Cancer Incidence, Mortality, and Associated Risk Factors Among Asian Americans of Chinese, Filipino, Vietnamese, Korean, and Japanese Ethnicities

Melissa McCracken, MPH; Miho Olsen, MPH; Moon S. Chen, Jr., PhD, MPH; Ahmedin Jemal, DVM, PhD; Michael Thun, MD, MS; Vilma Cokkinides, PhD, MSPH; Dennis Deapen, DrPH; Elizabeth Ward, PhD

ABSTRACT Many studies demonstrate that cancer incidence and mortality patterns among Asian Americans are heterogeneous, but national statistics on cancer for Asian ethnic groups are not routinely available. This article summarizes data on cancer incidence, mortality, risk factors, and screening for 5 of the largest Asian American ethnic groups in California. California has the largest Asian American population of any state and makes special efforts to collect health information for ethnic minority populations. We restricted our analysis to the 4 most common cancers (prostate, breast, lung, colon/rectum) and for the 3 sites known to be more common in Asian Americans (stomach, liver, cervix). Cancer incidence and mortality were summarized for 5 Asian American ethnic groups in California in order of population size (Chinese, Filipino, Vietnamese, Korean, and Japanese). Chinese Americans had among the lowest incidence and death rate from all cancer combined; however, Chinese women had the highest lung cancer death rate. Filipinos had the highest incidence and death rate from prostate cancer and the highest death rate from female breast cancer. Vietnamese had among the highest incidence and death rates from liver, lung, and cervical cancer. Korean men and women had by far the highest incidence and mortality rates from stomach cancer. Japanese experienced the highest incidence and death rates from colorectal cancer and among the highest death rates from breast and prostate cancer. Variations in cancer risk factors were also observed and were for the most part consistent with variations in cancer incidence and mortality. Differences in cancer burden among Asian American ethnic groups should be considered in the clinical setting and in cancer control planning. (CA Cancer J Clin 2007;57:190–205.) © American Cancer Society, Inc., 2007.

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INTRODUCTION

Cancer is a major public health problem among all racial and ethnic groups in the United States. Although Asian Americans and Pacific Islanders have lower incidence and mortality rates from all cancers combined than all other racial/ethnic groups, the pattern of cancers within Asian American ethnic groups is distinctive and is an important cause of suffering and death. Asian Americans and Pacific Islanders are the only major US racial/ethnic group for which the annual number of deaths from cancer exceeds that for heart disease. Although Asian Americans are at lower risk for cancers of the lung, colon and rectum, breast, and prostate, they have higher rates of cancers related to infectious conditions, particularly tumors of the cervix, stomach, liver, and nasopharynx.

Asian Americans are defined by the US Census Bureau as individuals with origins in "any of the original people of the Far East, Southeast Asia, or the Indian subcontinent. Asian groups are not limited to nationalities but include ethnic terms as well, such as the Hmong." The Census has analyzed data for 11 Asian groups with the residual category being “Other Asian.” These populations are extraordinarily diverse with respect to country of origin, time since immigration, socioeconomic status, languages and dialects spoken, religion, and many other characteristics that affect health. It is, therefore, not surprising that the various Asian American ethnic groups differ with respect to cancer and other chronic diseases.

This article summarizes available information on cancer incidence, mortality, risk factors, and screening among Asian Americans, with special focus on 5 of the largest populations: Chinese, Filipino, Vietnamese, Koreans, and Japanese for which data are available. Throughout this paper, we will refer to these populations as Asian American ethnic groups. Ethnic-specific data are available from California, which is home to approximately 3.7 million Asian Americans, 12% of the total population. Ethnic groups are presented in order of population size from largest to smallest.

DATA SOURCES FOR CANCER INCIDENCE, MORTALITY, AND RISK FACTORS

No national cancer incidence, mortality, or risk factor data are available for Asian American ethnic groups. Data that are available for this population are from some of the Surveillance, Epidemiology, and End Results (SEER) regions, including the states of California and Hawaii. Most incidence data and national-level mortality data are available only for all Asian/Pacific Islander groups combined. The SEER program provided data on cancer incidence for selected Asian subgroups for the time period 1988 to 1992 in a Special Report, which has not yet been updated. Up until 1999, the National Health Interview Survey (NHIS), which is the major national source of data on cancer risk factors and screening, reported data for Asian Americans and Pacific Islanders combined; since 1999, data have been reported separately for Asian Americans and for Native Hawaiians or other Pacific Islanders.

Nationwide socioeconomic and demographic characteristics of the Asian Americans by ethnic groups were derived from Census reports. Information on cancer incidence and mortality rates for ethnic groups of Asian Americans and non-Hispanic Whites in California for the years 2000 to 2002 were provided by the Los Angeles Cancer Surveillance Program and the California Cancer Registry (CCR). The CCR uses 9 categories for race/ethnicity: White, Black, Latino, Chinese, Filipino, Korean, Japanese, South Asian, and Vietnamese. The CCR also develops its own population estimates for denominators to calculate rates for ethnic populations. Information on risk factors and screening behaviors was obtained from the California Health Interview Survey (CHIS), a telephone survey of self-reported health-risk behavior information that oversamples minority populations in the state. The CHIS is conducted in 5 different languages (English, Spanish, Chinese, Korean, and Vietnamese) and includes detailed ethnicity questions.

Our analysis considered all cancers combined, the 4 most common cancers (lung, colorectal, breast, and prostate), and 3 other cancer sites (stomach, liver, and cervix) for which risk is known to be high in Asian Americans. Information on the prevalence of selected behavioral risk factors for cancer (smoking, overweight, physical inactivity, and alcohol intake) and use of cancer screening tests (colonoscopy, fecal occult blood test [FOBT], prostate-specific antigen [PSA] tests, Pap tests, and mammograms) were
Cancer Incidence, Mortality, and Associated Risk Factors Among Asian Americans

**BACKGROUND:** IMMIGRATION HISTORY

Modern Asian immigration began in the 1870s when Chinese immigrants were recruited to work on plantations and farms in Hawaii and later in California. Various Exclusion Acts limited other forms of immigration by Asians until 1965, when discrimination based on country of origin was prohibited. As the number of immigrants permitted to enter the United States increased steadily since then, the number of legal immigrants admitted as permanent residents has decreased. The 2003 CHIS data that adjusted for age, sex, race, and ethnicity to produce estimates that were consistent with the 2003 California Department of Finance Population Projections.12

**TABLE 1**  The Asian American Population by State in 1,000s, 2000, US Census Bureau5,8

| State      | Asian Alone (One Group) | Chinese | Filipino | Asian Indian | Vietnamese | Korean | Japanese | Cambodian | Hmong | Laotian | Pakistani | Total Asian |
|------------|-------------------------|---------|----------|-------------|------------|--------|----------|-----------|-------|---------|-----------|-------------|
| California | 3,698 (36.1%)           | 981     | 919      | 315         | 447        | 346    | 289      | Other Asian* | 402   |         |           | 10,243      |
| New York   | 1,045 (10.2%)           | 422     | 82       | 252         | 24         | 120    | 37       | Other Asian* | 106   |         |           |             |
| Texas      | 562 (5.5%)              | 106     | 52       | 129         | 135        | 46     | 17       | Other Asian* | 71    |         |           |             |
| Hawaii     | 504 (4.9%)              | 57      | 171      | 8           | 24         | 202    | Other Asian* | 42    |         |           |             |
| New Jersey | 480 (4.7%)              | 100     | 85       | 169         | 15         | 65     | 15       | Other Asian* | 30    |         |           |             |
| Illinois   | 424 (4.1%)              | 77      | 86       | 125         | 19         | 51     | 20       | Other Asian* | 45    |         |           |             |
| Washington | 322 (3.1%)              | 60      | 65       | 24          | 46         | 47     | 36       | Other Asian* | 44    |         |           |             |
| Florida    | 286 (2.8%)              | 46      | 54       | 71          | 33         | 19     | 11       | Other Asian* | 32    |         |           |             |
| Virginia   | 261 (2.5%)              | 37      | 48       | 49          | 37         | 45     | 9        | Other Asian* | 36    |         |           |             |
| Massachusetts | 238 (2.3%) | 84      | 8        | 44          | 34         | 17     | 11       | Other Asian* | 40    |         |           |             |

*Other Asian = Other Asian alone or 2 or more Asian categories.
United States, with a population of almost 1.9 million concentrated in California (49.6%) and Hawaii (9.2%) (Table 1). Vietnamese immigrated more recently, primarily after the end of the Vietnam War in 1975. Over 1.1 million Vietnamese reside in the United States, 40% in California and 12% in Texas (Table 1). The first Korean immigration period began in the early 1900s, when Koreans were employed as plantation workers in Hawaii. In the 1950s, the Korean War led to immigration of Korean-born wives and the orphaned children of US soldiers; immigration from Korea increased again following the 1965 Immigration Act. The number of Korean Americans exceeded 1 million in the 2000 US Census, with concentrations in California (32.1%) and New York (11.1%) (Table 1). Japanese Americans first immigrated to the United States around 1885 and were the largest Asian subgroup in 1900. However, the rate of continuing immigration for Japanese has been slower than that of other Asian groups, even after the 1965 Immigration Act, partly because of the strong economy and high standard of living in Japan. Consequently, the number of Japanese immigrants has remained small (800,000 in 2000). Two thirds of Japanese Americans are US-born (Table 2).

Historically, Asian immigrants settled predominately in the West, but this trend has changed as the proportion of Asian Americans settling in the Northeast and other regions has increased. About half of all Asians still live in the West, mostly concentrated in California. New York, Texas, and Hawaii have the next largest number of Asian Americans (Table 1). In the 2000 US Census, the overall Asian population represented 4.2% (11.9 million) of the US total population. Given current trends, Asian Americans are projected to comprise 8% (33.4 million) of the total population by 2050, triple the percentage in 2000.

**SOCIODEMOGRAPHICS**

Asian American ethnic groups vary substantially with respect to demographic and socioeconomic characteristics. The median age of various ethnic groups of Asian Americans in 2000 ranged from 16.3 to 42.6 years, with Japanese being on average the oldest and Hmong the youngest (Table 2). The Hmong are among the most recent immigrants and have the largest average household size. This is also observed for the Vietnamese, Cambodian, and Laotian populations. Because of the limited numbers of recent immigrants, Japanese Americans are the most acculturated, have the highest socioeconomic status, and the smallest average household size. Filipino, Chinese, and Koreans are intermediate with respect to the average time since immigration, household size, and median age (Table 2).

Time since immigration is directly related to language spoken at home and English-language fluency. Ethnic groups that have lived longer in the United States, such as Japanese and Filipinos, are more likely to speak English “very well” or speak only English at home. In contrast, among more recent immigrant groups, such as Vietnamese, Cambodian, and Hmong, less than half of the populations speak English “very well.” A singular exception to this are Asian Indians, many of whom entered the United States as highly educated professionals having high levels of English proficiency, which is prevalent in India (Table 2).

Variations in income are also observed among the Asian American ethnic groups. The median family income for all Asians in 2000 was $59,324. Across ethnic groups, it ranged from $32,284 for Hmong to $70,849 for Japanese. Vietnamese, Koreans, Cambodians, Hmong, and Laotians have median family incomes more than $10,000 below the median value for Asians combined (Table 2).

Education levels are much higher for persons of Indian, Chinese, Filipino, and Japanese descent than among Cambodians, Hmong, and Laotians. Whereas 44.1% of the overall Asian population achieved a bachelor’s degree, less than 10% of Cambodians, Hmong, and Laotians graduated from college, and only half were high school graduates (Table 2).

**CANCER INCIDENCE AND MORTALITY AND RISK BEHAVIORS**

**Chinese**

Chinese Americans in California have high rates for colorectal, liver, and lung cancer compared with other Asian ethnic groups. Chinese males had the third highest incidence and mortality rates (per 100,000 population) for colorectal cancer among the Asian ethnic groups (52.2...
### TABLE 2  Sociodemographic Characteristics of Asian Americans by Ethnic Group, 2000, US Census Bureau

| Characteristic                  | Chinese | Filipino | Asian Indian | Vietnamese | Korean | Japanese | Cambodian | Hmong | Laotian | Pakistani | Total Asian |
|--------------------------------|---------|----------|-------------|------------|-------|----------|-----------|-------|---------|-----------|-------------|
| **Median age**                 | 35.5    | 35.5     | 30.3        | 30.5       | 32.7  | 42.6     | 23.8      | 16.3  | 26.1    | 28.7      | 33.0        |
| **Nativity and citizenship (%)** |         |          |             |            |       |          |           |       |          |            |             |
| Native                          | 29.1    | 32.3     | 24.6        | 23.9       | 22.3  | 60.5     | 34.2      | 44.4  | 31.9    | 24.5      | 31.1        |
| Foreign-born, naturalized citizen | 37.5    | 41.6     | 29.8        | 44.0       | 39.5  | 10.1     | 30.0      | 17.4  | 32.8    | 30.7      | 34.4        |
| Foreign born, not a citizen     | 33.3    | 26.1     | 45.8        | 32.1       | 38.2  | 29.4     | 35.8      | 38.2  | 35.3    | 44.8      | 34.5        |
| **Average household size (n of persons)** | 2.9     | 3.4      | 3.1         | 3.7        | 2.8   | 2.3      | 4.4       | 6.1   | 4.2     | 2.6       | 3.1         |
| **Language spoken at home and English-speaking ability (%)** |         |          |             |            |       |          |           |       |          |            |             |
| Only English spoken at home    | 14.6    | 29.3     | 19.3        | 6.9        | 18.1  | 52.7     | 8.4       | 4.4   | 7.2     | 7.7       | 21.0        |
| Non-English at home, English spoken “very well” | 35.8    | 46.6     | 57.6        | 30.6       | 31.4  | 20.0     | 38.1      | 37.0  | 40.1    | 60.6      | 39.4        |
| Non-English at home, English spoken less than “very well” | 49.6    | 24.1     | 23.1        | 62.4       | 50.5  | 27.2     | 53.5      | 58.6  | 52.8    | 31.7      | 39.5        |
| **Poverty rate (%)†**          | 13.5    | 6.3      | 9.8         | 16.0       | 14.8  | 9.7      | 29.3      | 37.8  | 18.5    | 16.5      | 12.6        |
| **Median income ($)‡**         | 44,831  | 35,560   | 51,904      | 31,258     | 47,103 | 50,876   | 28,706    | 20,237 | 28,315  | 31,049    | 40,650      |
| Men                            | 34,869  | 31,450   | 35,173      | 24,028     | 35,998 | 21,911   | 21,857    | 28,135 | 50,189  | 59,324    |             |
| Women                          | 60,058  | 65,189   | 70,708      | 47,103     | 70,849 | 35,621   | 32,284    | 43,542 | 50,189  | 59,324    |             |
| **Educational attainment (%)§** |         |          |             |            |       |          |           |       |          |            |             |
| Less than high school graduate | 23.0    | 12.7     | 13.3        | 38.1       | 13.7  | 8.9      | 53.3      | 59.6  | 49.6    | 18.0      | 19.6        |
| High school graduate           | 13.2    | 14.9     | 10.3        | 21.6       | 22.2  | 18.8     | 16.1      | 24.4  | 12.9    | 15.8      |             |
| Some college or associate’s degree | 15.8  | 28.6     | 12.5        | 23.4       | 20.9  | 27.1     | 18.6      | 18.3  | 14.8    | 20.5      |             |
| Bachelor’s degree              | 48.1    | 43.8     | 63.9        | 19.4       | 43.8  | 41.9     | 9.2       | 7.5   | 7.7     | 54.3      | 44.1        |

* Percent distribution of population aged 5 years and older.
† Percent in poverty determined for everyone except those in institutions, military group quarters, or college dormitories, and unrelated individuals under age 15 years.
‡ For employed, full-time, year-round workers aged 16 years and older, in US dollars.
§ Percent distribution of population aged 25 years and older.
and 18.2, respectively) (Table 3). The colorectal cancer incidence and mortality rates for Chinese females were the second highest, with the age-standardized incidence rate per 100,000 (41.5) being similar to that for non-Hispanic White females (42.8) (Table 3). Although colorectal cancer rates were high for both Chinese men and women, their prevalence of endoscopic colorectal cancer screening within the past 5 years, while higher that most other Asian ethnic groups, was only 40.3% for men and 41.5% for women (Table 5). The high rate of colorectal cancer among Chinese in California contrasts sharply with the low risks in China, and the increase in risk with time since migration implicates behaviors associated with the Western lifestyle.

The incidence and mortality rates (per 100,000 population) for liver cancer among Chinese men in California (23.3 and 19.9, respectively) are more than twice as high as in Japanese men (9.3 and 8.3, respectively) (Table 3). Hepatitis B virus (HBV) infection, which is more prevalent in Asia and sub-Saharan Africa, is the main cause of liver cancer in developing countries, while hepatitis C, alcoholic cirrhosis, and obesity are more common causes of liver cancer in developed countries such as the United States and Japan. Worldwide, over 80% of liver cancer cases occur in developing countries, with China alone accounting for over 55% of the total cases. In fact, China has the ninth highest incidence rate of liver cancer among males worldwide (Table 6).

Chinese women have the second highest lung cancer incidence rate (29.8/100,000) and the highest lung cancer mortality rate (23.9/100,000) of all the Asian ethnic groups in California (Table 3). Their high rates of lung cancer are unexpected, given the low prevalence of smoking among Chinese women in California. According to CHIS data, only 2.2% of Chinese women report that they were current smokers, and only 5.4% were former smokers (Table 4). Chinese American women are commonly exposed to secondhand smoke at home and at the work site. Exposure to cooking oil from high-temperature frying may contribute to lung cancer risk among Chinese women in the United States, as it has been proposed to do in China. Lung cancer incidence among women in China (19.0/100,000) ranks as the ninth highest worldwide (Table 6). Indoor cooking and heating with coal has been linked to the high lung cancer incidence and mortality among Chinese women in China, but this is an extremely uncommon exposure in the United States.

Screening for colorectal and prostate cancer is less common among Chinese men than non-Hispanic White men, but more common than among other Asian ethnic groups, except Japanese men. Screening for cervical, breast, and colorectal cancer among Chinese women is substantially less common than in non-Hispanic White and Japanese women (Table 5).

Filipino

Filipino men had the highest incidence and mortality rates for prostate cancer among all Asian ethnic groups (Figures 1 and 2). Although prostate cancer incidence rates are much lower among Asian Americans compared with non-Hispanic Whites, it is still the most commonly diagnosed cancer among Asian American men. Risk factors for prostate cancer are not well understood. International studies suggest that a diet high in saturated fat may be a risk factor and that the risk of dying of prostate cancer may be associated with obesity. Higher prevalence of PSA testing is associated with higher incidence rates. The prevalence of PSA testing within the past year among Filipino men (46.1%) was intermediate among the Asian ethnic groups and lower than non-Hispanic Whites (57.7%). Filipino men have the second highest incidence (71.9/100,000) and the highest mortality (49.8/100,000) rate from lung cancer among the Asian ethnic groups, although the prevalence of current smoking is higher in Korean and Vietnamese men (Tables 3 and 4). These differences may reflect differences in age at initiation of smoking, as well as intensity and duration of smoking in the populations.

Compared with the other Asian ethnic groups, Filipino women had the second highest incidence (102.4/100,000) and the highest mortality (17.5/100,000) rate for breast cancer (Table 3). Overweight and obesity are established risk factors for postmenopausal breast cancer. The percentage (33.5%) of Filipino women who are overweight was higher than that of any other
Asian ethnic group (Table 4). Acculturation and adoption of Westernized diets and behaviors may contribute to the high breast cancer burden among Filipino women. The percentage of Filipino women who had a mammogram in the past year (61.1%) was similar to that for non-Hispanic White women (61.7%) (Table 5).

Cervical cancer is the second most common malignancy after breast cancer for women worldwide and is more common in Asian American women than in non-Hispanic White women in the United States. The incidence of cervical cancer among Filipino women (8.5/100,000) is higher than that in Whites, although not as

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**TABLE 3 Age-adjusted Cancer Rates (per 100,000) by Cancer Site* and Asian American Ethnic Group, California, 2000 to 2002, California Cancer Registry**

| Incidence       | Chinese | Filipino | Vietnamese | Korean | Japanese | Total Asian/Pacific Islander | Non-Hispanic White |
|-----------------|---------|----------|------------|--------|----------|------------------------------|-------------------|
| All sites       |         |          |            |        |          |                              |                   |
| Males           | 334.4   | 369.2    | 376.1      | 359.2  | 364.3    | 364.3                        | 560.8             |
| Females         | 265.8   | 281.6    | 274.8      | 251.2  | 295.5    | 294.6                        | 446.1             |
| Breast (female) | 75.1    | 102.4*   | 55.5       | 50.7   | 102.8*   | 89.9                         | 152.9             |
| Colon and rectum|         |          |            |        |          |                              |                   |
| Males           | 52.2    | 48.4     | 39.1       | 57.8*  | 64.4*    | 51.5                         | 42.8              |
| Females         | 41.9*   | 29.0     | 33.0       | 50.2*  |          | 38.2                         |                   |
| Lung            |         |          |            |        |          |                              |                   |
| Males           | 52.3    | 71.9*    | 72.8*      | 56.3   | 41.1     | 58.0                         | 77.9              |
| Females         | 29.8*   | 25.5     | 37.8*      | 26.1   | 22.8     | 28.5                         | 57.6              |
| Prostate        | 80.4    | 113.3*   | 65.4       | 51.0   | 103.7*   | 94.0                         | 159.9             |
| Stomach         |         |          |            |        |          |                              |                   |
| Males           | 18.3    | 7.2      | 28.1*      | 54.6*  | 27.0     | 20.1                         | 9.5               |
| Females         | 10.2    | 5.0      | 14.5*      | 27.5*  | 14.0     | 11.2                         | 3.8               |
| Liver           |         |          |            |        |          |                              |                   |
| Males           | 23.3    | 16.8     | 54.3*      | 33.7*  | 9.3      | 23.8                         | 6.8               |
| Females         | 7.6     | 5.4      | 15.8*      | 15.9*  | 8.1      | 8.8                          | 2.5               |
| Uterine cervix  | 5.4     | 8.5      | 14.0*      | 11.4*  | 5.6      | 8.8                          | 7.3               |

| Mortality       | Chinese | Filipino | Vietnamese | Korean | Japanese | Total Asian/Pacific Islander | Non-Hispanic White |
|-----------------|---------|----------|------------|--------|----------|------------------------------|-------------------|
| All sites       |         |          |            |        |          |                              |                   |
| Males           | 159.8   | 150.1    | 174.4      | 204.1  | 165.1    | 160.0                        | 225.4             |
| Females         | 109.0   | 97.7     | 105.1      | 105.6  | 122.0    | 108.1                        | 167.7             |
| Breast (female) | 13.2    | 17.5*    | 9.0        | 7.7    | 17.1*    | 14.6                         | 27.4              |
| Colon and rectum|         |          |            |        |          |                              |                   |
| Males           | 18.2    | 16.6     | 11.1       | 19.1*  | 27.1*    | 18.0                         | 21.3              |
| Females         | 13.8*   | 9.3      | 7.1        | 12.8   | 15.1*    | 11.6                         | 15.7              |
| Lung            |         |          |            |        |          |                              |                   |
| Males           | 46.6    | 49.8*    | 47.2       | 52.3*  | 36.0     | 44.7                         | 64.0              |
| Females         | 23.9*   | 17.5     | 23.3*      | 22.7   | 19.5     | 20.7                         | 44.9              |
| Prostate        | 8.9     | 15.7*    | 9.1        | 7.1    | 15.1*    | 11.9                         | 27.0              |
| Stomach         |         |          |            |        |          |                              |                   |
| Males           | 11.4    | 4.1      | 15.5       | 35.2*  | 18.1*    | 12.5                         | 5.0               |
| Females         | 6.6     | 3.2      | 8.9        | 13.9*  | 11.6*    | 7.1                          | 2.6               |
| Liver           |         |          |            |        |          |                              |                   |
| Males           | 19.9    | 12.0     | 35.5*      | 26.6*  | 8.3      | 17.9                         | 6.0               |
| Females         | 7.8     | 4.2      | 10.4*      | 11.5*  | 7.8      | 7.4                          | 2.7               |
| Uterine cervix  | 1.5     | 3.1      | 4.8*       | 3.0*   | †        | 2.7                          | 2.0               |

* The 2 highest rates for each gender-specific cancer site among the Asian ethnic groups.
† Rate not displayed due to fewer than 15 cases.
high as among Korean and Vietnamese women (Table 3). The prevalence of Pap screening within the last 3 years (Table 5) among Filipino women in California was 86.3%—higher than the prevalence for any other Asian ethnic group and for non-Hispanic Whites. Longer US residency has been associated with higher frequency of Pap tests in some studies.28

The majority of Filipino men and women speak English fluently and are either native-born or naturalized citizens. Filipino Americans have among the highest levels of income, education, health insurance, and usual source of health care of all Asian ethnic groups (Tables 2 and 5). Filipinos have among the lowest screening rates for colorectal cancer (Table 5), but also among the lowest incidence and death rates from this cancer. Further research is needed to understand whether perceptions about risk, awareness of the importance of screening, and/or unique cultural factors are affecting colorectal cancer screening behaviors in this population.

### Vietnamese

Vietnamese men in California have by far the highest incidence and death rates (54.3 and 35.5 per 100,000, respectively) from liver cancer of all the Asian ethnic groups. Their incidence rate is over 7 times higher than the incidence rate among non-Hispanic White men. Among Vietnamese women, the incidence and death rates from liver cancer are lower than in men (15.8 and 10.4 per 100,000, respectively), but still second only to Korean women (Table 3). Chronic infection with HBV causes most cases of hepatocellular carcinoma, the primary type of liver cancer, and is common in regions where liver cancer is endemic.17 As a result of their recent immigration history, Vietnamese may retain an increased prevalence of risk factors,

### Table 4: Prevalence of Risk Factors by Sex and Asian American Ethnic Group, California, 2003, California Health Interview Survey

|   | Chinese | Filipino | Vietnamese | Korean | Japanese | Non-Hispanic White |
|---|---------|----------|------------|--------|----------|-------------------|
| **Males** | | | | | | |
| Smoking | Current smoker | 15.2 | 23.7 | 30.9 | 36.2 | 20.5 | 18.7 |
| | Former smoker | 18.8 | 22.8 | 20.6 | 29.2 | 31.4 | 33.6 |
| | Never smoker | 66.0 | 53.5 | 48.6 | 34.6 | 48.1 | 47.7 |
| Alcohol | Drinker* | 57.2 | 58.4 | 61.6 | 71.1 | 62.2 | 72.3 |
| | None in the past 30 days | 42.9 | 41.6 | 38.4 | 28.9 | 37.8 | 27.7 |
| BMI | ≥25 | 37.7 | 49.8 | 31.4 | 33.8 | 52.5 | 64.9 |
| | <25 | 62.3 | 50.2 | 68.6 | 66.2 | 47.5 | 35.1 |
| Physical activity† | Less active | 78.8 | 79.2 | 80.0 | 78.6 | 82.8 | 78.3 |
| | Active | 21.2 | 20.8 | 20.0 | 21.4 | 17.3 | 21.7 |
| **Females** | | | | | | |
| Smoking | Current smoker | 2.2 | 8.3 | 2.6 | 8.5 | 15.6 | 15.9 |
| | Former smoker | 5.4 | 9.6 | 1.1 | 8.3 | 14.1 | 27.9 |
| | Never smoker | 92.4 | 82.2 | 96.4 | 83.2 | 70.3 | 56.2 |
| Alcohol | Drinker* | 32.0 | 40.0 | 19.4 | 43.4 | 40.6 | 61.2 |
| | None in the past 30 days | 68.1 | 60.0 | 80.6 | 56.6 | 59.4 | 38.8 |
| BMI | ≥25 | 18.6 | 33.5 | 16.9 | 17.3 | 28.3 | 43.1 |
| | <25 | 81.4 | 66.5 | 83.1 | 82.7 | 71.7 | 56.9 |
| Physical activity† | Less active | 71.4 | 79.4 | 70.0 | 75.2 | 72.7 | 74.5 |
| | Active | 28.6 | 20.7 | 30.0 | 24.8 | 27.3 | 25.5 |

* Drank alcohol in the past 30 days.
† Active = met guideline (having walked 30 minutes or more at a time on 3 or more days per week for transportation or fun); Less Active = did not meet guideline.
such as HBV infection, which are more prevalent in Vietnam.

Vietnamese women in California had the highest incidence and mortality from cervical cancer compared with other Asian ethnic groups. The incidence rate for cervical cancer among Vietnamese women (14.0/100,000) was nearly twice as high as that for non–Hispanic White women (7.3/100,000) (Table 3). Human papillomavirus (HPV) infection has been identified as a universal risk factor for cervical cancer, although variations in HPV infection rates and types do not appear to explain the large international variation in cervical cancer risk. High cervical cancer incidence and mortality in developing countries is likely related to lack of access to Pap testing, which prevents cervical cancer through identification of precancerous lesions, which leads to earlier treatment and detection of cancers at an early stage. Despite their high risk of cervical cancer, Vietnamese women in California have low prevalence

| TABLE 5 Prevalence of Screening Behaviors and Health Care Access by Sex and Asian American Ethnic Group, California, 2003, California Health Interview Survey |
|---------------------------------------------------------------|
| **Chinese** | **Filipino** | **Vietnamese** | **Korean** | **Japanese** | **Non-Hispanic White** |
| **Males** | | | | | |
| Endoscopy* | | | | | |
| >5 years or never | 59.7 | 69.0 | 67.1 | 71.3 | 51.9 | 48.7 |
| Within past 5 years | 40.3 | 31.0 | 32.9 | 28.8 | 48.1 | 51.3 |
| FOBT† | | | | | |
| >1 year or never | 81.1 | 92.3 | 85.6 | 93.1 | 89.6 | 79.6 |
| Within past year | 19.0 | 7.7 | 14.4 | 7.0 | 10.4 | 20.4 |
| PSA test‡ | | | | | |
| >1 year or never | 48.4 | 53.9 | 72.7 | 67.4 | 52.1 | 42.3 |
| Within past year | 51.6 | 46.1 | 27.3 | 32.7 | 48.0 | 57.7 |
| Health insurance§ | | | | | |
| No | 12.7 | 9.0 | 16.3 | 31.3 | 7.1 | 10.2 |
| Yes | 87.3 | 91.0 | 83.7 | 68.7 | 92.9 | 89.8 |
| Usual source of health care‖ | | | | | |
| No | 13.7 | 9.6 | 21.2 | 30.8 | 12.1 | 10.3 |
| Yes | 86.3 | 90.4 | 78.8 | 69.2 | 87.9 | 89.7 |
| **Females** | | | | | |
| Pap test¶ | | | | | |
| >3 years or never | 31.5 | 13.7 | 30.2 | 32.1 | 24.7 | 16.2 |
| Within past 3 years | 68.5 | 86.3 | 69.8 | 67.9 | 75.3 | 83.8 |
| Mammogram# | | | | | |
| >1 year or never | 47.5 | 38.9 | 41.3 | 57.4 | 34.4 | 38.4 |
| Within past year | 52.5 | 61.1 | 58.8 | 42.6 | 65.6 | 61.7 |
| Endoscopy* | | | | | |
| >5 years or never | 58.5 | 70.6 | 66.8 | 72.8 | 46.2 | 54.6 |
| Within past 5 years | 41.5 | 29.5 | 33.2 | 27.2 | 53.8 | 45.4 |
| FOBT† | | | | | |
| >1 year or never | 85.4 | 86.8 | 79.4 | 92.1 | 78.2 | 79.8 |
| Within past year | 14.7 | 13.2 | 20.6 | 7.9 | 21.8 | 20.2 |
| Health insurance§ | | | | | |
| No | 14.4 | 7.6 | 17.8 | 29.2 | 7.7 | 6.8 |
| Yes | 85.6 | 92.4 | 82.2 | 70.8 | 92.3 | 93.2 |
| Usual source of health care‖ | | | | | |
| No | 10.5 | 4.1 | 7.5 | 20.7 | 6.7 | 5.7 |
| Yes | 89.5 | 95.9 | 92.5 | 79.1 | 93.3 | 94.3 |

FOBT = fecal occult blood test.
PSA = prostate-specific antigen.
* Adults aged 50 years and older who had a sigmoidoscopy, colonoscopy, or proctoscopy.
† Adults aged 50 years and older who had an FOBT.
‡ Men aged 50 years and older who had heard of the PSA test and had the test.
§ Adults who are currently insured.
‖ Adults who report having a usual source of health care.
¶ Women aged 18 years and older who had a Pap smear.
# Women aged 40 years and older who had a mammogram.
of Pap testing within the past 3 years (69.8%) (Table 5).

Stomach and lung cancer are also common among the Vietnamese in California. Vietnamese males had the second highest incidence and the third highest death rate from stomach cancer compared with other Asian ethnic groups (Figures 1 and 2). Vietnamese females have lower rates than men, but still have high risk of developing and dying from stomach cancer (Figures 3 and 4). It is not clear why Vietnamese men and women have the highest lung cancer incidence rates, given that the prevalence of current smoking in Vietnamese women is the lowest of all Asian ethnic groups. Further studies that examine the influence of environmental tobacco exposure in lung cancer etiology are needed to assess its effect as a risk factor in this population.

Vietnamese have the lowest income and education level among the Asian ethnic groups examined (Table 2) and the second lowest prevalence of health insurance among Asian ethnic groups.

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**TABLE 6** Cancer Incidence Rank and Rates per 100,000 by Cancer Site and Country, GloboCan, 2002

| Cancer Site   | United States | Japan | China | Philippines | Korea, Democratic Republic | Korea, Republic | Vietnam |
|---------------|---------------|-------|-------|-------------|---------------------------|----------------|--------|
| Lung, Male    | 12th          | 49th  | 43rd  | 31st        | 27th                      | 27th           | 63rd   |
| Lung, Female  | 1st           | 33rd  | 9th   | 23rd        | 28th                      | 28th           | 58th   |
| Colon, Male   | 9th           | 5th   | 66th  | 54th        | 46th                      | 46th           | 58th   |
| Colon, Female | 6th           | 21st  | 80th  | 58th        | 53rd                      | 53rd           | 46th   |
| Stomach, Male | 118th         | 3rd   | 7th   | 104th       | 1st                       | 1st            | 33rd   |
| Stomach, Female| 142nd         | 5th   | 11th  | 104th       | 3rd                       | 3rd            | 42nd   |
| Liver, Male   | 94th          | 22nd  | 9th   | 32nd        | 3rd                       | 3rd            | 41st   |
| Liver, Female | 120th         | 34th  | 7th   | 38th        | 15th                      | 15th           | 20th   |
| Prostate      | 1st           | 114th | 7th   | 91st        | 134th                     | 134th          | 161st  |
| Breast, Female| 1st           | 74th  | 170th | 50th        | 130th                     | 130th          | 157th  |
| Cervical      | 150th         | 148th | 159th | 85th        | 98th                      | 98th           | 86th   |

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**FIGURE 1** Age-adjusted Cancer Incidence Rates Among Males by Asian American Ethnic Group and Cancer Site, California, 2000 to 2002, California Cancer Registry.
in California. Most Vietnamese in California are recent immigrants and must surmount language, cultural, and economic barriers to obtain preventive health care. Pap testing among Vietnamese women and PSA screening among men were among the lowest of all Asian ethnic groups (Table 5).

**Korean**

Koreans in California have a singularly high incidence of stomach cancer. The incidence rate (per 100,000) for Korean men (54.6) is nearly twice that of Vietnamese men (28.1) and over 5 times higher than that of non-Hispanic White men (9.5) (Table 3). Similarly, stomach cancer...
incidence rates for Korean females (27.5) are nearly twice as high as Vietnamese females (14.5) and over 7 times higher than non–Hispanic White females (3.8) (Table 3). Mortality due to stomach cancer was also the highest among Korean males and females in California (35.2/100,000 and 13.9/100,000, respectively) (Table 3). In general, the highest stomach cancer rates worldwide are found in Asia and parts of South America. Infection with Helicobacter pylori is thought to be an important risk factor for stomach cancer. Declines in stomach cancer in most industrialized counties during the latter part of the 20th century are likely due to improved hygiene; use of refrigeration rather than smoking, salting, or pickling to preserve foods; and antibiotic use. Worldwide, Korea has the highest incidence of stomach cancer for males and ranks third in the incidence of stomach cancer among females (Table 6). The unusually high rate of stomach cancer in Korea may be related to traditional dietary patterns in Korea, which include consumption of foods that are highly salted and rich in nitrites/nitrates.

Liver cancer incidence and mortality rates among Koreans residing in California are the highest of all of the Asian ethnic groups in females and the second highest in males. In Korea, the incidence of liver cancer ranks third worldwide for men and 15th for women (Table 6). This is likely related primarily to high prevalence of HBV infection in the Korean population. Koreans in California also have the highest proportion who report alcohol consumption in men (71.1%) and women (43.4%) among all Asian ethnic groups (Table 4). Korean women have the second highest incidence and death rate from cervical cancer (Table 3); only two thirds of Korean women report receiving a Pap test in the last 3 years. Overall, Koreans have the lowest prevalence of nearly every type of screening examined: endoscopy, FOBT, Pap smears, and mammograms (Table 5). A high proportion of Korean immigrants are foreign–born, and half the population has limited facility with English (Table 2). Koreans also have the lowest proportion of individuals covered by health insurance and the highest proportion with no usual source of health care (Table 5).

Korean men have the second highest incidence and death rates from colorectal cancer, comparable with those of non–Hispanic White males (Figures 1 and 2). Low screening rates may contribute to these higher rates, since colorectal cancer screening may reduce the incidence of colorectal cancer by removal of precancerous polyps. Korean men have the highest
lung cancer death rates among the Asian ethnic groups, although the incidence rate is the third largest. About 36% of Korean men are current smokers, the highest smoking prevalence among all Asian American ethnic groups examined (Table 4).

**Japanese**

High incidence rates for colorectal, stomach, prostate, and breast cancer were observed for Japanese Americans relative to other Asian American ethnic groups. Colorectal cancer incidence and mortality rates for Japanese males were higher than those of every other Asian ethnic group and even surpassed the rates for non-Hispanic Whites (Figures 1 and 2). Japanese females also had higher incidence of colorectal cancer than all other groups, including non-Hispanic Whites; however, their colorectal cancer mortality rate (15.1/100,000) was slightly lower than that of non-Hispanic White females (15.7/100,000) (Table 3). Diets high in processed and/or red meat and lacking sufficient intake of fruits and vegetables have been associated with an increased risk of colorectal cancer. Heavy alcohol consumption, physical inactivity, and overweight are also risk factors.19,30–33

CHIS data indicate that Japanese Americans exhibit a number of behavioral risk factors that could place them at risk for colorectal and other cancers. Most notable is the prevalence of overweight, which is defined as having a body mass index (BMI) greater than or equal to 25. The prevalence of overweight for Japanese males (52.5%) and females (28.3%) in California was greater than that of any other Asian ethnic group with the exception of Filipino females, although still lower than the prevalence for non-Hispanic Whites. A higher percentage of Japanese males (82.8%) reported that they did not meet physical activity guidelines compared with all other Asian subgroups and non-Hispanic Whites (78.3%) (Table 4). In addition, Japanese females reported a prevalence of current smoking of 15.6%, which was higher than all other Asian ethnic groups and similar to the prevalence among non-Hispanic Whites (15.9%) (Table 4). It is interesting to note that despite an historically low incidence of colorectal cancer in Japan, by 2002, Japan ranked fifth worldwide in colorectal cancer incidence for men and 21st for females (Table 6). The colorectal cancer rates in Japan are far higher than in any other Asian country, presumably reflecting changes in the Japanese dietary and behavior patterns as a result of “Westernization” in that country.

With respect to colorectal cancer screening behaviors, the prevalence of use among the Japanese was similar to that of non-Hispanic Whites, with the exception of FOBT screening within the past year, which was lower among Japanese males (10.4%) compared with non-Hispanic White males (20.4%). Rates of endoscopic colorectal cancer screening were more similar (48.1% for Japanese and 51.3% for non-Hispanic White males) (Table 5).

Dietary and behavioral factors associated with “Westernization” may also play a role in the high incidence of breast cancer observed for Japanese American females. Although the breast cancer incidence rate for Japanese females (102.8/100,000) is lower than that for non-Hispanic White females (152.9/100,000), it is the highest of all Asian American ethnic groups and twice as high as that for Korean (50.7/100,000) and Vietnamese (55.5/100,000) females (Table 3). Decreased age at menarche, late childbearing, fewer pregnancies, and increased use of postmenopausal hormone therapies are all factors that are prevalent in Western countries and associated with increased risk of breast cancer. It has also been suggested that the intake of soy and green tea, which are part of the Asian diet, may have protective effects against breast cancer.34 The prevalence of mammography within the past year was higher for Japanese Americans than for non-Hispanic Whites or any other Asian ethnic group; higher rates of mammography may also be associated with higher incidence rates.

The incidence and mortality rates for stomach cancer were also high among Japanese Americans. Japanese males and females in California had the third highest incidence rates (27.0/100,000 and 14.0/100,000, respectively) and second highest mortality rates (18.1/100,000 and 11.6/100,000, respectively) of stomach cancer compared with all other Asian ethnic groups (Table 3). As mentioned earlier, factors more common in developing countries, such as *Helicobacter pylori* infection, poor sanitation, and...
lack of refrigeration, increase the risk of stomach cancer. Despite industrialization, Japan ranked third and fifth for the incidence of stomach cancer among men and women, respectively, in 2002 (Table 6). Consumption of diets high in intake of salty and nitrite/nitrate rich food as part of the traditional Japanese diet may play a role.19,35–37

The similarity in screening behaviors between Japanese and non–Hispanic Whites may be the result of the long residency, high socioeconomic status, high prevalence of health insurance, and having a usual source of medical care in this population (Table 5).

CHALLENGES IN MONITORING CANCER OCCURRENCE, RISK FACTORS, AND SCREENING AMONG ASIAN SUBGROUPS

Methodologic difficulties in classification of race and ethnicity arise when tracking cancer occurrence in Asian Americans. Race/ethnicity information is collected and recorded in cancer registries and on death certificates and is relied on for race/ethnicity–specific analyses of cancer incidence and mortality; however, the source and accuracy of demographic data varies. Registries most often rely on medical records that are completed by hospital or clinical-practice staff who may enter patient demographic data based on their personal assumptions. In addition, race/ethnicity data are not collected using a uniform data collection instrument.38 Several studies have examined the classification of race/ethnicity and birthplace in cancer registries and have identified moderate misclassification for Asians that is even further variable for Asian ethnic groups.38–40 Death certificates are often completed by funeral directors, usually with the assistance of family members or friends of the deceased, and the measure of ancestry in these records has been shown to be inconsistent for races other than White or Black.41 Even given the limitations of self-reported data, including the possible underestimation of body weight, the CHIS provides a unique ability to examine risk factors by Asian American ethnic populations. However, these data are only available for California and may have limited generalizability to other parts of the country. The availability of accurate population estimates, which are necessary for denominator data for incidence and mortality rates and for standardization of risk factor and screening prevalence data, is an additional challenge for Asian American–specific analyses. Population data for Asian ethnic groups are only available every 10 years, when the Census is conducted; while intercensal population projections are calculated, they are generally not available for Asian ethnic groups at the national level.

An example of possible misclassification was noted in the analysis of lung cancer incidence and mortality rates: while Korean men have the third highest incidence rates, they have the highest lung cancer death rate among the Asian ethnic groups. Factors that could have contributed to this discrepancy could include differences in survival rates or subtypes of lung cancer or differential misclassification of ethnicity in registry compared with death certificate data. Monitoring cancer occurrence among ethnic groups requires systematic recording of race/ethnicity, place of birth, and native language in health system records, as well as accurate intercensal population counts.

RESOURCES FOR CLINICIANS

Linguistic and cultural barriers may contribute to low cancer screening rates for some Asian American ethnic groups. There are various methods that may be employed in clinical settings to overcome language barriers, including use of on-site professional interpreters, use of remote-simultaneous interpreter services, or use of family members as ad hoc interpreters. Studies investigating various methods for communication enhancements in clinical settings have found that professional interpreters can facilitate communication effectively and that ethnic concordance between patients and clinicians was associated with higher patient satisfaction among Asian Americans studied.42–44 An additional study of the influence of interpretation methods on patient satisfaction found that patients using family or ad hoc interpreters, such as other patients or untrained staff, reported lower satisfaction.45

In response to the need for linguistically appropriate cancer materials for lay audiences, the Asian American Network for Cancer Awareness, Research and Training (AANCART), a National Cancer Institute–funded Network, and the American Cancer Society have collaborated to produce a searchable Web portal for Asian language cancer materials for lay audiences.
(www.cancer.org/apicem or www.aancart.org/apicem). This Web portal serves as a single point of access for cancer education materials that have been translated into more than 12 Asian and Pacific Islander languages. Physicians and other health care providers are encouraged to use this Web-based tool to find medically sound, linguistically appropriate, and culturally competent materials for lay adults in selected Asian and Pacific Islander languages.

Clinicians should be aware of cancers that are more common in persons of Asian ethnicity than in other population groups. For example, the excess in liver cancer mortality among Asians overall, and particularly among Vietnamese and Korean men and women, is likely associated with a higher prevalence of chronic hepatitis B infection.\(^46\) Hepatitis B vaccination and hepatitis B-immune globulin administration are recommended to reduce the transmission of hepatitis B to neonates of mothers who are hepatitis B carriers, and the likelihood of cirrhosis and hepatocellular cancer among hepatitis B carriers can be reduced by antiviral treatment.\(^47\) Although no routine screening for stomach cancer is recommended in the United States, screening programs have been effective in reducing stomach cancer mortality in Japan, and a high index of suspicion, including diagnostic evaluation of symptomatic patients in high-risk subgroups, may be warranted.\(^46\) The prevalence of cervical cancer screening, which plays a critical role in both prevention and early detection of cervical cancer, is low for Chinese, Vietnamese, and Korean women; clinicians should encourage their female patients to have regular screening and HPV vaccination when appropriate.\(^48\) In addition, research should be done to better understand cultural barriers with respect to cancer.

**SUMMARY**

The differences in cancer incidence and mortality among the Asian American ethnic groups illustrate the heterogeneity of this population. Some groups with more recent immigration histories, such as Vietnamese and Koreans, have a higher burden of cancers that are not typically observed at high rates in Westernized countries (eg, stomach and liver). Other groups with older immigration histories, such as Japanese and Filipinos, have a higher burden from cancers that are commonly observed in the United States (eg, colorectal, breast), indicating that they may have acculturated to the Western lifestyle and thus succumbed to risk factors associated with these cancers. In addition, data from the CHIS reveal low screening rates among several of the Asian ethnic groups and, most notably, among groups with more recent immigration histories and limited English proficiency. This may suggest that certain groups of Asian Americans face barriers to medical care as a result of linguistic and cultural differences.

Thus, providers have the obligation to assist in overcoming linguistic and cultural barriers by using tools such as the American Cancer Society/AANCART’s Asian and Pacific Islander Cancer Education Web portal as they strive to communicate cancer prevention and early detection messages to their Asian language-speaking patients. When examining patients of Asian ancestry for cancer, the scope of attention should extend beyond the typical chronic cancers and their risk factors to those cancers of infectious origins, as well. Tobacco use is a common risk factor for most populations, including non-Hispanic Whites and Asian American ethnic groups; therefore, focusing on smoking cessation and reducing secondhand tobacco smoke exposure is always warranted.

As one of the fastest growing racial/ethnic components of the US population, the Asian American population has a cancer burden that deserves special attention. Asian Americans are heterogeneous with cultures, languages, malignancies, and risk factors specific to each of the populations aggregated within this group. Efforts to improve the quality of nationwide cancer incidence, mortality, and behavioral risk factor data for each of the Asian American ethnic populations should be made to better address the cancer burden among Asian Americans and help prevent its future occurrence.

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