Cancer Statistics for Asian Americans, Native Hawaiians, and Pacific Islanders, 2016: Converging Incidence in Males and Females

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Cancer is the leading cause of death among Asian Americans, Native Hawaiians, and Pacific Islanders (AANHPIs). In this report, the American Cancer Society presents AANHPI cancer incidence data from the National Cancer Institute, the Centers for Disease Control and Prevention, and the North American Association of Central Cancer Registries and mortality data from the National Center for Health Statistics. Among AANHPIs in 2016, there will be an estimated 57,740 new cancer cases and 16,910 cancer deaths. While AANHPIs have 30% to 40% lower incidence and mortality rates than non-Hispanic whites for all cancers combined, risk of stomach and liver cancers is double. The male-to-female incidence rate ratio among AANHPIs declined from 1.43 (95% confidence interval, 1.36-1.49) in 1992 to 1.04 (95% confidence interval, 1.01-1.07) in 2012 because of declining prostate and lung cancer rates in males and increasing breast cancer rates in females. The diversity within the AANHPI population is reflected in the disparate cancer risk by subgroup. For example, the overall incidence rate in Samoan men (526.5 per 100,000) is more than twice that in Asian Indian/Pakistani men (216.8). Variations in cancer rates in AANHPIs are related to differences in behavioral risk factors, use of screening and preventive services, and exposure to cancer-causing infections. Cancer-control strategies include improved use of vaccination and screening; interventions to increase physical activity and reduce excess body weight, tobacco use, and alcohol consumption; and subgroup-level research on burden and risk factors. CA Cancer J Clin 2016;66:182-202. © 2016 American Cancer Society.

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Introduction

Asian Americans represented 6.3% of the total US population (20 million of 318.7 million) in 2014 and are the fastest-growing racial/ethnic group in the United States. In contrast to Hispanics, the rapid growth in the Asian American population is driven by immigration as opposed to native births. Native Hawaiians and Pacific Islanders (NHPIs) (1.5 million) are also one of the fastest-growing populations in the United States. The term “Asian” refers to a person with origins in the Far East, Southeast Asia, or the Indian subcontinent. This group includes, but is not limited to, Asian Indians, Cambodians, Chinese, Filipinos, Hmong, Japanese, Koreans, Pakistanis, and Vietnamese. The term NHPI refers to people with origins in Hawaii, Guam, Samoa, or other Pacific Islands. Asian Americans and NHPIs are distinct racial groups with very different cancer profiles. Unfortunately include improved demographic and health data for these two groups are unavailable. Data are usually combined, because of small numbers or for continuity with historical statistics, and referred to as “Asian Americans, Native Hawaiians, and Pacific Islanders” (AANHPIs). The largest Asian American subpopulation is Chinese (23%), followed by Filipino (20%), Asian Indian (18%), Vietnamese (10%), and Korean (10%). The largest NHPI subpopulation

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is Native Hawaiian (43%), followed by Samoan (15%), Guamanian or Chamorro (12%), and Tongan (5%).¹ Ten US states are home to 73% of the AANHPI population; California has the largest proportion with 32%, followed by New York (9%), Texas (7%), Hawaii (5%), and New Jersey (5%).

Despite extraordinary heterogeneity within the AANHPI population, statistics are generally available only in aggregate, masking the vast diversity in the cancer burden between subgroups. The cancer profile of the combined AANHPI population is distinct from that of other racial and ethnic groups in the United States. While overall and most site-specific cancer rates are lower in this population than in non-Hispanic whites (NHWs), rates of some cancers, such as stomach and liver, are substantially higher. However, cancer rates and risk factors in the AANHPI population and its distinct subpopulations vary by immigration history, nativity, ethnic origin, acculturation, and socioeconomic status.⁵ The American Cancer Society published a report on cancer burden and risk factors in five Asian American subgroups in California in 2007.⁶ This report updates and expands upon that report using national data including NHPIs and expanded subgroups where possible. Aggregated AANHPI data presented here can be compared with other US aggregated population groups (eg, NHWs) and historical AANHPI statistics.

Materials and Methods

Incidence and Mortality

Cancer incidence data in the United States are collected and reported by the National Cancer Institute’s (NCT's) Surveillance, Epidemiology, and End Results (SEER) program and the Centers for Disease Control and Prevention’s (CDC’s) National Program of Cancer Registries (NPCR). The SEER program reports long-term, high-quality, population-based incidence data covering approximately 28% of the US population, including 50% of Asians and 67% of NHPIs,⁷ and began coding Asian/Pacific Islander race in 1992. A customized database from the SEER 11 registries (Connecticut, Hawaii, Iowa, New Mexico, Utah, and the metropolitan areas of Atlanta, Detroit, Los Angeles, San Francisco-Oakland, San Jose-Monterey, and Seattle-Puget Sound), plus Greater California and New Jersey for 1990 through 2010, was the source for 5-year (2006-2010) average annual incidence rates by AANHPI subgroup. This database includes Chinese, Filipinos, Asian Indians/Pakistanis (grouped together according to SEER coding rules), Vietnamese, Koreans, Japanese, Cambodians, Laotians, Native Hawaiians, Samoans, and NHWs.⁸ The SEER 13 registries (SEER 11 plus Rural Georgia and the Alaska Native Tumor Registry [except for NHWs]) were the source for graphs of incidence trends from 1992 through 2012.⁹ The SEER 18 registries (SEER 13 registries plus Greater Georgia, Greater California, Kentucky, Louisiana, and New Jersey) were the source for the lifetime probability of developing cancer (2010-2012), age-adjusted stage distribution (2008-2012), and 5-year cause-specific survival rates (2005-2011).¹¹ Cause-specific survival is a net survival measure that relies on specified diagnosis and cause of death instead of life tables, which are necessary for the calculation of relative survival and historically have been unavailable for populations other than whites and blacks.¹² Stage at diagnosis was classified based on SEER summary stage for the year 2000. The lifetime probability of developing cancer was calculated using the NCI's DevCan software (version 6.7.3; NCI, Bethesda, MD).

The North American Association of Central Cancer Registries (NAACCR) compiles and reports incidence data for 1995 onward from cancer registries that participate in the SEER program and/or the NPCR (5 states receive funding from both programs). Population coverage for these data has increased over time and is 96% overall and 97% for AANHPIs during 2008 through 2012. Data that met NAACCR high-quality standards were the source for 5-year average annual incidence rates (2008-2012) and the 2016 new cancer case projections (2003-2012).¹³ Data from 24 states (Arizona, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Illinois, Iowa, Kentucky, Louisiana, Maine, Michigan, Nebraska, New Jersey, New Mexico, New York, Pennsylvania, Rhode Island, Utah, Washington, Wisconsin, and Wyoming) and from one metropolitan area (Atlanta) that met NAACCR’s standards, which represent about 77% of the AANHPI population in the United States, were the source for Joinpoint analyses to produce 10-year incidence trends (2003-2012).¹⁴ Mortality data were obtained from the CDC’s National Center for Health Statistics (NCHS).¹⁴ Data from all 50 states and the District of Columbia were the source for Joinpoint analyses to produce 10-year incidence trends (2003-2012). Long-term mortality trends for NHWs from 1992 to 2012 exclude both Oklahoma and New Hampshire, because these states did not collect information on Hispanic origin for one or more years between 1992 and 1996 (Oklahoma, 1992-1996; New Hampshire, 1992). All other mortality statistics were based on data from all 50 states and the District of Columbia.

All cancer cases were classified according to the International Classification of Diseases for Oncology.¹⁵¹⁶ Causes of death were classified according to the International Classification of Diseases (ninth and 10th revisions).¹⁷¹⁸ Incidence and death rates for the United States were age-adjusted to the 2000 US standard population. All rates are expressed per 100,000 population. SEER*Stat software (version 8.2.1) was used to calculate all US incidence and death rates using denominator data from US Census Bureau population estimates. Ten-year incidence and death trends are described in terms of the average annual percent change.
based on the NCI’s Joinpoint regression analysis program (version 4.2.0.1). Trends were deemed increasing or decreasing when the slope of the trend was statistically different from zero (2-sided \(P < .05\)).

**Projected Cancer Cases and Deaths in 2016**

The precise number of cancer cases diagnosed in the current year is unknown because the availability of incidence and mortality data lags 2 to 4 years due to the time required for data collection, compilation, and dissemination. In addition, cancer registration is incomplete in some states. Therefore, we projected the numbers of new cancer cases and deaths among AANHPIs in the United States in 2016 to provide an estimate of the contemporary cancer burden.

To predict the number of cancer cases diagnosed in AANHPIs in 2016, we estimated the number of cases diagnosed each year from 2003 through 2012 and then projected these counts 4 years ahead. First, age-specific and sex-specific incidence rates, based on data from 44 states and the District of Columbia that met the NAACCR’s high-quality standards, were applied to the corresponding US Census Bureau population estimates to obtain estimated counts. Then, case counts were projected to 2016 based on the average annual percent change from 2003 through 2012 generated by the Joinpoint regression model. Delay adjustment factors from the SEER 18 registries for AANHPIs by sex and cancer site were applied to correct for delayed reporting or updated cases. The number of cancer deaths was estimated using the annual percent change for the most recent Joinpoint trend based on the actual numbers of cancer deaths from 1998 through 2012. For the complete details of this methodology, please refer to Chen et al.\(^{19}\)

**Risk Factor and Screening Data**

Data on behavioral risk factors (cigarette smoking, excess body weight, physical inactivity, and alcohol consumption), receipt of cancer screening, and vaccination coverage (human papillomavirus [HPV] and hepatitis B virus [HBV]) were obtained from national population-based surveys and are limited to the Asian American population. For adults, we used the National Health Interview Survey (NHIS)\(^{20}\) and the National Health and Nutrition Examination Survey (NHANES)\(^{21}\); and, for adolescents, we used the National Immunization Survey of Teens.\(^{22,23}\) NHANES is the preferred source of information for body mass index in the United States because height and weight are measured rather than reported by survey participants. Information on adults by subgroup from the NHIS allowed for estimates of risk factors and screening for the 3 largest Asian subgroups (Chinese, Filipinos, and Asian Indians). In contrast, information by AANHPI subgroup is not collected in national surveys of adolescents. The years of risk factor and screening estimates vary based on the availability of data. In some cases, data for 2 or 3 years were aggregated to achieve a sufficient sample size to produce reliable estimates. All surveys were analyzed using SUDAAN statistical software (version 11.0.1; RTI International, Research Triangle Park, NC) to obtain weighted prevalence estimates.

**Selected Findings**

**Overall Cancer Occurrence**

**Incidence**

In 2016, an estimated 57,740 new cancer cases are expected to be diagnosed among AANHPIs (Fig. 1). According to these estimates, the most commonly diagnosed cancers among males will be prostate (18%), lung (14%), and colorectum (12%). Among females, the three most commonly diagnosed cancers will be breast (34%), thyroid (10%), and lung (9%).

Table 1 provides the lifetime probability of developing cancer among AANHPIs, which is lower in both males and females compared with NHWs. Cancer risk among AANHPIs is lower than that among NHWs overall and for the four most common cancers (breast, lung, colorectum, and prostate) (Table 2). However, AANHPIs have higher risk for some infection-related cancers, such as stomach, liver, and nasopharynx.

Overall cancer incidence rates are 30% to 40% lower in AANHPIs than in NHWs (Table 2). However, there is striking variation in cancer incidence rates among AANHPI subgroups. Among males, all-sites incidence rates (per 100,000) during 2006 to 2010 range from 216.8 among Asian Indians/Pakistanis to 526.5 among Samoans, similar to rates in NHWs (554.1) (Fig. 2). Among females, rates range from 212.0 among Asian Indians/Pakistanis to 442.8 among Samoans, also similar to rates in NHWs (444.6). For both males and females, the highest rates after Samoans were among Native Hawaiians and Japanese.

For all cancers combined, incidence trends in AANHPIs mirror those in NHWs (Fig. 3). Although incidence rates continue to be slightly higher in AANHPI males than in females, they have been converging over the past 2 decades because of declining rates in males and relatively stable rates in females. The male-to-female rate ratio among AANHPIs has declined from 1.43 (95% confidence interval [CI], 1.36-1.49) in 1992 to 1.04 (95% CI, 1.01-1.07) in 2012. From 2003 to 2012, overall cancer incidence rates declined by 1.9% among AANHPI males and by 1.5% among NHW males, compared with stable trends among women in both groups (Table 3). Trends in cancer occurrence, particularly among Asian Americans, are influenced not only by the risk factor profiles of those living in the United States but also by the continual stream of newly arrived immigrants.
Stage at diagnosis and survival

AANHPIs are less likely than NHWs to be diagnosed with cancer at a localized stage (Fig. 4). The largest absolute differences are for cancers of the thyroid (9%), cervix (8%), prostate (5%), and lung (3%). The disparities for cervical and thyroid cancers may be attributable to less access to health care among AANHPIs, including screening and diagnostic services.24,25

Overall 5-year cancer-specific survival among AANHPIs compared with NHWs is lower for males (62% vs 68%) and similar for females (70% vs 68%) (Fig. 5). Survival is notably higher among AANHPIs for stomach and liver cancers, while it is similar for other major cancer sites (Fig. 5). AANHPIs appear to have a paradoxical survival advantage for sites with a relatively poor stage distribution (thyroid, lung, prostate) compared with NHWs. The reasons for this are not well understood but could be because of differences in tumor biology or lifestyle factors in AANHPIs, including screening and diagnostic services.24,25

Mortality

Cancer has been the leading cause of death among AANHPIs since 2000 (Table 4).29 In 2016, an estimated 16,910 cancer deaths will occur among AANHPIs (Fig. 1). The three leading causes of cancer death are lung (27%), liver (14%), and colorectum (11%) among males and lung (21%), breast (14%), and colorectum (11%) among females.

Similar to incidence rates, overall cancer death rates are 40% lower in AANHPIs compared with NHWs, although there is substantial variation by cancer site (Table 2). The rate ratios for mortality are generally consistent with those for incidence, with the exception of thyroid cancer. Compared with NHWs, AANHPIs are 10% to 20% less likely to be diagnosed with thyroid cancer but are equally (males) or more (females) likely to die from the disease. These racial disparities could be attributable to differences in access to early intervention and appropriate, high-quality care.30

Cancer death rates have been decreasing since 1992 in AANHPIs, mirroring trends in NHWs (Fig. 3). Unlike incidence trends, however, mortality rates in males and females have only slightly converged. The male-to-female rate ratio among AANHPIs has declined from 1.67 (95% CI, 1.58-1.78) in 1990 to 1.36 (95% CI, 1.31-1.41) in 2012. Mortality rates during 2003 to 2012 declined by 1.5% and 0.8% annually among AANHPI males and females, respectively, similar to declines in NHWs.

**FIGURE 1.** Leading Sites of New Cancer Cases and Deaths Among Asian Americans, Native Hawaiians, and Pacific Islanders (AANHPIs), 2016 Estimates.*

*Excludes basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.
The Four Major Cancer Sites in the United States

Female breast

Invasive breast cancer is the most commonly diagnosed cancer and the second leading cause of cancer death among AANHPI women, with a total of 11,090 new cases and 1180 deaths expected in 2016 (Fig. 1). About 1 in 10 AANHPI women will be diagnosed with breast cancer in her lifetime (Table 1). Age-standardized breast cancer incidence and mortality rates are 30% and 50% lower, respectively, than those in NHWs (Table 2). However, there is substantial variation in breast cancer incidence rates within the AANHPI population, ranging from 35.0 (per 100,000) in Cambodian women to 135.9 in Native Hawaiian women (Fig. 2). Higher rates among those with a longer immigration history, such as Japanese and Filipinos, are thought to be related to the adoption of western behaviors that increase breast cancer risk, such as a later age at childbirth, lower parity, and higher body weight.

Breast cancer incidence rates among AANHPI women have been increasing gradually, compared with stable rates in NHWs (Fig. 6); from 2003 to 2012, rates in AANHPIs increased by 1.1% annually (Table 3). Reasons for this increase are thought to include changes in factors such as body weight and reproductive patterns after immigration and acculturation as well as uptake of mammography. Increases in incidence of in situ breast cancers among AANHPIs since 1992 are consistent with increased screening. In contrast, from 1990 to 2012, breast cancer mortality rates decreased by 16% in AANHPI women and by 36% in NHW women (Fig. 7). These reductions have been attributed to improvements in both treatment and early detection.

The distribution of breast cancer stage at diagnosis is similar in AANHPIs and NHWs (Fig. 4), although 5-year cause-specific survival rates are slightly higher among AANHPI women (Fig. 5). However, there are some notable differences in survival by nativity and between AANHPI subgroups in population-based studies. A study in California showed that compared with foreign-born Asian women, those who are US-born are more likely to be diagnosed with breast cancer at a localized stage and have higher survival after adjusting for stage and other prognostic factors. Compared with NHWs, survival is higher in Japanese women but lower among NHPI women. Factors thought to contribute to the Japanese survival advantage include lower body weight and healthy diet. Survival differences may also reflect biological differences in tumor characteristics. A study in California showed that the risk of human epidermal growth factor receptor 2 (HER2)-positive breast cancer subtypes was higher among Korean, Filipina, Vietnamese, and Chinese women compared with NHW women.
Colorectum

Among AANHPIs, an estimated 2990 men and 2720 women will be diagnosed with colorectal cancer in 2016 (Fig. 1). It is the third leading cause of cancer death among both AANHPI men and women. Incidence and death rates among AANHPIs are 20% and 30% lower, respectively, compared with those among NHWs (Table 2). Among AANHPI subgroups, colorectal cancer incidence rates are lowest in Asian Indians/Pakistanis and highest in Japanese (Fig. 2). Higher incidence rates among US-born compared with foreign-born Chinese and Filipino men in a California study point to a higher prevalence of colorectal cancer risk factors, such as obesity, unhealthy diet, physical inactivity, and smoking.45

From 2003 to 2012, colorectal cancer incidence and mortality rates decreased among AANHPIs, albeit at a slightly slower pace than among NHWs (Table 3). Long-term declines in incidence and death rates in the overall population are attributed to changing patterns in risk factors, the uptake of screening, and improved treatments.46,47 However, the aggregation of AANHPI masks differences in trends by subgroup. A California study documented increasing colorectal cancer incidence rates in Koreans, Filipinos, and South Asians in California between 1988 and 2007,48 indicating a need for tailored colorectal cancer prevention and early detection interventions targeting these populations. Koreans have among the lowest rates of colorectal cancer screening in California.48

AANHPIs have slightly higher 5-year colorectal cancer-specific survival rates than NHWs (Fig. 5). However, one study found differences in outcomes between subgroups, with the highest survival among Japanese and Asian Indians/Pakistanis, while rates in other groups were similar to those in NHWs.49 Another study found that the survival advantage among Japanese was primarily because of sociodemographic factors, but also reflected specific disease characteristics, including stage, grade, and subsite.50

Lung and bronchus

Among AANHPIs, an estimated 3460 men and 3030 women will be diagnosed with lung cancer in 2016 (Fig. 1). Although lung cancer is the leading cause of cancer death among both men and women, incidence and mortality rates are roughly half those of NHWs (Table 2) reflecting historic differences in the prevalence of smoking. The highest lung cancer incidence rate in men is among Samoans (98.9 per 100,000), followed by Native Hawaiians (72.1), and Vietnamese (62.7); Asian Indians/Pakistanis have the lowest rate (21.1) (Fig. 2). Among women, Native Hawaiians (44.0) and Samoans (41.8) have the highest rates, and Asian Indians/Pakistanis (10.2) have the lowest. Notably, lung cancer rates among Chinese women in both Asia and the United States are relatively high given the low prevalence of smoking in this group.6,51 Reasons are unknown but may include exposure to cooking oils at high heat, secondhand smoke, genetic susceptibility, or other unknown risk factors.6,52-54

From 2003 to 2012, colorectal cancer incidence and mortality rates decreased among AANHPI men and have been relatively stable among women since the early 1990s (Figs. 6 and 7).39 Among AANHPI

### TABLE 2. Cancer Incidence and Mortality Rates and Rate Ratios Comparing AANHPIs With NHWs, 2008 to 2012*

|                  | INCIDENCE MALE |          | INCIDENCE FEMALE |          | MORTALITY MALE |          | MORTALITY FEMALE |          |
|------------------|----------------|----------|------------------|----------|----------------|----------|------------------|----------|
|                  | AANHPI         | NHW      | Rate Ratio†     | AANHPI   | NHW            | Rate Ratio† | AANHPI           | NHW      | Rate Ratio†     |
| All sites        | 316.8          | 528.9    | 0.6‡            | 287.5    | 436.2          | 0.7¹       | 128.4            | 210.6    | 0.6‡            | 91.2     | 149.2          | 0.6‡      |
| Breast           | -              | -        | -                | 88.3     | 128.1          | 0.7¹       | -                | -        | -              | 11.4     | 21.9          | 0.5¹      |
| Colorectum       | 39.0           | 47.4     | 0.8‡            | 29.2     | 36.2           | 0.8‡       | 13.0             | 18.2     | 0.2‡           | 9.4      | 12.9          | 0.2‡      |
| Liver and intrahepatic bile duct | 20.6 | 9.3 | 2.2‡ | 7.9  | 3.2 | 2.5‡ | 14.5 | 7.6 | 1.9‡ | 6.1 | 3.1 | 2.0‡ |
| Lung and bronchus | 47.4           | 79.3     | 0.6‡            | 28.3     | 58.7           | 0.5‡       | 34.0             | 62.2     | 0.5‡           | 18.2     | 41.4          | 0.4‡      |
| Nasopharynx      | 3.5            | 6.6      | 0.5§            | 1.2      | 0.2            | 6.0§       | 1.3              | 0.2      | 5.9‡           | 0.4      | 0.1           | 4.6‡      |
| Prostate         | 67.8           | 123.0    | 0.56            | -        | -              | -         | 9.4              | 19.9     | 0.51           | -        | -             | -         |
| Stomach          | 14.5           | 7.8      | 1.9             | 8.5      | 3.5            | 2.4        | 7.9              | 3.6      | 2.2†           | 4.7      | 1.8           | 2.6†      |
| Thyroid          | 6.3            | 7.7      | 0.8‡            | 20.4     | 21.9           | 0.9        | 0.5              | 0.5      | 1.0            | 0.8      | 0.5           | 1.7†      |
| Uterine cervix   | -              | -        | -                | 6.3      | 7.1            | 0.9        | -                | -        | -              | 1.8      | 2.0           | 0.9†      |

AANHPI indicates Asian American, Native Hawaiian, and Pacific Islander; NHW, non-Hispanic white.

*Rates are per 100,000 and are age-adjusted to the 2000 US standard population.

†The rate ratio is the unrounded AANHPI rate divided by the corresponding NHW rate.

‡The difference between the rates for AANHPIs and NHWs is significant (P<.05).

Sources: Incidence: North American Association of Central Cancer Registries (NAACCR), 2015. Incidence data for NHWs are based on the NAACCR Hispanic Identification Algorithm (NHIA), and data for AANHPIs are based on the NAACCR Asian Pacific Islander Identification Algorithm (NAPIIA). Mortality: National Center for Health Statistics, Centers for Disease Control and Prevention, 2015.
**FIGURE 2.** Cancer Incidence Rates by Cancer Site, Sex, and Asian American, Native Hawaiian, and Pacific Islander Ethnic Group, 2006 to 2010.

*Rates based on <25 cases are omitted.

Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2015.
women from 2003 to 2012, incidence rates were stable, while
death rates declined by 0.5% per year; in contrast, among
NHW women, incidence rates decreased by 0.7% annually,
and death rates decreased by 1.1% annually. Lung cancer
trends typically lag behind smoking trends by 2 or 3 decades.
However, national smoking prevalence for AANHPIs is not
available before 1990 and these data do not include informa-
tion for recent immigrants, who also influence cancer
patterns.

AANHPIs are more likely than NHWs to be diagnosed
with lung cancer at a distant stage of disease (Fig. 4); how-
ever, 5-year cause-specific survival is similar between the 2
groups (Fig. 5). AANHPIs and NHWs are equally likely
to receive appropriate treatment for lung cancer.49 The rea-
sons for the roughly equivalent survival in AANHPIs
given later stage at diagnosis are unknown but may
include genetic and/or cultural factors or less complete
follow up.27,49

Prostate

Prostate cancer is the most commonly diagnosed cancer
and the fifth-leading cause of cancer death among
AANHPI men, with a total of 4550 new cases and 520
deaths expected in 2016 (Fig. 1). Incidence and mortality
rates in AANHPIs are 50% lower than those in NHWs
(Table 2). However, incidence varies 3-fold among
AANHPI subgroups, with rates (per 100,000) of about 30
among Cambodians and Laotians; 45 to 70 among Viet-
namese, Koreans, Asian Indians/Pakistanis, and Chinese;
and 100 or more among Japanese, Filipinos, Native
Hawaiians, and Samoans (Fig. 2).

Prostate cancer incidence rates peaked among AANHPIs
in the early 1990s because of the rapid uptake of prostate-
specific antigen (PSA) testing, followed by a steady decline
(Fig. 6).55 Prostate cancer death rates have been generally
declining among AANHPIs since 1993 (Fig. 7), similar to
NHWs. These declines are attributed to early detection
and improvements in treatment, although the relative con-
tribution of each is debated.56,57

NHWs are more likely than AANHPIs to be diagnosed
with prostate cancer at the localized stage (Fig. 4), but 5-
year cause-specific survival is roughly the same in both
groups (Fig. 5).

Cancer Sites With Higher Rates for AANHPIs

Liver and intrahepatic bile duct

Among AANHPIs, an estimated 1760 men and 830 women
will be diagnosed with liver cancer in 2016 (Fig. 1). It is the
second-leading cause of cancer death among AANHPI men
and the fifth-leading cause of cancer death among AANHPI
women. Incidence and death rates among AANHPIs are
about twice as high as those in NHWs (Table 2). Rates are
particularly elevated in Laotians, Vietnamese, and
Cambodians, likely because of recent immigration and a high prevalence of HBV infection in their countries of origin (Fig. 2).\textsuperscript{6,10} Chronic infection with HBV or hepatitis C virus (HCV) is the strongest risk factor for hepatocellular carcinoma, which accounts for about 80% of all liver cancer cases worldwide.\textsuperscript{58} Other risk factors for liver cancer include certain toxins and parasitic infections in Asian and Pacific Island nations \textsuperscript{59} and obesity, diabetes, alcoholic liver disease, and tobacco smoking, which are more common in the US.

Liver cancer is one of the few cancers for which the direction of incidence and mortality trends differs in AANHPIs and NHWs. While it is among the most rapidly increasing cancers among NHWs, incidence rates during 2003 to 2012 were decreasing among male AANHPIs and stable among females (Table 3). Death rates during this time period were increasing among NHWs by about 3% and 2% per year in men and women, respectively, from 2003 to 2012, in contrast to downward trends among AANHPI males (0.8% annually) and stable trends in AANHPI females. The increasing rates among NHWs are thought to be attributable to the increased prevalence of chronic infection with HCV as a result of exposure to contaminated blood or medical equipment and injection drug use during the 1960s and 1970s and possibly to increases in obesity and type 2 diabetes more recently.\textsuperscript{60} Community advocacy for awareness of HBV and motivation to use HBV screening and related therapies among AANHPIs, who have historically had the highest liver cancer rates in the United States, may be driving the declining mortality rates.\textsuperscript{60} Trends may also be affected by the risk profiles of arriving immigrants.

AANHPIs are more likely than NHWs to be diagnosed with liver cancer at a localized stage (Fig. 4) and also have higher 5-year survival rates (Fig. 5). Better survival among AANHPIs may be because of earlier stage at diagnosis, receipt of appropriate treatment, and/or lower prevalence of comorbidities, such as cirrhosis.\textsuperscript{61,62}

**TABLE 3. Fixed-Interval Trends in Cancer Incidence and Mortality Rates Among AANHPIs and NHWs, 2003 to 2012**

\begin{table}
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
& \multicolumn{2}{c|}{MALE} & \multicolumn{2}{c|}{FEMALE} \\
& AANHPI & NHW & AANHPI & NHW \\
\hline
All sites & Incidence & $-1.9^*$ & $-1.5^*$ & 0.2 & $-0.1$ \\
& Mortality & $-1.5^*$ & $-1.6^*$ & $-0.8^*$ & $-1.3^*$ \\
Colorectum & Incidence & $-2.6^*$ & $-3.8^*$ & $-2.6^*$ & $-3.2^*$ \\
& Mortality & $-1.1^*$ & $-3.0^*$ & $-1.3^*$ & $-2.7^*$ \\
Female breast & Incidence & & & 1.1* & $-0.1$ \\
& Mortality & & & $-1.4^*$ & $-1.9^*$ \\
Liver & intrahepatic bile duct & Incidence & $-1.3^*$ & 3.7* & $-1.2$ & 3.5* \\
& Mortality & $-0.9^*$ & 2.9* & $-1.4$ & 2.1* \\
Lung & bronchus & Incidence & $-1.8^*$ & $-2.3^*$ & $-0.1$ & $-0.7^*$ \\
& Mortality & $-2.0^*$ & $-2.4^*$ & $-0.5^*$ & $-1.1^*$ \\
Prostate & Incidence & $-4.5^*$ & $-3.5^*$ & & \\
& Mortality & $-3.5^*$ & $-3.3^*$ & & \\
Stomach & Incidence & $-3.8^*$ & $-1.2^*$ & $-2.8^*$ & $-1.3^*$ \\
& Mortality & $-4.3^*$ & $-3.6^*$ & $-3.3^*$ & $-3.3^*$ \\
Thyroid & Incidence & 6.4* & 5.5* & 5.7* & 5.7* \\
& Mortality & 3.1 & 1.7* & $-0.9$ & 0.4 \\
Uterine cervix & Incidence & & & $-3.0^*$ & $-0.7^*$ \\
& Mortality & & & $-3.1^*$ & $-0.5$ \\
\hline
\end{tabular}
\end{table}

AANHPI indicates Asian American, Native Hawaiian, and Pacific Islander; NHW, non-Hispanic white.

*The average annual percent change from 2003 to 2012 is statistically significantly different from zero ($P < 0.05$).

Sources: Incidence: North American Association of Central Cancer Registries (NAACCR), 2015. Mortality: National Center for Health Statistics, Centers for Disease Control and Prevention, 2015.

Stomach (gastric)

Among AANHPIs, an estimated 980 men and 820 women will be diagnosed with stomach cancer in 2016 (Fig. 1).\textsuperscript{19} Chronic infection with HBV or hepatitis C virus (HCV) is the strongest risk factor for hepatocellular carcinoma, which accounts for about 80% of all liver cancer cases worldwide.\textsuperscript{58} Other risk factors for liver cancer include certain toxins and parasitic infections in Asian and Pacific Island nations \textsuperscript{59} and obesity, diabetes, alcoholic liver disease, and tobacco smoking, which are more common in the US.

Liver cancer is one of the few cancers for which the direction of incidence and mortality trends differs in AANHPIs and NHWs. While it is among the most rapidly increasing cancers among NHWs, incidence rates during 2003 to 2012 were decreasing among male AANHPIs and stable among females (Table 3). Death rates during this time period were increasing among NHWs by about 3% and 2% per year in men and women, respectively, from 2003 to 2012, in contrast to downward trends among AANHPI males (0.8% annually) and stable trends in AANHPI females. The increasing rates among NHWs are thought to be attributable to the increased prevalence of chronic infection with HCV as a result of exposure to contaminated blood or medical equipment and injection drug use during the 1960s and 1970s and possibly to increases in obesity and type 2 diabetes more recently.\textsuperscript{60} Community advocacy for awareness of HBV and motivation to use HBV screening and related therapies among AANHPIs, who have historically had the highest liver cancer rates in the United States, may be driving the declining mortality rates.\textsuperscript{60} Trends may also be affected by the risk profiles of arriving immigrants.

AANHPIs are more likely than NHWs to be diagnosed with liver cancer at a localized stage (Fig. 4) and also have higher 5-year survival rates (Fig. 5). Better survival among AANHPIs may be because of earlier stage at diagnosis, receipt of appropriate treatment, and/or lower prevalence of comorbidities, such as cirrhosis.\textsuperscript{61,62}

The bacterium *Helicobacter pylori* (*H. pylori*) is the strongest risk factor for stomach cancer, accounting for about 90% of noncardia gastric cancer cases worldwide.\textsuperscript{63,64} Stomach cancer rates have been declining in the United States since the early 20th century and have also been declining more recently in Asian countries with historically high rates, such as Japan, Korea, and China.\textsuperscript{65}
These declines are thought to be due to changes in risk factors, including improved availability of fresh fruits and vegetables, lower consumption of salt-preserved foods, and reduced prevalence of *H. pylori* infection through improved sanitation and antibiotic treatment. Cigarette smoking is also a risk factor, and declines in smoking also may have contributed. From 2003 to 2012, stomach cancer incidence and death rates among AANHPIs declined by 3%-4% annually (Table 3).

AANHPIs are more likely than NHWs to be diagnosed with stomach cancer at a localized or regional stage (Fig. 4), possibly because of awareness of the higher risk of stomach cancer among Asian Americans and/or screening recommendations by some medical societies. The American Society for Gastrointestinal Endoscopy states that endoscopic screening may be considered for first-generation immigrants aged 40 years or older from high-risk Asian countries such as Japan or China, especially if there is a history of gastric cancer in a first-degree relative. Likely because of the earlier stage at diagnosis, AANHPIs have higher 5-year survival than NHWs, 40% versus 28% in males and 38% versus 34% in females, respectively (Fig. 5).

**Thyroid**

Thyroid cancer is the second most frequently diagnosed cancer among AANHPI females, with 3320 cases estimated in 2016 (Fig. 1). While it is a commonly diagnosed cancer, especially among women, it is not a leading cause of cancer death because of high survival (Fig. 5). Thyroid cancer incidence rates among women in India are relatively high, contrasting with the low rates among Asian Indian women in the United States. This is likely because of the selectively younger and more educated Asian Indian immigrant population in the United States. Cervical cancer disparities among Asian American women are related primarily to access to screening as well as prevalence of HPV infection in the country of origin for more
recent immigrants. The widespread uptake of the Papanicolaou (Pap) test resulted in rapid declines in cervical cancer occurrence in the United States over the second half of the 20th century, and decreases in incidence since 1990 among Vietnamese, Cambodian, and Laotian women in the United States are attributed primarily to increased screening.

Incidence and death rates among AANHPI women decreased by about 3% annually during the past 10 years of data, while incidence declined slightly and mortality remained stable in NHW women (Table 3). AANHPIs are less likely than NHWs to be diagnosed with cervical cancer at the localized stage (43% vs 51%), although 5-year survival is about 70% for both groups (Figs. 4 and 5).

Nasopharynx

Nasopharyngeal carcinoma, which is the dominant form of nasopharyngeal cancer, is rare worldwide, although it has elevated incidence in certain regions and populations, including southern China and southeastern Asia. Incidence rates among AANHPIs overall are about 5 to 6 times higher than among NHWs (Table 2) and are particularly elevated for men in certain subpopulations, including Chinese, Samoans, Guamanians/Chamorros, and Hmong. Nasopharyngeal carcinoma is thought to be caused by a combination of viral, environmental, and genetic factors. It has been estimated that about 98% of nasopharyngeal carcinoma cases worldwide are related to infection with Epstein-Barr virus (EBV), although only a small fraction of people infected with EBV develop this malignancy. Other environmental risk factors include smoking, alcohol consumption, occupational exposures, and certain preserved foods. Cantonese salted fish, which is high in nitrosamines, was identified as a risk factor for nasopharyngeal carcinoma among southern Chinese in the 1970s, leading to its designation by the International Agency for Research on Cancer as a carcinogen. While previous studies reported stable rates through the 1990s in AANHPI populations, incidence and mortality rates declined by about 2% to 3% annually from 2003 to 2012. Rates have also been declining among some high-risk populations in Asia, possibly because of decreased smoking or consumption of salted fish. The recent declines among AANHPIs are not well understood but may be attributable to dietary factors and decreased smoking.

Risk Factors for Cancer

The heterogeneity within the AANHPI population in terms of socioeconomic status, immigration patterns, and English proficiency is reflected in differences in risk factor prevalence and the use of preventive services between subgroups. Asian Americans have been described as having a bimodal socioeconomic distribution. For example, more than one-third of Japanese, Filipinos, and Asian Indians have a bachelor’s degree or higher, and only about 5% live in poverty, compared with 12% and 20% of Cambodians and Hmong, respectively. NHPIs have generally lower socioeconomic status than NHWs. As with other lower socioeconomic status groups in the United States, the NHPI population also has a higher prevalence of cancer risk factors, including smoking and excess body weight. Lower socioeconomic status and longer duration of US residence are associated with a higher prevalence of cancer risk factors, including smoking and excess body weight. Both lower socioeconomic status and longer duration of US residence are associated with a higher prevalence of cancer risk factors. In addition, about 40% of Chinese, Vietnamese, Koreans, Cambodians, and Hmong report speaking English less than “very well,” which may limit ability to access preventive and health care services, such as cancer screening.

Tobacco

National smoking estimates are only available for Asian Americans (excluding NHPIs) as a group and for the three largest subgroups (Chinese, Filipinos, and Asian Indians). Local data on smoking among AANHPI subgroups are also scarce. Smoking among AANHPIs varies by sex, nativity, acculturation, and ethnicity. Overall, 10% of Asian
Americans smoked in 2014, compared with 19% of NHWs. While smoking prevalence among NHW men (20%) and women (18%) is similar, Asian American men (14%) are more than twice as likely to smoke as women (6%). While, among men, US-born and foreign-born Asian Americans are equally likely to smoke, among women, the US-born are 5 times more likely to smoke—16% versus 3% of the foreign-born. These gender differences reflect smoking practices in home countries, where smoking is more accepted among men than women, and acculturation in the United States, where female smoking is equally accepted. Current smoking is more common among Filipinos (12%) than Chinese (7%) or Asian Indians (6). A survey of smoking status from 2002 to 2005 found that 42% and 27% of NHPI men and women, respectively, were current smokers, and in Hawaii, where 55% of US Native Hawaiians reside, 27% of Native Hawaiians report being current smokers. Several studies using community-based sampling and culturally appropriate methods have documented smoking prevalence among AANHPI subgroups that vary substantially from aggregated data. For example, a study of Asians in New York City found smoking prevalence as high as 36% among Korean men. Data are scarce on other forms of tobacco use; however, use of various forms of smokeless tobacco is common in some Asian countries, such as India.

Smoking prevalence in Asian American men decreased from 25% during the early 1990s to 14% in 2014, in contrast to women, among whom smoking remained stable at 6% during this time period. However, national trends do not necessarily reflect those in local areas. For instance, while overall smoking in New York City declined from 22% to 14% from 2002 to 2010, it did not decline among Asian males.

Tobacco-control needs among AANHPIs include disaggregated data on subgroups using surveys that include non-English speakers; culturally specific discouragement of initiation, especially among youth, and culturally and linguistically tailored cessation assistance. Local examples of successful tobacco-control initiatives can inform implementation on a broader scale. In a clinic serving Chinese immigrants in San Francisco that offered tobacco-cessation services that included counseling, nicotine-replacement therapy, and acupuncture, over 90% of patients chose to include acupuncture; inclusion of this traditional medicinal approach may have increased acceptability of cessation assistance. Although telephone quitlines are an effective smoking-cessation tool, California was the only state in which they were available in Asian languages until 2012, when the service became available nationwide. In the first 2 years, almost 6000 callers have used this national resource.

### Overweight/obesity

Excess body weight increases the risk of several cancers (endometrial, colorectal, liver, kidney, gallsbladder, prostate [advanced], ovarian, pancreatic, breast [postmenopausal], and esophageal [adenocarcinoma]) and also contributes to the development of independent risk factors, such as nonalcoholic fatty liver disease and type 2 diabetes. As defined by the World Health Organization, normal weight is defined as a body mass index (BMI) from 18.5 to 24.9 kg/m², whereas overweight is from 25 to 29.9 kg/m² and obese is ≥30 kg/m². However, it has been shown that Asians have a higher percentage of body fat than whites at the same BMI, as well as a

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**TABLE 4. Leading Causes of Death Among Asian Americans, Native Hawaiians, and Pacific Islanders and Non-Hispanic Whites, United States, 2012**

|                    | ASIAN AMERICAN, NATIVE HAWAIIAN, AND PACIFIC ISLANDER | NON-HISPANIC WHITE |
|--------------------|-------------------------------------------------------|--------------------|
| **RANK**           | **NUMBER OF DEATHS** | **PERCENT OF TOTAL DEATHS** | **DEATH RATE†** | **RANK** | **NUMBER OF DEATHS** | **PERCENT OF TOTAL DEATHS** | **DEATH RATE†** |
| Cancer             | 1 | 15,340 | 27.2 | 104.2 | 2 | 462,499 | 22.9 | 170.2 |
| Heart disease      | 2 | 12,266 | 21.8 | 92.0  | 1 | 481,991 | 23.9 | 171.2 |
| Cerebrovascular diseases | 3 | 4,108 | 7.3  | 30.8  | 4 | 100,154 | 5.0  | 35.5  |
| Accidents (unintentional injuries) | 4 | 2,372 | 4.2  | 15.0  | 5 | 99,288 | 4.9  | 43.7  |
| Diabetes           | 5 | 2,158 | 3.8  | 15.7  | 7 | 50,443 | 2.5  | 18.5  |
| Influenza and pneumonia | 6 | 1,745 | 3.1  | 13.9  | 8 | 40,460 | 2.0  | 14.3  |
| Chronic lower respiratory diseases | 7 | 1,624 | 2.9  | 12.8  | 3 | 127,116 | 6.3  | 46.2  |
| Alzheimer disease  | 8 | 1,379 | 2.4  | 11.6  | 6 | 72,772 | 3.6  | 24.9  |
| Suicide            | 9 | 1,152 | 2.0  | 6.2   | 9 | 33,727 | 1.7  | 15.7  |
| Nephritis, nephrotic syndrome, & nephrosis | 10 | 1,054 | 1.9  | 8.0   | 10 | 33,105 | 1.6  | 11.8  |
| All causes         | 10 | 56,352 | 100.0 | 406.1 | 2,016,896 | 100.0 | 742.3 |

*Note: Death rates are not directly comparable to those published in prior years due to updated population denominator data.

Source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2015.
higher risk for type 2 diabetes at a lower BMI.\textsuperscript{106} For this reason, lower BMI cutoff points established by the American Diabetes Association are used for assessing diabetic risk in Asian Americans,\textsuperscript{107,108} and some researchers have hypothesized that cancer risk among Asians may also be elevated at a lower BMI. While some studies indicate this may be true, especially for colon cancer,\textsuperscript{109,110} others do not.\textsuperscript{111,112} Moreover, three large pooled studies did not find Asians to be at a higher risk for cancer death at a lower BMI cutpoint for overweight.\textsuperscript{113-115} Thus, more research is needed to clarify the association between cancer and body fatness in this population.

About 42\% of Asian Americans are overweight or obese compared with 69\% of NHWs.\textsuperscript{116} However, 76\% of Native Hawaiians in Hawaii are overweight or obese.\textsuperscript{96} Asian American men (50\%) are more likely to be overweight or obese than women (35\%) similar to patterns in NHWs.\textsuperscript{116} Body fatness has been increasing among US-born Asian Americans as well as recent and long-term immigrants. For instance, the prevalence of overweight among US-born Filipinos increased from 36\% during 1992-1995 to 55\% during 2003-2008.\textsuperscript{117} The prevalence of overweight and obesity varies by Asian American subgroup; a study in California found that only 8\% of South Asian and 9\% of Chinese children were overweight, compared with 16\% of Japanese and Korean children and 18\% of Filipino children.\textsuperscript{118}

**Alcohol**

Alcohol consumption is associated with increased risk of several cancers (oral cavity, pharyngeal, laryngeal, colorectal, breast, esophageal, and liver\textsuperscript{119}), and it also may interact with HBV and HCV to further promote the development of liver cancer.\textsuperscript{120} This is of special concern among Asian Americans, who have a higher prevalence of HBV infection. Fewer Asian Americans (49\%) consume alcohol than NHWs (72\%), although the prevalence in Asian American men (60\%) is much higher than in Asian American women (39\%).\textsuperscript{20} US-born Asian Americans (61\%) are also more likely to consume alcohol than those who are foreign-born (46\%).\textsuperscript{20}

Screening, brief intervention, and referral to treatment by a clinician for alcohol use, including use that does not constitute an alcohol use disorder but does put the patient at risk for alcohol-related diseases, can be effective in reducing alcohol use.\textsuperscript{121} Culturally specific approaches for addressing alcohol use in Asian Americans include using translated materials, increasing awareness of the health hazards of excessive alcohol use, and recognizing familial consequences.\textsuperscript{121}

**Infectious agents**

**H. pylori.** Chronic infection with *H. pylori* is highly endemic in Asia, and prevalence patterns mirror gastric cancer risk.\textsuperscript{122} *H. pylori* seroprevalence is close to 60\% in China and Korea,\textsuperscript{122} compared with about 30\% in the United States.\textsuperscript{123} Compared with Japanese living in Japan, the risk of stomach cancer is lower among long-term Japanese immigrants in the United States and is even lower among US-born Japanese.\textsuperscript{124} Although the spread of *H. pylori* is not well understood, infection occurs primarily during childhood and risk is higher in lower socioeconomic groups.\textsuperscript{123} Because of lack of evidence, there are currently no interventions aimed at prevention. Preliminary studies in Asia have shown that eradication of *H. pylori* infection with antibiotics can reduce the risk of stomach cancer, although further studies are needed before this measure is utilized for prevention.\textsuperscript{125}
Prevalence of hepatitis B surface antigen seropositivity is estimated to be about 9% to 15% among Asian Americans, with prevalence as high as 25% among some recent immigrants. Nearly 70% of AANHPIs living in the United States were born or have parents who were born in a country where HBV is highly prevalent. AANHPIs account for greater than 50% of those infected with HBV in the United States, although most who harbor the virus are unaware. The HBV vaccination rate among AANHPI teens (86%) is slightly lower than among other racial/ethnic groups, all of which have HBV vaccination coverage above 90%. Taiwan achieved HBV vaccine coverage of 89% to 97% among birth cohorts from 1984 to 2010, which resulted in dramatic declines of about 80% in hepatocellular carcinoma incidence rates among vaccinated cohorts. While HBV is the leading liver cancer risk factor among Asian Americans in the United States, HCV is also an important risk factor for some Asian American populations, including Pakistanis and older Japanese and Taiwanese.

The US Preventive Services Task Force (USPSTF) recommends screening all those born in regions with a prevalence of HBV infection ≥2%, which includes all countries of Asia and the Pacific Islands except Australia and New Zealand. Among adults 18 years of age and older, about 28% of both Asian Americans and NHWs have ever received a hepatitis B test. The USPSTF also recommends HCV screening for all adults born between 1945 and 1965, who account for three-quarters of HCV-infected individuals and HCV-related deaths in the United States. HCV testing coverage in this cohort is 13% among NHWs and 10% among Asian Americans.

HBV screening among Asian Americans can be increased through culturally appropriate interventions in communities and the health care system. In a community-based, randomized controlled trial among Hmong using bilingual/bicultural lay health workers, 24% of intervention participants reported receipt of HBV testing compared with 10% of controls. A church-based, randomized controlled trial among Koreans with sessions led by lay health educators resulted in 19% of intervention participants reporting HBV testing, compared with 6% of controls. A study among Vietnamese Americans found that those who had received a physician’s recommendation or requested HBV testing were 4 and 8 times more likely, respectively, to receive testing, indicating the need for both provider and patient education. As such, health system-based interventions also have the potential to improve HBV testing by leveraging the importance of provider recommendation and integrating electronic medical records. In one randomized controlled trial, providers with Asian American patients received electronic messaging prompts for patients indicated for HBV screening, which resulted in 34% of intervention patients receiving HBV testing, compared with 0% of control patients.

HPV. HPV causes nearly all cervical cancers in the United States, as well as many oropharyngeal and anogenital cancers. A clinic-based study from 2003 to 2005 found that 17% of AANHPI women had a high-risk HPV infection, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women. More recent HPV prevalence data reflecting the introduction of the HPV vaccine in 2006 are not yet available for AANHPIs in the United States. Worldwide, it has been estimated that 5% of women in North America are infected with any type of HPV, compared with 23% of white women.
HPV vaccine uptake is influenced by caregiver awareness and varies by local context. In a study in Los Angeles, California, only 64% and 44% of Chinese and Korean mothers, respectively, with HPV vaccine-eligible daughters were aware of the vaccine. A Seattle study of Cambodian mothers also found that lack of awareness, lack of physician recommendation, and a belief that the HPV vaccine is not necessary in the absence of health problems, were primary barriers to vaccination of eligible girls. Physician education of caregivers and recommendation of the HPV vaccine are important steps that can be taken to increase vaccination uptake.

**Cancer Screening**

Access to health care influences the use of preventive services such as screening. Among Asian Americans, 13% of adults 18 to 64 years of age were uninsured, including 16% of those who were foreign-born, while 21% of men and 14% of women had no regular source of medical care. Among Native Hawaiians in Hawaii, 8% were uninsured, and 16% had no regular source of medical care. Interventions to promote cancer screening among Asian American groups have been successful, especially those using lay health workers, one-on-one communications, translated materials, and approaches that involve not only Asian American community members but also health care providers. Trained medical interpreters and patient navigators can help to overcome barriers to access among AANHPIs, and patient navigators in particular have been shown to improve the receipt of recommended screening as well as follow-up and initiation of treatment.

**Cervical cancer screening**

Seventy-one percent of Asian American women overall (21–65 years of age) report having a Pap test within the past 3 years, compared with 83% of NHW women. However, prevalence varies by subgroup. In a California study using electronic health records of insured women during 2012 and 2013, 76% of AANHPI women overall were up to date on cervical cancer screening, with a range from 70% among NHPI women to 81% among Vietnamese women.

Cervical cancer incidence rates among Cambodian, Vietnamese, and Laotian women decreased dramatically from 1990 to 2008, a change that has been attributed to increases in screening and treatment of precancerous lesions in these groups. For example, from 2001 to 2007 in California, cervical cancer screening among Vietnamese women increased from 69% to 85%. Increases in screening among Vietnamese women have been achieved through Vietnamese language media campaigns and lay health worker interventions. Cervical cancer screening can also be improved among AANHPIs through regular access to health care and physician recommendation. In a California study, Asian American patients were 13% more likely to receive recommended cervical cancer screening for each primary care visit attended in the past 2 years. A Seattle study found that Vietnamese American women were about 4 times more likely to receive a Pap test if they received a recommendation from their physician.

**Breast cancer screening**

Slightly more than two-thirds of Asian American (68%) and NHW (69%) women 45 years of age or older report having a mammogram within the past 2 years. However, uninsured Asian Americans (52%) are more likely to have had a recent mammogram than uninsured NHWs (40%).

In a California study that found that insurance was not a significant predictor of mammography receipt among Asian American women, which could be because of programs specifically targeting Asian American women.

Breast cancer screening varies by subgroup; greater than 80% of Vietnamese and Japanese women were current for mammography, compared with 67% of Asian Indian and NHPI women and around 75% of Korean, Filipino, and Chinese women in a California health care organization during 2012 and 2013.

In partnership with the Hawaii Breast and Cervical Cancer Screening Program, the Hawaii Asian American Network for Cancer Awareness and Training (AANCART) implemented a successful mammography screening program among Filipino women. The culturally appropriate intervention from 2004 through 2008 included a multimedia campaign and engagement of Filipino medical professionals and community organizations. During this time, the proportion of Hawaii Filipina women who had never had a mammogram decreased from 18% to 10%

In addition to community factors, mammography participation among AANHPIs is also influenced by physician recommendation, access to health care, and availability of trained medical interpreters and patient navigators.

**Colorectal cancer screening**

Only about half of Asian Americans (52%) 50 years of age and older had received recommended colorectal cancer screening in 2013, compared with 61% of NHWs. Screening varies by subgroup; in California in 2009, adherence ranged from 61% in South Asians, Koreans, and Vietnamese to 71% in Japanese.

Asian Americans are more
likely than NHWs to use fecal occult blood test (11% vs 7%) and less likely to use endoscopy (48% vs 58%).

Community-based interventions have been successful in increasing colorectal cancer screening among AANHPI populations. A church-based program among Koreans that used Korean-language education and patient navigation resulted in 77% of intervention participants receiving colorectal cancer screening within 1 year, compared with 11% of control group participants. Among Asian Americans, having regular access to health care increases the likelihood of receiving recommended colorectal cancer screening, as does the recommendation of a family member or friend.

Prostate cancer screening
Currently, routine screening for prostate cancer is not recommended for men at average risk. The American Cancer Society guidelines for the early detection of prostate cancer promote informed choice for men aged 50 years and older who have a life expectancy of at least 10 years. Overall, 26% of Asian men aged 50 years and older underwent PSA testing within the past year compared with 37% of NHWs. There are no nationwide data on the use of shared decision-making for PSA testing among AANHPIs, although it is likely suboptimal given the low use of informed decision-making overall.

Lung cancer screening
Screening with low-dose spiral computed tomography has been shown to reduce lung cancer mortality by 20% among adults with a long-term smoking history. In 2013, the American Cancer Society recommended that clinicians with access to high-volume, high-quality lung cancer screening and treatment centers initiate a discussion about lung cancer screening with healthy patients ages 55 to 74 years who have at least a 30-pack-year smoking history. Data are limited concerning the use of low-dose spiral computed tomography for lung cancer screening in community practice. However, a study of 2010 National Health Interview Survey data indicated there was little absolute difference in the use of computed tomography screening for lung cancer between Asians (1.0%) and whites (1.3%) among high-risk former and current smokers.

Limitations
The data presented here have several limitations and should be interpreted with caution. First, AANHPIs are a genetically diverse population with different origins, immigration histories, cultures, and socioeconomic statuses, as well as lifestyle behaviors and cancer risks. However, conventionally reported AANHPI cancer data in the United States are reported in aggregate, masking important differences between these heterogeneous subpopulations. NHPIs in particular have very different cancer risk profiles and cancer rates, but these differences are obscured by aggregation with Asian Americans. There is increasing recognition of the need to disaggregate health data for AANHPIs. The US Department of Health and Human Services has developed new standards for collecting data on race and ethnicity that will allow for disaggregation of data for the largest AANHPI subgroups in the future. At present, health data on AANHPIs are imperfect.

Second, much of the demographic information in health records, such as place of birth and racial/ethnic identity, is often incorrect or incomplete for minority patients. This can occur when information is assigned by a health care worker instead of obtained directly from the patient or his/her family. The resulting misclassification leads to inaccurate, often underestimated cancer rates. Similarly, it has been shown that a small percentage of decedents who had self-reported as AANHPIs were not recorded as such on death certificates. The standard US death certificate was revised in 2003 to include several AANHPI subgroups and, by 2012, had been adopted by 44 states. This change will improve the availability of disaggregated data for AANHPIs, although issues of misclassification may persist.

Third, there are challenges when calculating statistics for racial/ethnic subgroups, especially those that are rapidly growing and changing. For example, population size, which is necessary for computing rates, is often difficult to estimate. Also, rates for subpopulations that are based on small numbers may be unreliable. Additional complexity is added to the classification of AANHPI race/ethnicity and...
calculation of statistics because of the high proportion of AANHPis of mixed race; about 15% of Asian Americans and 56% of NHPIs report more than one race.2,4

In addition, survey data on behaviors and cancer risk factors are relatively scarce for AANHPis, particularly for subgroups. Because of the small size of the AANHPI population relative to other groups, it is difficult for national population-based surveys to reach a sufficient number of participants to report reliable estimates, so information is confined to the three largest subgroups (Chinese, Filipino, and Asian Indian). While national risk factor data for NHPIs are especially scarce at present, the first NHPI National Health Interview Survey data are expected to be released in late 2015.60 In addition, many survey questionnaires are available only in English or in a limited selection of Asian languages, which excludes a considerable proportion of the Asian population. Moreover, much health behavior data rely on self-reports, which are subject to inaccurate recall.

Finally, the estimated numbers of new cancer cases and deaths among AANHPis in the United States in 2016 should be interpreted with caution. While they provide a reasonably accurate portrayal of the contemporary cancer burden, they are projections 4 years beyond actual data based on temporal trends in incidence and mortality as far back as 2003 and 1998, respectively. Therefore, we recommend the use of age-standardized or age-specific cancer death rates from the NCHS or cancer incidence rates from SEER or NAACCR for tracking changes in cancer occurrence over time.

Conclusions
AANHPis as a group have a generally lower risk of cancer than NHWs, with the exception of select infection-related cancer sites (stomach, liver, and nasopharynx). Overall cancer incidence rates in males and females are converging due to decreasing prostate and lung cancer rates among males and increasing breast cancer rates among females. Importantly, aggregating data for AANHPis masks stark differences in cancer risk within this heterogeneous population. NHPIs, who are small in number but have a higher cancer burden than Asian Americans, are particularly disadvantaged by data aggregation. It is essential that cancer-control strategies acknowledge the diversity of the AANHPI population because tailored interventions have demonstrated success. These include translation into native languages, consideration of cultural appropriateness, provider recommendation, improved access to health care and patient navigation, and improved knowledge about cancer prevention. Further research is needed among the subgroups of this highly diverse population to better understand the cancer burden and associated risk factors.

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