

Breast and Cervical Cancer Screening Practices among Asian and Pacific Islander Women in the United States, 1994–1997

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Abstract

Recent studies suggest that Asian and Pacific Islander women in the United States may underuse cancer screening tests. We examined the breast and cervical cancer screening practices of 6048 Asian and Pacific Islander women in 49 states from 1994 through 1997 using data from the Behavioral Risk Factor Surveillance System. About 71.7% [95% confidence interval (CI), 66.3–77.0%] of women in this sample aged ≥ 50 years had a mammogram in the past 2 years, and 69.5% (95% CI, 63.9–75.1%) had a clinical breast exam in the past 2 years. About 73.7% (95% CI, 71.3–76.0%) of women aged ≥ 18 years who had not undergone a hysterectomy had a Papanicolaou test in the past 3 years. Women with health insurance and those who had seen a physician in the past year were more likely to have been screened. These results underscore the need for continued efforts to ensure that Asian and Pacific Islander women who are medically underserved, including those without health insurance, have access to cancer screening services.

Introduction

In 1990, Asians and Pacific Islanders (people whose ancestors are the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands) represented about 3% of the United States population (1, 2). This percentage is expected to increase to 4.5% by 2000 (1).

Chinese, Japanese, and Filipino women in the United States have lower age-adjusted breast cancer incidence and mortality rates than do white women (1–3). Breast cancer incidence rates are also relatively low for Korean and Vietnamese women. Nevertheless, breast cancer is the most frequently diagnosed cancer among Chinese, Japanese, Filipino, Korean, and Hawaiian women in the United States, and it is the second most frequent cancer after cervical cancer among Vietnamese women (1, 3). Asian women whose families have lived in the United States longer are at higher risk for breast cancer than are

new immigrants (4, 5). Cervical cancer incidence and mortality rates vary widely among Asian and Pacific Islander women. Korean, and especially Vietnamese, women in the United States have higher age-adjusted cervical cancer incidence rates than do white women (1, 3). Native Hawaiian women have higher age-adjusted breast cancer incidence and mortality rates than do Asian women; breast cancer rates among Hawaiian women are close to those of white women (3).

Previous surveys have shown that Asian and Pacific Islander women may underuse cancer screening tests (6–19). For example, the 1994 Behavioral Risk Factor Survey in California found that only 61% of Asian women aged ≥ 50 years had received a mammogram in the previous 2 years, compared with 76% of white women (19). A study of 218 Filipino women in Los Angeles aged ≥ 50 years found that only 66% had ever had a screening mammogram and 54% had had one in the previous 2 years (6). A 1994 survey of 676 Korean Americans in Alameda County, California found that only 60% of those aged ≥ 18 years had ever had a Pap² test, and 55% of those aged ≥ 50 years had ever had a mammogram (7). Surveys of Vietnamese women in the San Francisco Bay area suggested that 17–66% of those aged ≥ 40 years had ever had a mammogram and that 46–68% of those aged ≥ 18 years had ever had a Pap test (12, 13). Surveys have often been carried out in local communities, and few national data on Asian and Pacific Islander women are available for evaluating progress toward year 2000 objectives that promote cancer prevention and control (20–22).

This paper extends on the work of previous authors by examining the breast and cervical cancer screening practices of Asian and Pacific Islander women in 49 states, using data obtained by population-based probability samples from 1994 through 1997. The preventive practices examined included screening mammography, clinical breast examinations, Pap tests, and other health behaviors.

Subjects and Methods

The data used were gathered from 6048 self-identified Asian and Pacific Islander women who were interviewed as part of the BRFSS from 1994 through 1997. The ages of 33 women were unknown, which left data on a sample of 6015 women available for analysis. Data from this 4-year period were pooled to create a sample sufficient for this analysis.

The BRFSS is a state-based telephone survey of adults ≥ 18 years (23, 24). The BRFSS uses a random-digit dialing technique and multistage cluster sampling in each participating state to sample noninstitutionalized adults who have telephones (25). A computer-assisted interview is administered by trained interviewers. The interviews include questions about general health status, tobacco use, alcohol consumption, demographic

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² The abbreviations used are: Pap, Papanicolaou; BRFSS, Behavioral Risk Factor Surveillance System; CI, confidence interval.

and socioeconomic characteristics, screening mammography, clinical breast examinations, and Pap tests. During the period of interest (1994 through 1997), each adult female respondent was asked whether she had ever had a mammogram; those who responded positively were asked how long it had been since their last mammogram. Similar questions were asked about clinical breast examinations and Pap tests. Women were also asked whether they had undergone a hysterectomy.

The study population ($n = 6015$) was drawn from Asian and Pacific Islander women aged ≥ 18 years who responded to BRFSS surveys in each state. Rhode Island, Puerto Rico, and the District of Columbia were excluded because data were not available for the entire period of interest. Analyses of screening mammogram and clinical breast examination use were limited to Asian and Pacific Islander women who were ≥ 40 years of age ($n = 2873$). Analyses of Pap test use were limited to women who were ≥ 18 years of age who had not had a hysterectomy ($n = 5254$).

Age-specific and crude rates of screening test use were calculated for the 4-year period of interest. In examining bivariate associations, levels of statistical significance were obtained using Pearson χ^2 tests. χ^2 tests for trend were also used. With the exception of screening rates stratified by age categories, significance testing for bivariate associations was limited to age-adjusted rates. All analyses used SAS and SUDAAN to calculate the 95% CIs and to allow for weighting of the estimates (26). Telephone surveys tend to undersample certain subpopulations, such as young persons. To better represent the overall population (of all races) and to enable the different samples to be combined and compared, the samples were weighted to compensate for the unequal sampling probability resulting from the unique number of phones per household; number of unique phone numbers per primary sampling unit; and poststratification by age, sex, and race. Estimates of the proportion of women screened for cancer were adjusted to the age distribution for Asian and Pacific Islander women in the overall sample. Data on women who reported that they had had a hysterectomy and who therefore did not have an intact uterine cervix were excluded from analyses of Pap test use.

A multivariate analysis of predictors of screening test use was carried out using logistic regression techniques and SUDAAN (26). Variables found to be significantly associated with screening at the $P < 0.20$ level in univariate analysis were selected for multivariate analysis. A stepwise, backwards elimination procedure was then used to identify variables independently associated with screening test use at the $P < 0.05$ level. Covariates for age categories were included in all models to adjust for age differences.

Results

Among the Asian and Pacific Islander women in this sample of women who had not had a hysterectomy, about 63.2% were 18–39 years old, 18.8% were 40–49 years, 12.4% were 50–64 years, and 5.6% were ≥ 65 years, all on the basis of weighted estimates (results not shown). Six % of the women (421 of 5243) reported having less than a high school education. About 15.7% (691 of 4408) reported having an annual household income of $\leq \$15,000$. Almost 70.5% (3854 of 5096) reported that they had seen a physician within the past year.

Among those women who were at least 40 years of age regardless of hysterectomy status, 44.9% were 40–49 years old, 34.8% were 50–64 years, and 20.2% were ≥ 65 years, all on the basis of weighted estimates (results not shown). About 10.1% (408 of 2860) reported having less than a high school

education. About 14.6% (380 of 2344) reported having an annual household income of $\leq \$15,000$. Almost 74.7% (2292 of 2810) reported that they had seen a physician within the past year.

Almost 82.0% (95% CI, 79.0–85.0%) of the Asian and Pacific Islander women aged ≥ 40 years reported they had ever had a mammogram, and 71.7% (95% CI, 66.3–77.0%) of those aged ≥ 50 years had a mammogram in the past 2 years (results not shown). Stratified analyses (Table 1) showed that the lowest screening rates were for women aged 40–49 years and for women aged ≥ 65 years. Having had a mammogram in the past 2 years was associated with having seen a physician in the past year and having health insurance (Table 1).

About 69.5% (95% CI, 63.9–75.1%) of women in this sample aged ≥ 50 years had a clinical breast exam in the past 2 years. Having had a clinical breast examination in the past 2 years was associated with having seen a physician in the past year, having health insurance, and being able to work (Table 2).

Among Asian and Pacific Islander women who were ≥ 18 years who had not had a hysterectomy, 78.5% (95% CI, 76.2–80.8%) had ever had a Pap test and 73.7% (95% CI, 71.3–76.0%) had a Pap test in the past 3 years (results not shown). Having had a Pap test in the past 3 years was associated with higher education, higher household income, being unable to work, having seen a physician in the past year, and having health insurance (Table 3).

In multivariate analysis (Table 4), factors found to be positively associated with having had a mammogram in the past 2 years included having health insurance and having seen a physician in the past year ($P < 0.01$ in each instance). Factors found to be positively associated with having had a clinical breast exam in the past 2 years in multivariate analysis included being unable to work, having health insurance, and having seen a physician in the past year ($P < 0.05$ in each instance; Table 5). The association with marital status was of borderline significance ($P < 0.10$). Factors found to be positively associated with having had a Pap test in the past 3 years in multivariate analysis included marital status, higher income, having seen a physician in the past year, and alcohol consumption ($P < 0.01$ in each instance; Table 6). The association between health insurance and receipt of a Pap test in the past 3 years was of borderline significance ($P \leq 0.10$) after adjustment for other variables in the model.

Tests for trend were carried out to verify that it was reasonable to pool data over the period 1994–1997. During this period, there were no significant trends in the percentage of Asian and Pacific Islander women who had ever had a mammogram or clinical breast examination or who had these screening tests in the past 2 years (χ^2 test for trend $P > 0.05$ for all). Similarly, there were no significant trends in the percentage of women who had ever had a Pap test or who had a Pap test in the past 3 years (χ^2 test for trend $P > 0.05$ for both).

Discussion

Analyses of national data on the breast and cervical cancer screening practices of Asian and Pacific Islander women are useful for evaluating progress toward year 2000 objectives (20). These objectives include increasing to at least 80% the percentage of women aged ≥ 40 years who have ever had a clinical breast examination and a mammogram and to at least 60% those aged ≥ 50 years who have had these tests within the preceding 1–2 years. Year 2000 objectives for the nation also include increasing to at least 95% the percentage of women

Table 1 Percentage of Asian and Pacific Islander women in the United States, aged ≥ 40 years, who had a mammogram in the past 2 years, according to selected demographic characteristics, medical history, and cancer screening practices, BRFSS, 1994–1997

	<i>n</i>	Unadjusted ^a % (95% CI)	Adjusted ^b % (95% CI)
Age			
40–49 yr	1239	64.6 (59.8–69.5)	
50–64 yr	814	72.1 (65.3–78.9)	
≥ 65 yr	783	71.0 (62.4–79.6)	
Marital status			
Presently married	1811	68.5 (64.1–73.0)	67.8 (63.4–72.2)
Divorced or separated	382	69.2 (59.5–78.9)	69.1 (59.8–78.4)
Widowed	459	67.0 (55.6–78.3)	64.4 (52.8–76.0)
Never married	168	68.5 (55.8–81.2)	65.4 (51.7–79.1)
Living as unmarried couple	13	84.5 (55.8–100.0)	81.0 (48.7–100.)
Educational attainment			
<High school graduate	396	62.3 (51.9–72.6)	64.4 (54.3–74.6)
High school graduate/GED ^c	770	72.4 (65.2–79.7)	70.7 (63.2–78.1)
Some college/technical school	656	74.1 (66.6–81.6)	71.2 (63.4–79.0)
College graduate	1003	65.7 (60.0–71.4)	65.4 (59.8–71.0)
Household income			
<\$15,000	378	68.8 (57.5–80.1)	66.2 (53.8–78.5)
\$15,000–34,999	786	65.2 (57.3–73.2)	64.9 (57.3–72.6)
\$35,000–49,999	432	71.9 (63.3–80.5)	70.8 (62.5–79.1)
\geq \$50,000	731	68.2 (61.9–74.5)	67.3 (61.0–73.5)
Employment status			
Presently employed	1625	66.8 (62.1–71.5)	65.9 (61.4–70.5)
Homemaker or retired	1076	69.8 (63.4–76.2)	68.9 (62.2–75.6)
Unemployed	79	82.4 (68.1–96.7)	80.9 (64.5–97.3)
Unable to work	50	68.2 (40.1–96.2)	64.6 (36.9–92.2)
General health status			
Good to excellent	2332	69.0 (65.1–72.9)	68.0 (64.1–71.9)
Fair or poor	490	65.8 (55.7–75.9)	65.3 (55.2–75.5)
Saw physician within past year			
Yes	2269	79.2 (75.8–82.6)	78.2 (74.8–81.7)
No	511	39.6 (31.4–47.9)	39.4 ^d (31.2–47.5)
Any health insurance coverage			
Yes	2684	70.7 (67.0–74.4)	69.6 (65.9–73.3)
No	151	45.5 (31.4–59.6)	44.7 ^e (30.9–58.4)
Clinical breast exam			
Ever	2377	75.0 (71.5–78.6)	74.1 (70.5–77.6)
Never	439	43.8 (34.1–53.5)	43.0 ^d (33.6–52.4)
Clinical breast exam in past 2 yr			
Yes	2038	83.1 (79.8–86.5)	82.6 (79.3–85.8)
No	756	37.5 (30.1–45.0)	36.2 ^d (29.0–43.4)
Pap test ^f			
Ever	1989	72.0 (67.9–76.0)	71.2 (67.2–75.1)
Never	164	24.8 (11.5–38.1)	25.9 ^d (11.8–40.1)
Pap test in past 3 years ^f			
Yes	1746	77.4 (73.4–81.3)	76.6 (72.7–80.5)
No	384	22.8 (14.3–31.4)	23.4 ^d (14.4–32.5)
Present cigarette smoker			
Yes	314	74.6 (65.7–83.6)	71.0 (60.9–81.2)
No	2518	67.9 (64.0–71.8)	67.2 (63.3–71.1)
Present alcohol use			
Yes	428	69.9 (61.8–77.9)	68.5 (60.5–76.6)
No	1222	68.1 (62.5–73.7)	67.3 (61.7–72.8)

^a Weighted population estimates unadjusted for age; women who responded don't know or not sure or who refused to answer are excluded.

^b Weighted population estimates adjusted to the 1994–1997 age distribution for Asian and Pacific Islander women in this sample.

^c GED, General Education Development.

^d $P < 0.001$.

^e $P < 0.01$.

^f Excludes women who had a hysterectomy.

aged ≥ 18 years with a uterine cervix who have ever received a Pap test and to at least 85% the percentage who had a Pap test within the preceding 1–3 years. The results of the present survey suggest that Asian and Pacific Islander women in the United States are approaching these objectives and highlight the need for continued efforts to ensure that Asian and Pacific

Islander women have access to breast and cervical cancer screening services.

The results of this survey provide information about the frequency of breast and cervical cancer screening practices among a diverse sample of Asian and Pacific Islander women in the United States. More than 30 distinct languages or dialects

Table 2 Percentage of Asian and Pacific Islander women in the United States, aged ≥ 40 years, who had a clinical breast exam in the past 2 years, according to selected demographic characteristics, medical history, and cancer screening practices, BRFSS, 1994–1997

	<i>n</i>	Unadjusted ^a % (95% CI)	Adjusted ^b % (95% CI)
Age			
40–49 yr	1232	67.2 (62.3–72.1)	
50–64 yr	805	74.2 (67.4–81.0)	
≥ 65 yr	774	61.5 (51.9–71.1)	
Marital status			
Presently married	1796	68.0 (63.5–72.6)	67.7 (63.1–72.3)
Divorced or separated	382	76.7 (68.4–85.1)	74.9 (65.8–83.9)
Widowed	451	58.9 (46.0–71.7)	57.3 (45.3–69.4)
Never married	165	77.6 (66.5–88.7)	75.5 (63.3–87.7)
Living as unmarried couple	13	81.5 (49.4–100.)	77.0 (40.9–100.)
Educational attainment			
<High school graduate	385	62.5 (52.2–72.9)	65.2 (54.9–75.4)
High school graduate/GED ^c	763	68.8 (60.9–76.7)	67.4 (59.4–75.4)
Some college/technical school	653	68.9 (60.0–77.8)	69.1 (60.7–77.5)
College graduate	1002	69.6 (64.0–75.3)	68.3 (62.6–74.0)
Household income			
<\$15,000	372	62.7 (50.6–74.7)	59.0 (46.2–71.9)
\$15,000–34,999	776	63.7 (55.2–72.2)	65.9 (58.2–73.7)
\$35,000–49,999	435	73.3 (65.1–81.4)	72.3 (63.9–80.7)
\geq \$50,000	730	74.2 (68.2–80.1)	72.6 (66.5–78.8)
Employment status			
Presently employed	1616	72.3 (67.9–76.7)	71.8 (67.4–76.1)
Homemaker or retired	1062	61.8 (54.8–68.7)	60.5 (53.3–67.8)
Unemployed	78	53.4 (29.2–77.6)	58.6 (35.6–81.6)
Unable to work	49	88.8 (78.2–99.5)	87.2 ^d (76.2–98.2)
General health status			
Good to excellent	2320	68.7 (64.6–72.9)	68.0 (63.9–72.1)
Fair or poor	478	67.2 (57.3–77.1)	67.2 (57.3–77.2)
Saw physician within past year			
Yes	2249	77.0 (73.0–80.9)	76.7 (72.8–80.6)
No	506	45.5 (36.9–54.0)	44.5 ^e (36.2–52.8)
Any health insurance coverage			
Yes	2661	70.8 (66.9–74.7)	70.3 (66.4–74.2)
No	149	43.8 (29.5–58.0)	40.4 ^e (26.9–53.9)
Mammogram			
Ever	2350	76.5 (72.6–80.4)	76.4 (72.6–80.3)
Never	457	32.1 (24.2–39.9)	32.2 ^e (24.5–40.0)
Mammogram in past 2 yr			
Yes	1992	82.8 (78.8–86.7)	82.8 (78.9–86.6)
No	802	36.9 (30.3–43.5)	36.5 ^e (30.2–42.8)
Pap test ^f			
Ever	1971	73.9 (69.6–78.1)	73.8 (69.8–77.9)
Never	166	21.8 (11.6–31.9)	22.2 ^e (11.7–32.8)
Pap test in past 3 yr ^f			
Yes	1738	79.8 (75.5–84.0)	79.9 (76.0–83.9)
No	380	18.9 (12.3–25.5)	19.1 ^e (12.3–26.0)
Present cigarette smoker			
Yes	311	68.2 (57.9–78.6)	68.5 (58.1–79.0)
No	2496	68.5 (64.5–72.6)	67.8 (63.8–71.8)
Present alcohol use			
Yes	422	73.4 (65.6–81.2)	72.2 (64.2–80.3)
No	1212	66.1 (60.1–72.1)	65.9 (60.0–71.7)

^a Weighted population estimates unadjusted for age; women who responded don't know or not sure or who refused to answer are excluded.

^b Weighted population estimates adjusted to the 1994–1997 age distribution for Asian and Pacific Islander women in this sample.

^c GED, General Education Development.

^d $P < 0.05$.

^e $P < 0.001$.

^f Excludes women who had a hysterectomy.

are spoken by Asians and Pacific Islanders in the United States, representing 24 or more ethnic populations each with their own distinct culture (1, 2). Previous studies have suggested that some communities of Asian and Pacific Islander women may have substantial barriers to cancer screening because of poverty, language barriers, lack of access to health care services,

and cultural and attitudinal factors (6–19). Median incomes in Asian and Pacific Islander communities in the United States vary widely (4). Poverty is often widespread among recent immigrants such as Vietnamese and Cambodians (4). Health insurance coverage, access to regular health care, and utilization rates of preventive services, such as cancer screening tests,

Table 3 Percentage of Asian and Pacific Islander women in the United States, aged ≥ 18 years, who had a Pap test in the last 3 years, according to selected demographic characteristics, medical history, and cancer screening practices, BRFSS, 1994–1997^a

	<i>n</i>	Unadjusted ^b % (95% CI)	Adjusted ^c % (95% CI)
Age			
18–29 yr	1497	62.7 (58.4–67.1)	
30–39 yr	1536	78.7 (74.4–82.9)	
40–49 yr	1079	80.7 (76.3–85.1)	
50–64 yr	567	82.1 (75.5–88.7)	
≥ 65 yr	497	74.0 ^e (62.5–85.6)	
Marital status			
Presently married	2955	80.4 (77.7–83.1)	80.7 (78.0–83.3)
Divorced or separated	553	81.8 (75.1–88.5)	80.8 (73.5–88.1)
Widowed	308	78.6 (67.3–89.9)	77.7 (65.9–89.5)
Never married	1250	55.3 (50.2–60.4)	53.2 (48.0–58.5)
Living as unmarried couple	100	87.9 (79.4–96.4)	86.7 ^e (77.1–96.3)
Educational attainment			
< High school graduate	407	61.5 (50.1–72.8)	61.7 (49.3–74.0)
High school graduate/GED ^d	1228	77.1 (72.4–81.8)	73.5 (68.2–78.9)
Some college/technical school	1398	67.8 (62.4–73.2)	63.8 (57.8–69.7)
College graduate	2133	76.9 (73.8–80.0)	75.8 ^f (72.6–78.9)
Household income			
<\$15,000	675	63.8 (55.8–71.7)	60.9 (52.2–69.7)
\$15,000–34,999	1534	71.0 (66.5–75.5)	68.9 (64.1–73.7)
\$35,000–49,999	847	75.8 (70.4–81.3)	73.6 (67.5–79.6)
\geq \$50,000	1296	83.7 (80.3–87.0)	82.6 ^e (78.9–86.2)
Employment status			
Presently employed	3767	72.7 (69.9–75.5)	69.8 (66.7–72.9)
Homemaker or retired	1142	77.5 (72.5–82.5)	78.2 (73.4–83.0)
Unemployed	203	71.6 (60.3–83.3)	68.8 (57.1–80.5)
Unable to work	55	82.5 (65.0–99.9)	81.1 ^g (62.1–100.0)
General health status			
Good to excellent	4624	73.7 (71.2–76.2)	71.2 (68.4–73.9)
Fair or poor	539	75.0 (67.8–82.2)	73.2 (65.2–81.2)
Saw physician within past year			
Yes	3810	81.4 (78.9–83.8)	78.6 (75.7–81.6)
No	1219	60.1 (55.1–65.1)	59.1 ^e (53.9–64.2)
Any health insurance coverage			
Yes	4642	77.5 (75.2–79.9)	75.3 (72.7–78.0)
No	522	50.9 (43.8–57.9)	49.0 ^e (41.9–56.1)
Mammogram			
Ever	2352	88.9 (86.4–91.4)	88.2 (85.4–91.0)
Never	2813	63.7 (60.4–67.0)	63.8 ^e (60.4–67.2)
Mammogram in past 2 yr			
Yes	1912	92.2 (89.7–94.7)	91.5 (88.7–94.2)
No	3240	65.2 (62.1–68.2)	64.9 ^e (61.7–68.1)
Clinical breast exam			
Ever	4026	87.3 (85.4–89.2)	87.0 (85.0–89.1)
Never	1113	37.1 (32.0–42.3)	33.2 ^e (28.4–38.0)
Clinical breast exam in past 2 yr			
Yes	3531	91.8 (90.1–93.5)	91.0 (89.0–93.0)
No	1586	41.0 (36.5–45.6)	37.7 ^e (33.2–42.2)
Present cigarette smoker			
Yes	681	77.9 (71.9–84.0)	76.6 (70.1–83.2)
No	4490	73.2 (70.7–75.8)	70.6 (67.9–73.4)
Present alcohol use			
Yes	1097	78.4 (74.2–82.5)	75.9 (71.2–80.5)
No	2004	70.6 (66.5–74.7)	67.5 ^g (63.0–72.0)

^a Excludes women who had a hysterectomy.

^b Weighted population estimates unadjusted for age; women who responded don't know or not sure or who refused to answer are excluded.

^c Weighted population estimates adjusted to the 1994–1997 age distribution for Asian and Pacific Islander women in this sample.

^d GED, General Education Development.

^e $P < 0.001$.

^f $P < 0.01$.

^g $P < 0.05$.

also vary widely in these communities (6–18). In the present study, women with health insurance were much more likely than women without health insurance to have had a recent mammogram or Pap test.

Because prior studies have shown that there are specific groups of Asians and Pacific Islanders, such as Southeast Asians and new immigrants who may have important barriers to cancer screening, there is a need for cancer screening programs

Table 4 Multivariate predictors of having had a mammogram in the last 2 years among Asian and Pacific Islander women in the United States aged ≥ 40 years, BRFSS, 1994–1997^a

	n	Multivariate adjusted odds ratio	(95% CI)
Age			
40–49 yr	1212	1.0	
50–64 yr	801	1.4	(0.9–2.0)
≥ 65 yr	766	1.0	(0.6–1.8)
Saw physician within past yr ^b			
Yes	2268	5.6	(3.7–8.4)
No	511	1.0	
Any health insurance coverage ^c			
Yes	2637	2.1	(1.2–3.7)
No	142	1.0	

^a Women who responded don't know or not sure or who refused to answer are excluded.

^b $P < 0.001$ from Wald F test.

^c $P < 0.01$ from Wald F test.

Table 5 Multivariate predictors of having had a clinical breast exam in the last 2 years among Asian and Pacific Islander women in the United States aged ≥ 40 years, BRFSS, 1994–1997^a

	n	Multivariate adjusted odds ratio	(95% CI)
Age			
40–49 yr	1198	1.0	
50–64 yr	792	1.3	(0.8–2.1)
≥ 65 yr	755	0.7	(0.4–1.3)
Marital status			
Presently married	1762	1.0	
Divorced or separated	374	1.9	(1.0–3.5)
Widowed	436	0.7	(0.4–1.4)
Never married	161	1.5	(0.8–2.7)
Living as unmarried couple	12	4.4	(0.6–32.4)
Employment status ^b			
Presently employed	1587	1.0	
Homemaker or retired	1036	0.9	(0.6–1.4)
Unemployed	75	0.5	(0.1–1.6)
Unable to work	47	4.8	(1.4–15.9)
Saw physician within past yr ^c			
Yes	2241	4.3	(2.8–6.5)
No	504	1.0	
Any health insurance coverage ^c			
Yes	2604	2.8	(1.5–5.0)
No	141	1.0	

^a Women who responded don't know or not sure or who refused to answer are excluded.

^b $P < 0.05$ from Wald F test.

^c $P < 0.001$ from Wald F test.

to reach these subgroups of Asians and Pacific Islanders. Variations in the frequency of cancer screening practices among subgroups of Asian and Pacific Islander women are not apparent in overall estimates based upon analyses of national data such as the present report.

Blackman *et al.* (22) examined trends in self-reported use of mammograms (1989–1997) and Pap tests (1991–1997) among women of different racial groups who had participated in BRFSS surveys conducted in 38 states. The percentage of Asian and Pacific Islander women aged ≥ 40 years who reported their most recent mammogram occurred within the past 2 years increased from 38.8% in 1989 to 72.5% in 1997, and the percentage of such women aged ≥ 18 years who reported their most recent Pap test occurred within the past 2 years increased

Table 6 Multivariate predictors of having had a Pap test in the last 3 years among Asian and Pacific Islander women in the United States aged ≥ 18 years or older, BRFSS, 1994–1997^a

	n	Multivariate adjusted odds ratio	(95% CI)
Age			
18–29 yr	708	1.0	
30–39 yr	802	1.4	(0.9–2.2)
40–49 yr	564	1.3	(0.8–2.3)
50–64 yr	244	1.6	(0.8–3.3)
≥ 65 yr	201	1.9	(0.8–4.2)
Marital status ^b			
Presently married	1459	1.0	
Divorced or separated	273	1.8	(0.7–4.4)
Widowed	131	2.1	(0.9–5.3)
Never married	599	0.5	(0.3–0.7)
Living as unmarried couple	57	4.5	(1.4–14.3)
Educational attainment			
< High school graduate	170	1.0	
High school graduate/GED ^c	553	2.3	(1.1–4.7)
Some college/technical school	647	1.5	(0.7–3.0)
College graduate	1149	1.6	(0.8–3.2)
Household income ^d			
<\$15,000	357	1.0	
\$15,000–34,999	869	1.9	(1.1–3.4)
\$35,000–49,999	495	2.1	(1.1–3.9)
\geq \$50,000	798	3.2	(1.7–6.3)
Saw physician within past yr ^b			
Yes	1895	4.2	(2.8–6.3)
No	624	1.0	
Any health insurance coverage			
Yes	2289	1.5	(0.9–2.4)
No	230	1.0	
Present alcohol use ^b			
Yes	922	2.2	(1.4–3.3)
No	1597	1.0	

^a Women who responded don't know or not sure or who refused to answer are excluded; also excludes women who had a hysterectomy.

^b $P < 0.001$ from Wald F test.

^c GED, General Education Development.

^d $P < 0.01$ from Wald F test.

from 59.7% in 1991 to 72.9% in 1997. In the 38 states for which data were available, the percentage of white women aged ≥ 40 years who reported their most recent mammogram occurred within the past 2 years increased from 54.7% in 1989 to 71.4% in 1997, and the percentage of white women aged ≥ 18 years who reported their most recent Pap test occurred within the past 2 years was roughly unchanged from 78.9% in 1991 to 80.1% in 1997 (22). In contrast to the present report, Blackman *et al.* (22) did not examine factors associated with screening practices. The present report also differs from the paper by Blackman *et al.* in that data for Asian and Pacific Islander women were pooled for a recent 4-year period (during which there were no statistically significant trends in the percentage of women who had received the screening tests of interest) to have a sample sufficient for examining factors associated with screening practices.

The present study was limited by a number of factors. The results may not be generalizable to all Asian and Pacific Islander women in the United States because of language barriers and other sources of response bias. The telephone survey excluded women living in households without a telephone. However, telephones were in the homes of about 98% of Asians and Pacific Islanders in 1990 (27). About 15–20% of contacted households of all races did not respond to the surveys. Race-

specific nonresponse rates are unavailable for BRFSS; hence the response rates for Asian and Pacific Islanders are unknown. Finally, self-reported information about cancer screening practices may differ from information obtained from the records of health-care providers. Validation studies involving women of other races have suggested that patients tend to overreport their use of screening and underreport the time since their last screening (28–30). Studies of the reliability of cancer screening information collected as part of BRFSS have shown the reliability of self-reported information about screening mammography and Pap tests to be excellent, but information from nonwhite respondents may be less reproducible (31, 32). Finally, the multivariate analysis carried out is limited by incomplete information about some factors that have been associated with breast and cervical cancer screening practices in previous studies, such as knowledge of cancer and the importance of early detection. Such information is not routinely collected as part of BRFSS surveys.

The present study did not examine whether screening prevalence is higher among Asian and Pacific Islander women who live in areas where they represent a sizeable minority group as compared with those who live in areas where they are more isolated from persons of similar backgrounds. Future studies might conduct stratified analyses based on the density of the Asian and Pacific Islander population and examine the extent to which a sense of community and social support relate to screening behaviors. Small-area analyses of BRFSS data require special statistical assumptions because of the sampling procedures used for this state-based survey, however.

These results underscore the need for continued efforts to ensure that Asian and Pacific Islander women who are medically underserved, including those without health insurance, have access to cancer screening services. Present efforts under way in the United States include the National Breast and Cervical Cancer Early Detection Program of the Centers for Disease Control and Prevention, which provides support to states for breast and cervical screening services for medically underserved women (33). Results of studies completed to date indicate there is a continuing need for multilingual, culturally sensitive educational efforts to provide factual information and increase cancer screening test use among Asian and Pacific Islander women.

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