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SAN DIEGO STATE UNIVERSITY

Health Beliefs and Cancer Prevention Practices of Filipino American Women

A dissertation submitted in partial satisfaction of the requirements for the degree
Doctor of Philosophy in
Clinical Psychology

by

Celine M. Ko

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2006

The dissertation of Celine M. Ko is approved, and it is

acceptable in quality and form for publication on microfilm:

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Chair

University of California, San Diego

San Diego State University

2006

Dedication

This work is dedicated to my grandmother, Dr. Bernabela Ko, who was an inspiration

to many women and who started me on this journey on cancer research.

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EDUCATION

University of California, Riverside   Riverside, CA
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PUBLICATIONS

Published Manuscripts

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ABSTRACT OF THE DISSERTATION

Health Beliefs and Cancer Prevention Practices of Filipino American Women

by

Celine M. Ko

Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2006

San Diego State University, 2006

Vanessa L. Malcarne, Chair

Cancer is the number one cause of death among Asian Americans, and Filipino Americans are the second largest Asian American group in number. Filipino American women have relatively low rates of breast and colorectal cancer screening compared to their White counterparts; however, they experience higher numbers of late-stage diagnoses and mortality rates. Thus, early detection of cancer and maintenance of healthy prevention behaviors are very important. Little is known about this community's prevention behaviors such as smoking, diet, alcohol consumption, and physical activity. This study aimed to extend the literature on Filipino American women's health by 1) describing their breast, cervical, colorectal cancer screening rates, 2) describing their rates of prevention behaviors, 3) identifying general predictors of screening, and 4) identifying culture-specific predictors of screening. Four hundred and two self-identified Filipino American women ages 21-83 ($M = 44.22$, $SD = 15$ years) participated. Sixty-six percent were in adherence to breast cancer

screening guidelines, 80% were in adherence to cervical cancer screening guidelines, and 60% reported adherence to colon cancer screening guidelines. Almost 90% of the sample reported not smoking, 47% were in adherence to dietary fat intake guidelines, 38% were in adherence to fruit and vegetable consumption guidelines, 63% abstained from alcohol, 59% were within recommended weight guidelines, and 96% reported engaging in physical activity, all of which were better than national averages. Acculturation significantly predicted clinical breast exam, peer group adherence significantly predicted mammography, and number of years in the US significantly predicted colon cancer screening. A new scale measuring cultural health beliefs and traditional values was created and had good reliability ($\alpha = .89$). It was negatively correlated with acculturation ($r = -.24$) and adherence to CBE guidelines ($r = -.16$), and positively correlated with God locus of health control ($r = .30$) and perceived barriers to pap smear ($r = .21$). While culture-specific factors were hypothesized to relate to health behaviors, they were not predictive of cancer screening or prevention. Acculturation, length of stay in the US, and peer group adherence were significant predictors and important considerations for future programs that target Filipino American women's health behaviors.

I. Introduction

Filipino Americans are the second largest Asian ethnic group in the United

States, making up 20% of this umbrella category that encompasses all persons from

many ethnic and cultural groups from Asia (U.S. Census Bureau, 2000). They are

second only to Chinese Americans in number, and are one of the fastest growing

segments of the population due to immigration (Chen, 1998). Despite Filipino

Americans' growing numbers, they are largely understudied in the areas of health, and

more specifically, cancer. There is research on cancer in Asian Americans; however,

the heterogeneity of this larger ethnic group makes it difficult to generalize these

results to each specific Asian subgroup.

A. Cancer

Cancer is a deadly and costly disease. Approximately 1.4 million men and

women will be afflicted with cancer this year, and more than 560,830 will die from the

disease, making cancer the second leading cause of death (American Cancer Society,

2006a). The National Institutes of Health estimate the cost of cancer in 2005 to be

$209.9 billion (American Cancer Society, 2006a). However, cancer risk can be

decreased and cancer can be detected early in order to increase chances of survival.

Not smoking, not drinking alcohol, having proper nutrition, participating in physical

activity, and getting vaccinations or engaging in other protective behaviors against

contagious disease that lead to cancer are some of the preventive efforts that can be

made. In addition, early detection of cancer through screening can lead to its diagnosis

at an earlier stage, when chances of achieving disease remission are higher (American Cancer Society, 2006b).

Cancer is the leading cause of death among Asian American and Pacific Islander women (Asian American Network for Cancer Awareness, Research and Training, 2004). Asian Americans have lower rates of cancer compared to other ethnic groups (American Cancer Society, 2006a); however, studies have shown that they tend to be diagnosed at later stages of cancer (Lin et al., 2002) and suffer from higher mortality rates (LeMarchand, Kolonel, & Nomura, 1984).

Recent Asian immigrants to the United States have been shown to have low cancer risk. It was thought that their cancer risk did not increase for several generations of time spent in the U.S. (Shimizu et al., 1991). However, other studies have shown that cancer risk among Asian American immigrants is proportionate to the length of their stay in the United States (Ziegler et al., 1993; Stanford, Herrinton, Schwartz, & Weiss, 1995). Japanese Americans were the first Asian group to migrate to the United States in large numbers and currently have the lowest numbers of foreign-born individuals. Japanese Americans have the highest rates of breast cancer, approximating those of White women (Ziegler et al.). It is postulated that the Westernized lifestyle (i.e., marry later, have fewer children, be taller, engage in less physical activity, and have increased rates of obesity) accounts for this increase in cancer rates (Ziegler et al.). Deapen, Liu, Perkins, Bernstein, and Ross (2002) examined the trend of breast cancer incidence and concluded that there is an increase in breast cancer rates among Asian Americans, especially in specific groups such as Filipino American women.

There are 11.4 million Asian Americans in the United States. Chinese Americans are the largest group in numbers (2.7 million) and Filipino Americans are the second largest (2.4 million). Asian Americans are concentrated in the West, with the biggest concentrations in Hawaii and California (U.S. Census Bureau, 2003a). According to the U.S. Census 2000, Asians have an 88% high school graduation rate and the highest proportion of any ethnic group of persons with graduate degrees (50% for those aged 25 and over). Due to their high educational attainment, Asian Americans are often stereotyped as the "model minority," characterized by being well-educated, self-sufficient, hardworking, and upwardly mobile (dela Cruz, McBride, Compas, Calixto, & van Derveer, 2002). Asian Americans have the highest median income among the different race groups (U.S. Census Bureau, 2004); however, Asian Americans tend to report higher income because of the increased number of workers per household. For instance, mean size of household among Asian Americans is 2.90 persons versus 2.43 persons for non-Hispanic Whites, and mean number of earners per household is 1.52 versus 1.33 persons, respectively (U.S. Census Bureau).

It has also been hypothesized that Filipino immigrants who completed all or most of their education before entering the United States may account for the high levels of education among Filipino Americans today (Okamura, 1997). The Philippines is the third top country of birth among those foreign-born in the U.S. (U.S. Census Bureau, 2003a). Approximately 1.4 million (58%) Filipino Americans currently living in the U.S. were born in the Philippines. In more densely populated areas of Filipino American communities, immigrant rates could be higher. For instance, among the Filipino Americans in Los Angeles, 70% are foreign born and

more than 25% do not speak English very well (Asian Pacific Factfinder, Los Angeles County, 1996).

Filipino Americans may be part of the Asian American "model minority," but they are perhaps more aptly characterized as the "hidden minority" (Anderson, 1983), due to the paucity of research-based health information available on this group (dela Cruz et al., 2002). The complex relationship between the Philippines and the United States may partly explain Filipino American's hidden minority status. The Philippines was colonized by the United States from 1898 until 1946. As U.S. nationals, Filipinos had unrestricted entry into this country; however, they did not have the right to vote or own property or businesses. Filipinos migrated to the United States in three distinct waves. The first wave (1898-1946) consisted of visiting scholars, men recruited to work in Hawaiian sugar plantations and Alaskan canneries, and soldiers who were recruited into the U.S. Navy during World War II. The second wave of immigrants (1947-1964) included relatives of Filipinos who were granted citizenship due to their service in the U.S. military, was well as nurses who came to the U.S. for post-graduate studies and who often stayed. The third wave of immigrants (1965-present) came after U.S. Congress granted the 1965 Immigration and Nationality Act that liberalized immigration rates, and targeted college-educated and highly skilled individuals to fill specific professional job shortages such as nursing. Individuals sponsored by their family, many who are 60 years and older, are also part of this migrant group. Finally, Filipino veterans who served for the U.S. Navy during World War II were granted their citizenship in 1990, and a proportion of them migrated to the U.S. to collect their benefits.

Because of this colonial relationship, Filipinos in the Philippines had been infused with Westernized ideals, and it has been hypothesized that the process of acculturation began even before they arrived in the United States. Because of their complex history with the United States, Filipino Americans have special characteristics that may separate them from other Asian groups. For example, English is the medium of instruction in the Philippines. Recent statistics of Filipinos in the US show that approximately 93% of Filipino Americans who speak Tagalog at home also report speaking English well or very well (U.S. Census Bureau, 2000b). Thus, language may not be as strong an indicator of acculturation within this group as it is in other Asian groups. Also, current immigrants may have higher rates of education and skill due to the targeted admission into the United States of college-educated and skilled professionals.

There are few published studies on cancer prevention and early detection efforts among Filipino American women. There is limited literature on their healthy (or unhealthy) lifestyles, and how "Westernized" they are in terms of health behaviors. It is important to study these behaviors in the context of rising cancer rates in this group. Filipino Americans, because of the U.S. influence in the Philippines, are receptive to modern medicine (Anderson, 1983). However, Anderson cautions that while Filipino Americans may seem acculturated because of their extensive history with the United States, they may revert to indigenous disease theories and health practices. Studies on Filipino cultural health beliefs are limited, amplifying the need to examine culture-specific predictors that might affect cancer prevention behaviors.

B. Cancer Incidence and Mortality Rates in Filipino American women

Breast Cancer

Breast cancer is the most common cancer among women, with 212,920 new cases diagnosed in 2006 (American Cancer Society, 2006a). An estimated 40,970 women will die from breast cancer in 2006, making it the second leading cause of cancer death among women after lung cancer. Five-year survival rate for localized disease is 98%. Rates of survival decrease if the disease has spread regionally (81%) or if it has metastasized (26%). Because earlier diagnosis leads to higher survival rates, early detection of breast cancer is encouraged.

Asian Americans have lower incidence of breast cancer compared to their White (97.2 versus 140.8 per 100,000) and African American counterparts (121.7 per 100,000). They also have the lowest mortality rates among any ethnic group (12.5 per 100,000 compared to Whites at 27.2 and African Americans at 35.9 per 100,000; American Cancer Society, 2006a). However, further examination of disaggregate data of the Asian American subgroups show that there are marked differences in risk (Kolonel, 1980), incidence (Deapen et al., 2002), and cancer prevention and screening behaviors (Chen, Diamant, Kagawa-Singer, Pourat, & Wold, 2004). Therefore, it is important to examine each group's cancer incidence, screening, and prevention efforts separately. The following studies examined incidence and mortality rates of breast cancer among Filipino Americans.

Filipino American women have lower rates of breast cancer incidence compared to White and African-American women, but higher rates of breast cancer than some other Asian groups. Among Filipino American women, breast cancer is the

leading cause of cancer death. Breast cancer incidence among Filipino American women has been estimated at 90.5 per 100,000 (Miller, Scoppa, Feuer, 2005). Two studies presented data on Filipino American women and showed that they have the second highest rates of breast cancer incidence among Asian Americans (Bernstein, Miu, Monroe, Henderson, & Ross, 1995; Deapen et al., 2002). Authors from both studies reported statistics from the California Surveillance Program (CSP), a registry for all cancer patients in Los Angeles county. Japanese American women tend to have the highest rates, approximating those of White women. Filipino American women's rates of breast cancer were consistently higher than those of Chinese American or Korean women, but lower than White women. Bernstein et al. (1995), who examined cancer rates from 1972-1991, reported that breast cancer accounted for 50% of the cancers among the Filipino American women in the registry. Deapen et al. (2002) examined rates of cancer incidence over three different time periods (1988, 1992, and 1997) and concluded that rates among Asian American women, especially with Japanese and Filipino American women, were rising.

Filipino American women have higher rates of late-stage diagnoses, have higher mortality from breast cancer, and tend to be diagnosed at a younger age. Mortality data of Filipino American women with breast cancer are mostly from studies that examined the Hawaiian Tumor Registry (HTR). Currently, Filipino Americans make up 14% of Hawaii's population, second only to Japanese Americans (16.7%). Goodman (1991) reported that cancer incidence is low among Filipino Americans compared to all other ethnic groups in Hawaii. However, as a group, Filipino American women have a higher proportion of late stage diagnosis of breast cancer,

even after adjustment for age and socio-economic status. The following studies demonstrate that Filipino Americans have higher rates of regional and distant metastases of breast cancer, and have higher risk of mortality than most other ethnic groups in Hawaii and the mainland U.S.

Le Marchand et al. (1984) examined breast cancer incidence and mortality data of five ethnic groups in the 1960-1979 HTR and found that 46% of Filipino Americans were diagnosed at regional and distal stages. Sixty-five percent of Filipino American women were under the age of 55 at diagnoses, and as a group, they consistently had a higher rate of cancer death, at least 1.7 times higher than those of White, Japanese American, and Chinese American women. Meng, Markarinec, and Lee (1997) examined the HTR data from 1960 to 1983, and found the same results. However, the authors also calculated conditional survival rates, or survival probabilities after a specific time period has passed. They demonstrated that Filipino Americans and Native Hawaiians had significantly higher risk of mortality compared to Japanese American, Chinese American and White women. Meng, Maskarinec, and Wilkens (1997) examined data from the HTR from 1980-1988 and reported that Filipino American women had the lowest SES, highest proportion of late-stage diagnosis, and the second highest rates of cancer morbidity, second only to native Hawaiians. Meng et al. also examined stage-specific models and showed that Filipino Americans have a three-fold risk of dying from localized disease compared to other groups.

Studies conducted in the mainland U.S. mainly reflect the results of studies conducted in Hawaii. Saunders (1989) examined data from the San Francisco Tumor

Registry from 1974-1985 and found that Filipino American women were more likely

than Chinese American women to be diagnosed with late stage breast cancer.

However, Filipino American women had lower rates of diagnoses at distal stages than

Black and Japanese American women.

Pineda, White, Kristal and Taylor (2001) examined three Surveillance,

Epidemiology, and End Results (SEER) program databases on breast cancer patients

of four different ethnic groups diagnosed in the two decades between 1973-1994. Most

Filipino Americans were born in Asia and tended to be younger than their U.S. born

counterparts. Seventy-one percent of Filipino Americans in the sample were diagnosed

between 1985-1994. Filipino American women had the lowest median age at

diagnosis compared to Chinese Americans, Japanese Americans and Whites, with

57% diagnosed before the age of 54. Filipino American women diagnosed with

localized cancer had poorer survival compared to Japanese American women with

localized disease, with a 5-year survival rate of 86% versus 95%, respectively.

The most recent study by Chu and Chu (2005) show that breast cancer

mortality rates among Filipino American women were higher in the 1999-2001 period

than in the 1988-1992 years. Breast cancer rates from 1999-2001 were 16.7 per

100,000 compared to 14.1 per 100,000 in the 1988-1992 years.

Results from these eight studies highlight the heterogeneity of cancer

incidence, stages of diagnosis, and mortality rates among different ethnic groups.

Filipino American women have the second highest rates of breast cancer incidence

among Asian American ethnic groups, second only to Japanese Americans. However,

Japanese American women have the highest rates of survival and lowest rates of

regional and distal breast cancer. Filipino Americans, on the other hand, have the second highest rates of mortality and higher proportions of regional and distal breast cancer diagnoses than most other Asian groups. Data also show that Filipino American women are diagnosed at earlier ages than any other Asian groups. In addition, most recent data show an increase in rates of breast cancer mortality among Filipino American women.

Cervical Cancer

An estimated 9,710 new cases of cervical cancer will be observed in 2006, and an estimated 3,700 cases of death will result from this disease. Five-year survival rate of localized cervical cancer is 92%. A trend in decrease of mortality in the last couple of decades is attributed to increase in prevalence of the Pap test, which leads to earlier detection of this cancer (American Cancer Society, 2006a).

Asian Americans have a slightly higher rate of incidence (8.9 versus 8.7 per 100,000) and of mortality compared to Whites (2.7 versus 2.5 per 100,000, respectively; American Cancer Society, 2006a). Cancer registry data suggest that women from Southeast Asia have a nearly fivefold increased risk of invasive cervical cancer when compared to non-Hispanic White women (Taylor, Jackson, Schwartz, Tu, & Thompson, 1996; Singh & Miller, 2004). However, cervical cancer incidence rates are usually examined for the entire Asian American group, as presented above. There is a limited number of studies that have examined Filipino American women's patterns of cervical cancer incidence.

Filipino American women have higher rates of cervical cancer incidence compared to Whites. Incidence of cervical cancer among Filipino American women is

9.6 per 100,000, higher compared to White women but lower than African American and Hispanic women (Miller et al., 1996). Data from the California Cancer Registry also show that Filipino American women have higher cervical cancer rates than White, Chinese American, and Japanese American women living in the Bay area (Bay Area Cancer Registry Report, 1991). Among specific Asian groups, Filipino American and Korean populations have elevated risks of getting the disease and have higher rates than Caucasian women (Taylor et al., 1996). Only one study has contradictory results, which could be a function of where the study was conducted. Robison, Dietrich, Person, and Farley (2002) examined records from the U.S. Military Health Care System for rates of cervical cancer incidence of women treated at Tripler Army Medical Center in Hawaii and demonstrated that Filipino Americans were the third largest group to be diagnosed, after Pacific Islanders and White women.

Filipino American women are diagnosed at later stages and have higher mortality rates than other ethnic groups. San Francisco Cancer Registry data (1974-85) showed that White, Black, Japanese American, Chinese and Filipino American women aged 50-69 years were at greater risk for late-stage diagnoses of cervical cancer. In addition, Japanese and Filipino American women were at greater risk for late-stage diagnoses than all the other groups (Saunders, 1989). It has also been shown that the 5-year survival rate for Filipino American women is lower than that for White women (Jenkins & Kagawa-Singer, 1994).

Studies that examined cervical cancer incidence in the U.S. demonstrated that cervical cancer incidence among Filipino American women is higher than White women. It has been demonstrated that Filipino American women have higher rates of

diagnoses at a later stage and have a higher risk of dying from the disease than do White women.

Colorectal Cancer

Approximately 75,810 women in the U.S. will be diagnosed with colon and rectum cancer in 2006, and an estimated 27,300 women will die from this disease. This is the third most common cancer among men and women. When colorectal cancer is diagnosed at the localized stage, chances of surviving for at least 5 years is 90%; however, only 39% of the total cases are diagnosed at this early stage. Only 10% of those diagnosed with metastases survive, a dramatic drop from when the cancer is diagnosed early (American Cancer Society, 2006a). Thus, it is imperative to diagnose colorectal cancer early. Asian American women have lower rates of colorectal cancer compared to White women (39.7 versus 45.3 per 100,000). Rates of mortality from this disease are also relatively low in Asian American women compared to White women (10.6 versus 16.8 per 100,000; American Cancer Society).

Filipino American women have low rates of incidence of colorectal cancer. Four studies reported on rates of colorectal incidence and mortality. Pagano, Morita, Dhakal, Hundahl, and Maskarinec (2003) examined all colorectal cancer patients in the Hawaiian Tumor Registry (HTR) from 1960-2000 and reported that Filipino American women comprised 8% of all patients. They had the lowest rates of incidence after Japanese American, White, Hawaiian, and Chinese American groups. Wegner, Kolonel, Nomura, and Lee (1982) examined a subset of the patients in the HTR from 1960-1974 and demonstrated the same results. Both studies reported that Filipino Americans had the second highest rates of mortality due to colorectal cancer; however,

it is unclear whether this applies to Filipino American women, who have a disproportionately lower rate of colorectal cancer incidence compared to Filipino American men. Miller, Scoppa, and Feuer (2005) showed that Filipino American women's rate of colorectal cancer was 14.35 per 100,000 based on the Surveillance, Epidemiology, and End Results (188-1992). Another recent study by Chu and Chu (2005) showed that rates of colorectal cancer mortality among Filipino American women are rising; rate in 1999-2001 was 8.8 per 1000,000, which is higher than mortality rate from 1988-1992 (7.5 per 100,000).

In sum, Filipino American women have the second highest rates of breast cancer incidence among all the Asian subgroups, and have the second highest rates of mortality and late-stage diagnoses among all Asian subgroups and White women. Rates of mortality from breast cancer are also rising. Rates of cervical cancer incidence, late-stage diagnoses and mortality among Filipino American women are also higher compared to White women. Colorectal cancer rates for Filipino American women are the lowest compared to Japanese American, Caucasian, Chinese American, and Hawaiian groups; however, as a group, Filipino Americans have the highest mortality rates from this cancer. Rates of mortality from colorectal cancer are rising among Filipino American women. The high rates of late-stage diagnoses and mortality that result from all three cancers underscore the importance of early detection of cancer through screening.

C. Cancer Screening among Filipino American women

Healthy People 2010 is a set of national health objectives used to identify threats to health that are preventable (US Department of Health and Human Services,

2006). Healthy People 2010 stems from initiatives from the past two decades (i.e., 1980 *Promoting Health/Preventing Disease: Objectives for the Nation,* and *Healthy People 2000: National Health Promotion and Disease Prevention Objectives)*. In these initiatives, nation-wide goals are set to reduce these preventable threats, which allow individuals, community groups, state- and federal groups to have uniform markers for improvement. Early detection of cancer through regular screening, as well as practicing healthy prevention behaviors are promoted in Healthy People 2010. Rates of screening and prevention behaviors in past studies, as well as the current study, are framed in the larger context of Healthy People 2010.

Breast Cancer

Studies have shown that early detection of breast cancer can lead to increase in chances of survival and opportunities for more treatment options (Smith et al., 2004). Early detection can be done through screening mammography, in which an x-ray is taken of the breast to detect lumps. Screening mammograms are used for asymptomatic and healthy women, while diagnostic mammograms are usually performed as a follow-up to changes in the breast that are detected during a breast self-exam (BSE) or a clinical breast exam (CBE). Annual screening mammography for women 40 years and older is recommended, and those with higher risk are encouraged to talk to their physicians about screening earlier or conducting additional tests. Clinical breast exam (CBE), when a professional health care provider examines a woman's breast for lumps or abnormalities, is also recommended annually for women 40 years and older. CBE is also recommended about every 3 years as part of the routine physical examination among women in their 20s and 30s. Breast self-exam

(BSE), when the woman examines her own breast monthly, is optional for women starting in their 20s (American Cancer Society, 2006b).

Only a handful of research studies documents breast cancer screening practices of Filipino American women. In general, the rates of mammography screening in this group are rising, perhaps following the secular trend of increase in mammography in the general population. In the final review of Healthy People 2000, a publication summarizing the nation's progress toward a set of health objectives, the proportion of women 50 years and older who received a mammogram in the past year or the past two years was 64%, exceeding the set goal of 60% (National Center for Health Statistics, 2001). Healthy People 2010 goal for breast cancer screening is to increase the proportion of women 40 years and older who received a mammogram in the past two years from 67% (as of 1998) to 70%. In 1998, the proportion of Asian American women 40 years and older who reported having a mammogram within the past 2 years was 61% (Department of Health and Human Services, 2000).

Wu, Bancroft, and Guthrie (2005) published a review of breast cancer screening practices and their correlates and reported three studies that related to Filipino Americans: Maxwell, Bastani, & Warda, 1997 and Maxwell, Bastani, & Warda, 2000; and Ko, Sadler, Ryujin, & Dong, 2003. In three separate manuscripts, Maxwell, Bastani, and Warda (1997,1998, and 2000) report on the screening practices of 218 Filipino American immigrant women aged 50 and older who live in Los Angeles. Sixty percent of the sample had at least a college education, 74% had health insurance (Medicaid and Medicare), and 38% had incomes less than $10,000/year. Only 35% of these women reported ever having had a clinical breast exam and 66%

reported ever having had a mammogram. Forty-two percent of the women reported having a mammogram in the past year, and 54% reported having had a mammogram in the past 2 years.

Using logistic regression analyses, the authors demonstrated that the following demographic variables were predictive of higher mammography use: higher percentage of lifetime spent in the United States; comfort in requesting a mammogram; and ever having had a check-up when symptoms were not present. Lower rate of mammography use was also predicted by endorsement of difficulty in getting to a facility for a mammogram. In addition, bivariate analyses showed that the following predictors had significant positive relationships with mammography use: whether women received a physician's recommendation for a mammogram; whether they felt comfortable requesting a mammogram; whether they had friends and relatives who had received mammograms; their perceived support from others in getting a mammogram; whether they had health insurance; how long they had stayed here in the U.S.; whether they had a checkup without any symptoms; and whether they were bicultural or acculturated. Negative predictors included: concern over cost, belief that a mammogram is only needed in the presence of symptoms, inconvenience of time and difficulty in getting to the mammography facility, embarrassment, less acculturation, and use of traditional medicine.

In 2003, Maxwell, Bastani, Vida, and Warda invited 530 Filipino American women 40 years and older to participate in a randomized clinical trial to test the efficacy of a cancer education intervention. Four hundred and forty-four women with a mean age of 63 years participated. About 60% of the women reported having at least

some college education, and about half the sample was married. Forty-eight percent of the women reported having had a mammogram in the past year, and 81% reported ever having had one. While there was an increasing trend in number of Filipino American women who reported ever having had a mammogram in these two studies, the percentage of women in compliance with screening guidelines was still lower than the Healthy People 2010 goal (Department of Health and Human Services, 2000).

Ko, Sadler, Ryujin, and Dong (2003) reported similar rates of mammography screening for Filipino American women. They conducted a grocery-store based educational intervention in San Diego, in which women 18 and over were invited to participate as they entered or left the grocery store. Two hundred and forty-eight women participated, with a mean age of 45 years. Approximately 47% of the women 40 years and older reported having had a mammography within the past year, which is similar to Maxwell et al's (2003) findings. Forty-three percent of the women reported having had a CBE in the past year. Of those women 50 years and older, 56% reported having a mammogram and 47% reported having a CBE in the past year. However, the authors did not report any predictors of cancer screening and it is unknown which demographic variables were related to screening.

Kagawa-Singer and Pourat (2000) assessed breast and cervical cancer screening rates of Asian American women who participated in the National Health Interview Survey (NHIS) in 1993 and 1994. Forty-three percent of Filipino American women 40 years and older reported having a mammogram within the past year. Level of education was an important predictor among Filipino American women. Fifty-three

percent of those in grades 6-12 had never had a mammogram compared to 20% of those in grades 13-18.

In 2004, Chen et al. examined breast cancer screening rates among Asian Americans through a population-based study that was conducted using random-digit dialing among women in Los Angeles county. Eighty-two Filipino American women participated in their study. Among Filipino American women 50 years and older, rates of ever having had a mammogram (88%) and ever having had CBE (83%) were comparable to Whites (81% and 80%, respectively) in this sample. The only factor that influenced breast cancer screening among the entire Asian American group was age, with older women screening less.

The most recent study (Somkin et al., 2004) report data on breast cancer screening from the "Pathfinder's Project" held in Northern California. Authors used random digit-dialing to collect breast cancer screening information among women between 40-74 years old. Forty-eight percent of their Filipina sample endorsed having had two recent (within 15 months of interview) mammogram, while 89% endorsed ever having had a mammogram.

Studies on Filipino American women demonstrate that their rates of breast cancer screening are increasing. The most recent study reported that most women are likely to report having had at least one mammogram, which reflects the increasing trend of breast cancer awareness (American Cancer Society, 2006a). Older women and those with less education were less likely to get a mammogram. Recommendation from physicians, having a check-up without symptoms, and feeling more comfortable requesting a mammogram were predictors of screening. Acculturation and length of

stay in the U.S. were both predictors of screening as well. However, there was a lack of information on culture-specific variables that may affect Filipino American women's breast cancer screening behaviors.

<u>Cervical Cancer</u>

Cervical cancer rates have been dropping in the U.S. due to the increase in prevalence of the Pap screen, which allows discovery of pre-invasive lesions in the cervix. Survival rates for those with pre-invasive lesions are nearly 100%. Treatment of invasive cervical lesions is the most successful of all cancer treatments when detected at an early stage, with a 5-year survival rate of 92% (American Cancer Society, 2006b). Thus, screening for cervical cancer is very important. Women should begin cervical cancer screening three years after they begin intercourse, but no later than when they are 21 years old, and it is recommended that a regular Pap smear be conducted every year. At age 30, women who have had three normal Pap results in a row may get screened every 2-3 years. If a woman has had a total hysterectomy, she may skip cervical cancer screening.

Healthy People 2010 goals for cervical cancer screening are based on two things: ever having had a Pap smear, and having a Pap smear in the past 3 years. In 1998, 92% of all women 18 years and older, and 78% of Asian American women 18 years and older reported ever having had a Pap smear. Seventy-nine percent of all women 18 years and older, and 67% of Asian American women 18 years and older reported having a Pap smear in the past three years. The Healthy People 2010 goal is to increase the rates of ever having had a Pap smear to 97%, and having a Pap smear in the past three years to 90% (Department of Health and Human Services, 2000).

McBride et al. (1998) recruited an age-stratified random sample of 875 Filipino American women ages 20 and older in Northern California. Sixty-three of the women ages 50-64 years and 53% of those ages 65 and older were compliant with cervical cancer screening, which was defined as having had a Pap test within the past 2 years. More than half of their participants (53%) reported having a college education, and almost all reported having insurance (91%). The group consisted of mostly foreign-born women, with 68% of the women reporting having lived in the United States for over 10 years.

Maxwell et al. (2000) examined cervical cancer screening among Filipino American women 50 years and older, and reported that 48% percent had a Pap smear in the past two years. The authors found that ever having had a check-up and length of stay in the United States were significant predictors of cancer screening. In a different study conducted years later, Maxwell et al. (2003) demonstrated that 84% of Filipino American women 40 years and older reported ever having had a Pap smear, and 42% reported having a Pap smear within the past year.

In another study, 64% percent of Filipino American women reported having had a Pap smear within the past 3 years (Kagawa-Singer & Pourat, 2000). The authors found that higher levels of education, having insurance and having a usual source of health care were highly correlated with adherence to screening. The most recent study on Filipino Americans (Chen et al., 2004) showed that the rate of having had a pap smear in the past two years among Filipino American women (78%) was higher than other Asian groups (52%-56%), but lower than Whites (81%). The authors found that

younger age (18-20 years) and less than 10 years of U.S. residency accounted for significantly lower rates of Pap smears among Asian American women.

Chen (2004) reported that 78% of Filipino American women endorsed having a Pap smear in the past two years. The most recent study (Somkin et al., 2004) report data on cervical cancer screening from the "Pathfinder's Project" held in Northern California. Authors used random digit-dialing to collect cervical cancer screening information among women between 40-74 years old. Seventy-three percent of their Filipina sample endorsed having had two recent (within the past 3 years) pap smears, while 95% endorsed ever having had a pap smear. Rates of pap smear test among Filipino Americans

The most recent study (Somkin et al., 2004) report data on cervical cancer screening from the "Pathfinder's Project" held in Northern California. Authors used random digit-dialing to collect cervical cancer screening information among women between 40-74 years old. Seventy-three percent of their Filipina sample endorsed having had two recent (within the past 3 years) pap smears, while 95% endorsed ever having had a pap smear. While these rates show considerable improvement than other studies, they are still short than the goals set for Healthy People 2010.

Colorectal Cancer

Colorectal cancer is the third most common cancer among American men and women. There is a decreasing trend in colorectal cancer incidence, postulated to be the result of increased screening and removal of pre-cancerous colorectal polyps. The five-year survival rate of colorectal cancer diagnosed in the localized stage is 93%, which makes it imperative to continue screening for this disease (American Cancer

Society, 2006a). Recommended screening includes a yearly fecal occult blood test (FOBT), a home kit to check for blood in the stool, or flexible sigmoidoscopy every 5 years, or a combination of both every 5 years. Abnormal results from these tests should be followed up with colonoscopy. Colonoscopy can also be used as a screening tool, and if normal, can be repeated after 10 years. Double-barium enema can also be used as a screening tool and repeated every 5 years (American Cancer Society, 2006b).

The Healthy People 2010 goal is to increase colorectal cancer screening rates of all men and women 50 years and older. This is measured using the following guidelines: fecal occult blood test (FOBT) within the past two years and ever having had a proctosigmoidoscopy. The goals for 2010 is to have 50% of all men and women 50 years and older adhering to those guidelines. In 1998, 35% of all men and women 50 years and older, and 33% of all Asian American men and women 50 years and older reported having had an FOBT in the past two years. Thirty-seven percent of all men and women 50 years and older, and 35% of Asian American men and women reported ever having had a proctosigmoidoscopy.

There are two studies that reported colorectal cancer screening rates of Filipino Americans. Maxwell et al. (2000) examined colorectal cancer screening rates, defined as having had a FOBT within past year or a lower endoscopic exam within the past 5 years. The authors found that 25% of the sample reported being compliant with screening guidelines. This rate is higher than average screening rates of Asian American women in general (20%; Breen, Wagener, Brown, Davis, & Ballard-Barbash, 2001) but lower than the national rates reported in the 1998 NHIS data.

Additionally, only 14% of Filipino American women reported adherence to all three (colorectal, breast, and cervical) cancer screening tests (Maxwell et al). Rates of colorectal cancer screening among Filipino American women appear low relative to screening for other types of cancer.

Wong et al. (2005) examined colorectal cancer screening data from the 2001 California Health Interview Survey (CHIS). Two hundred eighty Filipino men and women participated in the study, approximately 56% were women. Half the sample had a college degree or higher, 71% were married, and only 21 % have been in the US shorter than 15 years. Thirty-nine percent reported ever having had an FOBT, 37% reported ever having been screened with sigmoidoscopy/colonoscopy, and 57% reported ever having had one of these procedures. In contrast, 18% had FOBT in the past year, 36% had sigmoidoscopy/colonoscopy in the past 10 years, and 47% had up-to-date screening (either FOBT in past year or sigmoidoscopy/colonoscopy in past 10 years). It is difficulty to ascertain Filipino American women's rates of screening; however, results of this study highlight the need for increase in colorectal cancer screening in this community.

D. Cancer Prevention among Filipino American women

Prevention is defined as reduction of cancer mortality by lowering cancer incidence (Stein & Colditz, 2004). Based on previous research, the following modifiable behaviors contribute to the prevention of cancer: avoiding use of tobacco, avoiding excessive alcohol consumption; eating low-fat, high fiber foods; being physically active; and maintaining recommended body weight (Stein & Colditz, 2004). With regard to Filipino Americans, LeMarchand et al. (1997) explored

different correlates of colorectal cancer incidence and found that not smoking, lower

fat intake, having ideal body weight, and increased physical activity were all related to

decreased risk of cancer incidence among Filipino Americans. Another study showed

that among Filipino Americans, those with low alcohol consumption (1-7 drinks a

week) had a 20% decrease in morbidity rates (Maskarinec et al., 1998).

There is limited information on Filipino American women's rates of smoking,

adherence to good diet, levels of physical activity, and maintenance of body weight.

However, results found for the larger Asian American group suggests that Filipino

Americans may have relatively low risk based on these behaviors. Asian American

women have very low rates of cigarette smoking use compared to other ethnic groups

(7.9% versus 23% for Whites). Asian American women report more leisure time

physical activities than other minority groups (33% versus 25% for Latinos and

Blacks), but slightly less than White women (34%). In addition, only 8.3% of Asian

American women are obese, a dramatically lower rate than that found for American

Indian (43.2%) or Black women (35.9%; US Bureau of the Census, 2000b).

Tobacco use

Cigarette smoking is responsible for at least 30% of cancer deaths, and is a

contributing cause in the development of cervix and colorectal cancer (Office of the

US Surgeon General, 2000). Not smoking has been associated with increased cancer

screening (Rakowski, Bellis, Velicer, & Dube, 1993). Rakowski, Clark, and Ehrich

(1999) examined data from NHIS 1992-1994 Health Promotion Surveys and reported

that women who smoked more than a pack of cigarette a day were significantly less

likely to have a mammogram and had lower reported Pap test rates compared to women who never smoked.

The 1992-1994 NHIS disaggregate data on Asian Americans revealed that 17% of Filipino Americans were current smokers (Kuo & Porter, 1998). The average number of years as a smoker for Filipino Americans was less than White women (17 versus 24 years), and the average number of cigarettes smoked per day was lower as well (7.3 versus 16.6 cigarettes; Bernstein et al., 1995). Data from CSP (1972-1991) showed that Filipino American women who had been diagnosed with breast cancer had very low rates of smoking (2.3% versus 9.9% of White women).

Tang, Shimizu, and Chen (2005) examined data of 923 Filipino men and women who participated in the 2001 California Health Interview Survey (CHIS). Sixty-two percent of their sample was women. Most of the sample (70%) reported incomes greater than $30,000, college degree or beyond (48%), and high English language proficiency (i.e., speak only English at home, or spoke English "very well" when reported another language spoken at home). Results of this study showed that Filipino women with high English language proficiency reported higher rates of smoking (13.2%) compared to those with low English language proficiency (5.4%). Maxwell, Bernaards, & McCarthy (2005) also examined data from the 2001 CHIS, and reported that 11% of Filipina women reported current smoking.

Diet

Diet has been identified as a risk factor for breast cancer. Research has shown that healthful dietary patterns can reduce incidence of cancer (Kritchevsky, 2003), and that cancer death may be avoidable through dietary changes (Steinmetz & Potter,

2002). High-fat diets have been associated with increased risk of colon cancer. Cancer risk reduction, especially for colorectal cancer, can be achieved by eating at least 5 servings of vegetables and fruits per day, choosing whole grains rather than refined foods, limiting intake of red meat, and avoiding excess alcohol consumption (American Cancer Society, 2006b).

There is limited literature on Filipino American dietary practices. In one study examining healthy behaviors of an elderly Filipino American group, DiPasquale-Davis and Hopkins (1997) showed that most endorsed eating fried food, fish and poultry and complex carbohydrates. Kolonel et al. (1985) reported that Filipino Americans in Hawaii have diets that are traditional Southeast Asian (e.g., rice and fish), and thus have lower beef and fat intake than Caucasians. Results of the Behavioral Risk Factor Surveillance System (BRFSS) 2000 in Hawaii showed that Filipino Americans consumed an average of 4.2 fruits and vegetables (Hawaii State Department of Health, 2003).

Alcohol Consumption

Alcohol consumption can cause breast cancer and is associated with increased risk of colon cancer (Stein & Colditz, 2004). The current recommendation for women is to have no more than one drink (12 ounces of beer, five ounces of wine, or 1.5 ounces of 80-proof distilled spirits) per day (American Cancer Society, 2006b). Lubben, Chi, and Kitano (1988) explored drinking rates among a sample of 298 Filipino Americans and showed that half the women reported abstaining from alcohol consumption, and virtually none reported binge drinking. These rates are similar to those found by the Behavioral Risk Factors Surveillance System (2003) in Hawaii,

which showed that only 9% of Filipino American men and women reported binge drinking and only 1.5% reported heavy drinking. These rates for heavy and binge drinking are low compared to Whites (8% and 14.8%, respectively; Hawaii State Department of Health, 2003). Participation in religious service was a significant predictor of abstaining from alcoholic drinking among Filipino American women (Lubben et al.).

<u>Physical Activity</u>

Reduction of cancer risk has also been linked to regular physical activity through many different mechanisms such as helping an individual to maintain a healthy body weight (Freidenreich, 2001). Physical activity has also been shown to reduce colon cancer risk by encouraging movement of food through the intestine, and also to reduce breast cancer risk by limiting exposure of the breast to circulating estrogen (McTiernan, Ulrich, Slate, & Potter, 1998). For optimal cancer risk reduction, recommended levels are to engage in moderate-to-vigorous physical activity at least 30-45 minutes on five or more days of the week (American Cancer Society, 2006b).

However, for individuals with sedentary lifestyles, any increase in physical activity has also been shown to aid in reduction of cancer risk (Pate et al., 1995). To date, there is only one study on Filipino American women's physical activity levels. Maxwell, Bastani, Vida, and Warda (2002) examined physical activity of 487 Filipino American women 40 years and older, The authors reported that Filipino American women endorsed walking as the most frequent form of physical activity. The authors also reported that only 10% of the sample reported being sedentary. At least 34% of the sample endorsed physical activity at least three times per week.

Maintenance of recommended body weight

Maintaining a healthy weight is important to reduce the risk of cancer (Vainio, & Bianchini, 2002). Being overweight or obese increases the risk of several cancers, including cancers of the breast (among women 50 years and older) and colon. Ideal body weight, gauged through the Body Mass Index (BMI), is closely tied with healthful diet and adherence to recommendations for physical activity (Stein & Colditz, 2004).

In addition, there are studies to suggest that obesity may be a barrier to preventive care. Fontaine, Heo, and Allison (2001) examined the relationship between obesity and rates of mammography, clinical breast exam and pap smears in a population-based survey and found a J-shaped (not linear) relationship between BMI and screening. Women who were underweight were more likely to not be screened with Pap smear or mammogram within the past 2 years. Overweight and obese women were also not likely to have had a mammogram or clinical breast exam within the past 2 years. Similar results were demonstrated in other studies (Adams, Smith, Wilbur, Grady, 1993; Wee, McCarthy, Davis, & Phillips, 2000) suggesting that maintenance of healthy weight is related to other healthy behaviors associated with cancer screening.

Only 5.4% of a sample of Filipino Americans (N=875) reported BMIs greater than 30 in a recent study examining risk factors of diabetes in this population (Cuasay, Lee, Orlander, Steffen-Batey, & Hanis, 2001). Yates, Edman, and Aruguete (2004) reported that Filipina women had mean BMI of 21.71 (*SD* = 3.86). These results were based on a sample of 59 community college female students in Hawaii who self-

identified as Filipino. The most recent study on Filipino American women's BMI

showed a different picture. Araneta et al. (in press) reported that 49% of the Filipina

women reported BMIs > 25 (overweight and obese), and 9.3% reported BMIs greater

than 30 (obese). Their results were based on Filipinas aged 40-79 years old from San

Diego, most of whom were born in the Philippines.

In sum, it appears that Filipino Americans may have low risk of cancer based

on these modifiable behaviors. The very small literature to date suggests that Filipino

American women have low rates of smoking, endorse good dietary habits, have low

rates of alcohol consumption, endorse some levels of physical activity, and tend not to

be obese or overweight. Because studies of other groups suggest that these modifiable

behaviors are related to screening, it is important to assess these prevention behaviors

and examine how they relate to screening behaviors in Filipino Americans.

E. General Predictors of Cancer Screening

In a recent review of the National Health Interview Survey (NHIS) data, Hiatt,

Klabunde, Breen, Swan and Ballard-Barbash (2002) presented broad categories of

correlates of cancer screening practices: sociodemographic variables, health care

system correlates, and knowledge/behavioral/attitudinal variables.

Sociodemographic variables

The following sociodemographic variables are often assessed in conjunction

with screening among the general population: age, level of education, and annual

household income, marital status, and work status. Older individuals were less likely

to be screened for breast and cervical cancer but more likely to be screened for

colorectal cancer (Hiatt et al., 2002). Higher levels of education are associated with

higher screening rates for breast, cervical and colorectal cancers, and those with poor and near poor income levels have lower screening rates than those with middle/high income levels (Breen et al., 2001). Level of education and income are usually positively correlated with having health insurance and usual source of health care, two other variables that are also very strong predictors of screening.

Maxwell et al. (2000) examined sociodemographic variables as predictors of screening among Filipino American women. These women are more likely to be screened for colorectal cancer with advancing age; however, age was not a significant predictor for breast and cervical cancer screening. Filipino American women with higher levels of education were more likely to be screened for breast cancer, but not for cervical or colorectal cancer.

Additional demographic variables such as country of origin, and length of stay in the United States are also assessed in populations with high proportion of immigrants, such as the Filipino American community. A recent study (Maxwell et al., 2000) examined these variables in conjunction with breast cancer screening. Country of origin was not been shown to be a predictor of screening; however, length of stay in the U.S. was a powerful predictor of screening for cancer. Length of stay was used as a proxy for acculturation in this study.

Health care system correlates

The health care system correlates that were included in Hiatt et al.'s (2002) review were: having a usual source of health care, and having medical insurance. Those who reported having a usual source of healthcare were three to five times more likely to have been screened for breast, cervical and colorectal cancer than those who

did not; in addition, those who reported having insurance were twice more likely to have been screened than those who did not. Health insurance coverage and usual source of health care were highly correlated with socioeconomic status; however, they were also shown to be independent predictors of breast, cervical and colorectal cancer screening even after accounting for SES (Breen et al., 2001). Among Filipino Americans, having insurance was positively correlated to adherence to breast cancer screening (Maxwell et al., 2000). Maxwell et al. also found that there were strong associations of usual source of health care ("have you had a recent check-up?") to breast, cervical, and colorectal cancer screening cancer.

Knowledge and attitudes

There is a known relationship between knowledge about breast cancer prevention and risk factors and mammography screening among the general population (Hiatt et al., 2002) and Asian American ethnic groups (Yu, Hong, & Seetoo, 2003). In addition, attitudes toward cancer and cancer screening have been shown to relate to screening; those who did not endorse a prevention orientation were less likely to be screened (Tang, Solomon, Yeh, & Worden, 1999). The following attitudes are often assessed: perceived risk, or the woman's perception of her chance of getting cancer; perceived barriers such as pain, embarrassment, and transportation problems; and perceived benefits of getting the test (e.g., finding cancer early). Women's perceptions of group norms and support have also been assessed. Group norms are defined as the woman's perception of frequency of screening among her friends and family, and perceived support is a woman's perception of how supportive her friends and family are of her screening practices.

Knowledge questions used in a previous study tested Filipino American women's information about risk factors of cancer (Maxwell et al., 1997). It was hypothesized that more knowledge would be related to higher adherence to breast cancer screening. The authors found that no relationship between knowledge and screening rates, with the exception of endorsement of mammography as a diagnostic, not a screening tool, which negatively correlated with screening. Perceived risk, perceived benefits, perceived barriers, group norms, and social support were also assessed, and authors demonstrated that perceived risk and benefits were not related to mammography screening. Only perceived barriers such as concern over cost, time and difficulty of getting to the facility and embarrassment were negatively correlated with screening (Maxwell et al.). In addition, perception of mammography use as a group norm, and perceived support from family and friends in getting a mammogram were positive predictors of screening (Maxwell et al.).

E. Culture-specific predictors of cancer screening

Many papers on Filipino Americans postulate that traditional health beliefs influence concepts of illness (McLaughlin & Braun, 1998), medical decision-making (Klessig, 1992), and coping with illness (Braun & Browne, 1998). Traditional Filipino values, such as maintaining harmony and having close family ties, have also been postulated to influence Filipino Americans' preventive health care behaviors (Becker, Beyene, Newsom, & Rodgers, 1998). However, most of these studies have not quantitatively tested whether Filipino Americans' health beliefs or values affect their health. This study aims to examine relationships of cancer screening to the following

culture-specific variables: acculturation, views on health and illness, traditional values, and religiosity.

Only one study showed that traditional Filipino cultural beliefs and values correlated with Pap smear rates (McBride et al., 1998). Researchers conducted 22 individual interviews and six focus groups of young, middle-aged, and older women to collect in-depth data on health beliefs and practices of Filipino Americans. A 165-item survey on demographics, health status, social support, use of medical care, access to care, cancer screening beliefs, acculturation, Filipino cultural values, and traditional health practices was constructed. Then, random digit-dialing was used to recruit 875 women aged 20 years and older who self-identified as Filipino American to participate in the telephone survey.

Results of their study showed that older women who endorsed English language use and traditional health beliefs were found to be more likely to have been screened. English language use and traditional health beliefs were not related to screening among younger women. However, younger women who endorsed modesty and traditional gender role values were less likely to have been screened. Modesty and traditional gender role values did not play a role in screening among older women.

Acculturation

Acculturation is defined as the process by which attitudes and behaviors of one person's culture are changed as a result of contact with a different culture. Berry (2003) conceptualized acculturation as having two independent dimensions: the individual's affinity for his/her own culture, and affinity toward the new culture. Acculturation has traditionally been measured by language use since more

acculturated individuals tend to use the language of the dominant culture (Chun, Organista & Marin, 2003).

Acculturation has also been shown to relate to screening practices. A subgroup of less acculturated Hispanic women who had less knowledge about Pap smears were also less likely to adhere to screening recommendations (Harmon, Castro, & Coe, 1996). Acculturation is related to mammography utilization among Filipino Americans as well. More "traditional" Filipino Americans reported lower mammography screening compared to those who were "acculturated" or "bicultural" (Maxwell et al., 1998). Acculturation is also related to cervical cancer screening. Less acculturated older Filipino American women were less likely to be screened for cervical cancer. Acculturation was not a predictor for reported Pap smear adherence among younger Filipino American women (McBride et al., 1998).

Views on Health and Illness

The Filipino concept of health centers around balance (timbang). Health is equated to balance and illness is equated to imbalance (Anderson, 1983). Two types of imbalance were described in a recent qualitative study of Filipino American elderly with chronic disease: imbalance caused by humoral pathology (hot/cold; Gould-Martin, 1978) and that caused by stress (Becker, 2003). Humoral pathological concepts are pervasive in the Philippines. Filipinos believe that rapid shifts from "hot" to "cold" lead to illness. When Filipinos come from a hot climate (Philippines) to the cooler coastal areas of the United States, illness can be attributed to this move (Becker, 2003). In addition to the hot/cold theory, Filipinos also endorsed stress from too much worrying and from being overworked as a cause of illness (Becker, 2003).

A quantitative study on Filipino American elderly documented that participants endorsed that health is a gift from God (DiPasquale-Davis & Hopkins, 1997). Illness is sometimes thought of as a punishment from God (Anderson, 1983). However, as a people, Filipino Americans are also influenced by indigenous beliefs such as being possessed, or of having offended a spirit, a belief that is common in Southeast Asia (Sharp, 1982; Orque, 1983). Cause of illness can be attributed to mystical reasons (e.g., retribution from ancestors), personal reasons (e.g., social punishment delivered by supernatural forces), and other naturalistic reasons (e.g., lightning and other natural events; McBride, 2000).

Among Filipino Americans, illness can be attributed to causes other than that of the biomedical model. Thus, alternative ways of treating illness also exist. Becker et al. (1998) conducted a qualitative study on Filipinos with chronic illnesses and reported that approximately 35% of the sample endorses alternative treatment such as getting a massage with ointment (hilot). However, only about 4% of the women reported going to a faith healer.

Traditional values

Because of the collectivistic and interdependent nature of the Filipinos (Kim et al., 1999), group identity is reinforced in many ways. A dominant cultural value is one of harmony (pakikisama). Maintaining harmony or smooth interpersonal relations involves maintaining good feelings in all personal interactions and getting along with others, sometimes at the cost of one's own feelings. Getting along without outward signs of conflict is important (Lynch, 1964). Maintenance of harmony is exemplified in traditional gender roles. Traditional gender roles in the Filipino culture place higher

value on men, and wives are expected to appear submissive in public (Almirol, 1981). Traditional gender role values have been shown to relate directly to Pap smear adherence (McBride et al., 1998). Those who endorsed more traditional gender roles also had lower screening rates than those who did not endorse them.

Shame (hiya) is a construct that is closely tied with maintaining harmony. It can be conceptualized as a preoccupation with how one is perceived through others' eyes (Wilson & Billones, 1994). It is important to appear healthy and active. Filipino Americans often minimize the gravity of their illness, perhaps to minimize the shame of not being healthy (Becker et al., 1998). Other literature reports that Filipino Americans express their pain and suffering with family, but are very reluctant to show others their illness (Baysa, Cabrera, Camilon, & Torres, 1980).

Reciprocity of benevolence is also postulated to be an important Filipino value. Debt of gratitude (utang na loob), or a sense of obligation to repay those who express kindness, is similar to the Asian value of filial piety, or the importance of taking care of one's parents when they are too old to care for themselves. However, this obligatory sense of repayment can also be activated in relationships with other people, not just family. Forms of repayment vary from simple acts of repayment to grand gestures such as inclusion of the doer into the clan as part of the extended family (Cimmarusti, 1996).

The relationships between traditional values/views on health and illness and other general predictors (e.g., access to healthcare) have not been tested. However, the literature on Filipino American women suggests that age moderates the relationship between traditional values/views on illness and health (McBride et al., 1998). Among

older women, endorsement of traditional views on health and illness was associated with less screening.

Religiosity

Religiosity can be conceptualized in many ways, and has been shown to affect many outcomes in health (Fetzer Institute National Workgroup on Aging, 2003). Most Filipino Americans are Catholic (Becker, et al., 1998; Anderson, 1983), and there is some literature to support that their level of organizational religiousness is related to alcohol intake, a modifiable cancer prevention behavior (Lubben et al., 1988). Organizational religiousness, which is defined as the involvement in formal public religious institution measured by attendance at religious services or other activities of worship, has been linked to better health (Idler, 2003). Filipinos are family oriented, and it is not unusual for Filipinos to have a bilateral extended family system in the Philippines. This "clan" familial system is recreated when Filipino Americans come to the U.S. (Cimmarusti, 1996), and it is possible that one mechanism of doing so is through church related activities.

In addition to being Catholic and active in church-related activities, there is another aspect of religiosity that may be linked to health among Filipino American women. "Bahala na" (not to worry) is a culture-specific belief that one should not worry about unpleasant events because these are not in one's control. It is related to the idea of destiny and that it is God's will that events will happen (Wilson & Billones, 1994). This belief can be equated to faith or a lending of control to a higher power. While there are no studies examining religious-based locus of control and cancer screening among Filipino American women, there is literature in the general

population that suggest that stronger God locus of control is negatively related to screening (Holt, Clark, Kreuter, & Rubio, 2003).

G. Summary

In sum, Filipino American women have lower rates of breast than Whites but higher chances of being diagnosed at a later stage and from mortality due to these cancers. Filipino American women's rates of cervical cancer incidence, later stage diagnoses and mortality is also higher than Whites. Finally, Filipino American women have one of the lowest rates of colorectal disease incidence; however, their mortality from this disease is the second highest among all group, underscoring the need for early detection and cancer prevention of cancer.

Screening rates for breast, cervical, and colorectal cancer among Filipino American women are lower than the goals set for Healthy People 2010, and there is dearth of literature on their modifiable risk factor behaviors related to cancer screening. It has been shown that higher education, higher SES, having health insurance, having a usual source of health care, increased knowledge about cancer, higher acculturation, perceived support, and group norms are predictive of screening adherence for breast and cervical cancers in Filipino Americans. Perceived support and group norms were also positive correlates of breast cancer screening. Finally, concern over cost of mammography, time constraints, difficulty getting to the facility (to get a mammogram), embarrassment, endorsement of more traditional health beliefs and Filipino values were negatively correlated with screening. Relationships of these predictors with breast, cervical and colorectal cancer screening, and the relationships among screening and prevention behaviors were examined in this present study.

The following model will be tested. The latent variable cancer prevention composed of early detection and prevention behaviors of cancer will serve as the outcome variable. There are four pathways of predictors of the outcome variable. Sociodemographic variables have been shown to correlate with screening and prevention behaviors. Health care system correlates have also been shown to highly correlate with screening, and is hypothesized to mediate the relationship between SES and prevention behaviors. The relationships of latent SES variable (income, level of education, work status), latent health care system variable (usual source of health care and insurance), and the latent outcome variable will be tested.

In past studies on Filipino Americans, acculturation has been shown to predict cancer screening. Acculturation is proposed to affect cancer prevention behaviors through three different pathways: social constructs such as group norms, organizational religiousness, and perceived support; culture-specific variables such as traditional health beliefs, Filipino values and religiosity; and general health beliefs such as knowledge of cancer, perceived benefits and barriers, and perceived risk. There are no known studies that test the relationships of social constructs, culture-specific variables and general health beliefs, but they are hypothesized to correlate. Finally, age has been shown to moderate the relationship between culture-specific variables and screening, and will also be included in this model.

H. General Aim

Filipino Americans are the second largest Asian minority group and among the fastest growing minority groups in the United States (Chen, 1998). Breast cancer is the leading cause of cancer death among women in this group (Miller et al., 1996) and is

likely to be detected at later stages (Lin et al., 2002). Filipino American women diagnosed with breast cancer also have higher mortality rates than Caucasians and other ethnic groups (Le Marchand et al., 1984). Rates of colorectal and cervical cancers are relatively low in this population, but mortality from these cancers is disproportionately high (Saunders, 1989; Pagano et al, 2003). There is a dearth of literature on Filipino Americans regarding their cancer prevention behaviors. The overall aim of the study is to extend the literature on Filipino American women's cancer prevention practices by first documenting rates of breast, cervical and colorectal cancer screening and prevention behaviors, then examining the relationships among screening and prevention behaviors. In addition, general and culture-specific predictors of screening practices are examined.

Specific Aim 1. To determine rates of breast, cervical, and colorectal cancer screening among Filipino American women.

There are few studies to date for breast, cervical and colorectal cancer screening among Filipino American women. Maxwell et al. (1997; 1998; 2000) examined breast cancer screening rates in a convenience sample of 218 Filipino American immigrant women. There are only four additional studies on breast cancer screening rates (Maxwell et al., 2003; Kagawa-Singer, & Pourat, 2000; Ko, et al., 2003; and Chen et al., 2004). Four different studies examined cervical cancer screening rates (McBride et al., 1998; Maxwell, et al., 2000; Kagawa-Singer, & Pourat, 2000; Maxwell et al., 2003), and only one study to date has examined screening for colorectal cancer (Maxwell et al., 2003). Consistently, these studies report screening rates that are below the ideal set for Healthy People 2010 (U.S.

Department of Health and Human Services, 2000). In the present study, cancer

screening rates in Filipino American women were measured using questions from the

National Health Interview Survey (NHIS), a nationwide survey that measures

information on population health and is the primary tool for assessment of progress

toward meeting goals of the Healthy People 2010. These rates were reported and

compared to the most recent reported NHIS screening rates.

Specific Aim 2. To determine rates of cancer prevention behaviors among Filipino

American women and to examine their relationships to cancer screening.

Cigarette smoking has been identified as the modifiable lifestyle behavior that

most influences cancer incidence (Meng et al., 1999). Diet has been identified as a risk

factor for breast cancer. Cancer risk reduction can be achieved by choosing whole

grains rather than refined foods, limiting intake of red meat, and avoiding excess

alcohol consumption (American Cancer Society, 2006b). The National Cancer

Institute and the American Cancer Society also recommends the intake of five

servings of fruits and vegetables per day. Reduction of cancer risk has also been linked

to regular physical activity (Freidenreich, 2001). For optimal cancer risk reduction,

recommended levels are to engage in moderate-to-vigorous physical activity at least

30-45 minutes on five or more days of the week (American Cancer Society). Finally,

maintenance of ideal body weight is a modifiable lifestyle choice that can help prevent

cancer. Ideal body weight, gauged through the Body Mass Index (BMI) is closely tied

with healthful diet and adherence to recommendations for physical activity.

There is a dearth of literature among Filipino Americans on these preventive

behaviors. In this study, the following behaviors were assessed: rates of cigarette

smoking, intake of fruits and vegetables, dietary fat intake, alcohol consumption, physically active lifestyle, and maintenance of recommended body weight. Selected questions from the Behavioral Risk Factor Surveillance System (BRFSS), a national telephone surveillance system used to measure health risks in the general population, were used (Centers for Disease Control and Prevention, 2003). The rates of prevention behaviors were reported and compared to the most recent data (Centers for Disease Control and Prevention).

Adherence to cancer screening has also been shown to relate to smoking behaviors and to obesity (American Cancer Society, 2006b). Those who report smoking were also less likely to engage in screening (Rakowski, 1999). Those who were underweight, overweight and obese were also less likely to report screening (Fontaine et al., 2000). Since obesity is closely linked to diet and exercise, it is plausible that these behaviors will also be related to screening. In addition, relationships of screening and prevention behaviors were also examined.

Specific Aim 3. To examine general predictors of participation in cancer screening.

Hiatt et al. (2002) reported that there are four general groups of predictors that have been examined in various cancer screening studies: sociodemographic variables, health care system correlates, and knowledge and attitudes. In the general population, breast and cervical cancer screening rates decrease with age, but colorectal cancer screening rates increase with age. Level of education and income have been shown to positively correlate with screening rates. Having insurance and having a usual source of health care were strong predictors of all three screening behaviors as well (Breen et al., 2001). General knowledge and attitudes related to screening and cancer prevention

have been shown to affect cancer screening among the general population. It has been suggested that health status is related to screening use (Schonberg et al., 2004), with those having better health and less functional impairment reporting higher rates of screening. These variables: sociodemographics, health care system correlates, health status, and general knowledge and attitudes, were examined as predictors of Filipino American women's engagement in recommended screening practices for breast, cervical, and colorectal cancer.

Specific Aim 4. To investigate relationships of culture- specific beliefs and values to cancer screening among Filipino Americans.

Although it has been suggested that Filipino cultural beliefs and values influence health-related practices, these constructs have not always been clearly identified and relationships among beliefs, values and practices are rarely empirically tested. Only one study has explored cultural health beliefs and values in relation to cancer screening and demonstrated that Filipino cultural beliefs and values differentially affect Pap smear adherence by age (McBride et al., 1998). Religiosity and acculturation have also been shown to relate to cancer screening and were tested as predictors of screening in this study.

II. Method

A. Participants

Four hundred and five Filipino American women were recruited to participate in this study. Women aged 21 years and over who self-identified as Filipino or Filipino American were eligible to participate. Approximately 900 surveys were distributed to women in social, church, and student groups. It was not possible to collect information on the women who did not consent to participate.

B. Procedures

Recruitment for underresearched minority populations is challenging and the issue of internal validity and generalizability has been raised. Berg (1999) highlights that the following are essential for successful recruitment in minority populations, especially in the Filipino American community: endorsement from community leaders, advertising in community publications, use of age, gender and culturally matched research assistants. Studies to date on Filipino Americans have relied on recruitment from community-based organizations and churches (Maxwell et al., 2000 and 2003), Asian grocery stores (Sadler et al., 1998), and other community-based sources such as health fairs; also, snowballing techniques utilizing the community leaders have been employed (Berg, 1999).

Participants were recruited anonymously into the study. The increased anonymity was hypothesized to increase likelihood of participation since some sensitive personal, health practices, and beliefs were queried. Participants, therefore, were not required to sign a consent form, or give their names and contact information.

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Women were informed that by completing the survey, it was implied that they provided their consent to participate. However, they were also given the option of providing their names and contact information on a separate card if they were interested in learning about the results of the study.

While the study was not meant to deliver a cancer education intervention, the research assistants fielded any questions related to cancer, offered free NCI brochures on cancer information, and made referrals to other organizations such as the American Cancer Society and the UCSD Cancer Center if participants had any further questions.

There was originally a two-pronged approach for recruitment: through Filipino grocery stores, and through community organizations. However, recruitment at these sites also involved asking current participants to invite other women into the study, and this word-of-mouth method evolved as the third approach for recruitment.

Grocery stores

Managers of Filipino grocery stores or restaurants were approached, the study was explained, and permission was asked to set up a small table or booth outside of these sites. Culturally-aligned icons such as the Filipino flag or traditional Filipino dress decorated the sign inviting Filipino women to complete a questionnaire in order to help increase knowledge about their group. The invitation was intentionally left vague so that there was no bias in recruiting women who were only interested in health or cancer. Prior research has shown that Filipino women who were successfully recruited also felt a sense of pride from being affiliated with a university research study (Berg, 1999), so a banner identifying the researcher's affiliation with the universities was also displayed, which added credibility to the data collection site.

At these recruitment sites, Filipino American research assistants explained the study. The research assistants provided instructions for completing the survey, which took approximately 30 minutes to an hour to complete. After completion of the survey, participants were given their 10-dollar compensation on site. Participants were given a copy of the informed consent (which contained information about the study), as well as the PI's contact information.

<u>Community-based organizations</u>

The second approach was to recruit in Filipino American organizations. There are at least 125 Filipino American associations in or around San Diego county (Bonus, 2000), and the umbrella group, Council of Pilipino American Organizations of San Diego County, Inc. (COPAO), was approached to identify contacts for each group. In addition to COPAO member organizations, student organizations in the area universities, as well as churches in Filipino communities were approached. Presidents or identified leaders of these organizations were approached. The PI asked for permission to attend a meeting or social event in order to recruit participants. The same consenting method used for grocery store recruitment was conducted.

<u>Word-of-mouth approach</u>

For recruitment at both the grocery stores and organizations, packets were prepared in anticipation that women would be interested in taking the survey home instead of completing it on-site. The envelope contained a letter from the PI explaining the study, a copy of informed consent, the survey, the index card requesting their contact information, as well as a self-addressed return envelope. The letter from the PI explained the study, outlined instructions on how to complete the survey, and

explained that participants needed to return the index card with their contact information in order to get compensation. It was instructed that the index card was not to be sent with the survey in order to ensure anonymity.

Potential participants in the study at the grocery stores and community organizations did not only take packets for themselves, they took additional packets for their friends, family members or acquaintances.

C. Measures

Copies of all the measures can be found in the Appendix.

Cancer Screening Rates

Selected questions from the National Health Interview Survey (NHIS) Cancer Control Module 2000 regarding breast, cervical and colorectal cancer screening were used (Centers for Disease Control and Prevention, 2000). The NHIS is a nationwide survey that serves as the principal source of information on the health of the civilian noninstitutionalized population in the United States. This survey is also the primary assessment tool used by the federal government to measure progress in meeting the goals of Healthy People 2000 and Healthy People 2010 (Department of Health and Human Services, 2000). A total of 15 questions that assess breast cancer screening (clinical breast exam and mammography utilization), cervical cancer screening (Pap smear) and colorectal cancer screening (sigmoidoscopy, colonoscopy, proctoscopy, and fecal occult blood test) were administered. These questions included frequency and recency of use of those exams, reasons for exam (screening versus diagnostic), and whether a physician recommended the exam within the past year.

Cancer Prevention Behaviors

Questions from the Behavioral Risk Factors Surveillance System (BRFSS) 2003 and 2004 on tobacco use, nutrition, and physical activity were selected to measure rates of cancer prevention behaviors (Centers for Disease Control and Prevention, 2003). The BRFSS is a telephone-administered survey that measures behaviors related to premature morbidity and mortality. The BRFSS is administered on a state-wide level in contrast to the NHIS, which is administered nationally.

For purposes of keeping the measures short, only key questions were included. Three questions on smoking were included. These assess whether a person has smoked 5 packs of cigarettes over their entire lifetime, whether the person currently smokes, and if the person has attempted to quit in the past year. Questions to assess usual levels of physical activity at work and moderate/vigorous levels of physical activity were included. Nutrition was assessed according to the individual's adherence to the five fruits and vegetables recommendation set by the National Institute of Cancer and American Cancer Society. Six questions regarding fruit and vegetable consumption were included, and visual aids of a serving size were provided when requested. Dietary fat was measured using the NIH Fat Screener, which is a 12-item questionnaire assessing intake of high fat foods. Three questions regarding alcohol intake that assess frequency of alcohol consumption, average drinks imbibed, and frequency of binge drinking were included. In addition, a question on individual's height and weight was included and were used to calculate body mass index (BMI).

General predictors

Literature has documented several general variables that are related to screening such as sociodemographic variables, health care correlates, and cancer

knowledge and attitudes. Single item questions of these general predictors were used.

Demographic variables included: age, level of education, marital status, employment

status, annual household income, country of origin, length of stay in the US, and

family history of cancer. Health care correlate was measured by asking whether the

participant has a usual source of health care. Single items were used to measure cancer

knowledge (i.e., only need screening when symptomatic), perceived barriers to

screening (i.e., multiple choice that included cost, fear of finding cancer, etc.),

perceived benefits of screening (i.e., how worthwhile is it to get a mammogram?),

perceived risk of screening (i.e., what do you think are the chances that you will get

cancer?), perceived support among family and friends (e.g., how supportive will your

friends and family be if you wanted to get screened), and group norms (e.g., how

many of your friends and family have had a mammogram?).

Culture-specific predictors

   Acculturation. The "A Short Acculturation Scale for Filipino Americans"

(ASASFA; dela Cruz, Padilla, & Agustin, 2000) is the first acculturation measure to

be validated for use among Filipino Americans. This 12-item measure was derived

from the A Short Acculturation Scale for Hispanics (ASASH; Marin et al., 1987) and

has three dimensions: 1) language use and preference at work, at home, and with

friends; 2) language use and preference in media programs; and 3) preferred ethnicity

of individuals in social relations. Response format is a 5-point scale, with lower scores

corresponding to less acculturation.

   Views on health and illness and traditional Filipino values. A new

questionnaire was developed to measure Filipino women's views on health and illness,

as well as traditional values. Item of this measure were generated by the author from one-on-one interviews and through a review of the literature on Filipino values and health. A small focus group was held to decide which items were to be included. A total of 44 items measured different views on health and values. Additional data on this measure is presented in the results section.

Religiosity. Two dimensions of religiosity were included in this study. The first was religious preference, which is the religious tradition with which the individual identifies. This was measured using one question, "At the present time, what is your religious preference?" The second dimension was organizational religiousness, which is extent of the individual's involvement in formal public religious institution. Two questions on how often one attends religious services and other activities were asked (Fetzer, 1999).

"Bahala na" (not to worry) is a belief that one should not worry about unpleasant events because events are not in one's control. "Bahala na" was measured using the God Locus of Health Control scale (GLHC; Wallston et al., 1999). This six-item scale is used to assess how much the individual feels that God exerts control over his or her current state, and is usually administered as part of the larger Multidimensional Health Locus of Control Scales (Wallston, Wallston, & Devellis, 1978), which measure different attributions of control for health/illness. For the purposes of this study, only the GLHC was administered to keep the overall assessment brief. The GLHC can be tailored to specific illnesses such as cancer or arthritis. The general term "health" was used to measure perception of control of one's health.

D. Overview of Statistical Analyses

All analyses were conducted using SPSS 12.0 and Mplus

1. Descriptive statistics on demographic variables, rates of cancer screening, and rates of cancer prevention behaviors were calculated and compared to rates of the larger US and Asian-Americans/Filipino-American populations when data were available.

2. Bivariate correlation analyses were conducted among screening and prevention behaviors.

3. Reliability and validity of the new Filipino Health Beliefs and Values questionnaire, as well as of existing measures (A Short Acculturation Scale for Filipino Americans (ASASFA) and God Locus of Health Control (GLHC) scale), were determined using factor analysis and calculation of Cronbach's alpha coefficients.

4. Since there were a number of outcome variables that comprise ideal cancer prevention behaviors (e.g., non-smoking, limiting alcohol intake, being adherent to screening guidelines), latent class analyses were conducted to determine:

    a. Whether outcome measures of cancer screening (breast, colorectal and cervical screening outcome variables) and cancer prevention behaviors (smoking, drinking, diet, physical activity) would yield different classes of individuals (i.e., healthy versus unhealthy cancer prevention behaviors), and whether cancer screening behaviors would yield different classes of individuals.

    b. Whether the different individual predictor variables would also yield latent classification. The following were hypothesized:

        i. Income, marital status, education, work status would form a latent socioeconomic status variable

        ii. Group norms and perceived social support would form a latent social variable

        iii. Filipino Beliefs and Values scale, God Locus of Health Control scale, and religiosity would form a culture-specific latent variable

        iv. Perceived barriers, perceived benefits, and perceived risk to screening, as well as cancer knowledge would form a general health belief latent variable

        v. ASASFA and length of stay in the US would form an acculturation latent variable

5. A model (see Figure 1) relating latent predictor to outcome variables was to be tested using structural equation modeling.

6. Logistic regression analyses on cancer screening outcome measures (mammography, CBE, pap smear, FOBT/proctosigmoidoscopy) as well as latent outcome variable were conducted.

    a. Bivariate correlation analyses were conducted between the outcome variable and all predictors to determine predictors that were to be entered into the model.

b. Logistic regression analyses were conducted using general predictor variables.

c. Hierarchical logistic regression was conducted, with general predictors entered in the first step, and culture-specific variables entered in the second step to determine whether culture-specific variables explained variance of outcome variables above and beyond the general predictor variables.

d. Significant differences in chi-squares between the 2 models signaled unique contribution of culture specific variables to explanation of variance.

III. Results

A. Descriptive Statistics

In this section, descriptive statistics on demographic variables, rates of cancer screening, and rates of cancer prevention behaviors are presented. Table 1 shows the demographic information for the sample. In addition, Tables 2-5 show how this sample's cancer screening and prevention rates compare to the larger US and Asian population whenever data are available.

Sample Characteristics

Demographic information is presented in Table 1. A power calculation, assuming a medium effect size and an alpha = .05 and power = .90 for regression analyses with 20 predictors yielded a necessary sample size of 191 women. Four hundred and five women who self-identified as Filipina or Filipino American participated in this survey. Three women failed to provide their ages and were dropped from the analyses. Mean age for the remaining 402 women was 44.22 years ($SD =$ 15.10) with ages ranging from 21 to 83 years. Most women were married or living as married (62%), had completed college, some graduate work or graduate degree (56%), were employed for wages (72%), and reported earning more than $55,000 in annual household income (48%). Only 22% of the sample reported being born in the United States. Of those who provided their age of immigration to the US, latency between age of immigration and current age ranged from 0-49 years, with an average of 20.95 years ($SD = 11.39$). Seventy four percent of the sample reported English language preference over Tagalog or both, 77% reported having US citizenship, and 76% reported belonging to the Catholic religion. Half of the sample endorsed going to

service once a week or more. However, only 15% of the sample endorsed attending other activities of worship at least once a week or more.

Rates of Cancer

Of the 402 women, 5.7% (23) reported having had cancer. At least 194 (48.3%) participants reported having a family member with cancer. Reported types of cancer for these family members were: breast (13.2%); lung (6%); colorectal (5.4%); prostate (5.2%); ovarian/uterine/cervical (3.5%); liver (2.7%); and pancreatic (2.0%).

Rates of Screening

Breast Cancer. Breast cancer screening rates for this sample, along with general U.S. population and the Asian American population are presented in Table 2. The American Cancer Society (ACS) recommends getting a clinical breast exam every 3 years for women under 40 years of age, and getting an annual clinical breast exam (CBE) and an annual mammography test for women 40 years and older. Two hundred and sixty two (65.2%) women reported adherence to CBE, which is defined as those under 40 reporting having been screened in the past 3 years, and those 40 and over reporting having been screened within the past year. Of the 146 women under 40 years of age, 97 (66.4%) reported having had CBE within the past three years. Of the 256 women who were 40 years and older, 165 (64.4%) reported adherence to CBE. Of the 256 women who were 40 years and over, 170 (66%) reported having been screened with mammography in the past year.

Cervical Cancer. Cervical cancer screening rates along with US population and the Asian American population are presented in Table 2. ACS suggests that women start getting pap smears when they become sexually active or at least at the age of 18.

At 30 years of age, if women have had at least 3 normal pap smears, it is recommended that they get a pap smear every three years thereafter. Three hundred and fifty seven (88.8%) women reported having ever had a pap smear. Two hundred and forty-nine (61.9%) women reported being screened in the past year while 322 (80.1%) reported being screened in the past 3 years. Of the 95 women under the age of 30, 55 (57.9%) reported being screened in the past year. Of the 307 women who are 30 years and older, 258 (84%) reported having had a pap smear in the past three years.

Colorectal Cancer. Colorectal cancer screening rates along with US population and the Asian American population are presented in Table 2. ACS recommends that women 50 years and older have a fecal occult blood test every two years and/or having a proctosigmoidoscopy (flexible sigmoidoscopy every five years or colonoscopy every 10 years). Of the 150 women 50 years and older, 49 (32.6%) reported having had an FOBT within the past 2 years, and 90 (60%) reported ever having had a proctosigmoidscopy. Of the 150 women 50 years and older, 97 (64.7%) reported colon cancer screening.

Rates of prevention behaviors

The sample's rates of the following behaviors (smoking, estimated intake from fat, fruit and vegetable consumption, alcohol consumption, physical activity) are presented and compared to the general US population as well as the Asian American population (when available) in Table 3.

Smoking. Smoking tobacco can increase one's risk for cancer. It is recommended by the Office of the US Surgeon General (2000) that one does not smoke tobacco products. Four percent (15/402) reported smoking all days, 5%

(20/402) reported smoking some days, and 89.6% (360/402) denied smoking any days. Seven women (1.7%) declined to answer the question. Of the 35 women who reported current smoking, 82.9% (29) reported smoking at least 100 cigarettes in their life and 65.7% (23) reported that they tried to stop smoking for one day or longer because they were trying to quit.

Estimated Caloric Intake from Fat. Three hundred and thirty women provided sufficient information to estimate their caloric intake from fat using the NIH Fat Intake Screener. The remaining 72 women missed one or two questions in the questionnaire, which precluded calculation of estimated caloric intake from fat. Estimated caloric intake from fat ranged from 18.5% to 68.9%, with mean of 30.2% ($SD = 6.89\%$). Dietary guidelines set by the Department of Health and Human Service (HHS) and the Department of Agriculture (USDA) recommend that total caloric intake from fat should be no more than 30%.

Fruit and Vegetable Consumption. Three hundred and seventy-nine women gave responses to how many fruits and vegetables they consumed per day, week, month, or year. Responses for the week, month, or year were calculated to yield the total fruit and vegetable consumption per day (e.g., a person who endorsed eating 3 fruits per month had the equivalent of eating .10 fruits per day). Responses ranged from 0 - 28.86 fruits and vegetables per day, with a mean of 4.95 ($SD = 3.62$). Dietary guidelines set by the Department of Health and Human Service (HHS) and the Department of Agriculture (USDA) recommend that one consume at least 5 servings of fruits and vegetables each day.

Alcohol Consumption. Alcohol consumption is associated with increased risk of breast and colon cancer. The current recommendation for women is to have no more than one alcoholic drink (12 ounces of beer, five ounces of wine, or 1.5 ounces of 80-proof distilled spirits) per day (American Cancer Society, 2006b). Sixty-three percent (254) of the sample denied any alcohol consumption on any days. Twenty-eight percent (112) reported drinking 7 days or less per month, 8.4% (32) reported drinking between 8-20 days a month, and 0.7% (3) reported drinking every day of the month. Of the 148 participants who reported any drinking, average number of drinks was as follows: 65 (44%) reported one drink, 36 (24.3%) reported 2 drinks, 18 (12.2%) reported 3 drinks, 16 (10.8%) reported 4 drinks, 13 (8.8%) reported 5-12 drinks per day. Of the 148 participants who reported drinking, 21 women reported 1 day of binge drinking, 17 reported 2 days of binge drinking, 15 reported 3-8 days of binge drinking over the past month.

Physical Activity. Guidelines according to the Center for Disease Control and Prevention (CDC) for physical activity levels are 30-45 minutes per day on 5 or more days a week. Only 117 women (29%) were in adherence by doing at least 30 minutes of moderate or vigorous physical activity per day for at least 5 days a week.

When at work, 247 (61.4%) women reported mostly sitting or standing. One hundred sixteen (28.9%) reported mostly walking, 19 (4.7%) reported mostly heavy labor or physically demanding work, and 6 (1.5%) reported sitting, standing and walking. Fourteen (3.5%) women declined to state their physical activities at work.

Three hundred and seventy-two women (92.5%) and 251 (62.7%) reported doing moderate and vigorous activities for at least ten minutes, respectively. Only 15

(3.7%) women reported having a sedentary lifestyle where they report mostly sitting or standing at work and not doing any moderate or vigorous activities at least 10 minutes a day.

Maintenance of Recommended Body Weight. The Centers for Disease Control and Prevention (CDC) recommend maintaining a healthy body weight. The body mass index is a guide to whether one is at the recommended healthy body weight and is calculated using the following formula: [weight (lbs)/height (inches)^2 x 703]. Being underweight corresponds to BMI less than 18.5, normal weight corresponds to BMI ranging from 18.5-24.9, being overweight corresponds to BMI ranging from 25-29.9, and being obese corresponds to BMI of 30 and above (CDC, 2006). It is recommended that women maintain BMI within the normal range of 18.5 to 24.9.

Women were asked to report their height and weight, and their BMIs were calculated using the formula above. Approximately 3% of this sample were underweight, 60% were of normal weight, 29% were overweight, and 8% were obese. Table 4 presents additional information on this sample's BMI scores contrasted with the overall US population. When asked if one was trying to lose weight, 266 responded affirmatively. Of those 266 women, 1(0.4%) was underweight, 135 (50.8%) were within normal weight range, 103 (38.7%) were overweight, and 27 (10.1%) were obese. Of the 149 women who were overweight or obese, 130 (87.2%) reported actively trying to lose weight.

Rates of screening and cancer prevention behaviors are also contrasted with Healthy People 2010 goals in Table 5. In addition, this table contains information on the interim data from 1998 NHIS survey on the nation's progress toward these goals.

B. Relationships between Screening and Prevention Behaviors

Correlation analyses among the different screening and prevention behaviors (shown in Table 6) demonstrated that screening behaviors were generally positively correlated with each other. Mammography was positively correlated with CBE ($r = .24$) and colon cancer screening ($r = .24$). CBE was positively correlated with colon cancer screening. Some of the prevention behaviors were correlated with each other. Smoking was negatively correlated with alcoholic ($r = -.32$). Dietary fat intake was significantly positively correlated with fruit and vegetable consumption ($r = .22$).

While there were significant relationships among different behaviors, the strengths of these relationships were relatively small. Screening behaviors were positively correlated with each other suggesting that women who get certain screening tests also tend to get tested for other cancers. Cancer prevention behaviors on the other hand, were not related to screening or other cancer prevention behaviors, suggesting the need to examine each behavior individually.

C. Reliability and Validity of Measures

In this section, evidence for the reliability and validity of three scales: Filipino Health Beliefs and Values (FHBV), A Short Acculturation Scale for Filipino Americans (ASASFA) and God Locus of Health control (GHLC), is presented. Exploratory factor analyses were conducted on FHBV, ASASFA and GLHC to determine these scales' integrity. Reliability analyses were also conducted for all scales and subscales using Cronbach's alpha.

Filipino Health Beliefs and Values Scale

The Filipino Health Beliefs and Values Scale (FHBVS) was constructed for this study. Items measuring health beliefs (e.g., illness is caused by supernatural beings) and traditional Filipino values (e.g., belief in "utang ng loob" or debt of gratitude) were generated by the author based on one-on-one interviews with a small focus group of Filipino women, through a review of the literature, and by selecting items from an existing questionnaire (McBride et al., 1998). Forty-four items were used to measure constructs of 1) Filipino beliefs about health and illness, and 2) traditional Filipino values. Total scores ranged from 36 – 198, with $X = 124$, with $SD = 21.48$. Distribution of total scores were not skewed, but were kurtotic, with 75% of the women scoring within less than one standard deviation above or below the mean.

Principal components analysis (PCA) using direct oblimin rotation was conducted to explore the dimensionality of the 44-item FHBVS. The variance accounted for by the solution, the variance accounted for by each individual factor, and the interpretability of the factors were all evaluated to determine the initial plausibility of the factor structure. To further confirm the factor structure a parallel analysis was used.

An initial PCA of the instrument suggested that a two-factor solution best explained the data. The total variance explained by the solution was 32.04%, and the two factors individually accounted for 22.04% and 10% of the variance, respectively. In addition, the parallel analysis indicated that a two-component solution best represented the data when eigenvalues from the target data set were compared to eigenvalues from randomly generated data: Component 1: 9.69 vs. 1.88, and Component 2: 4.39 vs. 1.74. Using the pattern matrix for interpretation, 20 observed

variables loaded on the first component (values ranged from .41 to .66) and 16

observed variables loaded on the second component (values ranged from .25 to .75).

Seven items (items 8, 10, 11, 25, 28, 35, 37) loaded on both components and thus were

not pure markers of any component. One item (item 41) did not load on either

component. An analysis of item content suggests that component one corresponds to

Traditional Health Beliefs (e.g., cancer is caused by retribution or unfulfilled

obligations) while component two corresponds to Traditional Values (e.g., I try to do

things according to how they should be done). There was a positive correlation

between the two components ($r = .30$).

After the principal components factor analysis was conducted, we

subsequently specified two factors and reran the analysis using principal axis

factoring. The eight double-loading or non-loading items were deleted from the scale.

The total variance accounted for by this solution was 29.99%, and the variance

accounted for by each individual factor remained 20.03% and 9.96%, respectively.

The pattern matrix was used to interpret these factors. Factor 1 was composed of 20

items and was conceptualized as Traditional Health Beliefs while Factor 2 was

composed of 16 items and was conceptualized as Traditional Values. The two factors

were positively correlated ($r = .28$). Complete factor loadings are presented in Table 7.

Cronbach's alpha for the entire scale was .89. Cronbach's alpha for Factor 1 was .88,

and for Factor 2 was .84.

God Locus of Health Control (GLHC)

Three hundred and seventy-five women completed the GLHC. Scores for the

GLHC can range from 6 to 36; this represented the range of scores for the current

sample. The mean score was 17.16 (SD = 7.53). Principal component analysis with no rotation was conducted to explore the single dimensionality of the 6-item scale. A one-factor solution was extracted and one factor accounting for 68% of the variance. All of the items loaded on one factor and had factor loadings ranging from .69 to .85. Complete factor loadings are presented in Table 8. The scale had high reliability, with Cronbach's alpha coefficient of .90.

A Short Acculturation Scale for Filipino Americans (ASASFA)

Three hundred eighty four women provided complete responses for this scale. The mean score was 38.67 (SD = 8.02), with scores ranging from 14 to 60. Reliability for this scale is good, with Cronbach alpha coefficient of .89. This scale was designed to measure three components of acculturation: 1) language use and preference at work, at home, and with friends; 2) language use and preference in media programs; and 3) preferred ethnicity of individuals in social relations. However, the total score is typically used, with higher scores indicating higher acculturation into the US culture.

Exploratory factor analysis using principal component analysis with direct oblimin rotation was conducted to explore this scale's structure. Results yielded three factors. The first factor, with items reflecting language use and preference at work, at home, and with friends, explained 46% of the variance with factor loadings from .81 - .88. The second factor contained items measuring preferred ethnicity of individuals in social relations, and explained 15% of the variance with loadings ranging from .67 to .85. Items loading on the third factor corresponded to language use and preference in media programs, and explained 10% of the variance with loadings ranging from .86 to .89. Complete factor loadings are in Table 9. Initial communality values ranged from

46 to .81. The three factors were significantly positively correlated with each other ($r_{1,2} = .35$, $r_{1,3} = .47$, $r_{2,3} = .31$). Cronbach alphas for the three factors were .90, .81, and .86, respectively. Review of the psychometric properties of this scale supports the use of the total score as it has been proposed.

ASASFA total scores were highly correlated with whether one was born in the US or not ($r = .62$), with higher acculturation corresponding to being born in the US. Acculturation was only moderately correlated with language preference ($r = .24$), with higher acculturation corresponding to preference for using English or both English and Tagalog.

D. Latent Class Analyses

Because there were a number of variables that comprised ideal cancer prevention behaviors (e.g., non-smoking, limiting alcohol intake, being adherent to screening guidelines), latent class analysis was conducted to determine whether there was a latent variable underlying these individual outcome measures. In addition, individual predictor variables were also proposed to form the following five latent variables: SES, social , culture-specific, general health beliefs, and acculturation.

Latent Outcome Variable

Reported screening adherence, as well as reported adherence to behaviors that promote lower risk of cancer, were used to determine a latent outcome variable. Since ever having had a screening procedure and having been screened recently may be assessing two different constructs, both were included in determining the latent variable. The following screening adherence variables were used: ever having had a mammogram; ever having had CBE; ever having had a Pap smear; ever having had a

fecal occult blood test; ever having had a proctosigmoidoscopy; adherence to mammography; adherence to CBE; adherence to pap smear; adherence to colon cancer screening. The following healthy behaviors were used: estimated caloric intake from fat; fruit and vegetable consumption; amount of alcoholic intake; amount of binge drinking one endorses; whether one smokes or not; one's total amount of reported physical activity; and one's body mass index.

Based on Lo-Mendell-Rubin adjusted LRT test ($X^2 = 750.79$, p<.05), a two-class solution fits the data better than a one-class solution. Akaike (AIC) and Bayesian (BIC) values were also used to assess model fit, which were 14,805 and 14,975, respectively. Participants in the first group were more likely to report higher adherence to breast, cervical, and colon cancer recommended screening guidelines compared to participants in the second group. They also endorsed lower fat intake, higher fruit and vegetable consumption, lower amount of alcohol intake, lower number of total days of alcohol bingeing, and lower total amount of physical activity than those in the second group. They were less likely to report smoking. However, those who were classified in the first group are more likely to be overweight and obese.

The first group was more likely than the second group to endorse screening. Ninety-seven percent of the women endorsed ever having had a mammogram versus less than 1% of the women in the second group. Likewise, 99% in the first group versus 77% in the second group endorsed ever having had a pap smear, 42% versus 2% reported ever having had a blood test, 50% versus 7% endorsed ever having had a proctosigmoidoscopy. Sixty-nine percent of the women in the first group endorsed having had a mammogram in the past year and 42% endorsed having had a

proctosigmoidoscopy or FOBT compared to none in the second group. Eighty percent in the first group endorsed being in adherence for cervical cancer screening compared to 68% in the second group. The women in the second group endorsed higher total alcoholic intake and higher rates of binge drinking compared to those in the first group. Those in the second group were also more likely to smoke. Means of continuous variables and odds ratio of categorical variables, as well demographic information of each group, are presented in Table 10.

Since screening was the focus of this study, latent class analysis was conducted to determine if there were classifications based on women's screening practices. Two latent classes were formed, with good model fit, Akaike (AIC) and Bayesian (BIC) values of 4256 and 4396, respectively. Women in the second group (high adherence to screening) consistently reported higher screening rates compared to those in the first group (low adherence to screening). Women in the second group consistently were more likely to report ever having had a mammogram, CBE, pap smear, FOBT, and proctosigmoidoscopy compared to the women in the first group.

<u>Latent Predictor Variables</u>

Bivariate correlation analyses were conducted among scores hypothesized to form each proposed latent variable in order to determine whether there was enough shared variance to justify forming each latent variable. Proposed latent variables with two items (e.g., perceived social support and group norms were hypothesized to form the latent social variable) needed to have at least $r = .5$. Those with three items ideally would have $r = .3 - .4$, while those with four or more ideally would have correlations ranging from $r = .2 - .4$. Results of these zero sum correlations showed that it was not

feasible to form the hypothesized latent predictor variables because none met the minimum bivariate correlational criteria. Therefore no hypothesized latent predictor variables were formed.

E. Model Testing

Originally, this study proposed to test a model (Figure 1) of relationships among latent predictor variables and the latent outcome variable (high reporting of healthy behaviors versus low reporting of healthy behaviors) using structural equation modeling. A two-category latent classification of the outcome variable was generated, with class one representing those with high reporting of healthy behaviors and class two representing those with low reporting of healthy behaviors. However, the latent predictor variables: socioeconomic status, social, culture-specific, general health beliefs, and acculturation, were not created due to lack of shared variance among the indicators proposed to form these variables (see section above on latent class analyses on predictor variables). Thus, the proposed model could not be tested using structural equation modeling as proposed. Instead, individual predictors of membership in the two-category latent classification outcome were tested using logistic regression analyses in the following section.

F. Logistic Regression Analyses

The results for these logistic regressions are grouped according to the following outcomes: latent classification of prevention behaviors, latent classification of screening practices, mammography, CBE, pap smear, and colon cancer screening adherence.

Predictors of latent classes of prevention behaviors

In these analyses we considered the two classes of individuals that were formed using latent class analyses of cancer prevention behaviors. Bivariate correlation analyses showed that the following general variables were correlated with the latent variable of high versus low healthy behaviors: age, years in the US, marital status, having usual source of health care, and group norms for mammography, pap smear, and colonoscopy. Culture specific variables that were associated with the latent outcome variable were: attendance at religious service, attendance at other religious activities, acculturation, and total health belief scale score. The correlation values are shown in Table 12.

Logistic regression analyses were conducted to determine 1) the general variables that were statistically significant predictors of latent outcome classification, and 2) if addition of the culture-specific variables improved prediction. Logistic regression analysis was conducted with: age, years in the US, marital status, having usual source of health care, and group norms for mammography, pap smear, and colonoscopy as predictors ($\chi^2 = 45.19$, $df = 15$, $p < .0001$, -2 Log Likelihood = 23.02, Cox & Snell $R^2 = .26$ and Nagelkerke $R^2 = .71$). After addition of the attitudinal culture-specific predictors, $\chi^2 = 59.19$, p =.002, $df=31$, -2 Log Likelihood = 0.00, Cox & Snell $R^2 = .38$, and Nagelkerke $R^2 = 1.00$. Comparison of log-likelihood ratios for models with and without attitudinal cultural variables showed no reliable improvement with the addition of attitudinal predictors. Difference in Chi-squares was not significant, $\Delta \chi^2 = 14$, $df = 16$. Please see Table 13 for odds ratio and confidence intervals for this model.

Age, having a usual source of healthcare, and group norms for mammography predicted classification in the first versus the second group. For each increasing year of age, there was a 60% probability of belonging to the healthy group versus the other group. Those with usual source of healthcare were 5% more likely to belong to the healthy behaviors group rather than to the other group. Group norms for mammography were measured by asking women how many of their family and friends have had a mammogram. The reference group was "all of them." Those who replied, "some of them" were 30% more significantly more likely to belong to the other group versus the healthy behaviors group.

<u>Predictors of latent classes of screening behaviors</u>

Bivariate correlation analyses showed that the following general variables were correlated with the latent variable of high versus low adherence to screening: age, years in the US, marital status, having usual source of health care, perceived benefits for mammography, pap smear and colon cancer screening, perceived support, perceived risk, and group norms for mammography, pap smear and colon cancer screening. Culture specific variables that were associated with the latent outcome variable were: attendance at religious service, attendance at other religious activities, and acculturation. The correlation values are shown in Table 12.

Logistic regression analyses were conducted to determine 1) the general variables that were statistically significant predictors of latent outcome classification, and 2) if addition of the culture-specific variables improved prediction. Logistic regression analysis was conducted with: age, years in the US, marital status, having usual source of health care, perceived benefits for mammography, pap smear and

colon cancer screening, perceived support, perceived risk, and group norms for

mammography, pap smear and colon cancer screening ($\chi^2 = 273.16$, $df = 26$, $p < .0001$,

-2 Log Likelihood = 128.44, Cox & Snell $R^2 = .61$ and Nagelkerke $R^2 = .81$). After

addition of the attitudinal culture-specific predictors, $\chi^2 = 271.10$, p = .0001, df=41, -2

Log Likelihood = 116.56, Cox & Snell $R^2 = .62$, and Nagelkerke $R^2 = .827$.

Comparison of log-likelihood ratios for models with and without attitudinal cultural

variables showed no reliable improvement with the addition of attitudinal predictors.

Difference in Chi-squares was not significant, $\Delta \chi^2 = -2.05$, $df = 15$. Please see Table

14 for odds ratio and confidence intervals for this model.

Age, marital status and group norms for mammography were significant

predictors of classification into the second group (high screening adherence). Older

age corresponded to greater chance of belonging to the high screening adherence

group. Those who were widowed were only 7% likely to belong to high screening

adherence group compared to those who are married. Women were asked whether

friends and family have had a mammogram. The answer, "All of them" was the

reference category, and those who responded with "some of them" and "half of them"

were only 9% likely to belong to the high screening adherence group. Those who

responded "none of them" were only 6% likely to belong to the high adherence group.

Therefore, having other familiar women endorse mammography screening was a

powerful predictor of the individual's own adherence to mammography screening

guidelines.

Predictors of cancer screening adherence

Clinical Breast Exam (CBE). Adherence to CBE is defined as those under 40

reporting having been screened in the past 3 years, and those 40 and over reporting

having been screened within the past year. Bivariate correlation analyses showed that

the following general variables were associated with adherence to clinical breast

exam: level of education, yearly household income, years in the U.S., immigration

status, usual source of health care, perceived benefits to mammography, and

knowledge. Culture-specific variables that were associated with CBE adherence were:

acculturation, God locus of control, and total health belief scale score. The correlation

values are shown in Table 12. Logistic regression analyses were conducted to

determine 1) the general variables that were statistically significant predictors of CBE

adherence, and 2) if addition of the culture-specific variables improved prediction.

Logistic regression analysis with age, marital status, income, years in US, having

usual source of health care, perceived benefits, perceived support, perceived risk, and

group norms yielded $\chi^2 = 25.71$, $df = 17$, p <.080, -2 Log Likelihood = 409.04, Cox &

Snell $R^2 = .07$ and Nagelkerke $R^2 = .10$. After addition of the culture-specific

predictors, $\chi^2 = 40.49$, p =.004, $df = 20$, -2 Log Likelihood = 303.77, Cox & Snell $R^2 =$

.140, Nagelkerke $R^2 = .194$. The $\Delta \chi^2$ is 14.77, $df = 3$, which is significantly different

at p <.005. No other culture-specific predictors except for acculturation were

significant predictors for CBE adherence above and beyond general predictor

variables. Odds ratios and confidence intervals are shown in Table 15.

Acculturation was the only significant predictor of adherence to CBE. There

was a 7% probability of adhering to CBE for every point increase in the acculturation

scale. Thus, those who endorsed higher acculturation scores were more likely to endorse CBE adherence.

Mammography. Adherence to mammography was only applicable for those 40 years and older, and they had to report screening within the past year. Bivariate correlation analyses showed that the following general variables were associated with adherence to mammography: level of education, yearly household income, immigration status, perceived barriers, perceived benefits to mammography, perceived support, group norms, and knowledge. The only culture-specific variable associated with adherence to mammography was acculturation. The correlation values are shown in Table 12.

Logistic regression analyses were conducted to determine 1) the general variables that were statistically significant predictors of adherence to mammography, and 2) if addition of the culture-specific variables improved prediction. Logistic regression analysis with level of education, yearly household income, immigration status, perceived barriers, perceived benefits of mammography, perceived support, group norms, and knowledge yielded $\chi^2 = 55.31$, $df = 20$, $p < .0001$, -2 Log Likelihood = 206.19, Cox & Snell $R^2 = .24$ and Nagelkerke $R^2 = .33$. After addition of the culture-specific predictors, $\chi^2 = 54.22$, $df = 21$, $p < .0001$, -2 Log Likelihood = 200.94, Cox & Snell $R^2 = .24$, Nagelkerke $R^2 = .33$. The $\Delta \chi^2$ is -1.10, $df = 1$, which is not significant. Acculturation did not significantly improve prediction of adherence to mammography above and beyond general predictor variables. Odds ratios and confidence intervals are shown in Table 16.

Group norms for mammography were the only significant predictor of adherence to mammography. The women were asked how many friends and family have had a mammogram. The response "all of them" was the reference group. Those who responded "about half of them" were 36% less likely to endorse mammography adherence, while those who responded "only a few of them" were 30% less likely to endorse mammography screening compared to those who endorsed "all of them."

Pap Smear. Adherence to cervical cancer screening, defined as having had a pap smear in the past year for those under 30 years old and having had a pap smear in the past 3 years for those 30 years and older, was not significantly correlated with any general or culture-specific predictors. The correlation values are shown in Table 12. Hence, logistic regression analyses were not conducted.

FOBT/Proctosigmoidoscopy. Adherence to colon cancer screening guidelines was defined as having had a sigmoidoscopy or colonoscopy or having had an FOBT within the past 2 years. Bivariate correlation analyses showed that the following general variables were associated with adherence to colon cancer screening: years in the U.S., legal status, and group norms for colonoscopy. The only culture-specific variable associated with adherence to colon cancer screening was acculturation. These correlation values are shown in Table 12.

Logistic regression analyses were conducted to determine 1) the general variables that were statistically significant predictors of adherence to colon cancer screening guidelines, and 2) if addition of the culture-specific variables improved prediction. Logistic regression analyses with years in the U.S., legal status, and group norms for colonoscopy as predictors yielded $\chi^2 = 38.81$, $df = 7$, $p < .0001$, -2 Log

Likelihood = 126.76, Cox & Snell R^2 = .26, Nagelkerke R^2 = .36. After addition of the culture-specific predictors, χ^2 = 37.16, df = 7, p < .0001, -2 Log Likelihood = 122.90, Cox & Snell R^2 = .26 and Nagelkerke R^2 = .36. The $\Delta \chi^2$ is -1.644, df = 0, which is not significant. Acculturation did not help with prediction of adherence to colon cancer screening above and beyond general predictor variables. Odds ratios are shown in Table 17.

Years in the US was the only significant predictor of adherence to colon cancer screening. For every year spent in the US, there was a 7% increase in probability of having been screened for colon cancer. Thus, women have been in the US longer are more likely to have been screened for colon cancer.

IV. Discussion

This study's central aims were to 1) examine rates of cancer screening and healthy behaviors among Filipino American women, 2) examine relationships among cancer prevention behaviors, and 3) to discover whether culture-specific variables predicted screening.

A. Rates of screening and prevention behaviors

Results of this study provided information about Filipino American women's progress toward screening and prevention behavior goals set for Healthy People 2010. This sample surpassed Healthy People 2010 for the following behaviors: having a mammogram within the past two years, ever having had a proctosigmoidoscopy, maintaining healthy weight, not smoking, not being sedentary, and getting at least 30 minutes of physical activity at least five days of the week. In contrast, women in this study reported lower rates of ever having had a pap smear than the goals set by Healthy People 2010. Adherence to screening guidelines for pap smears (80%) was also lower than Healthy People 2010 goals (90%). Rates of binge drinking (13% versus 6% goal), limiting fat intake to 30% or less (47% versus 75% goal), and five servings of fruits and vegetables (38% versus 50% goal) were also less than optimal.

Rates of binge drinking among this sample (13%) are comparable to the general US population rates (15%), but are higher than the Asian American population rates (8%). These rates are higher than those reported by the Behavioral Risk Factors Surveillance System (2003) in Hawaii, which showed that only 9% of Filipino American men and women reported binge drinking (Hawaii State Department of Health, 2003). The pattern of results are similar to those found one other study on

Filipino Americans' rates of alcohol consumption, which reported that half of the women abstained from drinking (Lubben, Chi, & Kitano, 1988). Higher risks of binge drinking in our sample may be a function of the inclusion of younger age participants, who endorsed most of the binge drinking behavior.

The rate of adherence to fruit and vegetable and fat intake recommendations among the Filipino American women in this study are lower than the goal set by Healthy People 2010 but higher than national averages. There are virtually no data on this community regarding dietary practices; however, recent review by Satia-Abouta et al. (2002) warn of changes in dietary practices of recent immigrants to approximate those of the mainstream US. Therefore, longer stay in the US may result in an increase in fat intake and decrease in fruit and vegetable consumption among Filipino American women. Satia-Abouta et al. (2002) recommend that dietary interventions for immigrants need to focus on maintaining traditional eating patterns or adopting only the healthy US mainstream dietary patterns.

There were two latent classes based on the reported behaviors where the first group endorsed higher adherence to screening rates, lower alcohol consumption, less binge drinking, less intake from fat, and higher fruit and vegetable consumption compared to the second group. However, the first group also endorsed lower rates of physical activity and was more likely to be overweight compared to the second group. Age was a significant predictor of classifications. Members of the first class were older, had higher reported incomes, were more likely to be working, were more likely to be married, and had lower acculturation scores. The second class on the other hand,

were younger, less likely to be working, more likely to be single, had lower reported incomes, and had higher acculturation scores.

B. Rates and Predictors of Screening

Breast cancer. Adherence to breast cancer screening was assessed by rates of clinical breast exam (CBE) and mammography. Rates of breast cancer adherence for Filipino Americans in this study met the goals set by Healthy People 2010, reflected an increasing trend in screening, and mirrored the national trend in breast cancer awareness and knowledge (American Cancer Society, 2006b). Sixty-five percent of the sample reported behaviors that were adherent to CBE screening guidelines. This screening rate was higher than those reported in previous studies on Filipino American. Maxwell, Bastani and Warda (1997) reported that 35% of their sample reported adherence to CBE. This previous study only included immigrant Filipino women who were 50 years and older. The present study included women 40 years and older with 21% of the sample was born in the US. The present study's sample is probably much more acculturated that Maxwell et al.'s sample, which may explain the higher rates of screening. Ko, Sadler, Ryujin and Dong (2003) had a sample with similar age range, and reported that 43% of women 40 years and older reported adherence to CBE.

A similar pattern of increasing rates of mammography use was evident among studies on Filipino American women. The present study showed that 66% of the women reported having had a mammogram in the past year. Maxwell, Bastani and Warda (1997) reported that 42% of their sample had a mammogram in the past year. Kagawa-Singer and Pourat (2000) and Ko, Sadler, Ryujin and Dong (2003) reported

43% and 47% of their samples reporting mammography use in the past year, respectively. A recent study by Maxwell, Bastani, Vida and Warda (2003) showed that 48% of their sample had a mammogram in the past year.

For this study, acculturation was a significant predictor of CBE, and group norms was a significant predictor for mammography. Maxwell, Bastani and Warda (1997) showed similar results, with their bivariate analyses showing that those who were more traditional endorsed lower rates of mammography use compared to those who were more bicultural or acculturated. In addition, authors also showed that those with friends and relatives who have had mammograms were more likely to be screened.

Cervical cancer. Pap smear screening adherence was not correlated with any other behaviors or general predictors. Women in this study reported high rates of adherence to pap smear utilization (78%), which are higher than other previous studies (65%, McBride et al., 1998; 48%, Maxwell et al., 2000; 42%, Maxwell et al., 2003; 64%, Kagawa-Singer & Pourat, 2000; 78%, Chen et al., 2004; 73%, Somkin et al., 2004). Higher rates reported in this study may be due to the different criteria for adherence (every year for those under 30, and every three years for those 30 years and older) versus those in other studies (pap smear in the past year). Another reason for difference in rates may be the inclusion of younger women in our study. Our sample's rates of pap smear adherence were most similar to the most recent study by Somkin et al., which included a large sample of women 40 years and older in the San Francisco.

Cervical cancer screening adherence was not correlated to any of the other predictor variables. Previous studies of this community have shown that the following

were significant predictors of adherence to cervical cancer screening guidelines: age, insurance status, language use, traditional health beliefs, modesty, and traditional gender roles (McBride et al., 1998), ever having had a check-up and length of stay in the US (Maxwell et al., 2003); higher levels of education, having usual source of healthcare, and health insurance (Kagawa-Singer & Pourat, 2000); and younger age and length of stay in the US (Chen, 2004). A recent study (Somkin et al., 2004) showed that utilization of pap tests were significantly predicted by age and access to health care.

Colon cancer. Rates of colon cancer screening (65%) for this sample were similar to the goals set in Healthy People 2010 and are higher than previous studies. Maxwell et al. (2000) reported that 25% of their sample of Filipino American women reported having had an FOBT in the past year or lower endoscopic exam in the past 5 years. The sample from Maxwell et al's study included only women 50 years and older, and all were all foreign-born. They showed that higher percent lifetime in the US, as well as having had a check-up when asymptomatic were predictors of colon cancer screening. For this study, the length of stay in the US was also a significant predictor for colon cancer screening, with those who recently immigrated reporting lower rates of screening.

A recent study by Wong et al. (2005) reported that 57% of Filipino men and women reported ever being screened, and that 47% were up to date on their screening. These lower rates of screening may be explained by the inclusion of men in their sample. The authors reported that being male was predictive of lower screening rates.

Colorectal cancer screening was also significantly correlated with mammography and CBE screening. A previous study by Maxwell et al. (2000) examined rates adherence to screening for all three cancers, and they reported that only 14% of their sample reported being adherent for all three. Results of this study suggest that an area of intervention to increase Filipino American women's rates of colorectal cancer screening may be through reminders or education during their usual mammography, CBE, or pap smear test.

C. Culture-specific predictors of screening

Other than acculturation (for CBE), none of the culture-specific variables were significant in predicting screening behaviors. Concepts of health and illness, traditional values, and religiosity were not significant predictors of behaviors. The lack of support for these culture-specific variables in predicting screening is not surprising. Maxwell et al. (1997) reported that 31% of their sample reported the belief that breast cancer is caused by things that are out of their control. Using bivariate tests, they showed that women were less likely to be screened if they reported this belief. However, when the authors conducted multivariate analyses and included all variables that significantly correlated with screening, the effect of this cultural variable was no longer significant.

McBride et al. (1998) reported that culture-specific variables predicted pap smear screening adherence among Filipino Americans with similar demographic information as our sample. Those who endorsed higher English language use and lower traditional health beliefs also reported higher screening rates than those with lower English language use and higher traditional health beliefs. They also found that

among younger women (< 50 years), those with high concern for modesty had significantly lower screening rates than those with low concern for modesty. In addition, younger women who endorsed low traditional gender role values were less likely to be screened. However, authors of this study did not conduct analyses to concurrently assess effects of health insurance and age with the cultural factors, and it is unclear whether these culture specific factors would have contributed significantly to the prediction of adherence after controlling for these other variables.

Individual endorsement of traditional health beliefs and traditional values may not be as important to assess and use as points of intervention to increase cancer screening rates among Filipino Americans. Results of this study suggest that longer stay in the US seem to be a powerful predictor of adherence to screening guidelines. Longer stay in the US may expose Filipino American women to more mainstream behaviors related to cancer screening, as well as increase their likelihood of having health insurance and usual source of health care. Chun, Organista and Marin (2003) postulated that as individuals acculturated to the mainstream culture, they were more likely to be exposed to health-enhancing information, which in turn, affected their behaviors.

D. Limitations

There are several limitations to this study. While every effort was made to collect a sample that was representative of the Filipino community, the most effective recruitment strategies led to collecting from a convenience sample of women from social, church, or work groups in urban parts of Southern California. Women who participated in this study reported higher levels of education (66% in this sample

versus 42%), were more likely to be working (75% versus 69%) and were more likely to be married (62% versus 33%; US Census, 2000) compared to Filipino men and women in the state. However, 48% of the women reported an annual household income greater than $55,000, which is probably reflective of California's median household income of $62,143 for Filipinos (US Census, 2000). Seventy-nine percent of the sample was foreign born compared to 68% of Filipinos in California (US Census, 2000). Seventy-four percent of the sample preferred to speak English, 8% preferred to speak both, while only 15% preferred to speak Tagalog. Sixty-nine percent of Filipinos in California report speaking a language other than English at home (US Census, 2000).

The current sample was more highly educated, reported higher income, and was more likely to be married compared to the Filipino population in California. While this may serve as a limitation to the generalizability of the study, this may also serve as a benchmark for those women who are more informed, and thus, more likely to report healthier behaviors compared to the rest of the community. Findings in this study may be inflated in a positive way and may not accurately reflect the needs of this community. Other recruitment strategies, such as use of random-digit dialing may have led to a less biased sample.

Another limitation of the study is lack of availability of translated measures. Due to limited funds and time to create valid translated versions of the different measures, this self-report questionnaire was only offered in English. Inclusion criteria included English language proficiency. Exclusion based on language proficiency may have led to a biased sample. It can be hypothesized that those without English

language proficiency are perhaps more marginalized and have more limited access to resources to information, services, and different interventions related to cancer early detection and prevention.

In order to limit subject burden, the survey was kept brief. For example, variables such as perceived risk, support, and group norms were measured using one question. Dietary practices were measured using brief questionnaires on fruit and vegetable consumption and fat intake. A more comprehensive questionnaire conducted through one-on-one interview would have generated more accurate and detailed data on women's dietary practices. Self-report measures were used, and corroborating evidence such as proof of screening from their health-care providers was not collected. A measure of social desirability was also not included and would have been important to measure given the literature on underreporting of behaviors such as drinking (Klatsky et al., 2006), energy intake (Westerterp & Goris, 2002), and overreporting of physical activity (Adams et al., 2005).

Another limitation is the conceptualization of general health beliefs as predictors for screening. There are studies to suggest that specific health beliefs related to each particular screening exam may influence whether individuals choose to get screened or not (e.g., belief that mammography procedures are painful may deter someone from getting one). Exam-specific health beliefs were not examined in this study since screening behaviors and prevention practices were examined in the context of the larger cultural health beliefs of the community. It would be interesting to examine whether culture- and exam-specific beliefs influence behaviors in a future study.

E. Implications

Interventions for cancer screening among Filipino American women need to take into consideration the variables that significantly predict screening. Predictors of screening include acculturation, length of stay in the US, and group norms. It may be important to target interventions to those who have recently immigrated, more marginalized and without access to other members of the community who may be able to provide them with normative cancer screening behaviors.

Success with the recruitment of Filipino American women through social organizations in this study suggests that these groups are accessible pockets in the community where future interventions can be offered. Some Filipino American social organizations in the US are formed by groups of individuals from each province, city, or region in the Philippines (Bonus, 2000). Recent immigrants may feel welcomed in these organizations because of the shared history and knowledge that comes from originating from the same geographic location in the Philippines. In addition, most of these regional social groups share the same dialect, which contributes to the easy communication and comradeships, even among strangers.

This study's success in recruiting through word-of-mouth also suggests that health messages may be disseminated through key individual members in this community. It was important to pinpoint individuals who influenced many different groups within the community. These individuals were able to then recruit other leaders within each social group to help with recruitment. This train-the-trainers model has been shown to be an effective way of disseminating health information, especially in underserved communities (Sadler et al., 2001). In addition to ensuring a credible

source as the bearer of health messages, it is equally important to provide incentive to distribute the message to other group members. Results of this study suggest that screening behaviors were not necessarily related to indigenous health beliefs or traditional values thus health interventions do not necessarily have to emphasize traditional cultural messages. Perhaps a more important message is to empower the individual to take action in order to have healthier lives.

In addition, results of the latent class analyses suggest that there may be two classes of Filipino American women based on their cancer screening and prevention behaviors. Majority of the studies on Filipino American women have targeted older, mostly immigrant groups and their screening practices. Results of this study suggest that it may be important to start examining behaviors of the younger, more acculturated generation of Filipino Americans to identify and address potential areas of early intervention.

Having a usual source of healthcare was also a significant predictor of belonging to the group that endorsed higher adherence to screening. Previous literature has shown that health care correlates are important predictors of prevention behaviors (Hiatt et al.,2002). In addition to interventions that focus on those who have shorter stay here in the US and who may not have been exposed to group norms of screening, efforts in the future may have to focus on providing access to health care to individuals in this community.

F. Conclusion

In sum, this study provides additional information on the health of Filipino American women. It may be important to study the more marginalized, less

acculturated, or recently immigrated Filipino American women to identify pockets of needs regarding knowledge about and access to cancer information and screening services. In addition, it may also be important to focus interventions on policy-wide level to encourage access to services, availability of health insurance and of usual source of healthcare, which are important factors that contribute to screening adherence.

Appendix

Questionnaire

DEMOGRAPHIC INFORMATION

1. What is your age?

_____ years

2. Which of the following best describes your marital status?

____ Married or Living as Married

____ Separated

____ Widowed

____ Divorced

____ Single (never married)

3. What is the highest grade or year of school that you completed?

____ Less than 8th grade

____ 8th grade to 11th grade

____ High school graduate

____ Post high school, trade or technical school

____ 1 to 3 years of college

____ College graduate

____ Some graduate work or graduate degree

4. Are you currently…?

____ Employed for wages

____ Self-employed

____ Out of work for more than 1 year

____ Out of work for less than 1 year

____ Student

____ Homemaker

____ Retired

____ Unable to work

____ Other activities (SPECIFY)_____

5. What is your yearly household income (your income plus the incomes of all family members with whom you live) ?

____ Less than $10,000   (Less than $833/month or $192/week)

____ $10,000-24,999   ($834-2083/month or $193-481/week)

____ $25,000-39,999   ($2084-3333/month or $482-769/week)

____ $40,000-54,999   ($3334-4583/month or $770-1058/week)

____ More than $55,000   (More than $4584/month or $1059/week)

6. Were you born in the United States?

____ Yes

____ No

If no, where were you born? _____

If no, how old were you when you came to the U.S. _____

7. What is your immigration/legal status? This information will not be used for any purposes than for data analyses in this research study. This information will be kept confidential.

____ US citizen
____ Green card holder/legal immigrant
____ Tourist or work visa
____ None of the above

8. What is preferred language to use? (please fill in) _____

9. Please put an "x" on where you fall on the following dimensions:

Not at all Filipino   Completely Filipino

Not at all American   Completely American
----

10. At the present time, what is your religious preference? _____

11. How often do you attend religious services?

       1 Never
       2 Less than once a year
       3 About once or twice a year
       4 Several times a year
       5 About once a month
       6 2-3 times a month
       7 Nearly every week
       8 Every week
       9 Several times a week

12. Besides religious services, how often do you take part in other activities at a place of worship?

       1 Never
       2 Less than once a year
       3 About once or twice a year
       4 Several times a year
       5 About once a month

13. Have you or any members of your family had cancer?
____ Yes
____ No
If **yes,** who? What type of cancer? (Include only yourself and blood relatives.)

_____
_____

CANCER SCREENING

1. A mammogram is an x-ray of each breast to look for breast cancer. Have you ever had a mammogram?

     ____ Yes
     ____ No

2. How long has it been since you had your last mammogram?
____ Within the past year (within the last 12 months)
____ Within the past 2 years (1 year but less than 2 years ago)
____ Within the past 3 years (2 yeas but less than 3 years ago)

_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago

3. Your last mammogram was (see your answer above). How long before THAT mammogram was your last one?
_____ Within the past year (within the last 12 months)
_____ Within the past 2 years (1 year but less than 2 years ago)
_____ Within the past 3 years (2 yeas but less than 3 years ago)
_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago
_____ Has only had one mammogram

4. Mammograms are done as part of a routine check-up. Sometimes a mammogram is done to check something that might be a problem, such as a lump or discomfort. Was your mammogram done to check a problem?
_____ Yes
_____ No

5. A clinical breast exam is when a doctor, nurse or other health professionals feels the breast for lumps. Have you ever had a clinical breast exam?
_____ Yes
_____ No

6. How long has it been since your breast exam?
_____ Within the past year (within the last 12 months)
_____ Within the past 2 years (1 year but less than 2 years ago)
_____ Within the past 3 years (2 yeas but less than 3 years ago)
_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago

7. A pap smear is a test for cancer of the cervix. Have you ever had a pap smear?
_____ Yes
_____ No

8. How long has it been since your last Pap smear?
_____ Within the past year (within the last 12 months)
_____ Within the past 2 years (1 year but less than 2 years ago)
_____ Within the past 3 years (2 yeas but less than 3 years ago)
_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago

9. Have you had a hysterectomy?
_____ Yes
_____ No

10. A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?
_____ Yes
_____ No

11. How long has it been since your last blood stool test using a home kit?
_____ Within the past year (within the last 12 months)
_____ Within the past 2 years (1 year but less than 2 years ago)
_____ Within the past 3 years (2 yeas but less than 3 years ago)

_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago

12. Sigmoidoscopy and colonoscopy are exams where a tube is inserted in the rectum to view the bowel for signs of cancer or other health problems. Have you had either of these exams?

_____ Yes
_____ No

13. How long has it been since you had your last sigmoidoscopy or colonoscopy?
_____ Within the past year (within the last 12 months)
_____ Within the past 2 years (1 year but less than 2 years ago)
_____ Within the past 3 years (2 yeas but less than 3 years ago)
_____ Within the past 5 years (3 years but less than 5 years ago)
_____ More than 5 years ago

14. In the past year, has a doctor or other health professional RECOMMENDED that you…

have a mammogram?	___ Yes	___ No
have a pap smear?	___ Yes	___ No
have a sigmoidoscopy, colonoscopy or proctoscopy?	___ Yes	___ No

15. Do you ever go to the doctor when you're not sick or having any problems, just to get a check-up?

_____ Yes
_____ No

FRUIT AND VEGETABLE CONSUMPTION

These next questions are about the foods you usually eat or drink. Please tell me how often you eat or drink each one, for example, twice a week, three times a month, and so forth. Remember, I am only interested in the foods YOU eat. Include all foods YOU eat, both at home and away from home.

1. How often do you drink fruit juices such as orange, grapefruit or tomato?
__ __ per day
__ __ per week
__ __ per month
__ __ per year

2. Not counting juice, how often do you eat fruit?
__ __ per day
__ __ per week
__ __ per month
__ __ per year

3. How often do you eat green salad?
__ __ per day
__ __ per week
__ __ per month
__ __ per year

4. How often do you eat potatoes, not including french fries, fried potatoes, or potato chips?

__ __ per day
__ __ per week
__ __ per month
__ __ per year

5. How often do you eat carrots?

__ __ per day
__ __ per week
__ __ per month
__ __ per year

6. Not counting potatoes, carrots, or salads, how many servings of vegetables do you usually eat? (For example, servings of vegetables at both lunch and dinner would be 2 servings)

__ __ per day
__ __ per week
__ __ per month
__ __ per year

NATIONAL INSTITUTES OF HEALTH-FAT SCREENER

1. Think about your eating habits over the past 12 months. How often did you eat or drink each of the following foods? Remember breakfast, lunch, dinner, snacks, and eating out. Blacken in only one bubble for each food.

Food	Never	Less than once a month	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 or more times per day
Cold cereal	O	O	O	O	O	O	O	O
Skim milk, on cereal or to drink	O	O	O	O	O	O	O	O
Eggs, fried or scrambled in margarine, butter or oil	O	O	O	O	O	O	O	O
Sausage or bacon, regular fat	O	O	O	O	O	O	O	O
Margarine or butter on bread, rolls, pancakes	O	O	O	O	O	O	O	O
Orange juice or grapefruit juice	O	O	O	O	O	O	O	O

Fruit (not juices)	O	O	O	O	O	O	O	O
Beef or pork hot dogs, regular fat	O	O	O	O	O	O	O	O
Cheese or cheese spread, regular fat	O	O	O	O	O	O	O	O
French fries, home fries, or hash brown potatoes	O	O	O	O	O	O	O	O
Margarine or butter on vegetables, including potatoes	O	O	O	O	O	O	O	O
Mayonnaise, regular fat	O	O	O	O	O	O	O	O
Salad dressing, regular fat	O	O	O	O	O	O	O	O
Rice	O	O	O	O	O	O	O	O
Margarine, butter, or oil on pasta or rice	O	O	O	O	O	O	O	O

2. Over the past 12 months, when you prepared foods with margarine or ate margarine, how often did you use reduced fat?

O   O   O   O   O   O   O

Didn't use Almost About ¼ About 1/2 About ¾ Almost always
Margarine Never the time the time   the time or always

3. Overall, when you think about the foods you ate in the past 12 months, would you say your diet was high, medium or low in fat?

      O   O   O
      Low   Medium   High

PHYSICAL ACTIVITY

1. When you are at work, what best describes what you do?
   1 Mostly sitting or standing
   2 Mostly walking
   3 Mostly heavy labor or physically demanding work

2. Now, thinking about moderate activities you do when you are not working, in a usual week, do you do moderate activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or at least anything else that causes some increases in breathing or heart rate?
   1 Yes
   2 No

3. How many days per week do you do these activities?

__ __ days per week

4. On the days that you do moderate activities for at least 10 minutes, how much total time per day do you spend doing these activities?

__:___ hours and minutes per day

5. Now, thinking about vigorous activities you do when you are not working, in a usual week, do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or at least anything else that causes large increases in breathing or heart rate?

____ Yes

____ No

6. How many days per week do you do these activities?

__ __ days per week

7. On the days that you do vigorous activities for at least 10 minutes, how much total time per day do you spend doing these activities?

__:___ hours and minutes per day

GENERAL KNOWLEDGE AND ATTITUDES

1. Do you think any of these are barriers to…(check all that apply)

Mammography? ___ Cost
___ Exposure to Radiation
___ Painful
___ Embarrassing
___ Transportation
___ Possibility of finding cancer

Pap smear? ___ Cost
___ Exposure to Radiation
___ Painful
___ Embarrassing
___ Transportation
___ Possibility of finding cancer

Colonoscopy, Sigmoidoscopy or ___ Cost
Fecal Occult Blood Test? ___ Exposure to Radiation
___ Painful
___ Embarrassing
___ Transportation
___ Possibility of finding cancer

2. Do you think it is worthwhile to get a …

mammogram? ____ YES ____ NO
Pap smear? ____ YES ____ NO
Colon cancer screening? ____ YES ____ NO

3. How many of your female friends and relatives have had a…

Mammogram? ____ All or most of them
____ About half of them

		Only a few
		None of them
Pap Smear?		All or most of them
		About half of them
		Only a few
		None of them
Colon cancer test?		All or most of them
		About half of them
		Only a few
		None of them

4. How supportive would your friends and family be if you wanted to get a mammogram, Pap smear or colon cancer screening?

           ____Very supportive
           ____ Supportive
           ____ Not supportive

5. As a Filipina, and given your lifestyle choices and personal history, what do you think are the chances that you personally will get breast cancer some day?

           ____ Very big chance
           ____ Moderate chance
           ____ Very small chance

6. Do you agree or disagree with the following statement?
   You only need to have a mammogram, Pap smear or endoscopy when you have symptoms. Do you…

           ____ Agree
           ____ Disagree

CULTURAL HEALTH BELIEFS AND VALUES

Please note whether you agree or disagree with the following statements using the following scale:

           1 = strongly disagree
           2 = disagree
           3 = neither agree nor disagree
           4 = agree
           5 = strongly agree

____ A traditional healer has the ability to cure illness.
____ Services of a midwife after childbirth are important.
____ A witch or sorcerer has the ability to make a person sick.
____ Heat and sweating remove fat from the body.
____ I prefer to have a female physician to perform my pelvic exam.
____ I feel embarrassed when a male doctor does my breast exam.
____ Filipino men prefer that Filipino women see a female doctor.
____ Father is always head of the household even when the wife works.
____ Husband should give his paycheck to his wife.
____ Women should remain virgins until they are married.

_____ I have high self-respect and try to do things according to how they are supposed to be done.

_____ I have feelings of personal obligation to those who help me or my family (utang na loob).

_____ Rapid shifts from "hot" to "cold" lead to illness.

_____ Cold or cooling drinks should be avoided in the morning.

_____ An overheated body is vulnerable.

_____ Heated body or muscles can get "shocked" when cooled suddenly.

_____ A layer of fat is preferred to maintain "warmth" and protect vital energy.

_____ Health and cooling are related to quality and balance of air in the body.

_____ Sudden changes in weather patterns and cooling breezes may upset the body balance by blowing on the body surface.

_____ Cancer is caused by retribution for unfulfilled obligations.

_____ Cancer or illness is social punishment by supernatural beings.

_____ Cancer or illness is caused by nature events (thunder, lightning, drafts).

_____ If you think about bad things, they will happen to you.

_____ Illness is caused by something bad I had done in the past.

_____ I stay healthy to enjoy my family's and friends' company.

_____ I believe in faith healers.

_____ Wandering of the soul out of the body, which results in nightmares (bangungot), result in death.

_____ I need to take care of my health so that I can feel good.

_____ I need to take care of my health because it is a gift from God.

_____ It is important for me to have smooth interpersonal relationship with my fellowman (pakikisama).

_____ Illness means a loss of control.

_____ Being ill makes one appear weak and is embarrassing.

_____ If you live long, God is protecting you.

_____ Occupational failure does not bring shame to the family.

_____ One should not deviate from familial and social norms.

_____ One's family need not be the main source of trust and dependence.

_____ One should think about one's group before oneself.

_____ Modesty is an important quality for a person.

_____ Following familial and social expectations is important.

_____ I expect my family to care for me in the event of illness.

_____ Decisions regarding my health are made by me and my family.

_____ I do not want to seek help because I do not want to be a burden.

_____ Invasive medical procedures that puncture the skin can cause bad things to happen to the body.

GOD LOCUS OF HEALTH CONTROL (GLHC)

On a scale of 1 to 5 (1= strongly agree to 5 = strongly disagree), please rate the following statements:

1. If my health worsens, it is up to God to determine whether I will feel better again.	Strongly agree 1	2	3	Strongly disagree 4	5
2. Most things that affect my health happen because of God.	Strongly agree 1	2	3	Strongly disagree 4	5
3. God is directly responsible for my health getting better or worse.	Strongly agree 1	2	3	Strongly disagree 4	5
4. Whatever happens to my health is God's will.	Strongly agree 1	2	3	Strongly disagree 4	5
5. Whether or not my health improves is up to God.	Strongly agree 1	2	3	Strongly disagree 4	5
6. God is in control of my health.	Strongly agree 1	2	3	Strongly disagree 4	5

A SHORT ACCULTURATION SCALE FOR FILIPINO AMERICANS (ASASFA)

Instructions: Please circle the number that corresponds to your best answer to each question.

1. In general, what language(s) do you read and speak?
   Only Philippine language(s) **   1
   More Philippine language(s) than English   2
   Both equally   3
   More English than Philippine language   4
   Only English   5
2. What language(s) did you use as a child?
   Only Philippine language(s) **   1
   More Philippine language(s) than English   2
   Both equally   3
   More English than Philippine language   4
   Only English   5
3. What language(s) do you speak at home?
   Only Philippine language(s) **   1
   More Philippine language(s) than English   2
   Both equally   3
   More English than Philippine language   4
   Only English   5
4. In which language(s) do you usually think?
   Only Philippine language(s) **   1
   More Philippine language(s) than English   2
   Both equally   3

More English than Philippine language	4
Only English	5

5. What language(s) do you usually speak with your friend?

Only Philippine language(s) **	1
More Philippine language(s) than English	2
Both equally	3
More English than Philippine language	4
Only English	5

6. In what language(s) are the TV programs you usually watch?

Only Philippine language(s) **	1
More Philippine language(s) than English	2
Both equally	3
More English than Philippine language	4
Only English	5

7. In what language(s) are the radio programs you usually listen to?

Only Philippine language(s) **	1
More Philippine language(s) than English	2
Both equally	3
More English than Philippine language	4
Only English	5

8. In general, in what language(s) are the movies, TV, and radio programs you prefer to watch and listen to?

Only Philippine language(s) **	1
More Philippine language(s) than English	2
Both equally	3
More English than Philippine language	4
Only English	5

9. Your close friends are:

All Filipinos	1
More Filipinos than Americans	2
About half and half	3
More Americans than Filipinos	4
All Americans	5

10. You prefer going to social gatherings/parties at which people are:

All Filipinos	1
More Filipinos than Americans	2
About half and half	3
More Americans than Filipinos	4
All Americans	5

11. The persons you visit or who visit you are:

All Filipinos	1
More Filipinos than Americans	2
About half and half	3
More Americans than Filipinos	4
All Americans	5

12. If you could choose your children's friends, you would want them to be:

All Filipinos	1
More Filipinos than Americans	2
About half and half	3
More Americans than Filipinos	4
All Americans	5

Figures and Tables
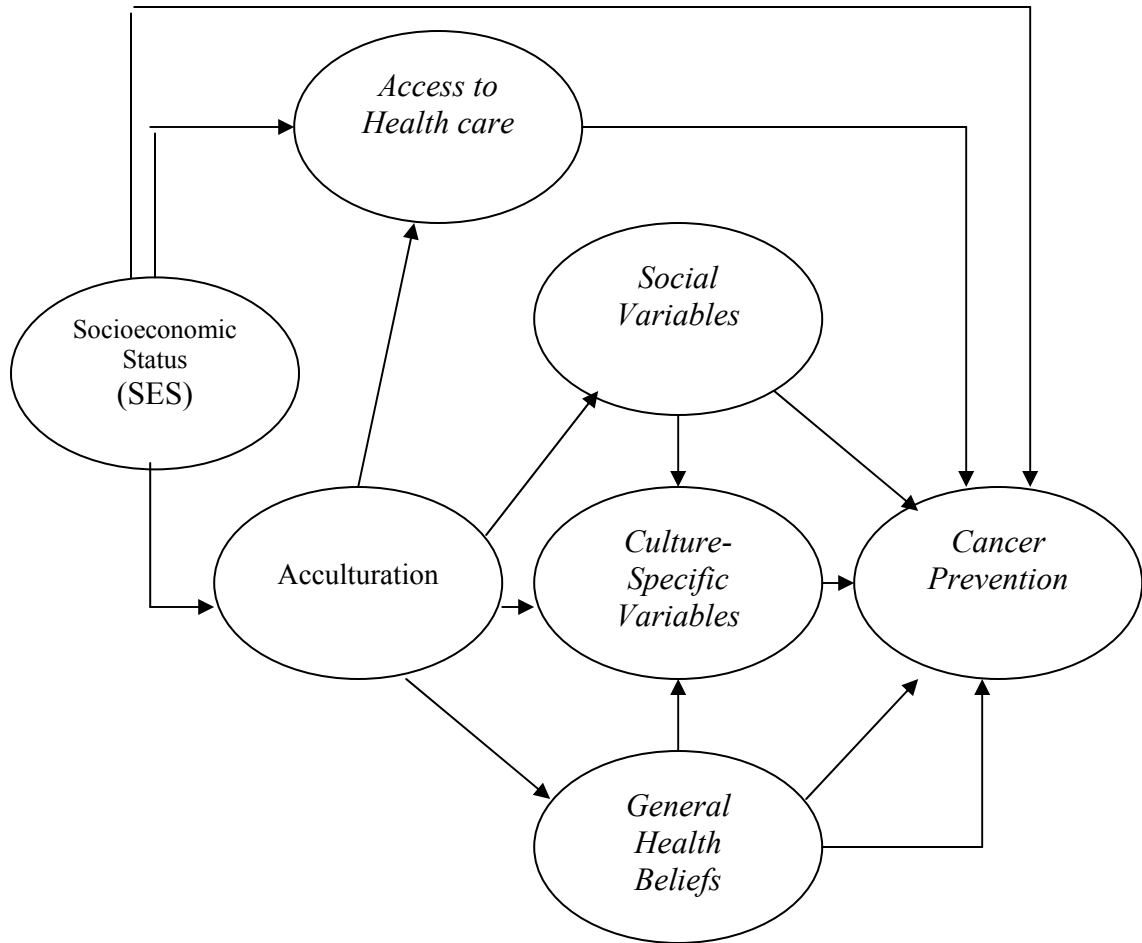
Figure 1. Proposed model of relationships

Table 1. Demographic Information

Age (in years)	
Range	21-83
Mean (SD)	44.22 (15.1)
Age groups (in years)	
21-30	95 (23.6%)
31-40	51 (12.7%)
41-50	106 (26.4%)
51-60	87 (21.6%)
60-69	45 (11.2%)
70+	18 (4.5%)
Marital Status	
Married or Living as Married	251 (62.4%)
Separated	6 (1.5%)
Widowed	26 (6.5%)
Divorced	18 (4.5%)
Single	98 (24.4%)
Missing Information	3 (0.7%)
Level of Education (completed)	
High school or less	25 (6.2%)
Post-high school, tech or trade school	19 (4.7%)
1-3 years of college	93 (23.1%)
College graduate	199 (49.5%)
Some graduate work or graduate degree	65 (16.2%)
Employment	
Employed for wages	288 (71.6%)
Self-employed	14 (3.5%)
Unemployed/Unable to work	10 (2.5%)
Student	36 (9.0%)
Homemaker	14 (3.5%)
Retired	35 (8.7%)
Other/Missing Information	5 (1.2%)
Annual Household Income	
Less than $10,000	34 (8.5%)
$10,000-24,999	39 (9.7%)
$25,000-39,999	58 (14.4%)
$40,000-54,000	65 (16.2%)
$55,000 +	192 (47.8%)
Missing Information	14 (3.5%)

Table 1 continued

Place of Birth	
United States of America	86 (21.4%)
Other (Philippines, Japan, Italy, or missing information)	316 (78.6%)
Of those who provided age of immigration (N=301)	
Range of number of years in the US	0 - 49 years
Mean number of years in the US (SD)	21.0 (11.4)
Language Preference	
English	296 (73.6%)
Filipino	60 (14.9%)
Both	32 (8.0%)
Missing Information	14 (3.5%)
Legal Status	
U.S. Citizen	308 (76.6%)
Permanent Resident	78 (19.4%)
Tourist Visa	10 (2.5%)
Refuse to answer/Missing information	6 (1.4%)
Religious Preference	
Catholic	305 (75.9%)
Christian	53 (13.2%)
Other	9 (2.2%)
None	7 (1.7%)
Missing Information	28 (6.9%)
Attendance at Religious Service	
Never	12 (3.0%)
About 1-2 times a year	29 (7.2%)
Several times a year	37 (9.2%)
About once a month	17 (4.2%)
2-3 times a month	46 (11.4%)
Nearly every week	59 (14.7%)
Every week	150 (37.3%)
Several times a week	52 (12.9%)
Attendance in other activities at a place of worship	
Never	102 (25.4%)
About 1-2 times a year	98 (24.4%)
Several times a year	67 (16.7%)
About once a month	35 (8.7%)
2-3 times a month	25 (6.2%)
Nearly every week	11 (2.7%)
Every week	42 (10.4%)
Several times a week	17 (4.2%)
Missing Information	5 (1.2%)

Table 2. Cancer screening rates compared to U.S. general population.

	Sample	U.S. population, All [1]	U.S. population, Asians only [1]
Mammography (N=256)	*N (%)*	*%*	*%*
Ever had a mammogram	232/256 (91)	Not avail	Not avail
Mammogram in the past year	170/256 (66)	Not avail	Not avail
Within the past 2 years	205/256 (80)	69	58
Clinical Breast Exam	*N (%)*		
Age 21-39 (N=146)		Not avail	Not avail
Ever had a CBE	110/146 (75)		
CBE within the past 3 years	97/146 (66)		
Age 40 and over (N=256)		Not avail	Not avail
Ever had a CBE	219/256 (85)		
CBE within the past year	165/256 (64)		
Pap Smear	*N (%)*	*%*	*%*
All (N=402) w/in past 3 years	322/402 (80)	79	68
<30 years old (N=95) in past year	55/95 (58)	Not avail	Not avail
30 years +(N=307) in past 3 years	258/307 (84)	Not avail	Not avail
Colon cancer screening (50 +)	*N (%)*	*%*	*%*
FOBT			
Ever had an FOBT	74/150 (49)		
Within the past 2 years	49/150 (33)	26 [2]	Not avail
Ever had a proctosigmoidoscopy	90/150 (60)	53 [2]	Not avail
FOBT or proctosig in past year	35/150 (30)	Not avail	Not avail

[1] Data are from BRFSS 2005 (Centers of Disease Control and Prevention, 2005)

[2] Data are from BRFSS 2004 (Centers for Disease Control and Prevention, 2004)

Table 3. Rates of prevention behaviors compared to US general population

Behaviors	Sample %	US population, All %	US Population, Asian only %
Non smoker	90	81 [1]	94 [2]
Est. caloric intake from fat	47	33 [1]	Not available
Fruit and vegetable intake	38	23 [4]	Not available
Alcohol intake			
Abstained	63	43 [5]	70 [2]
Binge drinkers	13	15 [5]	8 [2]
Physical Activity	29	31 [1]	33 [3]
Sedentary	4	39 [1]	36 [3]
Normal BMI	59	40 [5]	Not available

[1] All female respondents. Data are from Health, United States, 2005 publication

[2] Asian female respondents. Data are from Health, United States, 2005 publication

[3] All Asian men and women. Data are from Health, United States, 2005 publication

[4] Data are from BRFSS 2003, nationwide (Centers for Disease Control and Prevention, 2003)

[5] Data are from BRFSS 2004, nationwide (Centers for Disease Control and Prevention, 2004)

Table 4. Body mass index compared to US general population

BMI Range	Weight Status	Sample N (%)	U.S. Population % [1]
Below 18.5	Underweight	14 (3.5)	47.8
18.5 - 24.9	Normal	238 (59.2)	
25.0 – 29.9	Overweight	118 (29.4)	29.2
30 and above	Obese	31 (7.7)	22.5
	Missing Information	1 (0.2)	N/A

[1] Data are from BRFSS 2004, nationwide, females only (Centers for Disease Control and Prevention, 2004)

Table 5. Cancer prevention behaviors compared with Healthy People 2010 goals.

	Healthy People 2010 Goal [1]	This study's sample	1998 data for all women [1]	1998 data for Asian women [1]
Breast Cancer (40 years +) Mammogram within past 2 years	70	80	67	61

Cervical Cancer
   Ever having had a pap smear
   Pap smear in past 3 years
	97
	90
		88
		80
			92
			79
				78
				67

Colon Cancer (50 years +)
   FOBT in past 2 years
   Ever had a proctosigmoidoscopy
	50
	50
		49
		54
			35
			37
				33
				35

Current tobacco use	12	10	22	Not avail
Alcohol use – binge drinking	6	13	15	8
Limit fat intake to 30% of diet	75	47	33	Not avail
Five servings of fruit and vegetable	50	38	31	Not avail

Physical Activity
   30 mins/day at least 5 days/week
   Sedentary lifestyle
	30
	20
		29
		4
			15
			40
				15
				36

Obesity (measured by BMI)	15	8	20	Not avail

[1] Data from Healthy People 2010 Publication (http://www.healthypeople.gov/)

Table 6. Correlations among screening and prevention behaviors

Adherence to guidelines:	1	2	3	4	5	6	7	8	9	10
1.Mammo-graphy	1									
2. CBE	.24*	1								
3. Pap smear	-.02	-.10*	1							
4. Colon screening	.24*	.21*	-.10	1						
5. Smoking	.18*	-.01	-.03	.00	1					
6. Alcohol use	-.39*	.00	-.02	-.05	-.32*	1				
7. Dietary fat	-.07	.16*	-.04	.02	-.14*	.18*	1			
8. Fruit and vegetables	-.01	.06	-.05	.03	.01	.08	.22*	1		
9. Physical activity	-.03	-.03	-.06	.04	-.06	-.01	.06	.18*	1	
10. BMI	-.15*	.00	.03	-.01	.00	.05	-.09	-.10	-.04	1

* significant at $p < .05$

Table 7. Factor Loadings of Filipino Health Beliefs and Values Scale

Item	Factor 1	Factor 2
Cancer is caused by retribution or unfulfilled obligations.	.62	.09
Rapid shifts from hot to cold lead to illness.	.60	.37
Wandering of the soul out of the body, which results in nightmares, result in death.	.59	.12
Illness is caused by something bad I had done in the past.	.59	.15
A witch or sorcerer has the ability to make a person sick.	.57	.18
Cancer or illness is social punishment by supernatural beings.	.56	.01
Cold or cooling drinks should be avoided in the morning.	.55	.12
Being ill makes one appear weak and is embarrassing.	.55	.25
Health and cooling are related to quality and balance of air in the body.	.54	.40
Invasive medical procedures that puncture the skin cause bad things to happen to the body.	.54	.03
Heated body or muscles can get "shocked" when cooled suddenly.	.53	.36
I believe in faith healers.	.51	.19
Illness means a loss of control.	.50	.21
Sudden changes in weather patterns may upset the body balance.	.47	.30
A traditional healer has the ability to cure illness.	.47	.13
Cancer or illness is caused by natural events.	.47	-.09
Heat and swelling remove fat from the body.	.46	.20
I do not want to seek help when I am ill because I do not want to be a burden.	.44	.10
One should think about one's group before oneself.	.43	.25
I believe that whatever happens, happens.	.31	.24

Table 7 continued

Modesty is an important quality for a person.	.18	.74
I try to do things according to how they should be done.	.19	.69
I need to take care of my health because it is a gift from God.	.21	.65
It is important to me to have smooth interpersonal relationships with my fellowman.	.08	.64
I stay healthy to enjoy my family's and friends' company.	.08	.62
I need to take care of my health so that I can feel good.	-.08	.62
Decisions regarding healthcare are made by me and my family.	.00	.61
If you live long, God is protecting you.	.41	.55
Father is always head of the household even when the wife works.	.40	.51
Women should remain virgins until they get married.	.25	.51
I have feelings of personal obligation to those who help me or my family	.14	.45
Following familial and social expectations is important.	.28	.42
I prefer to have a female physician perform my pelvic exam.	.18	.39
I expect my family to care for me in the event of an illness.	.15	.37
Filipino men prefer that Filipino women see a female doctor.	.24	.30
Occupational failure does not bring shame to the family.	.12	.22

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Table 8. Factor Loadings of God Locus of Health Control

Item	Factor
If my health worsens, it is up to God to determine whether I will feel better again.	.76
Most things that affect my health happens because of God.	.76
God is directly responsible for my health getting better or worse.	.83
Whatever happens to my health is God's will.	.85
Whether or not my health improves is God's will.	.87
God is in control of my health.	.85

Extraction method: Principal Component Analysis, 1 factor extracted

Table 9. Factor Loadings of A Short Acculturation Scale for Filipino Americans

Item	Factor 1	Factor 2	Factor 3
In what language(s) do you usually think?	.88	.37	.53
What language(s) do you usually speak with your friends?	.84	.46	.49
What language(s) did you use as a child?	.86	.22	.30
In general, what language(s) do you read and speak?	.81	.36	.57
What language(s) did you speak at home?	.84	.29	.40
Your close friends are:	.31	.85	.27
The persons who you visit or who visits you are:	.34	.83	.18
You prefer going to social gatherings/parties at which people are:	.40	.82	.28
If you could choose your children's friends, you would want them to be:	.14	.67	.26
In what language(s) are the movies, TV, and radio programs you prefer to listen to?	.49	.35	.89
In what languages are the TV programs that you usually watch?	.52	.31	.88
In what language(s) are the radio programs that you usually listen to?	.37	.21	.86

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Table 10. Latent classes for reported health behaviors

	Class 1 *Healthy behaviors group* Mean (SE) N = 164	Class 2 *Other group* Mean (SE) N = 132
Continuous Variables		
Total Exercise	235 (15.16)	254 (34.33)
Total Alcohol Intake	.889 (0.19)	13.61 (2.67)
Total Days of Alcohol Binge	0.07 (0.03)	0.68 (0.12)
Est. Caloric Intake from Fat	28.80 (0.47)	31.68 (0.66)
Fruit and Vegetable Total	5.14 (0.26)	4.65 (0.32)
Categorical Variables		
	Class 1 Probability (SE)	Class 2 Probability (SE)
Ever had a mammogram	.971 (.02)	.093 (.03)
Ever had a CBE	.917 (.02)	.755 (.04)
Ever had a pap smear	.988 (.01)	.766 (.04)
Ever had an FOBT	.423 (.04)	.022 (.01)
Ever had a proctosigmoid	.503 (.04)	.073 (.02)
Adherence to mammography Yes Not applicable	.691 (.04) .010 (.002)	.000 (.008) .916 (.008)
Adherence to CBE	.716 (.04)	.654 (.04)
Adherence to pap smear	.879 (.03)	.681 (.04)
Adherence to proctosigmoid Yes Not applicable	.422 (.04) .364 (.04)	.000 (.00) 1.00 (.00)
Smoker	.026 (.01)	.194 (.03)
BMI Underweight Normal Overweight Obese	.018 (.01) .554 (.04) .363 (.04) .064 (.02)	.060 (.02) .622 (.04) .238 (.04) .079 (.02)

Table 11. Latent classes for reported screening behaviors

	Class 1 *Low Adherence to screening* Mean (SE) N = 170	Class 2 *High adherence to screening* Mean (SE) N = 232
Categorical Variables		
	Class 1 Probability (SE)	Class 2 Probability (SE)
Ever had a mammogram	.11 (.04)	1.00 (.00)
Ever had a CBE	.72 (.03)	.90 (.02)
Ever had a pap smear	.75 (.03)	.99 (.00)
Ever had an FOBT	.02 (.01)	.47 (.03)
Not applicable (< 50 yrs old)	.02 (.01)	.01 (.00)
Ever had proctosigmoidoscopy	.07 (.02)	.51 (.03)
Not applicable (< 50 yrs old)	.02 (.01)	.04 (.01)
Adherence to mammography	.00 (.00)	.74 (.05)
Not applicable (<40 yrs old)	.81 (.04)	.03 (.01)
Adherence to CBE	.56 (.04)	.72 (.03)
Adherence to pap smear	.75 (.03)	.99 (.01)
Adherence to proctosigmoidoscopy	.01 (.01)	.43 (.04)
Not applicable (< 50 yrs old)	.93 (.02)	.40 (.03)

Table 12. Correlations of outcome and predictor variables

Predictor	Latent Healthy Behavior r	Latent Screen Behavior r	Mammo-graphy r	CBE r	Pap Smear r	Colon Cancer r
Age	-.84**	.72**	.06	-.04	.001	.07
Marital status	.52**	-.41**	-.03	-.01	-.01	.00
Education	-.04	.05	.16**	.14**	.04	.03
Employment	-.03	.04	.02	-.08	.03	.03
Income	-.17	.16**	.21**	.14**	-.04	.06
Years in the US	-.28**	.27**	.12	.10*	.03	.36**
Legal status	.01	-.09	-.19**	-.10*	-.05	-.30**
Health care	-.26**	.22**	.08	.14**	.05	-.09
Barriers to mammography	-.02	-.02	-.14*	-.03	-.02	.05
Barriers to pap smear	.01	-.05	-.17**	-.09	-.05	.06
Barriers to colon cancer screening	.01	.037	-.18**	-.01	-.02	.07
Benefits to mammography	-.15	.18**	.19**	.13**	.03	-.00
Benefits to pap smear	-.02	.04	.20**	.18**	.03	.00
Benefits to colon cancer screening	-.09	.17**	.11	.10*	.04	-.05
Perceived support	-.18	-.13*	-.18**	-.09	.02	-.06
Perceived risk	-.13	.11*	-.10	-.09	-.02	-.11
Group norms mammography	-.69**	-.62**	-.22**	.07	-.06	-.13
Group norms pap smear	.21**	-.21**	-.21**	-.19**	-.04	-.11

Table 12 continued

Group norms colon screening	.51**	-.44**	-.17**	-.09	-.03	-.25**
Cancer knowledge	.03	-.01	-.19**	-.12*	-.04	.09
Religious preference	.04	-.06	.00	.01	-.01	.03
Attend religious service	-.32**	.26**	.02	-.04	-.04	-.07
Attend religious activities	-.21**	.16**	.00	-.04	-.04	-.12
Acculturation	.38**	-.29**	.13*	.12	-.03	.18*
God Locus of Health Control	.052	-.05	-.12	-.11*	-.08	-.05
Filipino Health Beliefs & Values	-.15*	.02	-.11	-.18**	.04	.02

* significant at $p < .05$
** significant at $p < .01$

Table 13. Odds ratios for latent classes of cancer prevention behaviors

	OR	95% CI
Age	.593*	.474 - .742
Years in US	.966	.900 - 1.038
Marital Status		
Married or Living as Married	Reference group	
Separated	.195	.001 - 26.446
Widowed	.005	.000 - 1.59 E+67
Divorced	14.803	.761 - 287.98
Single	.398	.017 - 9.14
Usual source of health care		
No	Reference group	
Yes	.049 *	.005 - .527
Group Norms Mammography		
All of them	Reference group	
About half of them	9.680	.437 - 214.426
Some of them	77.507*	2.17 - 2766.08
None of them	13926.381	.000 - 2.11 E+52
Group Norms Colonoscopy		
All of them	Reference group	
About half of them	217.820	.000 - 3.33 E+112
Some of them	722.982	.000 - 1.09 E+113
None of them	211.396	.000 - 3.20 E+112
Group Norms Pap Smear		
All of them	Reference group	
About half of them	.903	.092 - 8.887
Some of them	.641	.028 - 14.668
None of them	66056.772	.000 - 7.29 E+176

   * significant at p <.05

Table 14. Odds ratios for latent classes of screening behaviors

	OR	95% CI
Age	1.25*	1.16 – 1.35
Years in US	1.04	.99 - 1.09
Income		
Less than $10,000	Reference group	
$10,000 - $24,999	10.94	.53 – 224.54
$25,000 - $39,999	2.51	.12 – 52.65
$40,000 - $54,999	3.76	.17 – 84.96
More than $55,000	4.30	.23 – 80.91
Marital Status		
Married or Living as Married	Reference group	
Separated	7.82	.40 – 151.26
Widowed	.07 *	.01 - .77
Divorced	1.00	.09 – 11.51
Single	1.04	.20 – 5.51
Usual source of health care		
No	Reference group	
Yes	1.37	.38 – 4.90
Perceived benefits mammography	.25	.02 – 3.62
Perceived benefits colonoscopy	1.46	.29 – 7.35
Perceived support		
Very supportive	Reference group	
Supportive	.55	.17 –1.80
Not at all supportive	3.91	.01 – 3377.91
Perceived risk		
Very big chance	Reference group	
Moderately chance	.19	.02 – 1.59
Very small chance	.35	.05 – 2.55
Group Norms Mammography		
All of them	Reference group	
About half of them	.09 *	.02 - .54
Some of them	.09 *	.02 - .51
None of them	.06 *	.01 - .82
Group Norms Colonoscopy		
All of them	Reference group	
About half of them	.93	.23 – 3.74
Some of them	.96	.17 –5.31
None of them	.38	.01 – 32.04

Table 14 continued

Group Norms Pap Smear		
All of them	Reference group	
About half of them	8.21	.09 – 722.44
Some of them	1.63	.03 – 100.10
None of them	1.00	.02 – 62.33

* significant at p <.05

Table 15. Odds ratios for adherence to CBE guidelines.

	OR	95% CI
Education		
Less than 9th grade	Reference group	
9th- 11th grade	.282	.006 – 13.17
High school graduate	.823	.047 – 14.47
Post-high school, tech or trade school	.103	.006 – 1.83
1-3 years college	.433	.032 – 5.88
College graduate	.683	.053 – 8.735
Some graduate work or graduate degree	.503	.036 – 6.97
Income		
< $ 10,000	Reference group	
$10,000 – 24,999	2.67	.679 – 10.52
$25,000 – 39,999	.812	.238 – 2.77
$40,000 – 54,999	2.97	.797 – 11.07
≤ $55,000	1.42	.447 – 4.54
Years in US	.993	.965 – 1.022
Legal		
US Citizen	Reference group	
Green Card	1.11	.479 – 2.57
Tourist/Work Visa	1.05	.192 – 5.74
Refuse to Answer	3.35	.037 – 301.236
Usual source of health care		
No	Reference group	
Yes	1.616	.407 – 3.025
Perceived Benefits to Mammography		
No	Reference group	
Yes	2.088	.676 – 6.45
Knowledge (only have to be screened when symptomatic)		
No	Reference group	
Yes	1.109	.407 – 3.025
Acculturation	1.068 *	1.023 – 1.114
God Locus of Control	.972	.933 – 1.102
Health Belief Scale	.981	.960 – 1.002

* significant at $p < .05$

Table 16. Odds ratios for adherence to mammography guidelines.

	OR	95% CI
Education		
Less than 9th grade	Reference group	
9th- 11th grade	.000	.0 - 1.3 x 10 E26
High school graduate	.047	.003 - .844
Post-high school, tech or trade school	1.081	.036 - 32.872
1-3 years college	.256	.019 - 3.364
College graduate	.369	.030 - 4.481
Some graduate work or graduate degree	.663	.049 - 9.036
Income		
< $ 10,000	Reference group	
$10,000 – 24,999	1.128	.158 - 8.060
$25,000 – 39,999	1.978	.300 - 13.056
$40,000 – 54,999	1.646	.258 - 10.494
$\leq$ $55,000	2.035	.372 - 11.129
Legal		
US Citizen	Reference group	
Green Card	1.321	.529 - 3.299
Tourist/Work Visa	.132	.013 - 1.312
Perceived Barriers to Mammography	.727	.508 - 1.041
Perceived Benefits to Mammography		
No	Reference group	
Yes	4309.110	.000 – 6.3 x 10E18
Perceived support		
Very supportive	Reference group	
Supportive	.482	.193 1.207
Not very supportive	10661.679	.000 – 1.8 x 10E35
Group norms for mammography		
All of them	Reference group	
About half of them	.365*	.165 - .806
Only a few of them	.297*	.108 - .818
None of them	.358	.023 - 5.652
Knowledge (only have to be screened when symptomatic)		
No	Reference group	
Yes	0.998	.220 - 4.524

* significant at p <.05

Table 17. Odds ratios for adherence to colon cancer screening.

	OR	95% CI
Years in US	1.071*	1.023 - 1.121
Legal		
US Citizen	Reference group	
Green Card	.972	.306 – 3.084
Tourist/Work Visa	.000	.000
Refuse to Answer	.000	.000
Perceived Norms		
All of them	Reference group	
Some of them	.000	.000
None of them	.000	.000

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