Cancer is a major public health problem for all Americans. In 1994, about 534,300 deaths in the United States were attributed to cancer: 465,800 among whites, 59,900 among African Americans, and 8,600 among Americans of other races. Although the burden of cancer is high among individuals of all races and ethnicities, striking differences in cancer incidence and mortality exist among these populations. Information on these differences can help us to identify new ways to reduce the burden of cancer.

Although cancer data of a national level are regularly available for African Americans and whites, data on cancer in other American racial and ethnic populations are published infrequently. In 1996, however, the Surveillance, Epidemiology and End Results Program (SEER) of the National Cancer Institute released a monograph on racial and ethnic patterns of cancer that is the most extensive compilation of this type of information published to date. We present key findings on cancer incidence and mortality from this monograph along with information on the prevalence of cancer risk factors and screening examinations among racial and ethnic groups in the United States. These additional data are presented to provide a rationale for differences in cancer incidence and mortality among the various groups.

Sources of Data

The information on cancer incidence and mortality in this report is from the SEER publication Racial/Ethnic Patterns of Cancer in the United States 1988–1992. Information on incidence is tabulated for 11 racial and ethnic groups (African American, Alaska Native, American Indian from New Mexico, Chinese, Filipino, Hawaiian, Hispanic, Japanese, Korean, Vietnamese, and white). Mortality information is presented for the same groups except Koreans and Vietnamese, for whom national data are not yet available. All of the incidence and mortality rates tabulated in the report are for the years 1988 to 1992 and have been age-adjusted to the 1970 US standard population.

Data on cancer risk factors and screening examinations are derived from two sources. Statistics on tobacco are from the 1994 National Health Interview Survey, and statistics on other cancer-related behaviors are from the 1991–1992 Behavioral Risk Factor Surveillance Sys-
tem (BRFSS). In both surveys, race and ethnicity are defined according to US government standards established by the Office of Management and Budget’s (OMB) Directive Number 15. For this reason, data on cancer risk and screening behaviors are available only for five broad categories of race and ethnicity (African Americans, American Indians, Asians and Pacific Islanders, Hispanics, and whites). The sections of this report are organized around these five categories, with an introductory section comparing overall cancer rates among racial and ethnic groups.

Overall Cancer Rates

Overall rates of cancer incidence vary considerably among US racial and ethnic populations. Figure 1 shows cancer incidence rates from 1988 to 1992 for the 11 racial and ethnic populations for whom SEER data were available.

For men, rates were highest among African Americans (560 per 100,000) and whites (469 per 100,000) and lowest among American Indians from New Mexico (196 per 100,000). Rates among Asian men were also low and ranged from 266 per 100,000 for Koreans to 326 per 100,000 for Vietnamese. Among women, overall cancer incidence rates for every racial and ethnic group were lower than those for men. Incidence was highest among Alaskan Native women (348 per 100,000) and white women (346 per 100,000) and lowest among American Indian women (180 per 100,000) and Korean women (180 per 100,000). As did Asian and American Indian men, Asian and American Indian women experienced low rates of cancer incidence.

Overall mortality rates also varied considerably by race and ethnicity. Figure 2 shows mortality rates in the United States from 1988 to 1992 for the nine racial and ethnic groups for whom national level data are available. Among both men and women, African Americans, Hawaiians, Alaska Natives, and whites experienced mortality rates that were at least 40% higher than those of other populations. Among men, rates ranged from 105 per 100,000 for Filipinos to 319 per 100,000 for African Americans; among women rates ranged from 63 per 100,000 for Filipinos to 179 per 100,000 for Alaska Natives. For all racial and ethnic groups, mortality rates for women were lower than those for men.

For both incidence and mortality rates, racial and ethnic variations for all sites combined may differ considerably from those for individual cancer sites.

For men, cancer incidence rates were highest among African Americans and whites.

Population Profiles

AFRICAN AMERICANS

Population

OMB Directive Number 15 refers to African Americans as “blacks” and defines them as “persons whose lineage includes ancestors who originated from any of the black racial groups of Africa.” Most African Americans are descendants of slaves who were transported from Africa to the United States and the Caribbean during the 17th through the early 19th centuries. However, an increasing proportion of this population is composed of either new immigrants or their first- or second-generation descen-
African Americans are currently the second largest racial group in the United States. The 1990 US census counted approximately 30 million African Americans in the United States, who make up about 12% of the population.

Cancer Incidence

According to data from the SEER program for 1988 to 1992, the three most frequently diagnosed cancers among African American men were cancers of the prostate, lung and bronchus, and colon and rectum. Of the 11 racial and ethnic groups studied, African American men had the highest overall rate of cancer incidence (560 per 100,000) and the highest rates of cancers of the prostate (180.6 per 100,000), lung and bronchus (117.0 per 100,000), and oral cavity (20.4 per 100,000).

The most frequently diagnosed cancers among African American women were cancers of the breast, colon and rectum, and lung and bronchus. Among the populations studied, African American women had the highest rates of cancers of the lung and bronchus (44.2 per 100,000) and colon and rectum (45.5 per 100,000). Alaska Native women had the highest rates of both cancers.

Cancer Mortality

According to vital statistics data for 1988 to 1992, the three most common causes of cancer death among African American men were cancers of the lung and bronchus, prostate, and colon and rectum. For all three of these cancers, African American men had higher mortality rates than any of the other racial or ethnic groups studied. Prostate cancer mortality rates were particularly high; from 1988 to 1992, the rate for African Americans (53.7 per 100,000) was more than twice as high as the rate for whites (24.1 per 100,000).

The most common causes of cancer death in African American women from 1988 to 1992 were cancers of the lung and bronchus, breast, and colon and rectum. Of the populations studied, African American women had the highest breast cancer mortality rate (31.4 per 100,000) and the second highest rates of cervical cancer (6.7 per 100,000) and colorectal cancer (20.4 per 100,000). Unlike African American men, African American women did not generally experience cancer mortality rates that were higher than those for women of other races and ethnicities for most cancer sites.

Risk Factors, Screening, and Access to Health Care

Obesity is a major health problem for African American men and women. According to BRFSS data, 37.7% of African American women and 28.4% of African American men were overweight in the period 1991 to 1992. Of the racial and ethnic groups studied, African American women were more likely to be overweight than women of other races or ethnicities.

High smoking rates are also a major health problem among African Americans. According to 1994 data from the National Health Interview Survey, 33.9% of African American men and 21.8% of...
Figure 1
Cancer Incidence Rates for All Sites Combined by Race, Ethnicity, and Sex, SEER, 1988–1992

Race or Ethnicity

| Race or Ethnicity         | Incidence Rate per 100,000 Population |
|---------------------------|---------------------------------------|
| African American          | 560                                   |
| White                     | 326                                   |
| Chinese                   | 282                                   |
| American Indian (New Mexico) | 213                          |
| Alaska Native             | 372                                   |
| American Indian           | 196                                   |
| (New Mexico)              |                                        |
| Vietnamese                | 326                                   |
| Hawaiian                  | 340                                   |
| Japanese                  | 322                                   |
| Korean                    | 266                                   |
| Filipino                  | 274                                   |
| Japanese                  | 241                                   |
| Vietnamese                | 273                                   |
| Hawaiian                  | 321                                   |
| Japanese                  | 241                                   |
| Korean                    | 180                                   |
| Filipino                  | 224                                   |
| Japanese                  | 243                                   |
| Vietnamese                | 319                                   |

*Persons of Hispanic origin may be of any race.

Data source: NCI Surveillance, Epidemiology, and End Results (SEER) Program, 1996.²
Figure 2
Cancer Mortality Rates for All Sites Combined by Race, Ethnicity, and Sex, United States, 1988–1992

| Race or Ethnicity           | Males | Females |
|-----------------------------|-------|---------|
| African                     | 319   |         |
| American                    | 168   |         |
| Chinese                     | 139   | 86      |
| Filipino                    | 105   | 63      |
| Hawaiian                    | 239   | 168     |
| Japanese                    | 133   | 88      |
| Korean                      | N/A   | N/A     |
| Vietnamese                  | N/A   | N/A     |
| Alaska Native               | 225   | 179     |
| American Indian (New Mexico)| 123   | 99      |
| White                       | 213   | 140     |
| Hispanic*                   | 129   | 85      |

*Mortality Rate per 100,000 Population

*Persons of Hispanic origin may be of any race.
N/A = data not available.
Data source: NCI Surveillance, Epidemiology, and End Results (SEER) Program, 1996.²
African American women reported that they currently smoked. Smoking rates for African American men were higher than those for men of any other group except Native Americans. Rates for both African American men and African American women were much higher than the year 2000 smoking target of 15%.

Asians and Pacific Islanders

Population

OMB directive Number 15 defines a person as an Asian or Pacific Islander if he or she has “origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.” This population is very diverse, including individuals from at least 24 ethnic populations who speak more than 30 major languages or dialects. Because of immigration and high birth rates, the Asian and Pacific Islander population is growing rapidly. The 1990 US census counted 7.5 million Asians and Pacific Islanders living in the United States, who make up about 3% of the population. This percentage is expected to increase to 4.1% by the year 2000 and to 8.7% by 2050.

Cancer Incidence

Rates of cancer incidence vary considerably among subgroups of the Asian and Pacific Islander population (Tables 1 and 2). For 1988 to 1992, SEER data on cancer incidence rates were available for Chinese, Filipino, Hawaiian, Japanese, Korean, and Vietnamese men and women.

Among men, the three most frequently diagnosed sites included prostate, lung and bronchus, and colon and rectum, with the following exceptions. Stomach rather than prostate was a leading site among Korean men, and liver rather than colon and rectum was a leading site among Vietnamese men. Stomach cancer rates among Korean men (48.9 per 100,000) and liver cancer rates among Vietnamese men (41.8 per 100,000) were higher than those for any other racial or ethnic group studied.

Incidence rates for prostate, lung and bronchus, and colorectal cancers among Asian men were generally lower than those among African American and white men. However, incidence rates of lung and bronchus cancer among Hawaiian men (89.0 per 100,000) were considerably higher than those among whites (76.0 per 100,000), and colorectal cancer incidence rates among Japanese men (64.1 per 100,000) were higher than those for any racial or ethnic group except Alaska Natives (79.7 per 100,000).

The three most commonly diagnosed cancers among Asian and Pacific Islander women included cancers of the breast, colon and rectum, and lung and bronchus with the following exceptions. Stomach rather than lung was a leading cancer site among Japanese and Korean women, and cervix rather than colon and rectum was a leading cancer site among Vietnamese women. Rates of cervical cancer incidence among Vietnamese women (43.0 per 100,000) were more

Asian and Pacific Islander women had the lowest rates of Pap test screening and mammography and clinical breast examination of any racial or ethnic group in the United States.
than two and a half times higher than rates for women of any other racial or ethnic group.

Asian and Pacific Islander women experienced lower rates of breast, lung and bronchus, and colorectal cancers than other racial or ethnic groups, with the following exceptions. Breast cancer rates among Hawaiian women (105.6 per 100,000) were higher than those for any group other than whites (111.8 per 100,000). Rates of lung and bronchus cancer incidence among Hawaiian women (43.1 per 100,000) were similar to those for African American women (44.2 per 100,000) and white women (41.5 per 100,000), and rates of colorectal cancer incidence among Japanese women (39.5 per 100,000) were in the same range as those for African American women (45.5 per 100,000) and white women (38.3 per 100,000).

Cancer Mortality

Mortality data for the United States from 1988 to 1992 are available only for four Asian and Pacific Islander ethnicities: Chinese, Filipino, Hawaiian, and Japanese.

Among men, lung cancer was the most common cause of cancer death for all four of these populations (Table 3).2 Other frequent causes of cancer death varied by race and ethnicity and included liver and colorectal cancer in Chinese men; prostate and colorectal cancer in Filipino and Hawaiian men; and colorectal and stomach cancer in Japanese men. Mortality rates for stomach cancer were higher among Japanese men (17.4 per 100,000) than among men of any other racial or ethnic group studied except Alaska Natives (18.9 per 100,000).

Among women, lung cancer was the leading cause of cancer death for Chinese, Hawaiians, and Japanese and the second leading cause of cancer death for Filipinos (Table 4).2 Rates ranged from 10 per 100,000 for Filipinos to 44.1 per 100,000 for Hawaiians. Other leading causes of cancer death varied by Asian and Pacific Islander ethnicity and included breast and colorectal cancer in Chinese, Filipino, and Japanese women; and breast and stomach cancer in Hawaiian women. Stomach cancer mortality rates for Hawaiian women (12.8 per 100,000) were higher than those for women of any other racial or ethnic group.

Breast and lung cancer mortality rates were lower among Chinese, Filipinos, and Japanese than among Hawaiians and the other racial and ethnic groups studied. Male lung cancer mortality rates for 1988 to 1992 reflect this pattern. Rates for non-Hawaiian Asian and Pacific Islander men ranged from 29.8 per 100,000 for Filipinos to 40.1 per 100,000 for Chinese, whereas the rate for Hawaiians (88.9 per 100,000) was higher than that for any racial or ethnic group other than African Americans.

Risk Factors, Screening, and Access to Health Care

Because the Asian and Pacific Islander population is so diverse, risk factor and screening prevalence rates are likely to vary considerably among subpopulations of this group. Unfortunately, data on national patterns of risk factors and screening for subgroups of Asians and Pacific Islanders currently are not available to prove or disprove this hypothesis.

Data on cancer risk factors and screening for a cross-section of Asian and Pacific Islanders in the United States are presented in Table 5. Among this group, prevalence rates for tobacco use, chronic alcohol use, and obesity are lower than those for any other race or ethnic group studied.4-6 Despite these favorable patterns, the prevalence of cancer risk factors could be further reduced through targeted intervention efforts. Furthermore, cancer screening rates among Asian and Pacific Islander women could be improved. According to BRFSS data for 1991 to 1992, these
| African American | Chinese | Filipino | Hawaiian | Japanese | Korean | Vietnamese | Alaska Native | American Indian† | White | Hispanic‡ |
|------------------|---------|----------|----------|----------|--------|------------|---------------|----------------|--------|-----------|
| Prostate         | Lung & Bronchus | Lung & Bronchus | Prostate | Lung & Bronchus | Lung & Bronchus | Lung & Bronchus | Lung & Bronchus | Lung & Bronchus | Prostate | Prostate | Prostate |
| 180.6 52.6 | 69.8 52.6 | 88.0 52.6 | 53.2 52.6 | 70.9 52.6 | 81.1 52.6 | Prostate | Prostate | 52.5 46.1 | 134.7 56.3 | 89.0 38.3 |
| Lung & Bronchus | Prostate | Lung & Bronchus | Prostate | Colon & Rectum | Stomach | Liver | Colon & Rectum | Colon & Lung & Bronchus | Lung & Bronchus | Prostate | Kidney & Lung & Bronchus | 18.6 15.6 | 76.0 63.0 | 41.8 38.3 |
| 117.0 52.6 | 46.0 52.6 | 57.2 52.6 | 48.9 52.6 | 41.8 52.6 | 79.7 52.6 | 46.1 52.6 | 15.6 56.3 | 56.3 38.3 |
| Colon & Rectum | Colon & Rectum | Colon & Rectum | Colon & Bronchus | Colon & Rectum | 40.0 52.6 | Prostate | Kidney & Renal Pelvis | Colon & Rectum | Colon & Colon & Rectum | 18.6 15.6 | 76.0 63.0 | 41.8 38.3 |
| 60.7 35.4 | 44.8 35.4 | 35.4 35.4 | 42.4 35.4 | 43.0 35.4 | 31.7 35.4 | Prostate | Kidney & Renal Pelvis | Colon & Bladder | Renal Pelvis | 56.3 25.8 | 31.7 25.8 | 15.8 25.8 |
| Oral Cavity | Liver | Non-Hodgkin’s Lymphoma | Stomach | Stomach | Colon & Rectum | Colon & Stomach | Lung & Bronchus | Urinary | Urinary | Bladder | Bladder |
| 20.4 12.9 | 20.8 12.9 | 20.5 12.9 | 30.5 12.9 | 24.8 12.9 | 30.5 12.9 | 27.2 12.9 | 14.4 12.9 | 31.7 12.9 | 15.8 12.9 |
| Stomach | Stomach | Liver | Non-Hodgkin’s Lymphoma | Urinary | Prostate | Stomach | Kidney & Renal Pelvis | Liver | Non-Hodgkin’s Stomach | Lymphoma | 15.3 |
| 17.9 12.5 | 15.7 12.5 | 10.5 12.5 | 13.7 12.5 | 13.7 12.5 | 24.2 12.5 | 25.8 12.5 | 19.0 12.5 | 13.1 12.5 | 18.7 12.5 |

*Incidence rate per 100,000 population, age-adjusted to the 1970 US standard population.
†In New Mexico.
‡Persons of Hispanic origin may be of any race.
§Rate is based on fewer than 25 cases and may be subject to greater variability than the other rates, which are based on larger numbers.

Data source: NCI Surveillance, Epidemiology, and End Results Program (SEER), 1996.2
| African American | Chinese | Filipino | Hawaiian | Japanese | Korean | Vietnamese | Alaska Native | American Indian | White | Hispanic |
|-----------------|---------|----------|----------|----------|--------|------------|--------------|----------------|--------|-----------|
| Breast          | Breast  | Breast   | Breast   | Breast   | Breast | Cervix Uteri | Breast       | Breast         | Breast | Breast   |
| 95.4            | 55.0    | 73.1     | 105.6    | 82.3     | 28.5   | 43.0        | 78.9         | 31.6           | 111.8  | 69.8      |
| Colon & Rectum  | Colon & | Colon &  | Lung &   | Colon &  | Colon & | Breast      | Colon &       | Ovary          | Lung & | Colon &  |
| 45.5            | Rectum  | Rectum   | Bronchus | Rectum   | Rectum | 37.5        | Rectum       | 17.5           | Bronchus| Rectum   |
| 33.6            | 20.9    | 43.1     | 39.5     | 21.9     |        | 67.4        |              | 41.5           |        | 24.7      |
| Lung & Bronchus | Lung &  | Lung &   | Colon &  | Stomach  | Stomach | Lung &     | Lung &        | Colon &        | Lung & | Colon &  |
| 44.2            | Bronchus| Bronchus | Rectum   | 15.3     | 19.1   | Bronchus   | Bronchus     | Rectum        | Bronchus| Rectum   |
| 25.3            | 17.5    | 30.5     | 31.2     |          |        | 50.6       |              | 38.3           |        | 19.5      |
| Corpus Uteri    | Corpus Uteri | Thyroid | Corpus Uteri | Lung & Bronchus | Lung & Bronchus | Colon & Rectum | Kidney & Renal Pelvis | Gallbladder | Corpus Uteri | Cervix Uteri |
| 14.4            | 11.6    | 14.6     | 23.9     | 15.2     | 16.0   | 27.1       | 3.2          | 22.3           | 16.2   |
| Cervix Uteri    | Ovary   | Corpus Uteri | Stomach | Corpus Uteri | Cervix Uteri | Stomach | Cervix Uteri | Corpus Uteri | Ovary | Corpus Uteri |
| 13.2            | 9.3     | 12.1     | 13.0     | 14.5     | 15.2   | 25.8       | 15.8         | 10.7           | 15.8   | 13.7      |

*Incidence rate per 100,000 population, age-adjusted to the 1970 US standard population.

†In New Mexico.

‡Persons of Hispanic origin may be of any race.

§Rate is based on fewer than 25 cases and may be subject to greater variability than the other rates, which are based on larger numbers.

Data source: NCI Surveillance, Epidemiology, and End Results (SEER) Program, 1996.²
# Table 3

## Mortality Rates* for the Five Most Frequent Causes of Cancer Death Among Males by Race and Ethnicity, United States, 1988–1992

| Race/Ethnicity | Lung & Bronchus | Prostate | Colon & Rectum | Stomach | Rectum | Esophagus | Pancreas | Leukemia | Nasopharynx | Colon & Rectum | Kidney & Renal Pelvis | Pancreas | Stomach | Leukemia | Pancreas |
|----------------|-----------------|----------|-----------------|--------|--------|----------|---------|---------|------------|-----------------|------------------------|---------|---------|---------|---------|
| African American | 105.6 | 53.7 | 28.2 | 14.8 | 14.4 | 10.5 | 10.5 | 5.7 | 11.6 | 12.8 | 13.4 | 11.4 | 9.7 | 8.5 | 7.1 |
| Chinese | 40.1 | 17.7 | 15.7 | 8.5 | 6.7 | 7.8 | 5.7 | 12.8 | 8.5 | 11.6 | 10.4 | 11.7 | 8.5 | 6.7 | 7.1 |
| Filipino | 29.8 | 13.5 | 11.4 | 7.8 | 6.7 | 14.4 | 12.8 | 8.5 | 11.6 | 11.7 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| Hawaiian | 88.9 | 23.7 | 20.5 | 14.4 | 12.8 | 14.4 | 12.8 | 8.5 | 11.6 | 11.7 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| Japanese | 32.4 | 20.5 | 20.5 | 14.4 | 12.8 | 14.4 | 12.8 | 8.5 | 11.6 | 11.7 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| Alaska Native | 69.4 | 27.2 | 17.4 | 18.9 | 11.2 | 9.7 | 11.7 | 10.5 | 8.5 | 11.6 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| American Indian† | 16.2 | 11.2 | 19.9 | 11.2 | 24.1 | 9.7 | 11.7 | 10.5 | 8.5 | 11.6 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| White | 72.6 | 24.1 | 19.9 | 18.9 | 11.2 | 9.7 | 11.7 | 10.5 | 8.5 | 11.6 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |
| Hispanic‡ | 32.4 | 15.3 | 11.4 | 12.8 | 12.8 | 8.4 | 11.7 | 10.5 | 8.5 | 11.6 | 10.4 | 10.5 | 12.8 | 8.5 | 7.1 |

* Mortality rate per 100,000 population, age-adjusted to the 1970 US standard population.
† In New Mexico.
‡ Persons of Hispanic origin may be of any race.
§ Rate is based on fewer than 25 cases and may be subject to greater variability than the other rates, which are based on larger numbers.

Data source: NCI Surveillance, Epidemiology, and End Results (SEER) Program, 1996,* based on data from the National Center for Health Statistics.
Table 4
Mortality Rates* for the Five Most Frequent Causes of Cancer Death Among Females
by Race and Ethnicity, United States, 1988–1992

| Race/Origin          | African American | Chinese | Filipino | Hawaiian | Japanese | Alaska Native | American Indian† | White | Hispanic‡ |
|----------------------|------------------|---------|----------|----------|----------|--------------|-----------------|-------|-----------|
| Lung & Bronchus       | Lung & Bronchus   | Breast  | Lung & Bronchus | Lung & Bronchus | Lung & Bronchus | Lung & Bronchus | Gallbladder§   | Lung & Bronchus | Breast    |
| 31.5                 | 18.5             | 11.9    | 44.1     | 12.9     | 45.3     | 8.9          | 31.9           | 15.0           |
| Breast               | Breast           | Lung & Bronchus | Breast  | Breast  | Colon & Rectum | Breast§   | Breast          | Lung & Bronchus | Breast    |
| 31.4                 | 11.2             | 10.0    | 25.0     | 12.5     | 24.0     | 8.7          | 27.0           | 10.8           |
| Colon & Rectum       | Colon & Rectum   | Colon & Stomach | Colon & Rectum | Colon & Rectum | 16.0     | Cervix       | Colon & Rectum | Colon & Rectum | 8.3       |
| 20.4                 | 10.5             | 5.8     | 12.8     | 12.3     | 8.0      | 15.3         | 8.3            | 10.8           |
| Pancreas             | Pancreas         | Pancreas | Colon & Rectum | Stomach | 9.3      | Pancreas§     | Pancreas§       | Ovary           | Pancreas   |
| 10.4                 | 5.1              | 3.5     | 11.4     | 15.5     | 7.4      | 8.1          | 5.2            |                 |
| Cervix               | Stomach          | Ovary   | Pancreas | Pancreas | Kidney & Renal Pelvis§ | Ovary§       | Pancreas        | Ovary         |
| 6.7                  | 4.8              | 3.4     | 9.1      | 6.7      | 7.4      | 6.9          | 4.8            |                 |

*Mortality rate per 100,000 population, age-adjusted to the 1970 US standard population.
†In New Mexico.
‡Persons of Hispanic origin may be of any race.
§Rate is based on fewer than 25 cases and may be subject to greater variability than the other rates, which are based on larger numbers.
Data source: NCI Surveillance, Epidemiology, and End Results (SEER) Program, 1996, based on data from the National Center for Health Statistics.
### Table 5
Percentage of US Adults with Selected Self-Reported Cancer Risk Factors by Sex, Race and Ethnicity

| Risk Factor                        | African American | Asian & Pacific Islander | Native American | White | Hispanic* | Non-Hispanic† |
|------------------------------------|------------------|--------------------------|-----------------|-------|-----------|---------------|
|                                    | % (SE)           | % (SE)                   | % (SE)          | % (SE)| % (SE)    | % (SE)        |
| **MALES**                          |                  |                          |                 |       |           |               |
| Current tobacco use‡               | 33.9 (2.0)       | 20.4 (3.1)               | 53.7 (8.6)      | 28.0 (0.6) | 24.3 (2.1) | N/A           |
| Chronic alcohol consumption§       | 4.3 (0.4)        | 2.3 (0.4)                | 6.9 (1.4)       | 6.7 (0.2) | 5.9 (0.6)  | 6.4 (0.1)     |
| Overweight¶                        | 28.4 (0.8)       | 10.8 (1.1)               | 33.8 (3.0)      | 24.8 (0.3) | 23.8 (1.2) | 25.0 (0.2)    |
| Lack of health care plan**         | 22.2 (0.8)       | 17.5 (1.6)               | 33.2 (3.0)      | 15.1 (0.2) | 35.5 (1.4) | 14.6 (0.2)    |
| **FEMALES**                        |                  |                          |                 |       |           |               |
| Current tobacco use‡               | 21.8 (1.1)       | 7.5 (1.8)                | 33.1 (5.5)      | 24.7 (0.6) | 15.2 (1.4) | N/A           |
| Chronic alcohol consumption§       | 0.7 (0.1)        | UE                       | 3.3 (5.5)       | 24.7 (0.6) | 15.2 (1.4) | N/A           |
| Overweight¶                        | 37.7 (0.7)       | 10.1 (1.0)               | 30.3 (2.5)      | 21.7 (0.2) | 26.5 (1.1) | 23.1 (0.2)    |
| Pap test within past 2 years       | 66.1 (0.7)       | 58.4 (1.9)               | 61.2 (2.9)      | 62.3 (0.3) | 63.4 (1.0) | 62.6 (0.2)    |
| Mammography and CBE†               | 54.9 (1.3)       | 48.5 (4.2)               | 60.7 (5.1)      | 57.7 (0.4) | 55.0 (2.3) | 57.5 (0.4)    |
| Lack of health care plan**         | 20.8 (0.6)       | 15.7 (1.5)               | 24.8 (2.4)      | 12.5 (0.2) | 32.6 (1.2) | 12.2 (0.2)    |

*Persons of Hispanic origin may be of any race.
†Persons of any race who are not of Hispanic origin.
‡Persons who had ever smoked 100 cigarettes and who were current smokers in 1994.
§Persons who consumed 60 or more drinks during the past month, 1991–1992.
¶Body mass index 27.8 or greater in men or 27.3 or greater in women, 1991–1992.
**No coverage by insurance, prepaid plan such as an HMO, or government plan such as Medicare or Medicaid, 1991–1992.
††Screening mammography and clinical breast examination within the preceding 2 years among women 50 years and older.
N/A = data not available; SE = standard error; UE = unstable estimate based on fewer than 50 observations.

Data sources: CDC National Health Interview Survey, 1996; CDC Behavioral Risk Factor Surveillance System, 1994.
women had the lowest rates of Pap test screening and mammography and clinical breast examination of any racial or ethnic group in the United States.\textsuperscript{6}

\textbf{NATIVE AMERICANS}

\textbf{Population}

The US government refers to Native Americans as American Indians and Alaska Natives and defines them as “persons having origins in the original peoples of North America, and who maintain cultural identification through tribal affiliations or community recognition.”\textsuperscript{7} American Indians and Alaska Natives represent more than 500 tribes, each with unique cultural, genetic, and sociodemographic characteristics.\textsuperscript{10} In 1990, the US census counted about 2.1 million American Indians and Alaska Natives living in all 50 states, about one-third on federal reservations and half in urban centers.\textsuperscript{8,10} Native Americans constituted about 0.8\% of the US population in 1990.\textsuperscript{8}

\textbf{Cancer Incidence}

Because of the heterogeneity of the Native American population, it is likely that cancer incidence rates vary considerably among tribes. Unfortunately, national level data on tribe-specific incidence patterns are not available currently. For 1988 to 1992, cancer incidence rates were calculated only for Alaska Natives and American Indians from New Mexico.\textsuperscript{2} Even between these two populations, incidence patterns differed considerably (Tables 1 and 2).

The most frequently diagnosed cancers among Alaska Native men were cancers of the lung and bronchus, colon and rectum, and prostate; among American Indians from New Mexico the most frequently diagnosed sites were prostate, colon and rectum, and kidney (Table 1). Colorectal cancer rates among Alaska Native men (79.7 per 100,000) and kidney cancer rates among American Indian men (15.6 per 100,000) were higher than those for any other racial or ethnic group studied. The kidney cancer rate among Alaska Natives (19.0 per 100,000) was also high, but the estimate is not stable because it is based on fewer than 25 cases.

For women, the most frequently diagnosed cancers among Alaska Natives were breast, colon and rectum, and lung and bronchus, whereas the most frequently diagnosed cancers among American Indian women from New Mexico were cancers of the breast, ovary, and colon and rectum (Table 2). Alaska Native women had higher rates of colorectal cancer (67.4 per 100,000) and lung and bronchus cancer (50.6 per 100,000) than any other racial or ethnic group studied, and American Indian women had high rates of ovarian (17.5 per 100,000) and gallbladder cancers (13.2 per 100,000). The kidney cancer rate among Alaska Native women was also high; however, the rate is not stable because it is based on fewer than 25 cases.

\textbf{Cancer Mortality}

As with data on cancer incidence, information on cancer mortality in Native Americans has been tabulated only for Alaska Natives and American Indians from New Mexico (Tables 3 and 4).

From 1988 to 1992, the three most frequent causes of cancer death for Alaska Native men were cancers of the lung and bronchus, colon and rectum, and stomach. For American Indian men from New Mexico the three most frequent causes of cancer death were cancers of the prostate, stomach, and liver.\textsuperscript{2} Among Alaska Native men, the colorectal cancer mortality rate (27.2 per 100,000) was greater than that for any other group studied except African American men. Rates for most other sites were variable because the numbers of deaths were small.

For 1988 to 1992, the three most frequent causes of cancer deaths for Alaska...
Native women were cancers of the lung and bronchus, colon and rectum, and breast; for American Indian women from New Mexico the three most frequent causes of cancer deaths were cancers of the gallbladder, breast, and cervix uteri. Only lung and bronchus and colorectal cancer rates for Alaska Native women were based on more than 25 cancer deaths. For both cancers, rates for Alaska Natives were higher than those for any other population studied.

Risk Factors, Screening, and Access to Health Care

Despite the diversity of the Native American population, risk factor and screening data for this group are available only for a heterogeneous cross-section of the population. Native Americans have high prevalences of exposure to cancer risk factors, particularly cigarette smoking (Table 5). According to data from the 1994 National Health Interview Survey, 53.7% of Native American men and 33.1% of Native American women reported that they currently smoked; smoking rates for Native American men were more than 50% higher than those for other racial or ethnic populations. The prevalence of obesity among Native Americans was also very high. According to BRFSS data for 1991 to 1992, about one-third of Native American men and women were overweight.

In addition to cancer risk factors, access to health care is a problem for Native Americans, who are second only to Hispanics in their lack of health care coverage. According to BRFSS data for 1991 to 1992, 33.2% of Native American men and 24.8% of Native American women had no health care plan.

Whites

Population

Whites are defined by OMB Directive Number 15 as “persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.” Whites are by far the largest racial group in the United States, and health care programs historically have been targeted toward them. In 1990, the US census counted about 209 million whites, who constitute approximately 84% of the US population.

Cancer Incidence

Because most Americans are white, the leading cancer sites for whites are also the leading sites for the United States as a whole. According to SEER data for 1988 to 1992, the three most frequently diagnosed cancers among white males were cancers of the prostate, lung and bronchus, and colon and rectum (Table 1). White males had higher rates of incidence of urinary bladder cancer (31.7 per 100,000) than any other racial or ethnic group—almost two times higher than those of Hispanics, who had the second highest rates. They also had the highest rate of non-Hodgkin’s lymphoma (18.7 per 100,000), and their prostate cancer rate (134.7 per 100,000) was second only to that of African Americans.

The three most frequently diagnosed cancers among white women were cancers of the breast, lung and bronchus, and colon and rectum (Table 2). Breast cancer rates among white women (111.8 per 100,000) were higher than those among women of any other racial or ethnic group studied, and rates of cancers of the corpus uteri (22.3 per 100,000) and ovary (15.8 per 100,000) also were relatively high.

Cancer Mortality

According to US vital statistics data for 1988 to 1992, the leading causes of cancer death among white males were lung, prostate, and colorectal cancers (Table 3). Leukemia mortality rates for white men (8.5 per 100,000) were in the same range as those for African Americans (8.0 per 100,000) and Hawaiians (7.8 per 100,000) and were higher than those for
other racial or ethnic groups studied.

The leading causes of cancer death among white females were cancers of the lung and bronchus, breast, and colon and rectum (Table 4). Breast cancer mortality rates for whites (27.0 per 100,000) were similar to those for African Americans (31.4 per 100,000) and Hawaiians (25.0 per 100,000) and were higher than those for other racial and ethnic groups studied except African Americans. Mortality rates for ovarian cancer among whites (8.1 per 100,000) were higher than those for any other racial or ethnic group.

Risk Factors, Screening, and Access to Health Care

Of the racial and ethnic groups studied, whites do not have the highest rates of tobacco use, chronic consumption of alcohol, or obesity (Table 5). However, lowering exposure to these risk factors could help to reduce overall rates of cancer incidence. Among white women, rates of Pap test screening and mammography screening with clinical breast examination are in the same range as those for other racial and ethnic groups. White men and white women are more likely to have a health care plan than individuals of other racial or ethnic groups.

Hispanics

Population

The US government defines Hispanics as “persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.” The term “Latino” is also often used to describe individuals in this population.

The 1990 census counted 22.4 million Hispanics, about 9% of the US population. Because of high birth and immigration rates, the Hispanic population is growing rapidly. According to US census projections, by the year 2010, Hispanics will surpass non-Hispanic African Americans as the largest US racial or ethnic group, and by the year 2050, 24.5% of the US population will be Hispanic. Hispanics are in every racial group. In 1990, the US census reported that 91.3% of the Hispanic population was white, 5.4% African American, 1.2% Native American, and 2.1% Asian and Pacific Islander.

Hispanic men and women are about two and a half times more likely than non-Hispanic men and women to report having no health care plan.

Cancer Incidence

According to SEER data for 1988 to 1992, the most commonly diagnosed cancers among Hispanic men and women were the same as those for whites: prostate, breast, lung and bronchus, and colon and rectum (Tables 1 and 2). Incidence rates for all four leading sites were lower among Hispanics than among whites. Other cancers commonly diagnosed among Hispanics include cancers of the urinary bladder and stomach in men and cancers of the uterine cervix and corpus in women. Among women in the racial and ethnic groups studied, Hispanics had the highest cervical cancer incidence rates (16.2 per 100,000) of any group other than Vietnamese.
Cancer Mortality
According to vital statistics data for 1988 to 1992, the leading causes of cancer deaths for Hispanics were the same as those for whites: lung and bronchus, prostate, breast, and colon and rectum (Tables 3 and 4). As with incidence rates, mortality rates for all four sites were lower among Hispanics than among whites. In general, rates among Hispanics were of the same magnitude as those for Chinese, Filipino, and Japanese men and women.

Risk Factors, Screening, and Access to Health Care
The most striking difference between Hispanics and non-Hispanics (defined as persons of any race who are not of Hispanic origin) with respect to their risk factor and health care status is that Hispanic men and women are about two and a half times more likely than non-Hispanic men and women to report having no health care plan (Table 5). A 1986 survey suggested that this difference might be the result of the large number of Hispanics who are employed as farm workers or in service occupations in which health insurance is not always offered as a benefit.

Despite this deficit in health care coverage, Hispanic women were about as likely as non-Hispanic women to have had a recent Pap test or mammogram and clinical breast examination. The prevalence of chronic alcohol consumption and that of obesity were also similar in Hispanics and non-Hispanics.

Limitations and Future Challenges
Although some of the reported variations in cancer patterns across racial and ethnic populations may be associated with genetic and cultural factors, others may be artifacts of the methods used to collect the data. The limitations of race-specific data on cancer incidence, mortality, risk factors, and screening behaviors have been described in detail elsewhere. In brief, four types of problems are related to the collection and analysis of data by race and ethnicity.

Collection of Data
Language barriers and low literacy levels may influence the quality of information collected in cancer surveys and registry programs. Findings also may be influenced by the methods used to assign race and ethnicity to survey and registry participants. In a National Center for Health Statistics study that compared race information obtained from study respondents with information obtained by interviewers, investigators found that 5.8% of persons who reported themselves as African American were classified as white by the interviewer and that 32.3% of self-reported Asians and 70% of self-reported Native Americans were classified as white or African American.

When rates are calculated with numerator and denominator data that have been collected separately using different methods to assign race, the situation becomes even more complicated.

For every racial and ethnic group, overall cancer incidence rates and mortality rates for women were lower than those for men.
This type of misclassification could potentially result in large over- or underestimates of cancer incidence and mortality rates and risk factor and screening prevalences.

CODING OF RACE AND ETHNICITY

Ambiguous definitions of race and ethnicity may result in inconsistently or incorrectly coded data. For example, SEER, BRFSS, the National Health Interview Survey, and the census all consider race and Hispanic ethnicity to be separate but not mutually exclusive entities. This approach to coding can be confusing to individuals of Hispanic origin, who often consider themselves to be of Hispanic race. In the 1990 census, 42.7% of Hispanics assigned themselves to “other race.”12,13

REPRESENTATIVENESS OF POPULATIONS SURVEYED

For heterogeneous racial and ethnic groups, data selected from a subset of the population may not represent the population as a whole. For example, studies have shown that cancer incidence and mortality rates vary among American Indian tribes.9,16 Because it is not known to what degree the cancer incidence patterns evident among American Indians from New Mexico differ from those for the entire American Indian population, generalizing cancer statistics for American Indians from New Mexico to the American Indian population as a whole may not be possible.3

Similarly, BRFSS data are collected from a subset of the Native American population. Participants in this survey are selected using random digit dialing techniques.8 Because telephone coverage rates are particularly low among American Indians and Alaska Natives (77%), it is likely that the cancer experience of the subset of the Native American population with telephones may not be representative of that of others in the group.5 In such situations, data from a more representative cross-section of the population are necessary to evaluate better the cancer status of the group as a whole.

CONFOUNDING BY SOCIOECONOMIC STATUS

Race and ethnicity are strongly associated with socioeconomic status and with related factors such as education and poverty status. According to 1995 data from the US Bureau of the Census, education and poverty levels vary considerably by race and ethnicity. The percentage of the US population living in poverty included 32% of African Americans, 12% of Asians and Pacific Islanders, 30.6% of Native Americans, 11% of whites, and 28% of Hispanics. The percentage of the population lacking a high school education included 26% of African Americans, 16% of Asian and Pacific Islanders, 34% of Native Americans, 17% of whites, and 46% of Hispanics.8

Because race and ethnicity are so strongly correlated with socioeconomic status, some of the differences in cancer incidence and mortality rates that exist among racial and ethnic groups are probably the result of socioeconomic status rather than genetic and cultural aspects of race and ethnicity.

Despite these limitations, the information that we have presented provides a starting point for future cancer research and for cancer control efforts. Only when the health needs of all races and ethnicities are considered can we develop the prevention and screening programs necessary to reduce the impact of cancer on all Americans.

References

1. American Cancer Society: Cancer Facts and Figures–1998. Atlanta, American Cancer Society, 1998.
2. Miller BA, Kolonel LN, Bernstein L, et al: Racial/Ethnic Patterns of Cancer in the United States 1988–1992 (NIH Publication No. 96-4104).
Bethesda, MD, National Cancer Institute, 1996.
3. Fleiss J: Statistical Methods for Rates and Proportions. New York, John Wiley & Sons, 1981.
4. Centers for Disease Control and Prevention: Cigarette smoking among adults—United States, 1994. MMWR Morb Mortal Wkly Rep 1996;45:588-590.
5. Centers for Disease Control and Prevention: Prevalence of selected risk factors for chronic disease by education level in racial/ethnic populations—United States, 1991-1992. MMWR Morb Mortal Wkly Rep 1994; 43:894-899.
6. Centers for Disease Control and Prevention: Chronic Disease in Minority Populations: African-Americans, American Indians and Alaska Native, Asians and Pacific Islanders, Hispanic Americans. Atlanta, Centers for Disease Control and Prevention, 1994.
7. Office of Management and Budget: Directive No. 15: Race and ethnic standards for federal statistics and administrative reporting, in Statistical Policy Handbook. Washington, DC, Office of Federal Statistical Policy and Standards, US Department of Commerce, 1978.
8. US Bureau of the Census: Statistical Abstract of the United States: 1996, ed 116. Washington, DC, 1996.
9. US Bureau of the Census: Population projections of the United States, by age, sex, race, and Hispanic origin: 1992 to 2050 (Current Population Reports, Series P25, No. 1092). Washington, DC, US Government Printing Office, 1992.
10. Burhansstipanov L, Dresser CM: Native American Monograph No. 1: Documentation of the Cancer Research Needs of American Indians and Alaska Natives (NIH Publication No. 93-3603,1993). Bethesda, MD, National Institutes of Health, 1993.
11. Freeman HE, Aiken LH, Blendon RJ, et al: Uninsured working-age adults: Characteristics and consequences. Health Serv Res 1990;24:811-823.
12. Hahn RA: The state of federal health statistics on racial and ethnic groups. JAMA 1992;267:268-271.
13. McKenney NR, Bennett CE: Issues regarding data on race and ethnicity: The census bureau experience. Public Health Rep 1994;109:16-25.
14. Centers for Disease Control and Prevention: Use of race and ethnicity in public health surveillance. MMWR Morb Mortal Wkly Rep 1993;42:1-17.
15. Massey J: Using interviewer observed race and respondent reported race in the Health Interview Survey, in Proceedings of American Statistical Association Meetings: Social Statistics Section. Alexandria, VA, American Statistical Association, 1980.
16. Valway S, Kileen M, Paisano R, et al: Cancer Mortality Among Native Americans in the United States: Regional Differences in Indian Health, 1984-1988 and Trends Over Time, 1968-1987. Rockville, MD, Indian Health Service, 1992.

Erratum

In the September/October 1997 issue in the article “Evaluating Prostate Needle Biopsy: Therapeutic and Prognostic Importance” (pp. 297-319), an error appeared in the formula for calculating the volume of a cylinder, which was given on page 298 in the last sentence in the left-hand column. The correct formula for determining the volume of a cylinder is \( \pi r^2 x \) length.

We thank Roland A. Finston, PhD, formerly Director of Health Physics at Stanford University, now retired, of Palo Alto, California, for noting the correct formula.