Published in final edited form as:
Cancer. 2005 December 15; 104(12 Suppl): 2940–2947.

Disparities in Colorectal Cancer Screening Rates among Asian Americans and Non-Latino Whites

Sabrina T. Wong, R.N., Ph.D.[1], **Ginny Gildengorin, Ph.D**[2], **Tung Nguyen, M.D.**[2], and **Jeremiah Mock, M.Sc., Ph.D.**[2]

1 *School of Nursing, University of British Columbia, Vancouver, British Columbia, Canada.*

2 *Department of Medicine, Division of General Internal Medicine, University of California, San Francisco, California.*

Abstract

Among Asian Americans, colorectal cancer (CRC) is the second most commonly diagnosed cancer, and it is the third highest cause of cancer-related mortality. The 2001 California Health Interview Survey (CHIS 2001) was used to examine 1) CRC screening rates between different Asian-American ethnic groups compared with non-Latino whites and 2) factors related to CRC screening. The CHIS 2001 was a population-based telephone survey that was conducted in California. Responses about CRC screening were analyzed from 1771 Asian Americans age 50 years and older (Chinese, Filipino, South Asian, Japanese, Korean, and Vietnamese). The authors examined two CRC screening outcomes: individuals who ever had CRC screening and individuals who were up to date for CRC screening. For CRC screening, fecal occult blood test (FOBT), sigmoidoscopy/colonoscopy, and any other form of screening were examined. CRC screening of any kind was low in all populations, and Koreans had the lowest rate (49%). Multivariate analysis revealed that, compared with non-Latino whites, Koreans were less likely to undergo FOBT (odds ratio [OR], 0.40; 95% confidence interval [95% CI], 0.25–0.62), and Filipinos were the least likely to undergo sigmoidoscopy/colonoscopy (OR, 0.62; 95% CI, 0.44–0.88) or to be up to date with screening (OR, 0.68; 95% CI, 0.48–0.97). Asian Americans were less likely to undergo screening if they were older, male, less educated, recent immigrants, living with ≥ 3 individuals, poor, or uninsured. Asian-American populations, especially Koreans and Filipinos, are under-screened for CRC. Outreach efforts could be more focused on helping Asian Americans to understand the importance of CRC screening, providing accurate information in different Asian languages. Other strategies for increasing CRC screening may include using a more family-centered approach and using qualified translators.

Keywords

Asian American Network for Cancer Awareness, Research, and Training; cancer; Chinese; Vietnamese; Korean; Filipino; South Asian; Japanese; fecal occult blood test; sigmoidoscopy; colonoscopy

Address for reprints: Sabrina T. Wong, R.N., Ph.D., University of British Columbia, 2211 Wesbrook Mall, Vancouver, BC V6T-2B5; Fax: (604) 822–7466; E-mail: wong@nursing.ubc.ca.

Presented at Asian American Network for Cancer Awareness, Research, and Training (AANCART): Fifth Asian American Cancer Control Academy, Sacramento, California, October 22–23, 2004.

Supported by a grant from the Asian American Cancer Awareness, Research and Training Program that was made possible from the National Cancer Institute (7U01 CA86322; Principal Investigator: Moon S. Chen, M.P.H., Ph.D.).

The authors thank Drs. Stephen J. McPhee, Susan Stewart, Steven Gregorich, and Eliseo J. Perez-Stable for their support and thoughtful comments.

Colorectal cancer (CRC) screening can reduce mortality by detecting both precancerous polyps and cancers early,[1–3] and it is recommended for individuals age 50 years and older.[4] Potential strategies for screening include annual fecal occult blood testing (FOBT) with sigmoidoscopy every 5 years or colonoscopy every 10 years.[5,6] CRC screening rates are low in the general population,[7] and African Americans and Latinos have even lower rates than whites.[8,9]

CRC is the second most commonly diagnosed cancer for Asian Americans and is the third leading cause of cancer-related deaths.[10,11] Honda[12] found that, in a sample of 305 Japanese, only 37% reported undergoing FOBT in the past 2 years, and 26% reported having undergone a sigmoidoscopy/colonos-copy in the past 5 years. Similar results were found for FOBT and sigmoidoscopy/colonoscopy in a sample of Filipino and Korean women who resided in Los Angeles.[13] Previous studies have shown that 65% of the Vietnamese-American population age 40 years and older have never had a CRC screening test compared with 61% of the United States population.[14,15] Results gathered from the 1997 Behavioral Risk Factor Surveillance System[16] indicate that individuals in the aggregated category of Asian American/Pacific Islander age 50 years and older were half as likely as non-Latino whites to be up to date with FOBT screening (11.5% vs. 20.1%). In a recent study that was conducted in San Francisco comparing Vietnamese, Latinos, and non-Latino whites, Vietnamese were less likely than non-Latino whites to have had a sigmoidoscopy in the past 5 years.[17]

Most previous studies either aggregated all Asian-American ethnic groups or examined only one or two different groups. No population-based study has reported CRC screening rates among different Asian-American ethnic groups or has compared rates between Asian-American groups or with non-Latino whites. This is due in part to the finding that there are no reliable national data on CRC screening rates among different Asian-American ethnic groups, although they are the fastest growing ethnic group in the United States.[18] Moreover, national surveys that include Asian Americans frequently are limited by the use of English-only questionnaires and the failure to differentiate between Asian ethnic groups.

The objective of the current study was to examine 1) CRC screening rates among different Asian-American groups compared with non-Latino whites and 2) factors related to CRC screening. We hypothesized that 1) CRC screening rates are lower for Asian-American ethnic groups compared with non-Latino whites, and 2) CRC screening is related to predisposing, enabling, and need factors.

MATERIALS AND METHODS

CRC screening rates were collected from a representative sample of different Asian ethnic populations using the 2001 California Health Interview Survey (CHIS). The CHIS is a statewide telephone survey that was modeled after the National Health Interview Survey and was designed to provide population-based estimates for United States civilian, noninstitutionalized Californians.[19] Information was collected from more than 55,000 households, capturing major content areas, such as health status, health behaviors, cancer history and prevention, access to and utilization of healthcare services, and insurance. The CHIS collected data on non-Latino whites, African Americans, and Latinos as well as many Asian-American groups, including Chinese, Filipinos, Japanese, Koreans, South Asians, Vietnamese, and Cambodians. The CHIS was conducted in English, Spanish, Chinese (Cantonese and Mandarin), Vietnamese, Korean, and Khmer (Cambodian). The response rate for interview completion was 64%, comparable to other national surveys, such as the National Health Interview Survey.

Random digit dialing (RDD) was the primary method of data collection. An additional sample of Cambodians, South Asians, Japanese, Koreans, and Vietnamese also was recruited by using

lists of telephone numbers from different community organizations.[19] The 2001 CHIS Asian-American sample included 3960 individuals from RDD and an additional 1759 individuals from the list sample. For the current analysis, the RDD sample and the list sample of Asian Americans first were combined and then were restricted to those age 50 years and older. Cambodians were excluded from the analysis because of the small number of individuals who met the age criteria. No significant differences in sociodemographics or health status were found between individuals in the RDD sample and individuals in the list sample.

Variable Definitions

Two main measures of CRC screening were assessed: 1) whether individuals ever had CRC screening and 2) whether individuals were up to date for CRC screening. For each measure, we examined three outcomes: 1) FOBT; 1) lower endoscopy (sigmoidoscopy or colonoscopy); and 3) any screening, either FOBT or endoscopy. A respondent was considered up to date if he or she had undergone either FOBT in the past year, or endoscopy in the past 10 years, or both. Sigmoidoscopy and colonoscopy were considered together, because the survey questions were, "Have you *ever had* a sigmoidoscopy, colonoscopy, or a proctoscopy to look for signs of cancer or other problems in your colon?" and "How long ago did you have your most recent examination (sigmoidoscopy, colonoscopy, and proctoscopy)?" These criteria for up-to-date screening were based on clinical guidelines recommended by the American College of Gastroenterology.[5,6] Individuals who had colon cancer were excluded (n = 162 individuals).

Aday and Andersen's behavioral model of health services use[20] served as this study's conceptual model, highlighting factors that either may facilitate or may impede the use of CRC screening. Predisposing factors include factors that exist before the onset of illness, enabling factors describe the resources individuals have available to use healthcare services, and need for care refers to the actual acuity of illness, perceived level of illness symptoms, or restrictions in daily living. For the current study, predisposing variables included ethnic group (Chinese, Filipino, South Asian, Japanese, Korean, Vietnamese, and non-Latino white), age, gender, educational attainment (≤ Grade 12, some college, undergraduate degree or greater), marital status, household size (1, 2, or ≥ 3 individuals), years in the United States (< 15 yrs, ≥15 yrs), English-language proficiency, income (0%–99% of the Federal Poverty Level [FPL], 100%–199% of the FPL, 200%–299% of the FPL, and ≥300% of the FPL), comorbid conditions (diabetes or cardiovascular disease), and a family history of colon cancer. Enabling variables included insurance status (public, private, or uninsured), a usual source of care (yes or no), and the number of physician visits in the last year. Need variables included both physical and mental health, which were scored from 0 to 100 (higher score = better health), general health status, and limitation of activities. We also included a variable that accounted for the data collection method (RDD sample or list sample).

Analysis

Data were weighted to produce population estimates.[19] The STATA software package (version 8) was used to analyze the data, because it adjusts for the complex sampling design.[21] We examined the correlation matrix to detect multicollinearity. Years in the United States and English-language proficiency were collinear; thus, we removed English-language proficiency from the models. Similarly, we dropped limitation of activities, because it was collinear with health status. Descriptive statistics were computed for all sociodemographic and dependent variables, including means and standard errors for continuous data and frequency distributions for each categorical variable.

In the bivariate analyses, chi-square tests and t tests were used to determine any significant ethnic differences in sociodemographics and CRC screening outcomes. Six multivariate logistic regression models were used to assess the extent to which ethnic group differences in

CRC screening were explained by predisposing, enabling, and need factors. All reported odds ratios (ORs) were considered statistically significant at the $P < 0.05$ level.

RESULTS

The sociodemographic characteristics of the sample for individuals age 50 years and older are shown in Table 1. There were significant differences in sociodemographics by ethnic group. Non-Latino whites were least likely to be married, whereas South Asians were most likely to be married (62% vs. 83%; $P < 0.001$). Compared with non-Latino whites and other Asian-American ethnic groups, Vietnamese were more likely to be poorer (55%), more likely to live in larger households (22%), and more likely have immigrated recently (60%); whereas Koreans were more likely to be uninsured (32%) and more likely not have a usual place of medical care (27%; all $P < 0.001$).

Bivariate Results

Receipt of CRC screening was low for all groups, but Asian Americans had lower rates compared with non-Latino whites ($P < 0.001$). Non-Latino whites had the highest rate of undergoing FOBT (58%), endoscopy (57%), and any CRC screening (75%); whereas the Asian Americans rates were 38% for FOBT, 42% for endoscopy, and 58% for any screening. Koreans had the lowest rate of undergoing FOBT (23%) and any screening (49%), whereas Vietnamese had the lowest rate of undergoing endoscopy (36%). The Japanese had rates of for all three CRC screening outcomes that were similar to non-Latino white rates.

The pattern for being up to date for CRC screening was similar to that for receipt of CRC screening. Non-Latino whites were the most likely to be up to date for FOBT (26%), endoscopy (52%), and any CRC screening (62%; $P < 0.001$). Koreans were least likely to be up to date for FOBT (12%), endoscopy (34%), and any screening (41%); Vietnamese also had low rates of being up to date for endoscopy (34%) (Table 2).

Multivariate Results

Table 3 summarizes the multivariate findings for each of the six logistic regression models. For the multivariate results, the results for receipt of (ever had) CRC screening are reported first. Then, the results for being up to date for CRC screening are described.

Ever had CRC screening—After controlling for predisposing, enabling, and need variables, the only ethnic group that was less likely than non-Latino whites to have undergone FOBT were Koreans (OR, 0.40; 95% confidence interval [95% CI], 0.25–0.62). Other predisposing factors that were associated with significantly lower receipt of FOBT included male gender (OR, 0.90; 95% CI, 0.83–0.97), those who lived in households with ≥ 3 individuals (OR, 0.80; 95% CI, 0.74–0.87), those who lived in the United States for < 15 years (OR. 0.56; 95% CI, 0.38–0.83), and those with a family income < 300% of the FPL. Individuals who were more likely to have undergone FOBT included those who were older (OR, 1.02; 95% CI, 1.01–1.03), college graduates (OR, 1.70, 95% CI; 1.42–2.03), and those with a family history of colon cancer (OR, 1.77; 95% CI, 1.43–2.19). Significant enabling factors for FOBT receipt were having either public insurance (OR, 2.00; 95% CI, 1.53–2.61) or private insurance (OR, 1.59; 95% CI, 1.30–1.95), having a usual source of care (OR, 2.49; 95% CI, 1.97–3.14), and having more physician visits. Moreover, need factors that were associated with undergoing FOBT included more physician visits (OR, 1.04; 95% CI, 1.02–1.05) and having a usual source of care.

The results for receipt of endoscopy and any CRC screening were similar to those for FOBT, except that Filipinos had a significantly lower receipt of endoscopy (OR, 0.62; 95% CI, 0.44–

0.88) compared with non-Latino whites. Other Asian-American ethnic groups had similar rates of endoscopy and any CRC screening.

Up to date with CRC screening—All Asian-American ethnic groups had similar rates of being up to date with FOBT compared with non-Latino whites. One predisposing factor was associated with individuals who were significantly less likely to be up to date with FOBT: living in households with ≥ 3 individuals (OR, 0.68; 95% CI, 0.58–0.79). However, individuals were more likely to be up to date with FOBT screening if they were married (OR, 1.41; 95% CI, 1.24–1.62), if they had a family history of colon cancer (OR, 1.77; 95% CI, 1.43–2.19), if they had either public health insurance (OR, 2.00; 95% CI, 1.53–2.61) or private health insurance (OR, 1.59; 95% CI, 1.30–1.95), if they had more physician visits (OR, 1.04; 95% CI, 1.02–1.05), if they had a usual source of care (OR, 2.49; 95% CI, 1.97–3.14), and if they had better health status (physical health: OR, 1.00; 95% CI, 1.00–1.01; mental health: OR, 1.00; 95% CI, 1.00–1.01).

The regression model for being up to date with endoscopy differed somewhat from that for being up to date with FOBT. Filipinos were less likely to be up to date with endoscopy (OR, 0.68; 95% CI, 0.48–0.97). In addition, individuals were significantly less likely to be up to date with endoscopy if they lived in a household of ≥ 3 individuals (OR, 0.79; 95% CI, 0.69–0.90), if they had lived in the United States for < 15 years (OR, 0.50; 95% CI, 0.37–0.69), or if they had a family income < 200% of the FPL (0–99% of the FPL: OR, 0.72; 95% CI, 0.61–0.84; 100–199% of the FPL: OR, 0.86; 95% CI, 0.76–0.97).

Additional predisposing factors that were associated significantly with being up to date with endoscopy included male gender (OR, 1.54; 95% CI, 1.44–1.65) and having a greater educational attainment (high school graduate: OR, 1.34; 95% CI, 1.13–1.57; college graduate: OR, 1.85; 95% CI, 1.57–2.18). Enabling and need factors that were associated with the model for being up to date with endoscopy were similar to the FOBT model. The results for the multivariate regression model for being up to date for any CRC screening were similar to the model for being up to date with endoscopy.

DISCUSSION

Although some data are available for CRC screening rates among Asian Americans and Pacific Islanders,[13,22,23] to our knowledge, this is the first study to address CRC screening across different Asian-American ethnic groups in languages other than English. Moreover, this is the first population-based study to examine CRC screening in several different Asian-American ethnic groups rather than aggregating them into a single category. Despite recommendations for regular colon cancer screening for all adults age 50 years and older, rates of screening remain low for all ethnic groups, including non-Latino whites. For all Asian Americans as an aggregated group, the CRC screening rates are lower compared with the rates for non-Latino whites.

Our multivariate regression models suggested that, after accounting for predisposing, enabling, and need variables, there are few ethnic differences in CRC screening rates between Asian Americans and non-Latino whites. However, many Asian Americans are more likely to have many of the predisposing and enabling factors associated with low rates of CRC screening. Asian Americans age 50 years and older tend to be immigrants and to live in households with ≥ 3 individuals. They also tend to have lower educational and income levels and to lack health insurance compared with non-Latino whites. Our findings suggested that we should continue trying to reach individuals who are at risk for not receiving or maintaining CRC screening through increasing access to free screening, increasing enrollment of individuals who are eligible for Medicaid and Medicare, and focusing on immigrant groups. Collaboration with

ethnic community organizations and churches to provide individuals with information about CRC screening and the locations of any free screening programs may be a good way to reach immigrant groups. Another way to reach target groups may be through ethnic media campaigns, such as informational commercials, posters, and community campaigns to improve colon health.

We found that most Asian-American groups were 30–50% less likely than whites to be up to date with CRC screening. Whereas some Asian-American groups, such as the Japanese, had a CRC screening rate that was similar the rate among whites, Koreans were less likely to undergo FOBT and Filipinos were less likely to undergo or be up to date with endoscopy compared with non-Latino whites, even after controlling for other predisposing, enabling, and need variables. These findings suggest heterogeneity among different Asian ethnic groups.[24,25] Certain lifestyle factors or traditional beliefs, especially among Koreans and Filipinos, may act as significant barriers to receiving and remaining up to date with CRC screening.[23,26–28] More important, the underuse of CRC screening among Koreans and Filipinos may be due to linguistic and attitudinal barriers related to hesitancy to discuss health concerns in a nonnative tongue. More work is needed with Koreans and Filipinos to understand which lifestyle behaviors may be acting as barriers to receipt of CRC screening.[29] In addition, access is needed to print and media material promoting knowledge of CRC and screening that is sensitive to Korean and Filipino culture. Interventions targeting Koreans and Filipinos can narrow the disparity in CRC screening rates between these groups and non-Latino whites.

Our finding that years in the United States and English language proficiency were collinear suggests that Asian-American immigrants, particularly those who have lived in the United States for < 15 years, are not fluent in English. Asian immigrants should be targeted for outreach efforts, because those who have lived in the United States for < 15 years are approximately half as likely to have ever undergone or to be up to date with CRC screening, suggesting that there may be additional barriers to getting screening even after an individual has health insurance and a usual place of medical care. Indeed, the length of time spent in the United States has been identified as a significant predictor of CRC screening in different Asian-American ethnic groups.[13,29,30] There is likely both a lack of familiarity with the importance of obtaining and maintaining CRC screening and a lack of CRC screening information available in specific Asian languages (other than Chinese). There also may be a predisposition for using biomedical procedures as a method of prevention.

This study has highlighted the importance of the clinician's success in maintaining CRC screening once it is initiated. In fact, being up to date with endoscopy was more significant than being up to date with FOBT. Active efforts focusing on provider recommendation and improving patient-provider communication may help to increase the receipt and maintenance of CRC screening. High levels of psychological distress, including fear and anxiety regarding cancer, often are associated with the avoidance of other types of cancer screening[31,32]

However, the current study had important limitations. All participants lived in California and, thus, may not be representative of individuals living in other parts of the United States. However, more than half of the Asian-American population lives in three states (California, New York, and Hawaii).[33] As with any telephone survey, respondents without a telephone were not included. The CHIS 2001 was weighted to minimize the effects of this characteristic of telephone surveys.[19] Data were self-reported, which may have produced bias. There was a potential for under-reporting or over-reporting of screening that occurred; however, there should be no differential bias according to ethnicity in the level of reporting.[17] One report of the concordance between patient self-reports and medical records showed that self-reports of CRC screening behavior were accurate irrespective of age, gender, ethnicity, or family history of CRC.[34]

Despite these limitations, to our knowledge, this is the first study that has examined population based CRC screening rates in several different Asian-American ethnic groups in their own language and that compared their rates with the rates among the non-Latino white population. A major strength of this study is that the survey was administered in Chinese, Korean, and Vietnamese (among other languages), which allowed the participation of considerably larger proportions of these groups.[35]

In conclusion, further work is needed to examine barriers to CRC screening and to test culturally sensitive interventions aimed at promoting CRC screening, particularly among Koreans and Filipinos. Among all Asian Americans, strategies to increase screening should include familiarizing immigrants about the importance of obtaining and maintaining screening and providing CRC screening information in different Asian languages. Interventions also might include developing and implementing a family-centered care model and increasing the use of qualified translators to discuss CRC and screening.

References

1. Hardcastle JD, Chamberlain JO, Robinson MH, et al. Randomised controlled trial of faecal-occult-blood screening for colorectal cancer. Lancet 1996;348:1472–1477. [PubMed: 8942775]
2. Kronborg O, Fenger C, Olsen J, Jorgensen OD, Sondergaard O. Randomized study of screening for colorectal cancer with faecal-occult-blood test. Lancet 1996;348:1467–1471. [PubMed: 8942774]
3. Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. Minnesota Colon Cancer Control Study. N Engl J Med 1993;328:1365–1371. [PubMed: 8474513]
4. U.S. Preventive Services Task Force. Screening for colorectal cancer: recommendation and rationale. Ann Intern Med 2002;16:129–131.
5. Rex D, Johnson D, Lieberman D, Burt R, Sonnenberg A. Colorectal cancer prevention 2000: screening recommendations of the American College of Gastroenterology. Am J Gastroenterol 2000;94:868–877. [PubMed: 10763931]
6. Winawer S, Fletch R, Miller L, et al. Colorectal cancer screening: clinical guidelines and rationale. Gastroenterology 1997;112:594–642. [PubMed: 9024315]
7. Seef L, Nadel M, Blackman D. Colorectal cancer test use among persons aged ≥50 years—United States 2001. MMWR Morbid Mortal Wkly Rep. 2003
8. Breen N, Wagener D, Brown M, Davis W, Ballard-Barbash R. Progress in cancer screening over a decade: results of cancer screening from the 1987, 1992, and 1998 National Health Interview Surveys. J Natl Cancer Inst 2001;21:1704–1713. [PubMed: 11717331]
9. Etzioni D, Ponce N, Babey S, et al. A population-based study of colorectal cancer test use: results from the 2001 California Health Interview Survey. Cancer 2004;101:2523–2532. [PubMed: 15505783]
10. Centers for Disease Control and Prevention. Screening for colorectal cancer—United States, 1992–1993, and new guidelines. MMWR Morbid Mortal Wkly Rep. 1996
11. Landis S, Murray T, Bolden S, Wingo P. Cancer statistics. CA Cancer J Clin 1999;49:8–31. [PubMed: 10200775]
12. Honda K. Factors associated with colorectal cancer screening among the US urban Japanese population. Am J Public Health 2004;94:815–823. [PubMed: 15117706]
13. Maxwell A, Bastani R, Warda U. Demographic predictors of cancer screening among Filipino and Korean immigrants in the United States. Am J Prev Med 2000;18:62–68. [PubMed: 10808984]
14. Jenkins CNH, McPhee SF, Bird JA, et al. Cancer risks and preventive behaviors among Vietnamese refugees. West J Med 1990;153:34–39. [PubMed: 2389574]
15. McPhee SJ, Jenkins CNH, Hung S, Nguyen KP, Ha NT. Behavioral risk factor survey of Vietnamese-California, 1991. MMWR Morbid Mortal Wkly Rep 1992;41:69–72.
16. Centers for Disease Prevention MMWR. Screening for colorectal cancer—United States 1999. Washington, DC: US Government Printing Office; 1999.

17. Walsh JME, Kaplan CP, Nguyen B, Gildengorin G, McPhee SJ, Perez-Stable EJ. Barriers to colon cancer screening in Latino and Vietnamese Americans compared to non-Latino white Americans. J Gen Intern Med 2004;19:156–166. [PubMed: 15009795]

18. U.S. Census Bureau. Projections of the total resident population by 5-year age groups, race, and Hispanic origin with special age categories, Middle series, 2050–2070. Washington, DC: U.S. Department of Commerce; 2000.

19. California Health Interview Survey. CHIS 2001 design and methodology summary. [(accessed September 22, 2004)]. Available at: http://www.chis.ucla.edu/methods_design.html

20. Aday, L.; Andersen, R., editors. Development of indices of access to medical care. Ann Arbor: Health Administration Press; 1975. A framework for the study of access to medical care; p. 1-13.

21. StatCorp. Stata reference manual: release 8.0. College Station: Stata Corporation; 2003.

22. Walsh JME, Posner SF, Perez-Stable EJ. Colon cancer screening in the ambulatory setting. Prev Med 2002;35:209–218. [PubMed: 12202062]

23. Tang TS, Solomon LJ, McCracken LM. Barriers to fecal occult blood testing and sigmoidoscopy among older Chinese-American women. Cancer Pract 2001;9:277–282. [PubMed: 11879329]

24. Chen J, Diamant A, Kagawa-Singer M, Pourat N, Wold C. Disaggregating data on Asian and Pacific Islander women to assess cancer screening. Am J Prev Med 2004;27:139–145. [PubMed: 15261901]

25. Sadler G, Ryujin L, Nguyen T. Heterogeneity within the Asian American community. Int J Equity Health 2003;29:2–12.

26. McBride M, Pasick R, Stewart S, Tuason N, Sabogal F, Duenas G. Factors associated with cervical cancer screening among Filipino women in California. Proceedings to cancer concerns for Asian Americans and Pacific Islanders. Asian Am Pacific Isl J Health 1998;6:358–367.

27. Hiatt R, Pasick R. Unresolved problems in early breast cancer detection: focus on the underserved. Cancer Epidemiol Biomarkers Prev 1996;9:597–603.

28. Maxwell AE, Bastani R, Warda US. Demographic predictors of cancer screening among Filipino and Korean immigrants in the United States. Am J Prev Med 2000;18:62–68. [PubMed: 10808984]

29. Juon H, Han W, Shin H, Kim K, Kim M. Predictors of older Korean Americans' participation on colorectal cancer screening. J Cancer Educ 2003;18:37–42. [PubMed: 12825633]

30. Kim K, Yu E, Chen E, Kim J, Brintnall R. Colorectal cancer screening. Knowledge and practices among Korean Americans. Cancer Pract 1998;6:167–175. [PubMed: 9652248]

31. Kash K, Dabney M. Psychological aspects of cancer screening in high-risk populations. Med Pediatr Oncol 2001;26:519–524. [PubMed: 11340606]

32. Macrae F, Hill D, John D. Predicting colon cancer screening behavior from health beliefs. Prev Med 1984;13:115–126. [PubMed: 6718327]

33. Barnes, JS.; Bennett, CE. The Asian population: 2000. Washington, DC: U.S. Department of Commerce, U.S. Census Bureau; 2002.

34. Baier M, Calonge N, Cutter G, et al. Validity of self-reported colorectal cancer screening behavior. Cancer Epidemiol Biomarkers Prev 2000;9:229–232. [PubMed: 10698488]

35. Ponce N, Lavarreda S, Yen W, Brown E, Disogra C, Satter D. The California Health Interview Survey 2001: translation of a major survey for California's multiethnic population. Public Health Reps 2004;119:388–395.

TABLE 1

Sociodemographic Characteristics of Asian Americans and Non-Latino Whites Age 50 Years and Older

Variable	Chinese (*n* = 394)	Filipino (*n* = 280)	South Asian (*n* = 148)	Japanese (*n* = 375)	Korean (*n* = 254)	Vietnamese (*n* = 320)	Non-Latino whites (*n* = 17,718)
Predisposing variables							
Mean age in yrs (± SE)[a]	62.56 (0.57)	61.58 (0.75)	56.77 (0.68)	65.97 (0.37)	62.21 (0.41)	61.27 (0.36)	64.97 (0.07)
Female (%)[b]	54	56	42	58	56	51	54
Education (%)[a]							
Grade lt 12	22	9	2	2	21	39	6
High school graduate, some college	39	43	22	59	35	43	55
College graduate or more	39	48	76	39	44	18	39
Married (%)[a]	78	71	83	70	79	73	62
Household size (%)[a]							
1 Individual	10	8	8	19	15	6	25
2 Individuals	43	33	26	56	42	21	52
≥ 3 Individuals	47	59	66	25	43	73	22
Yrs in the U.S. (%)[a]							
Born in U.S.	14	6	2	82	2	0	83
In the U.S. <15 yrs	27	21	18	1	22	60	14
In the U.S. ≥15 yrs	59	73	80	17	76	40	2
FPL[a]							
0–99% FPL	24	8	7	4	19	55	6
100–199% FPL	20	26	4	18	30	24	17
200–299% FPL	12	18	12	15	15	6	15
≥ 300% FPL	44	48	77	63	36	15	62
Comorbid condition (%)[c]	17	23	14	17	14	19	18
Family history of colon cancer (%)[a]	3	3	1	4	2	0	4
Enabling variables							
Insurance (%)[a]							
Uninsured	9	10	10	1	32	14	4
Public	44	39	14	55	40	61	51
Private	47	50	76	44	27	25	45
Has usual source of care (%)[a]	93	95	83	96	73	93	96
Mean (SE) no. of physician visits in past yr[a]	3.70 (0.21)	3.20 (.021)	2.54 (0.23)	3.13 (0.18)	3.74 (0.26)	5.75 (0.26)	4.01 (0.03)
Need variables: Mean score (SE) from 0 to 100							
SF-12 Physical Health	47.61 (0.60)	47.64 (0.82)	48.80 (1.30)	48.37 (0.67)	46.30 (0.85)	40.44 (0.77)	46.20 (0.10)
SF-12 Mental Health	51.72 (0.53)	50.56 (0.54)	54.10 (0.76)	53.86 (0.39)	52.49 (0.67)	49.44 (0.60)	53.81 (0.06)

SE: standard error; FPL: Federal Poverty Level; SF-12: 12-item Short Form Health Survey.

[a] $P < 0.001$.

[b] $P < 0.05$.

[c] Diabetes or cardiovascular disease.

TABLE 2

Colorectal Cancer Screening in Asian Americans and Non-Latino Whites Age 50 Years and Older[a]

Ethnic group	Ever screened (%)[b]			Up-to-date (%)[c]		
	FOBT[d]	Sig/Col[d]	Screening[d]	FOBT[d]	Sig/Col[d]	Screening[d]
Non-Latino whites	58	57	75	26	52	62
All Asian Americans	38	42	58	18	39	48
Chinese	40	43	59	17	40	49
Filipino	39	37	57	18	36	47
South Asian	32	41	53	21	39	48
Japanese	52	56	72	23	50	58
Korean	23	38	49	12	34	41
Vietnamese	29	36	52	18	34	45

FOBT: fecal occult blood test; Sig/Col: sigmoidoscopy/colonoscopy.

[a] All data were weighted. All individuals with 0 were added back in, because they did as not meet the screening requirements; Individuals who were diagnosed with colon cancer were excluded.

[b] Ever screened refers to ever having had an FOBT or Sig/Col (CHIS questions AF22, AF14).

[c] Up-to-date colorectal cancer screening refers to FOBT in the past year or Sig/Col in the past 10 years (AF24, AF16).

[d] $P < 0.001$.

TABLE 3

Logistic Regression Models: Ever Had Colorectal Cancer Screening and Up-to-Date Screening[a]

Variable	Odds ratio (95% confidence interval)					
	Ever had screening			Up-to-date screening		
	FOBT	Sig/Col	Any screening	FOBT	Sig/Col	Any screening
Predisposing variables						
Age	1.02 (1.01–1.03)[b]	1.03 (1.02–1.04)[b]	1.03 (1.02–1.04)[b]	1.01 (1.00–1.02)[c]	1.03 (1.02–1.03)[b]	1.02 (1.02–1.03)[b]
Ethnicity						
Non-Latino white (ref)	—	—	—	—	—	—
Chinese	0.74 (0.55–1.01)	0.86 (0.64–1.16)	0.81 (0.60–1.09)	0.72 (0.50–1.03)	0.84 (0.62–1.14)	0.83 (0.61–1.12)
Filipino	0.73 (0.51–1.03)	0.62 (0.44–0.88)[c]	0.71 (0.49–1.02)	0.80 (0.55–1.18)	0.68 (0.48–0.97)[c]	0.79 (0.56–1.10)
South Asian	0.64 (0.34–1.19)	1.00 (0.51–1.98)	0.84 (0.45–1.55)	1.13 (0.52–2.43)	1.02 (0.52–2.00)	1.01 (0.56–1.82)
Japanese	0.76 (0.54–1.08)	1.02 (0.77–1.34)	0.92 (0.65–1.31)	0.88 (0.62–1.26)	0.91 (0.66–1.26)	0.86 (0.62–1.18)
Korean	0.40 (0.25–0.62)[b]	0.91 (0.59–1.40)	0.71 (0.45–1.12)	0.55 (0.30–1.04)	0.82 (0.52–1.29)	0.78 (0.51–1.19)
Vietnamese	0.65 (0.40–1.07)	1.13 (0.70–1.80)	1.02 (0.60–1.75)	0.96 (0.58–1.61)	1.10 (0.68–1.78)	1.13 (0.69–1.86)
Male (ref: female)	0.90 (0.83–0.97)[c]	1.45 (1.35–1.56)[b]	1.24 (1.14–1.36)[b]	1.10 (1.00–1.22)	1.54 (1.44–1.65)[b]	1.46 (1.35–1.58)[b]
Education						
Grade < 12 (ref)	—	—	—	—	—	—
High school, some college	1.32 (1.10–1.57)[c]	1.33 (1.14–1.56)[c]	1.40 (1.15–1.71)[c]	1.03 (0.87–1.23)	1.34 (1.13–1.57)[c]	1.26 (1.06–1.51)[c]
≥ BS	1.70 (1.42–0.03)[b]	1.89 (1.62–2.22)[b]	1.95 (1.61–2.35)[b]	1.16 (0.97–1.39)	1.85 (1.57–2.18)[b]	1.74 (1.46–2.07)[b]
Married (ref: others)	1.41 (1.24–0.62)[b]	1.43 (1.28–1.60)[b]	1.53 (1.33–1.77)[b]	1.25 (1.07–1.46)[c]	1.41 (1.26–1.57)[b]	1.43 (1.26–1.62)[b]
Household size						
One individual (ref)	—	—	—	—	—	—
Two individuals	0.91 (0.80–1.04)	0.99 (0.88–1.12)	0.98 (0.86–1.12)	0.99 (0.85–1.15)	1.03 (0.91–1.17)	1.05 (0.93–1.20)
Three or more individuals	0.68 (0.58–0.79)[b]	0.74 (0.64–0.85)[b]	0.68 (0.58–0.79)[c]	0.80 (0.67–0.96)[c]	0.79 (0.69–0.90)[c]	0.78 (0.67–0.90)[c]
Yrs in the U.S.						
Born in the U.S. (ref)	—	—	—	—	—	—
< 15 yrs in the U.S.	0.56 (0.38–0.83)[c]	0.46 (0.34–0.63)[b]	0.48 (0.32–0.71)[b]	0.81 (0.52–1.27)	0.50 (0.37–0.69)[c]	0.58 (0.40–0.82)[c]
≥ 15 yrs in the U.S.	0.80 (0.70–0.92)[c]	0.93 (0.80–1.08)	0.80 (0.68–0.95)[c]	0.94 (0.79–1.11)	0.99 (0.85–1.15)	0.95 (0.82–1.10)
Have comorbid condition (ref: no)	1.06 (0.95–1.19)	1.03 (0.92–1.15)	1.06 (0.92–1.21)	1.06 (0.94–1.20)	1.04 (0.94–1.17)	1.06 (0.95–1.18)
Have family history of colon cancer (ref: no)	1.77 (1.43–2.19)[b]	2.15 (1.73–2.68)[b]	2.26 (1.66–3.06)[b]	1.30 (1.01–1.67)[c]	2.26 (1.84–2.78)[b]	2.34 (1.87–2.94)[b]
Enabling variables						
Poverty level						
0–99% FPL	0.82 (0.68–0.99)[c]	0.68 (0.58–0.80)[b]	0.75 (0.62–0.92)[c]	0.90 (0.75–1.10)	0.72 (0.61–0.84)[b]	0.77 (0.64–0.91)[c]
100–199% FPL	0.88 (0.78–0.99)[c]	0.87 (0.77–0.98)[c]	0.89 (0.78–1.01)	0.98 (0.86–1.13)	0.86 (0.76–0.97)[c]	0.90 (0.80–1.02)
200–299% FPL	0.90 (0.81–0.99)[c]	0.97 (0.85–1.11)	0.97 (0.84–1.12)	0.93 (0.81–1.06)	0.99 (0.88–1.12)	0.98 (0.86–1.11)
≥ 300% FPL (ref)	—	—	—	—	—	—
Insurance status						
Uninsured (ref)	—	—	—	—	—	—
Public	2.00(1.53–2.61)[b]	2.11 (1.70–2.62)[b]	2.12 (1.65–2.72)[b]	1.69 (1.20–2.40)[c]	2.51 (2.00–3.16)[b]	2.47 (1.92–3.17)[b]
Private	1.59(1.30–1.95)[b]	1.95 (1.55–2.45)[b]	1.81 (1.48–2.22)[b]	1.43 (1.07–1.92)[c]	2.27 (1.80–2.85)[b]	2.10 (1.68–2.63)[b]
Physician visits in past yr	1.04 (1.02–1.05)[b]	1.06 (1.04–1.07)[b]	1.07 (1.05–1.09)[b]	1.04 (1.02–1.05)[b]	1.06 (1.05–1.07)[b]	1.06 (1.05–1.08)[b]
Have usual source of care (ref: no)	2.49 (1.97–3.14)[b]	2.75 (2.16–3.50)[b]	3.00 (2.38–3.78)[b]	3.46 (2.41–4.97)[b]	2.93 (2.27–3.78)[b]	3.51 (2.72–4.52)[b]
Need variables						
Health status						
Physical health	1.00 (0.99–1.01)	1.00 (0.99–1.00)	1.00 (0.99–1.00)	1.01 (1.00–1.01)[c]	1.00 (1.00–1.01)[c]	1.01 (1.00–1.01)[c]
Mental health	1.00 (0.99–1.01)	1.00 (0.99–1.01)	1.00 (0.99–1.01)	1.01 (1.00–1.01)[c]	1.01 (1.00–1.01)[c]	1.01 (1.00–1.01)[c]
List sampling (ref: RDD)	1.15 (0.82–1.62)	0.86 (0.59–1.25)	0.86 (0.60–1.24)	1.11 (0.76–1.62)	0.93 (0.63–1.38)	0.98 (0.68–1.42)

Variable	Odds ratio (95% confidence interval)					
	Ever had screening			Up-to-date screening		
	FOBT	Sig/Col	Any screening	FOBT	Sig/Col	Any screening

FOBT: fecal occult blood test; Sig/Col: sigmoidoscopy/colonoscopy; ref: reference group; BS: Batchelor of Science; FPL: Federal Poverty Level; RDD: random digit dialing

[a] Note: All data were weighted. This analysis did not include individuals with colon cancer or rectal cancer.

[b] $P < 0.001$.

[c] $P < 0.05$.