer.

The logistic model was used to examine the variables (lack of barriers and health beliefs) that significantly predicted BSE use. In the final analysis, health beliefs was dropped out of the model because the Wald and Likelihood Ratio tests were different and the permutation *P* value was .13. Having a nurse or doctor examination was predicted by educational level (higher), a family history of breast cancer (positive), and marital status (married). Ever had a mammogram was best predicted by lack of barriers and age (older). The model is summarized in Table 4.

## Discussion

Cervical cancer is a disease of the developing world. Mortality rates in Vietnam are 2 times higher than those in the United States (Appendix). Those who are recent Vietnamese immigrants probably carry a higher risk of mortality than those who have lived here longer. Breast cancer appears to be a disease of both the developed and developing worlds. Mortality rates were similar in both parts of the world. Vietnamese women are at lower risk of both developing of and dying of breast cancer than are US women. Thus recent Vietnamese immigrants may be at a lower risk but those who reside here longer are at higher risk (<http://www.who.int./cancer/en/>).

The number of Vietnamese in the United States has doubled since 1990. Most of the Vietnamese live in California and Texas.<sup>2</sup> The Houston area is the fourth ranked city in the United States and the largest in the South (<http://factfinder.census.gov./servlet/QTTable?>). The incidence for cervical cancer in Texas is similar to that seen nationally while the mortality is slightly higher. The incidence for breast cancer in Texas is slightly lower than that seen nationally while mortality is similar (<http://www.txcancer.org>; <http://www.tdh.state.tx.us/tcr/>) (Appendix). We hope that data will soon be available on the risk of both cancers in the Texas Vietnamese population.

**Table 5 • Beliefs About Breast Cancer Screening**

### Susceptibility

- Chances of getting breast cancer high 32/209 (15%)
- Worry a lot about getting cancer (22%)
- Ever had a diagnostic mammogram 20/167 (10%)
- Personal history of breast cancer 2/209 (1%)
- Family history of breast cancer 7/209 (3%) [2 mothers and 5 maternal/paternal aunts]
- Family member had breast cancer 4/205 (2%)
- Friend had breast cancer 5/204 (2%)

### Seriousness

- Breast cancer scares me 152/209 (73%)
- Breast cancer makes me feel nauseous 41/209 (20%)
- My heart races when I think of breast cancer 79/209 (38%)
- My career would be endangered 110/209 (52%)
- My marriage would be endangered 138/209 (66%)
- I would change my feeling about myself 113/209 (55%)
- Afraid to even think of breast cancer 124/209 (59%)
- Breast cancer is not a hopeless disease AGREE 104/209 (50%)

### Benefits

#### Benefits of BSE

- Would be less anxious if did monthly BSE 127/209 (61%)
- If I do BSE I may find lumps before the regular check-up 138/209 (66%)
- I would gain a lot by doing BSE 172/209 (82%)
- BSE can prevent future problems 172/209 (82%)
- BSE will improve my health 147/209 (70%)

#### Benefits of mammography

- Probability that mammogram would find a cancer 62/194 (30%) very high and 53/194 (25%) some-what high, overall 115/194 (59%)
- High chance of cure if caught early 104/194 (55%)
- Family member had breast cancer 4/205 (2%)
- Friend had breast cancer 5/204 (2%)
- Family member suggested to get mammogram 7/202 (3%)
- Friend suggested to get mammogram 4/205 (2%)
- My doctor suggested to get mammogram 25/184 (14%)
- It was a routine part of a check-up exam 50/159 (31%)
- Heard from mass media to get a mammogram 13/196 (7%)
- My age suggested I get a mammogram 32/196 (16%)
- Getting a mammogram brought me peace of mind 28/181 (15%)

(Continues)

 **Table 5 • Beliefs About Breast Cancer Screening (Continued)**

**Barriers**

**Barriers to BSE**

- Do not know how 65/209 (31%)
- Would interfere with other activities 13/209 (6%)
- BSE is painful 16/209 (8%)
- ZBSE is time-consuming 122/209 (58%)
- BSE would interfere with other activities 12/209 (6%)
- BSE is too embarrassing 16/209 (8%)
- Family will make fun of me (3%)
- I'm giving up a lot to do BSE 27/209 (13%)

**Barriers to mammography**

- I never had a mammogram 107/209 (51%)
- I put it off 7/202 (3%)
- Not knowing I should go 21/188 (11%)
- Not knowing where to go 26/183 (14%)
- Not needed, unnecessary 29/180 (16%)
- It costs too much 16/193 (8%)
- I had no transportation 7/202 (3%)
- Not knowing the kind of doctor 14/195 (7%)
- I had no insurance coverage 21/188 (11%)
- I do not go to the doctor 6/203 (3%)
- I do not have a doctor for this 14/195 (7%)
- My doctor did not order the test 24/185 (13%)
- It is too embarrassing 5/204 (2%)
- I have not had any problems 38/171 (22%)
- I am afraid of cancer 2/207 (1%)
- I am afraid it is painful 2/207 (1%)
- I am afraid of radiation 5/204 (2%)
- My age 11/198 (5%)

**Health**

- Heard of BSE 173/209(83%)
- Knew how to do BSE 129/209 (62%)
- Perform BSE monthly 56/209 (27%)
- Confident about BSE skills 46/209 (22%)
- Breast checked by medical personnel 42/209 (20%)
- Breast checked by doctor yearly 84/186 (45%)
- Ever had a mammogram 82/209 (39%) [32/82 (39%) once, 22/82 (27%) twice, remainder (34%) more than twice]
- How likely are you to get a mammogram next year if your doctor recommends it 104/205 (51%)
- Would send for new health information 146/209 (70%)
- Always follow medical orders 183/209 (88%)
- Know when to do BSE 56/209 (27%)
- Risk of acquiring breast cancer increases with age (155/209) 74%
- Family history puts me at greatest risk for breast cancer 140/209 (67%)
- Ever had an abnormal mammogram 3/73 (4%)
- Mammograms done for screening, only 20/167 (10%) had diagnostic mammograms

This study recruited a largely well-educated and married population of Vietnamese women. Roughly one third of participants did not answer where they were born; however, the remaining two thirds were born in Vietnam. Moreover, Vietnamese is the language most often spoken by these partici-

pants. Many were recruited through church lists; thus we assume many were practicing Buddhists, Protestants, and Catholics.

Only a few other studies of the Texas Vietnamese have been undertaken, as seen in Table 6, those by Nguyen<sup>3</sup> and Yi.<sup>8</sup> Most of the studies of Vietnamese immigrants in the United States have been in California. Since California and Texas have the 2 largest populations of Vietnamese immigrants in the United States, it is interesting to see if they are similar.

Our study shows that the use of both Papanicolaou test and mammography in Vietnamese in Texas was similar to that in the populations of Vietnamese in California.<sup>3,8,9,10-18</sup> In fact, the results are like those found by any of the study designs used for measurement as detailed in Table 6. We found that 67% of participants ever had a Papanicolaou test and 89% had a Papanicolaou test this year. The range for "ever had a Papanicolaou test" in other studies was 37% to 76% (Table 6). The use of BSE in our study was 55% compared to 24% in one other study. The use of mammography ever was 45% compared to a range of 23%<sup>10</sup> to 79% postintervention in the clinical trials with pre- and postmeasurements after interventions.<sup>18</sup>

McPhee et al point out that the use of these screening tests, both ever use and current use, is statistically significantly different than that in White Californians.<sup>9</sup> We are not aware that such data exist for Texans, but hope to conduct similar studies for them in the future. McPhee, Nguyen, Jenkins et al have studied those factors that increase screening behaviors and intentions to participate in screening. As with our own experience with patients who participate in our screening studies, we have shown that they are most often highly educated, married, and high-income women.<sup>9,13,17</sup> Like other investigators we found marital status to be a predictor of both Papanicolaou test and mammography use. Although our results resemble those in other studies of smaller and larger sizes, our sample size may not have been sufficiently large or diverse to achieve significance with some of the other variables.

The additional factor often found by many groups of investigators to be a significant predictor of Papanicolaou test and mammography use by Vietnamese women is "time spent in the United States." How the amount of time spent in the United States impacts screening is unknown. It may be that the increased time allows greater time to obtain healthcare insurance, greater knowledge about screening, more income, more education, more stability, better resources, etc, or all of the above. In our study, patients had been in the United States for 1 to 20 years, with a mean of 12 years. This undoubtedly helped these patients participate in screening programs, perhaps more than in studies in which fewer patients were here as long. Most of our patients were Vietnamese speakers, and so we are confident that the sample was a representative one. Since patients were contacted through telephone directories and church directories, they may be of higher income group than a more community-based and randomly selected sample. Although there can be considerable issues with methodology<sup>19</sup> in all behavioral studies, this is an emerging area in which additional measures of validity are evolving. We recognize that patients may overreport their use of screening studies,<sup>19</sup> a

**Table 6 • Review of Studies of Vietnamese Women Participating in Breast and Cervical Screening Studies, Including Census Data, Surveys, Interviews, and Intervention Trials**

Author, Year (Reference)	Number of Patients	Study Design	Ever Had Papanicolaou Test	Papanicolaou Test This Year	Ever Had Mammography	Mammography This Year	Do BSE
Vi Ho, this study	209	Mail survey	67%	89%	45%	~15%	55%
Nguyen, 2002 <sup>3</sup>	1566	Telephone survey	76%				
Yi, 1998 <sup>8</sup>	207	Telephone and mail survey	37%				
McPhee, 1997 <sup>9</sup>	933	Telephone survey	53%		30%		24%
Sadler, 2001 <sup>10</sup>	275	Survey, mailed			23% of total; 31% of women over 40		
Pham, 1992 <sup>11</sup>	107	Survey, mailed	46%		66% (n = 31)		
McGarvey, 2003 <sup>12</sup>	28	Face-to-face interview in language			47%		
McPhee, 2002 <sup>13</sup>	645	Face-to-face interview in language	70%		50%		
Taylor, 2003 <sup>14</sup>	25,118	Electoral roll and Central Cancer Registry	44% for 97/98 47% for 98/99				
Bird, 1998 <sup>15</sup>	306	Intervention—lay health worker	Pre 46%* Post 66%		Pre 54%* Post 69%		
Lam, 2003 <sup>16</sup>	400	Intervention—media versus media + lay health workers (LHWO)	Media Pre 70%, Media, Post 73%, Media + LHWO Pre 62%*, and Media + LHWO Post 77%				
Jenkins, 1999 <sup>17</sup>	876	Intervention trial—media led	Precontrol 62% Preintervention 70% Postcontrol 58% Postintervention 67%	44% 54% 37% 47%	57% 63% 63% 68%	47% 53% 46% 55%	
Nguyen, 2001 <sup>18</sup>	807	Intervention trial—media led			Precontrol 61% Preintervention 69% Postcontrol 79%* Postintervention 79%		

\*Statistically significant at  $P < .05$ .

 **Table 7 • Review of Barriers and Incentives to Participate in Screening in the Vietnamese**

Author, Year (Reference)	Test	Barriers to Screening	Incentives to Screening
Vi Ho, this study		Papanicolaou test: Not knowing she should go, not knowing where to go, not knowing what kind of doctor, no insurance coverage, no doctor for this, perception that if no problems then no need to go. BSE: do not know how, BSE is time-consuming Mammogram: never had one, not knowing where to go, not knowing she should go, no insurance coverage, doctor did not order the test, perception that if no problems then no need to go	Papanicolaou test: high educational level, being married, lack of barriers BSE: lack of barriers MBE: high educational level, family history of breast cancer, being married Mammogram: lack of barriers and age
Nguyen, 2002 <sup>3</sup>	Papanicolaou test		<i>Intention:</i> younger age, married, requested Papanicolaou test, physician recommended, physician female <i>Receipt:</i> married, higher education, female physician, physician recommended, respectful physician
Yi, 1998 <sup>8</sup>	Papanicolaou test	Belief that only married women need Papanicolaou tests	Acculturation Marital status Sexual activity
McPhee, 1997 <sup>9</sup>	Papanicolaou test Mammogram Clinical Breast Examination	Vietnamese doctor Unemployed Chinese-Vietnamese descent	Earlier age Number of years in the United States Married, ever married Having health insurance
Sadler, 2001 <sup>10</sup>	Mammogram Clinical Breast Examination	Lack of time Language Lack of money Not want to think about it Embarrassment Not important No transportation	
Pham, 1992 <sup>11</sup>	Papanicolaou test Mammogram BSE	Recent immigration No health insurance Vietnamese doctor	
McGarvey, 2003 <sup>12</sup>	Papanicolaou test Mammogram BSE	Vietnamese doctor Cost Lack of insurance	
McPhee, 1997 <sup>13</sup>	Papanicolaou test Mammogram BSE Clinical Breast Examination	<i>Recognition:</i> low education, not having a regular doctor <i>Receipt:</i> low education, not having a regular doctor, short duration in the United States, never married <i>Currency:</i> low education	

known problem in all volunteer studies. Another drawback of this study is that we could not conduct a chart review of any of the participants to see that their responses matched their actual screening behaviors. Other drawbacks in this study were

not asking how many women were in each household and which woman filled out the questionnaire. We also did not ask about health insurance, which has been shown in some studies to predict the use of screening examinations for the use of

Papanicolaou test and mammography. These are important issues that have been addressed by others and will be addressed in our future work.

We found good internal consistency for susceptibility, seriousness, benefits, barriers, and health. The patients perceived themselves more susceptible to breast cancer than cervical cancer. They perceived the seriousness of breast cancer more than cervical cancer. The benefits of BSE were perceived as much more than those of the Papanicolaou test or mammography. Barriers to all the 3 tests and behaviors (BSE, Papanicolaou test, and mammography) were similar. The health scale was consistent throughout both sections of the questionnaire (cervical and breast).

Our study found that the lack of barriers, age, a high educational level, presence of a family history of the cancer, married status, and seriousness of the perceived disease were statistically significant in positively predicting the use of screening examinations and tests. Some studies examine barriers to screening, while others examine incentives. A review of both barriers and incentives in other studies is reported in Table 7. In other studies, investigators have found short length of time in the United States, having a Vietnamese doctor, low education level, lack of insurance, not having a regular doctor, and lack of English as negative predictors of the use of screening examinations and health behaviors.

The literature suggests that interventions are difficult to mount and it is even more difficult to measure their impact.<sup>15-18</sup> One of the gratifying outcomes of new optical technologies is that they work in real time, providing patients with diagnoses instantaneously. This allows for an intervention and pre- and posttesting during the same visit.

Adherence to screening examinations and screening tests is an important outcome that has not been well studied in many populations as of yet. Adherence studies require time and resources. We are conducting such a study in cervical screening, for which no results are yet available. The report of this questionnaire study suggests that several simple interventions would be of value, such as dissemination information about screening programs in which patients can be seen by a provider and receive the test the same day.

Given that the perceived seriousness of developing a cancer impacts the use of screening tests and leads to an increase in health behaviors, perceived seriousness of all cancers should be studied. Perhaps breast cancer is especially frightening because it was seen less often when participants resided in Vietnam than when residing here. Participants, thus, are less familiar with the presentation and treatment of breast cancer.

Future studies should concentrate on variables that deal with adherence to cervical and breast screening, attitudes about receiving information at a single visit, fear of technology, confidence in the provider, and perceived barriers to care. Optical devices that make a diagnosis in real time may increase adherence and patient satisfaction. The Food and Drug Administration has currently designated these devices as low-risk devices (<http://www.fda.gov>). We are hoping to keep the design and construction as low-tech and cost-effective as possible. We have hypothesized that optical devices, which pro-

vide the diagnosis at one visit, should decrease both unnecessary biopsies and office visits in the more developed world, thus decreasing healthcare costs. In the developing world, their impact should alleviate the need for the creation of expensive infrastructure, help decrease diagnostic errors, and allow referral for treatment that day. What we learn from studies such as those cited here will simplify the adoption of optical technologies in developing countries, where the potential for decreased mortality is the highest.

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Appendix • WHO, US Census, SEER, and Texas Data on Population and Cancer Incidence and Mortality

<b>(a) WHO data</b>						
	Cases	Crude	Age Standardized Rate	Deaths	Crude Rate (Unadjusted)	Age Standardized Rate
<b>WHO Cervical Cancer Data</b>						
World	470,606	15.66	16.12	233,372	7.76	7.99
More developed countries	91,451	14.99	11.35	39,350	6.45	4.08
Less developed countries	379,153	15.83	18.73	194,025	8.1	9.79
United States	13,230	9.37	7.84	6,417	4.54	3.28
Vietnam	5,426	13.43	17.57	2,913	7.21	9.54
<b>WHO Breast Cancer Data</b>						
World	1,050,346	34.94	35.66	372,969	12.41	12.51
More developed countries	579,285	94.93	63.22	189,203	12.41	12.51
Less developed countries	471,063	19.66	23.07	183,768	7.67	9.12
United States	183,494	129.97	91.39	45,553	32.27	21.22
Vietnam	5631	13.94	17.44	2519	6.23	7.88
<b>(b) US Census data</b>						
Total enumerated Vietnamese						
1990				1,122,528		
2000				593,213		
Increase				1.89		
<b>(c) SEER Data</b>						
	Cervix		Breast			
	Incidence	Mortality	Incidence	Mortality		
All races	9.6	3	135	27.7		
White	9.2	2.7	140.8	27.2		
Hispanic	17.5	3.8	92.7	19.3		
Non-Hispanic	7.6	2.6	148.3	27.4		
Black	12.4	5.9	121.7	35.9		
Asian/Pacific Islander	10.2	2.9	97.2	12.5		
American Indian/Alaskan native	6.9	2.9	58	14.9		
Hispanic	16.8	3.7	89.2	17.9		
<b>(d) Ranking of the 50 states by Vietnamese Population</b>						
Rank	State	Population	Compared to California			
1	California	447,032	1			
2	Texas	134,961	0.3			
3	Washington	46,149	0.1			
4	Virginia	37,309	0.08			
<b>(e) Texas Cancer Data Center and Texas Department of Health data</b>						
Year	Cancer	Cases	Incidence	Mortality		
2000	Breast	11,266	115	25.4		
2000	Cervix	1028	10.3	3.7		
<b>(f) Southern cities by Vietnamese population</b>						
Rank	City	Population	Compared to Houston			
1	Houston area	63,924	1			
2	Dallas-Fort Worth	47,090	0.74			
3	Atlanta	23,996	0.38			
4	New Orleans	14,868	0.23			