Cancer is the leading cause of death among Hispanics/Latinos, who represent the largest racial/ethnic minority group in the United States, accounting for 17.4% (55.4 million/318 million) of the total US population in 2014. Every 3 years, the American Cancer Society reports on cancer statistics for Hispanics based on 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 Hispanics in 2015, there will be an estimated 125,900 new cancer cases diagnosed and 37,800 cancer deaths. For all cancers combined, Hispanics have 20% lower incidence rates and 30% lower death rates compared with non-Hispanic whites (NHWs); however, death rates are slightly higher among Hispanics during adolescence (aged 15-19 years). Hispanic cancer rates vary by country of origin and are generally lowest in Mexicans, with the exception of infection-associated cancers. Liver cancer incidence rates in Hispanic men, which are twice those in NHW men, doubled from 1992 to 2012; however, rates in men aged younger than 50 years declined by 43% since 2003, perhaps a bellwether of future trends for this highly fatal cancer. Variations in cancer risk between Hispanics and NHWs, as well as between subpopulations, are driven by differences in exposure to cancer-causing infectious agents, rates of screening, and lifestyle patterns. Strategies for reducing cancer risk in Hispanic populations include increasing the uptake of preventive services (eg, screening and vaccination) and targeted interventions to reduce obesity, tobacco use, and alcohol consumption. CA Cancer J Clin 2015;65:457-480. © 2015 American Cancer Society.

Keywords: statistics, surveillance, Hispanic, Latino

Introduction

Hispanics are the second largest racial/ethnic group in the United States after non-Hispanic whites (NHWs). The US Census Bureau estimates that there were 55.4 million Hispanics living in the United States in 2014, comprising 17.4% of the total population. The term “Hispanic” is used to refer to persons of Mexican, Cuban, Puerto Rican, South or Central American, Dominican, or other Spanish descent. Hispanic origin is determined based on the response to the question “Is this person of Hispanic, Latino, or Spanish origin?” in the 2010 US Census questionnaire. Affirmative respondents are asked to self-identify from 1 of 3 designated categories (Mexican, Chicanos; Puerto Rican; or Cuban) or write in an alternative origin (eg, Argentinian, Spaniard, etc). The majority of Hispanics are of Mexican origin (64.3%), followed by Puerto Rican (9.5%), Salvadoran (3.7%), Cuban (3.7%), and Dominican (3.1%). Federal standards mandate that race and ethnicity are separate and distinct concepts; therefore, people of Hispanic origin may be of any race and have various combinations of European, American Indian, and African ancestry.

There are many reasons to study cancer patterns in US Hispanics. First, this population is growing rapidly; projections indicate the size of this demographic will double by 2050. Second, Hispanics are vulnerable to cancer inequalities due to disproportionate poverty and other barriers to health care. For example, compared to other racial/ethnic groups, Hispanic cancer patients are the most likely to be uninsured. Third, there are striking variations in cancer risk between Hispanics and NHWs, reflecting differences in behavioral and environmental exposures that provide opportunities for etiologic hypotheses. Fourth, Hispanics have among the highest prevalence of some important cancer risk factors, such as obesity and diabetes. This report provides current cancer incidence, survival, and mortality statistics for Hispanics living in the United States, including the projected numbers of new cases and deaths in 2015, as well as the prevalence of cancer risk factors and screening uptake. It is important to note that

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Despite immense diversity within the Hispanic community in terms of nativity and degree of acculturation, cancer data are generally reported for Hispanics in aggregate, thereby masking important differences between subpopulations. However, for the first time, we are able to provide mortality data by country of origin for select groups.

**Materials and Methods**

**Incidence and Mortality Data**

Cancer incidence data in the United States are collected and reported by the National Cancer Institute’s (NCI’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 38% of Hispanics, and began coding Hispanic ethnicity in 1992. Twelve SEER registries were the source for incidence trends from 1992 through 2012 (Connecticut, Hawaii, Iowa, New Mexico, Utah, rural Georgia, and the metropolitan areas of Atlanta, Detroit, Los Angeles, San Francisco-Oakland, San Jose-Monterey, and Seattle-Puget Sound). In 2000, 5 additional catchment areas were added to the SEER program (Kentucky, Greater California, New Jersey, Louisiana, and Greater Georgia); collectively, these 17 registries were the source for the lifetime probability of developing cancer (2010-2012), stage distribution (2008-2012), and 5-year cause-specific survival rates (2005-2011). Cause-specific survival is a net survival measure that relies on specified causes of death instead of life tables, which are necessary for relative survival and historically unavailable for populations other than whites and blacks. Stage at diagnosis was classified based on SEER summary stage 2000 except for gallbladder cancer, which was based on SEER historic stage because summary stage was unavailable. The lifetime probability of developing cancer was calculated using the NCI’s DevCan software (version 6.7.3).

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 98% for Hispanics during 2008 through 2012. Data that met NAACCR high-quality standards were the source for 5-year average annual incidence rates (2008-2012), 10-year incidence trends (2003-2012), and the 2015 new cancer case projections (2003-2012). Mortality data by Hispanic origin have been available since 1990 and were obtained from the CDC’s National Center for Health Statistics (NCHS). Long-term mortality trends exclude deaths from Louisiana, New Hampshire, and Oklahoma because these states did not collect information on Hispanic origin for one or more years between 1990 and 1996. All other mortality statistics were based on data from all 50 states and the District of Columbia. Death rates for Hispanic subgroups (Mexicans, Puerto Ricans, and Cubans) and non-Hispanic whites for 2011 through 2012 were based on population denominator data from the single-year US Census Bureau’s American Community Survey Public Use Microdata Samples. Age-specific rates for these subgroups were adjusted for misclassification of ethnicity using methods previously described by the NCHS and were then age-adjusted to the 2000 US standard population using SAS statistical software (version 9.4; SAS Institute Inc, Carey, NC).

All cancer cases were classified according to the International Classification of Diseases for Oncology. Causes of death were classified according to the International Classification of Diseases (9th and 10th revisions). All incidence and death rates were age-adjusted to the 2000 US standard population and expressed per 100,000 population. SEER Stat software (version 8.2.1) was used to calculate all incidence and death rates (except death rates by Hispanic subgroup) using population 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 value < .05).

**Projected Cancer Cases and Deaths in 2015**

The precise number of cancer cases diagnosed each year is unknown because cancer registration is incomplete in some states. Furthermore, the most recent year for which incidence and mortality data are available lags 3 to 4 years behind the current year due to the time required for data collection, compilation, and dissemination. Therefore, we projected the numbers of new cancer cases and deaths among Hispanics in the United States in 2015 to provide an estimate of the contemporary cancer burden.

To predict the number of cancer cases diagnosed in Hispanics in 2015, we estimated the number of cases diagnosed each year from 2003 through 2012 and then projected these counts 3 years ahead. First, age- 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’s population estimates to obtain estimated counts. Then, case counts were projected to 2015 based on the average annual percent change from 2003 through 2012 generated by the Joinpoint regression model. 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.\textsuperscript{19}

Risk Factors and Screening Data

Data on behavioral risk factors (cigarette smoking, obesity, 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 surveillance systems. For adults, we used the National Health Interview Survey (NHIS)\textsuperscript{20} and the National Health and Nutrition Examination Survey (NHANES)\textsuperscript{21} and for adolescents, we used the Youth Risk Behavior Surveillance System\textsuperscript{22} and the National Immunization Survey of Teens.\textsuperscript{23} NHANES is the preferred source of information for obesity prevalence in the United States because height and weight are measured rather than reported by participants. Historically, the NHANES has only reported data for Hispanics of Mexican descent; data for all Hispanics combined became available beginning with the 2007 through 2008 survey, but are still not available for Hispanic subgroups other than Mexicans. Information on adults by country of origin from the NHIS allowed for estimates of risk factors and screening for major Hispanic subgroups (specifically, Mexicans, Puerto Ricans, Cubans, Central/South Americans, and Dominicans). In contrast, information by country of origin is not collected in surveys of adolescents. We acknowledge that this limitation masks variability across Hispanic subgroups. All surveys were analyzed using SUDAAN statistical software (version 11.0.1; RTI International, Research Triangle Park, NC) to obtain weighted prevalence estimates, which are considered representative of the noninstitutionalized civilian population.

Selected Findings

Overall Cancer Occurrence

Incidence

In 2015, approximately 125,900 new cancer cases are expected to be diagnosed among Hispanics (Fig. 1). The most common cancer in men is prostate (22%), followed by cancers of the colorectum (11%) and lung and bronchus (9%). The most common cancers in women are breast (29%), thyroid (9%), and colorectum (8%). The distribution of cancers in Hispanics is somewhat different from that in the general population because of differences in cancer risk and age structure; 82% of Hispanics are aged younger than 50 years versus 60% of NHWs. Thyroid cancer has become the second most common cancer in Hispanic women both because it has a younger median age at diagnosis compared with other cancers (49 years vs 65 years for all sites combined) and because incidence has been increasing rapidly; rates in Hispanic women doubled between 2000 and 2012 (Fig. 2), consistent with the trend in NHWs.\textsuperscript{10} Cancer of the uterine corpus, the fourth most common cancer in women, is also increasing rapidly, by 2.3% per year in Hispanic women aged younger than 50 years and by 1.2% per year in those aged 50 years and older. In NHWs, rates are stable in young women, but increasing slightly by 0.7% per year in those aged 50 years and older.
The lifetime probability of developing cancer among Hispanic men and women is 39% and 34%, respectively (Table 1), compared with 42% and 39%, respectively, among NHWs. Incidence rates are 20% lower in Hispanics overall (Table 2), and are lower for every age group except those aged 5 to 14 years, among whom they are the same as for NHWs. The cancer profile in US Hispanics reflects the risk in immigrant countries of origin. Hispanics are less likely than NHWs to be diagnosed with the 4 most common cancers (prostate, breast, lung and bronchus, and colorectum), but have a higher risk of cancers associated with infectious agents, such as those of the stomach, liver, and cervix (Table 2). However, incidence varies substantially by nativity and country of origin, with rates in Cubans and Puerto Ricans more similar to those in NHWs than to those in Mexicans.24

For all cancers combined, incidence trends in Hispanics mirror those in NHWs (Fig. 3). Although incidence rates continue to be higher in men than in women, as a result of declining incidence in men coupled with a more stable trend in women, the male-to-female rate ratio among Hispanics has declined from 1.47 (95% confidence interval [95% CI], 1.41-1.53) in 1992 to 1.13 (95% CI, 1.10-1.16) in 2012. Similarly, overall cancer risk is currently higher in NHW women than in Hispanic men (rate ratio [RR], 1.20; 95%
TABLE 1. Probability (%) of Developing Invasive Cancer Among Hispanics/Latinos Within Selected Age Intervals by Sex, United States, 2010 to 2012*

| Age Interval | Male | Female | Male | Female |
|--------------|------|--------|------|--------|
| All sites†  |      |        |      |        |
| 0 | 2.6 (1 in 39) | 4.6 (1 in 22) | 11.3 (1 in 9) | 32.8 (1 in 3) |
| 1 | 4.4 (1 in 23) | 4.8 (1 in 21) | 8.0 (1 in 13) | 24.2 (1 in 4) |
| 2 | 1.5 (1 in 68) | 1.8 (1 in 55) | 2.6 (1 in 38) | 5.1 (1 in 20) |
| 3 | 0.3 (1 in 386) | 0.3 (1 in 383) | 0.2 (1 in 383) | 0.2 (1 in 383) |
| 4 | 0.2 (1 in 1,009) | 0.4 (1 in 228) | 0.7 (1 in 149) | 1.4 (1 in 69) |
| 5 | 0.1 (1 in 1,406) | 0.3 (1 in 370) | 0.9 (1 in 107) | 4.6 (1 in 22) |
| 6 | 0.1 (1 in 1,208) | 0.2 (1 in 421) | 0.7 (1 in 313) | 3.1 (1 in 32) |
| 7 | 0.2 (1 in 1,099) | 0.4 (1 in 55) | 0.7 (1 in 13) | 0.5 (1 in 298) |
| 8 | 0.3 (1 in 1,406) | 0.4 (1 in 370) | 0.9 (1 in 107) | 4.6 (1 in 22) |
| 9 | 0.1 (1 in 1,208) | 0.2 (1 in 421) | 0.7 (1 in 313) | 3.1 (1 in 32) |
| 10 | 0.2 (1 in 1,099) | 0.2 (1 in 644) | 0.3 (1 in 923) | 0.2 (1 in 644) |
| 11 | 0.3 (1 in 1,406) | 0.3 (1 in 370) | 0.9 (1 in 107) | 4.6 (1 in 22) |
| 12 | 0.1 (1 in 1,208) | 0.2 (1 in 421) | 0.7 (1 in 313) | 3.1 (1 in 32) |
| 13 | 0.2 (1 in 1,099) | 0.4 (1 in 228) | 0.7 (1 in 149) | 1.4 (1 in 69) |
| 14 | 0.1 (1 in 1,406) | 0.3 (1 in 370) | 0.9 (1 in 107) | 4.6 (1 in 22) |
| 15 | 0.1 (1 in 1,208) | 0.2 (1 in 421) | 0.7 (1 in 313) | 3.1 (1 in 32) |

*For those free of cancer at the beginning of the age interval.
†All sites excludes basal cell and squamous cell skin cancers and in situ cancers except urinary bladder.
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.3. Bethesda, MD: Statistical Research and Applications Branch, National Cancer Institute; 2015 (surveillance.cancer.gov/devcan/).

TABLE 2. Cancer Incidence and Mortality Rates and Rate Ratios Comparing Hispanics With Non-Hispanic Whites, 2008 to 2012

| Incidence/Mortality | Male Hispanic | Male Non-Hispanic White | Female Hispanic | Female Non-Hispanic White | Male Hispanic | Male Non-Hispanic White | Female Hispanic | Female Non-Hispanic White |
|---------------------|---------------|------------------------|-----------------|--------------------------|---------------|------------------------|-----------------|--------------------------|
| All sites           | 408.5         | 528.9                  |                 |                          | 148.0         | 210.6                  | 0.7             |                          |
| Breast (female)     | 112.1         | 123.0                  |                 |                          | 29.5          | 62.2                   | 0.5             |                          |
| Cervix              | 4.4           | 6.8                    |                 |                          | 0.9           | 0.5                    | 0.5             |                          |
| Uterine cervix      | 5.1           | 7.7                    |                 |                          | 0.7           | 0.5                    | 0.7             |                          |

Rates are per 100,000 and age-adjusted to the 2000 US standard population. Persons of Hispanic origin may be of any race.
*Ratio is the unrounded Hispanic rate divided by the corresponding non-Hispanic white rate.
†The difference between the rates for Hispanics and non-Hispanic whites is significant (P < 0.05).
Sources: Incidence: North American Association of Central Cancer Registries (NAACCR), 2015. Incidence data for Hispanics and non-Hispanic whites are based on the NAACCR Hispanic Identification Algorithm (NHIA). Mortality: National Center for Health Statistics, Centers for Disease Control and Prevention, 2015.
CI, 1.17-1.22), despite being lower prior to 1995 (rate ratio [RR], 0.91; 95% CI, 0.88-0.94). From 2003 through 2012, overall cancer incidence rates in Hispanics declined by 2.4% per year among men and by 0.5% per year among women, compared with a decline of 1.5% per year in NHW men and stable rates in NHW women (Fig. 3) (Table 3). The magnitude of decline in Hispanics may be somewhat affected by the influx of lower-risk Hispanics through immigration.

Stage at diagnosis and survival
Hispanics are generally less likely than NHWs to be diagnosed at an early stage of disease (Fig. 4). Absolute differences in the percentage of cancers diagnosed at a localized stage are largest for melanoma (12%) and female breast cancer (8%). Although less access to high-quality care due to lower socioeconomic status (SES) undoubtedly contributes to this disparity,25-27 some studies have shown that Hispanics are at higher risk of advanced-stage disease even when SES and health care access are similar.28,29

For all ages combined, survival rates in Hispanics appear similar to those in NHWs overall and for most cancers (Fig. 5). However, rates in adolescents and young adults (aged 15-34 years) are lower in Hispanics (81%) than in NHWs (89%).30 The higher likelihood of advanced stage at diagnosis

FIGURE 3. Trends in Cancer Incidence and Death Rates by Ethnicity, 1992 to 2012.
NHW indicates non-Hispanic white. Rates are age-adjusted to the 2000 US standard population. Persons of Hispanic/Latino origin may be of any race.
Sources: Incidence: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2015. Mortality: National Center for Health Statistics, Centers for Disease Control and Prevention, 2015.
for Hispanics with melanoma is reflected in lower 5-year survival rates, particularly for men (79% vs 88% in NHWs). It is very important to note that survival statistics for Hispanics and other minority groups are known to be artificially inflated, particularly for more fatal cancers, because of incomplete death ascertainment due to the logistical challenges associated with case follow-up for reasons such as return migration after diagnosis. A selectively healthy immigrant population may also bias survival statistics for US Hispanics.

Mortality

Cancer is the leading cause of death among Hispanics, followed by heart disease, based on recorded vital statistics data for 2012 (Table 4). In 2015, an estimated 37,800 Hispanic men and women will die of cancer (Fig. 1). Lung cancer remains the leading cause of cancer death for Hispanic men (17%), but liver cancer (12%) is projected to surpass colorectal cancer (11%) to become the second most common cause of cancer death (Fig. 6). Among Hispanic women, the leading cause of cancer death is breast cancer (16%), followed by lung (13%) and colorectal (9%) cancers.

Overall cancer death rates are 30% lower in Hispanics compared with NHWs (Table 2). However, this mortality advantage is confined to middle- and older-aged adults. Among those aged younger than 25 years, rates in Hispanics are the same as those in NHWs except for individuals aged 15 to 19 years, for whom rates in Hispanics are slightly higher (3.4 [95% CI, 3.1-3.6] vs 2.8 [95% CI, 2.6-2.9] per 100,000 population). This likely reflects the lower survival rates for leukemia and testicular cancer—the two most commonly diagnosed cancers in Hispanics younger than 25 years. Notably, Hispanics have death rates for testicular cancer that are identical to those in NHWs, despite 35% lower incidence rates, because of later-stage diagnoses and lower stage-specific survival rates (Table 2).

There are sizable differences in cancer death rates between Hispanic subpopulations. Overall, death rates in Puerto Ricans and Cubans are more similar to those in NHWs than in Mexicans. For example, the total cancer death rate for Puerto Rican men (180.7 per 100,000 population) is 12% lower than that for NHW men (205.0), but approximately 20% higher than the rate for Mexican men (151.8) (Table 5). Mexicans have the lowest death rates for the 4 most common cancers (lung, breast, colorectal, and prostate), but the highest rates for infection-related cancers.

Cancer death rates have been decreasing since 1995 in Hispanic men and since 1996 in Hispanic women, 4 years later than declines began in NHWs (Fig. 3). Rates in Hispanic men and NHW women coincided in the mid-2000s and have since been on the same trajectory. From 2003 through 2012, cancer death rates in Hispanics declined by 1.5% per year in men and 1.3% per year in women, consistent with declines in NHWs of 1.6% in men and 1.3% in women (Table 3).

The 4 Major Cancer Sites

Female breast

Invasive breast cancer is the most commonly diagnosed cancer and the leading cause of cancer death among Hispanic women in the United States, with 19,800 new cases and 2,800 deaths expected in 2015. Both incidence and death

### TABLE 3. Fixed-Interval Trends in Cancer Incidence and Death Rates, 2003 to 2012

|                | MALE HISPANIC | MALE NON-HISPANIC WHITE | FEMALE HISPANIC | FEMALE NON-HISPANIC WHITE |
|----------------|---------------|-------------------------|----------------|--------------------------|
| All sites      | Incidence     | -2.4*                   | -1.5*          | -0.5*                   |
|                | Death         | -1.5*                   | -1.6*          | -1.0*                   |
| Lung & bronchus| Incidence     | -3.1*                   | -2.3*          | -1.3*                   |
|                | Death         | -3.1*                   | -2.4*          | -1.4*                   |
| Prostate       | Incidence     | -4.7*                   | -3.5*          | -1.8*                   |
|                | Death         | -3.0*                   | -3.3*          | -1.3*                   |
| Female breast  | Incidence     | -1.9*                   | -1.6*          | -0.2*                   |
|                | Death         | -1.5*                   | -1.3*          | -0.2*                   |
| Thyroid        | Incidence     | 5.2*                    | 5.5*           | 5.3*                    |
|                | Death         | -2.5*                   | 1.7*           | 1.7*                    |
| Colorectum     | Incidence     | -1.6*                   | -2.0*          | -2.8*                   |
|                | Death         | -3.0*                   | -3.8*          | -2.8*                   |
| Stomach        | Incidence     | -2.9*                   | -1.2*          | -2.2*                   |
|                | Death         | -3.1*                   | -3.6*          | -2.7*                   |
| Liver & intrahepatic bile duct | Incidence | 1.8* | 3.7* | 2.4* |
|                | Death         | 1.7*                    | 2.9*           | 1.4*                    |
| Cervix         | Incidence     | -3.9*                   | -0.7*          | -1.6*                   |
|                | Death         | -3.3*                   | -0.5           | -0.7*                   |
| Gallbladder    | Incidence     | -2.2*                   | -0.4           | -1.6*                   |
|                | Death         | 0.2                     | -1.5           | 0.2                     |

*The average annual percent change from 2003 to 2012 is significantly different from zero (P<.05). Source: NAACCR, 2015.
rates are approximately 30% lower in Hispanics than NHWs (Table 2). Differences in breast cancer risk largely reflect reproductive patterns. A younger age at first birth, higher parity, and breastfeeding are all associated with lower breast cancer risk and are more common in Hispanic than NHW women. However, risk is lower among foreign-born compared with US-born Hispanics and also varies by country of origin. For example, a study based on Florida cancer registry data found that breast cancer incidence rates in Mexican women were 35% to 40% lower than those in Cuban and Puerto Rican women. Moreover, rates in these women were substantially higher than those reported in their corresponding countries of origin, likely due to acculturation and differences in the use of mammography. Mammography screening increases rates due to lead time and the detection of indolent disease.

Breast cancer incidence rates in Hispanic women increased from 1992 until around 2000, then decreased.
until 2003, but have since remained fairly stable (Fig. 2), similar to trends in NHW women. Increases during the 1990s are attributed to the increased detection of preclinical disease due to the rapid uptake of mammography screening. In contrast to incidence trends, death rates have generally been declining over the past 2 decades (Fig. 6); from 1990 to 2012, the rate dropped by 25% in Hispanic women (from 19.6 per 100,000 population to 14.7) and by 36% in NHW women (from 33.2 per 100,000 population to 21.1). Over the past decade (2003 through 2012), death rates declined by 1.3% per year in Hispanic women and by 1.9% per year in NHW women (Table 3), reflecting improvements in early detection and treatment.40

Hispanics are less likely than NHWs to be diagnosed with breast cancer at a localized stage (57% vs 65%) (Fig. 4), most likely due to less access to mammography and delayed follow-up after an abnormal mammogram.41,42 Research is conflicted regarding differences in breast cancer survival between Hispanic and NHW women. A recent analysis of the National Comprehensive Cancer Network Breast Cancer Outcomes Database found that despite a larger percentage of advanced-stage, high tumor grade, and aggressive molecular phenotypes, Hispanic women have a 22% lower risk of breast cancer-specific death than white women after controlling for sociodemographics, tumor characteristics, and treatment factors.43 However, the experience of these patients may not be generalizable to the population at large. Multivariate analyses of population-based SEER registry data report a borderline increased risk of breast cancer death for Hispanic women.44 The current 5-year survival rate (cases diagnosed during 2005 through 2011) based on SEER data is similar for Hispanic (88%) and NHW (89%) women (Fig. 5).

**Colorectum**

In 2015, an estimated 11,700 Hispanic men and women will be diagnosed with colorectal cancer (CRC) and 3,800 will die of the disease (Fig. 1). CRC incidence and death rates among Hispanics are approximately 10% to 20% lower than those among NHWs (Table 2). However, rates vary substantially between Hispanic subgroups. A study of Florida residents found that CRC incidence rates among Cuban and Puerto Rican men were similar to those of NHW women and twice those of Mexican men.24 Although historically the risk of CRC has been higher in US Hispanics than Hispanics living elsewhere, this pattern is changing because of declining rates in the US and increasing rates in Puerto Rico and some Latin American countries.46,47 For example, incidence rates for 2007-2011 were approximately 10% lower in US Hispanics than in Puerto Rico residents.10,48 Increasing trends in countries with historically low rates are attributed to the adoption of behaviors associated with economic development, such as rising obesity and declining levels of physical activity.49 The decline in CRC incidence rates in the United States began later and was slower in Hispanics than NHWs. As a result, the 31% lower risk of disease experienced by Hispanics in 1992 had shrunk to 11% in 2012.7 Currently, the magnitude of decline for both incidence and death rates is slightly smaller for Hispanics than NHWs (Table 3). However, incidence rates are increasing among adults aged younger than 50 years.50,51

**TABLE 4. Leading Causes of Death Among Hispanics and Non-Hispanic Whites, United States, 2012**

| HISPANIC | 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                   | 34,147                  | 21.8        | 117.8 | 2                   | 462,499                  | 22.9        | 170.2 |
| Heart disease | 2                   | 31,595                  | 20.2        | 122.4 | 1                   | 481,991                  | 23.9        | 171.2 |
| Accidents (unintentional injuries) | 3                   | 11,447                  | 7.3         | 26.5  | 5                   | 99,288                   | 4.9         | 43.7  |
| Cerebrovascular diseases | 4                   | 7,767                   | 5.0         | 30.1  | 4                   | 100,154                  | 5.0         | 35.5  |
| Diabetes | 5                   | 7,363                   | 4.7         | 27.1  | 7                   | 50,443                   | 2.5         | 18.5  |
| Chronic liver disease & cirrhosis | 6                   | 4,988                   | 3.2         | 14.2  | 12                  | 25,720                   | 1.3         | 9.9   |
| Chronic lower respiratory diseases | 7                   | 4,477                   | 2.9         | 18.6  | 3                   | 127,116                  | 6.3         | 46.2  |
| Alzheimer’s disease | 8                   | 3,772                   | 2.4         | 17.4  | 6                   | 72,772                   | 3.6         | 24.9  |
| Influenza and pneumonia | 9                   | 3,049                   | 1.9         | 12.1  | 8                   | 40,460                   | 2.0         | 14.3  |
| Nephritis, nephrotic syndrome, & nephrosis | 10                  | 2,964                   | 1.9         | 11.3  | 10                  | 33,105                   | 1.6         | 11.8  |
| All causes | 156,419              | 100.0                   | 541.2       | 2,016,896 | 100.0             | 742.3                    |

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

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.
Hispanics are slightly less likely than NHWs to be diagnosed with CRC at a localized stage (Fig. 4), although overall survival rates appear similar (Fig. 5). A study of colon cancer outcomes in Los Angeles that included 5,082 Hispanic patients found that although Hispanics were less likely than NHWs to be diagnosed with localized disease, their median survival time was longer for every stage of diagnosis. However, another California study of almost 15,000 Hispanic patients that controlled for stage, SES, and treatment found similar colon cancer-specific survival for Hispanics and NHWs, but a 16% increased risk of death among Hispanics for rectal cancer.

**Lung and bronchus**

In 2015, an estimated 9,600 Hispanic men and women will be diagnosed with lung cancer and 5,800 will die of the disease (Fig. 1). Among Hispanics, lung cancer is the leading cause of cancer death in men and the second leading cause of cancer death in women. Compared with NHWs, lung cancer incidence and death rates are about 50% lower in men and 60% lower in women (Table 2), reflecting historic
differences in smoking. Approximately 82% of all lung cancer deaths in the United States are caused by cigarette smoking,\(^5^3\) and smoking prevalence is 40% lower in Hispanics than in NHWs (Table 6). Moreover, Hispanic smokers are less likely to smoke on a daily basis and are more likely to be intermittent smokers.\(^5^4\) One study reported that the risk of lung cancer among low-level smokers (\(<20\) cigarettes per day) was lower in Hispanics than NHWs,\(^5^5\) although this may reflect less intense smoking as opposed to reduced susceptibility. Heterogeneity in lung cancer rates within the Hispanic population also reflects diverse smoking patterns.\(^2^4,^3^3\) For example, the lung cancer death rate in Cuban men (49.9 per 100,000 population) is almost double that in Mexican men (27.1) (Table 5) because Cubans have historically been more likely to smoke and to be heavy smokers (for more information about smoking, see section on risk factors).\(^5^4\)

Likewise, population trends in lung cancer mirror historic smoking patterns, which are more similar by sex than ethnicity. Lung cancer death rates among Hispanics have been declining for 2 decades in men, but only since 2003 in women (Fig. 6), similar to trends in NHWs. From 2003 through 2012, lung cancer death rates decreased by 3.1% per year in Hispanic men and by 1.4% per year in Hispanic women (Table 3).

Although lung cancer is seldom diagnosed early, Hispanic patients are more likely than NHWs to be diagnosed at a distant stage of disease (58% vs 54%) (Fig. 4). Stage-specific survival rates based on patients in SEER areas are slightly higher for Hispanics than NHWs. For example, the 5-year survival rate for regional-stage disease is 32.8% (95% CI, 30.6%-35.0%) in Hispanic patients compared with 30.5% (95% CI, 30.0%-31.0%) in NHWs. However, lung cancer survival data for Hispanics are particularly prone to artificial inflation because of the higher likelihood of loss to follow-up coupled with the fatal nature of the disease.\(^2^0\)

### Prostate

In 2015, there will be approximately 13,000 new cases of prostate cancer diagnosed in Hispanic men and 1,800 deaths from the disease (Fig. 1). Despite being the most commonly diagnosed cancer, it ranks fourth for cancer deaths. Incidence rates in the United States range widely, from 67.8 (per 100,000 population) in Asian/Pacific Islanders to 208.7 in black men (during 2008-2012).\(^5^6\) Rates in Hispanics (112.1 per 100,000 population) are most similar to those in NHWs (123.0) (Table 2). With the exception of age and African ancestry, there are few established risk factors for prostate cancer and the variation in incidence is thought to largely reflect differences in disease detection through screening with the prostate-specific antigen (PSA) test.\(^5^7\)

Prostate cancer incidence and death rates are decreasing rapidly for men in all racial and ethnic groups. In Hispanic men, both incidence and death rates have dropped by 40% since the mid-1990s (Figs. 2 and 6). In the most recent decade (2003-2012), incidence and death rates fell annually by 4.7% and 3.0%, respectively, similar to declines among NHWs (Table 3).

Most prostate cancers are diagnosed at an early stage. Hispanic men are somewhat less likely than NHWs to be diagnosed with localized-stage disease (75% vs 79%), for which the 5-year survival rate is 98% in both groups. Differences in stage distribution most likely reflect lower PSA screening uptake among Hispanic men. Five-year survival for all stages combined is 93% in Hispanics and 94% in NHWs (Fig. 5).

### Cancer Sites With Higher Rates for Hispanics

#### Liver and intrahepatic bile duct

In 2015, an estimated 5,100 Hispanic men and women will be diagnosed with liver cancer and 3,300 will die of the disease. The burden of liver cancer in the US is particularly high among racial and ethnic minority groups, and incidence rates in Hispanics are double those in NHWs (Table 2). However, there is marked diversity in risk within the Hispanic community by nativity, country of origin, and geography. For example, death rates in Cuban men and women are one-half those in Mexican men and women (Table 5). Notably, the risk of liver cancer in US-born

### Table 5. Cancer Death Rates Among Hispanics by Country of Origin, 2011 to 2012

| Cancer Site                          | MEXICAN | PUERTO RICAN | CUBAN | NON-HISPANIC WHITE |
|--------------------------------------|---------|--------------|-------|--------------------|
| All sites                            | 125.6   | 139.4        | 132.9 | 170.7              |
| Male                                 | 151.8   | 180.7        | 175.3 | 205.0              |
| Female                               | 105.1   | 110.4        | 109.2 | 145.8              |
| Female breast                        | 15.0    | 17.0         | 18.9  | 21.2               |
| Colorectum                           | 12.4    | 15.3         | 14.6  | 14.6               |
| Male                                 | 16.1    | 19.7         | 17.6  | 17.4               |
| Female                               | 9.3     | 12.2         | 13.4  | 12.4               |
| Liver & intrahepatic bile duct       | 11.1    | 10.8         | 5.5   | 5.4                |
| Male                                 | 15.7    | 17.9         | 8.1   | 7.9                |
| Female                               | 7.0     | 5.3          | 3.4   | 3.2                |
| Lung & bronchus                      | 19.5    | 26.2         | 30.4  | 48.4               |
| Male                                 | 27.1    | 37.4         | 49.9  | 59.2               |
| Female                               | 13.5    | 18.0         | 16.2  | 40.1               |
| Prostate                             | 17.3    | 19.1         | 19.6  | 18.7               |
| Stomach                              | 5.8     | 4.9          | 3.4   | 2.5                |
| Male                                 | 7.4     | 7.5          | 4.9   | 3.4                |
| Female                               | 4.4     | 3.2          | 2.4   | 1.7                |
| Uterine cervix                       | 2.8     | 3.4          | 2.8   | 2.1                |

Rates are per 100,000 and are age-adjusted to the 2000 US standard population. Persons of Hispanic origin may be of any race.

NOTE: Rates presented in this table are based on different population denominator data than rates presented elsewhere in this report, and cannot be directly compared.
Hispanics is double that in immigrants; this is in contrast to Asian/Pacific Islanders, among whom rates are higher in the foreign-born.58 Similarly, rates in Puerto Ricans residing in Florida are double those of individuals residing in Puerto Rico.24 The cause for this pattern is unclear but may reflect acculturation and a higher prevalence of risk factors for liver cancer, such as obesity, hepatitis C infection, heavy alcohol consumption, and diabetes, in US-born Hispanics. Incidence and death rates among Hispanics in Texas, who are predominantly of Mexican descent, are also elevated.12,59 This may partly reflect the rapid increase in obesity among Mexican men and women.5,60

Trends in liver cancer mortality mirror those for incidence because of the high fatality rate (Figs. 2 and 6). Patterns of liver cancer occurrence in Hispanics are similar to those in NHWs since the early 1990s, when ethnicity information was first recorded in health and vital statistics data. Since 1992, incidence rates in men have doubled in both Hispanics and NHWs. The increase in the US has primarily been attributed to the hepatitis C virus (HCV) infection epidemic beginning in the 1960s and peaking in the late 1980s.61,62 From 2003 through 2012, incidence rates in Hispanics increased by approximately 2% per year in both men and women (Table 3). However, analysis of these data by age indicates that rates in adults aged younger than 50 years decreased by 4.1% per year in men (from 4.2 per 100,000 population to 2.8), for a total drop of 43%, and have begun to decline in women (Fig. 7). In young NHWs, incidence rates are decreasing in men (3.0% per year), but still increasing in

### Table 6. Current Cigarette Smoking* and Alcohol Consumption (%), Adults Aged 18 Years and Older, United States, 2014

|                  | HISPANIC |       | NON-HISPANIC WHITE |       |       |
|------------------|----------|-------|-------------------|-------|-------|
|                  | MALE     | FEMALE| TOTAL             | MALE  | FEMALE|
| **Smoking**      |          |       |                   |       |       |
| **Origin†**      |          |       |                   |       |       |
| Puerto Rican     | 14.8     | 7.6   | 11.2              | 19.4  | 17.3  |
| Mexican          | 15.0     | 6.5   | 10.7              | 26.0  | 17.5  |
| Cuban            | 16.7     | 6.2   | 11.8              | 15.6  | 8.0   |
| Dominican        | 12.5     | 6.4   | 9.3               | 11.3  | 4.2   |
| Central/South American | 11.3 | 4.2 | 7.9 |          |       |
| **Education†**   |          |       |                   |       |       |
| ≤12 y, no diploma| 14.9     | 7.5   | 11.2              | 42.2  | 41.8  |
| GED              | 26.0     | 17.5  | 21.6              | 50.1  | 48.3  |
| High school diploma | 15.6 | 8.0  | 12.1              | 27.6  | 28.0  |
| Some college     | 11.3     | 8.6   | 9.9               | 22.4  | 20.2  |
| College degree   | 6.3      | 4.8   | 5.3               | 7.4   | 6.9   |
| **Poverty status§** |        |       |                   |       |       |
| Poor             | 16.7     | 11.0  | 13.4              | 41.9  | 34.9  |
| Near poor        | 14.2     | 6.6   | 10.4              | 35.1  | 30.8  |
| Nonpoor          | 12.2     | 6.1   | 9.5               | 16.0  | 13.1  |
| **Health insurance status** | | | | | |
| Not covered      | 16.7     | 5.0   | 11.0              | 41.2  | 38.7  |
| Covered          | 12.5     | 8.3   | 10.4              | 17.8  | 16.5  |
| **Nativity††**  |          |       |                   |       |       |
| US born          | 16.4     | 12.0  | 14.3              | 20.2  | 18.7  |
| Foreign born     | 12.0     | 4.3   | 8.2               | 21.0  | 11.7  |
| **Alcohol consumption#** | | | | | |
| Light            | 34.2     | 24.0  | 29.0              | 33.1  | 34.8  |
| Moderate         | 17.2     | 3.3   | 10.2              | 25.6  | 11.5  |
| Heavy            | 4.3      | 1.6   | 2.9               | 6.5   | 6.4   |
| Binge            | 30.2     | 13.4  | 21.8              | 36.1  | 25.0  |

GED indicates General Educational Development high school equivalency. Percent estimates, except overall smoking prevalence, are age-adjusted to the 2000 US standard population. Persons of Hispanic/Latino origin may be of any race.

*Ever smoked 100 cigarettes in lifetime and smoking every day or some days at time of survey.

†Based on 2013 and 2014 National Health Interview Survey data combined.

†Among persons aged ≥25 years.

§Poorest indicates <99% of the poverty threshold; near poor, 100% to ≤199% of the poverty threshold; and nonpoor, >200% of the poverty threshold.

††US born includes those born in a US territory.

#Current consumption: ≥12 drinks in lifetime and ≥1 drink within the past year. Light indicates ≥12 drinks in lifetime and <3 drinks/week within the past year; moderate, ≥12 drinks in lifetime and (male) 3 to 14 drinks/week within the past year or (female) 3 to 7 drinks/week within the past year; heavy, ≥12 drinks in lifetime and (male) >14 drinks/week within the past year or (female) >7 drinks/week within the past year; binge, current drinker and (male) >5 or (female) >4 drinks on at least 1 day within the past year.

Source: National Center for Health Statistics, National Health Interview Survey, 2014. Public-use data file and documentation (available at cdc.gov/nchs/nhis.htm).
women (by 2.2% per year). Patterns in young adults are often predictive of future population trends.

Among both Hispanics and NHWs, the 5-year survival rate for liver cancer is approximately 20% (Fig. 5). Even for the 44% of Hispanic patients diagnosed with localized disease, the 5-year survival rate is only 33%.8

Stomach (gastric cancer)

An estimated 3,200 Hispanic men and women will be diagnosed with gastric cancer in 2015 and 1,700 will die of the disease. Similar to liver cancer, gastric cancer rates in Hispanics are similar to those in Asians/Pacific Islanders, blacks, and American Indians/Alaska Natives, and are approximately double those in NHWs (Table 2). There is also variation between Hispanic subgroups, with death rates for Mexicans nearly twice those for Cubans (Table 5). Gastric cancer remains common throughout Mexico, Central and South America, and Asia, but has become rare in high-income countries such as the United States.63
More than 90% of gastric cancers are adenocarcinomas that are classified as proximal (cardia) or distal (noncardia) based on tumor site. The ethnic disparity in gastric cancer is driven wholly by distal tumors, for which the incidence rate is 6.2 (per 100,000 population) in Hispanics compared with 2.2 in NHWs. Indeed, the rate for proximal tumors is lower in Hispanics (1.5 per 100,000 population) than in NHWs (2.2). Chronic infection with Helicobacter pylori \((H.\ pylori)\) is the strongest risk factor for distal gastric cancer, but is inversely associated with proximal tumors. Gastric cancer risk varies among Hispanics by nativity consistent with patterns of \(H.\ pylori\) seroprevalence. Risk factors for proximal gastric cancer are consistent with those for esophageal adenocarcinoma and include obesity and chronic gastroesophageal reflux disease.

Stomach cancer incidence and death rates have been declining in Hispanics since at least the early 1990s (Fig. 6) and in NHWs for many decades. Reasons for the decline are complex and not well understood, but are thought to be somewhat due to declining \(H.\ pylori\) prevalence as a result of improved hygiene and advances in food preservation (eg, refrigeration). The pace of the decline has been more rapid in NHWs than in Hispanics, resulting in a crossover for Hispanic women and NHW men. Whereas the death rate for Hispanic women in 1990 was 21% lower than that in NHW men, it was 17% higher in 2012. This likely reflects to some extent the elevated disease risk of incoming immigrants. From 2003 through 2012, death rates for stomach cancer declined by approximately 3% per year in men and women of both ethnicities (Table 3).

The 5-year survival rate for stomach cancer is about 30% for both Hispanics and NHWs (Fig. 5). Hispanic patients are less likely to be diagnosed with localized-stage disease (22% vs 27%), for which the survival rate is approximately 68% for both groups. The 5-year survival rate for distal tumors is higher for NHWs (36%) than Hispanics (33%), whereas that for proximal tumors is equivalent (24%).

**Uterine cervix**

In 2015, an estimated 2,000 Hispanic women will be diagnosed with cervical cancer (Fig. 1) and 600 will die of...
the disease. Hispanic women, along with black women, have the highest incidence of cervical cancer in the United States, with rates 40% higher than those in NHWs (Table 2). The highest rates among Hispanic women are in the lower Mississippi valley and southern Appalachia. 68

Between 1992 and 2012, incidence rates for cervical cancer declined by approximately one-half in Hispanic women (from 21.2 per 100,000 population to 9.2) and by 33% in NHW women (from 8.8 per 100,000 population to 5.9), whereas death rates declined by 35% in both groups (Figs. 2 and 6). These declines are largely due to the uptake of the Papanicolaou (Pap) test for cervical cancer screening. 69 In the most recent 10 years (2003–2012), both incidence and death rates in Hispanic women have been declining rapidly compared with slight declines in incidence and stable death rates in NHWs (Table 3). Part of this difference is because of higher baseline rates in Hispanics.

According to SEER data, Hispanic women are as likely as NHW women to be diagnosed with local-stage disease (47%) and are less likely to be diagnosed with distant-stage disease (12% vs 14%) (Fig. 5). The overall 5-year survival rate for cervical cancer is higher for Hispanics (75%) than for NHWs (70%) (Fig. 6). Differences in stage distribution and survival may to some extent reflect ethnic variation in tumor characteristics, such as histology. 70 For example, Hispanic women have a lower percentage of adenocarcinoma of the cervix, which is associated with poorer survival than squamous cell carcinoma. 71 The survival benefit may also be related to differences in comorbidities, indeterminate cultural factors, or out-migration of the terminally ill. 72–74

**Gallbladder**

Gallbladder cancer is one of the few cancers that occur more often in women than in men. In 2015, an estimated 800 Hispanic women will be diagnosed with gallbladder cancer. Information regarding gallbladder cancer in the scientific literature is scant due to its rarity, particularly in economically developed countries. In the United States, Hispanic women have the second highest incidence and mortality rates after American Indian/Alaska Native women. 75 The incidence rate in Hispanic women (2.6 per 100,000 population) is double that of Hispanic men (1.2) and NHW women (1.1) and triple that of NHW men (0.7) (Table 2). The highest rates in the United States are among Hispanic and American Indian women in New Mexico and Hispanic women in California. 76 Reasons for the high risk in Hispanic women are not well understood. The strongest known risk factor for gallbladder cancer is chronic gallstones, which can result from hereditary factors that affect cholesterol secretion in the bile and may be more common among Hispanics than NHWs. However, the presence of stones is neither sufficient nor necessary for the development of malignancy. 77,78 Other factors that increase risk include cholecystitis, 77 obesity (in females), 79 diabetes, 80 and the use of hormone replacement therapy. 81

Gallbladder cancer incidence and death trends are similar because of a high fatality rate. In Hispanic women, rates declined from 1992 until the mid-2000s, but have since remained fairly stable. Over the past decade (2003–2012), rates were stable in men and decreased slightly in women (except death rates in Hispanic women, which remained stable).

Gallbladder cancer typically presents with nonspecific symptoms, resulting in a late stage at diagnosis and poor prognosis. The 5-year survival rates, which are similar by sex, are 25% among Hispanics and 19% among NHWs. 8 Approximately one-third of patients are diagnosed at a localized stage, for which 5-year survival is approximately 50%.

**Childhood leukemia**

Leukemia is the most common pediatric cancer, accounting for 40% of cases in Hispanic children and 30% in NHW children aged birth to 14 years (excluding benign and borderline malignant central nervous system tumors). 56 The majority of these are acute lymphocytic leukemia (ALL; 78% in both groups) followed by acute myeloid leukemia (AML; 13%). In contrast to adults, among whom the leukemia incidence rate is 27% lower in Hispanics than NHWs, Hispanic children have incidence rates that are approximately 20% higher than those for NHWs for each of the 2 major subtypes. Hispanic children also have lower leukemia survival rates, which appears to stem from a higher likelihood of recurrence as opposed to differences in clinical remission rates. 82 The 5-year survival rate for ALL is 89% in Hispanic children and 93% in NHW children, whereas the 5-year survival rate for AML is lower at 69% and 77%, respectively. Although the reasons for the elevated incidence and poorer outcomes noted among Hispanics remain unclear, there is evidence of a biological basis for these disparities that, for survival, could potentially be overcome through the development of more individualized antileukemic agents. 83 Incidence trends from 1992 through 2012 are the same for Hispanics and NHWs based on SEER data; rates for ALL increased slightly by 0.7% per year, whereas rates for AML were stable. 7 Trends in death rates are also consistent; from 1990 through 2012, death rates declined by approximately 3% per year for ALL and by approximately 1% per year for AML.

**Risk Factors for Cancer**

The Hispanic population has several distinguishing demographic characteristics, including its diverse ancestry and immigrant status, and generally low educational and socioeconomic levels. The heterogeneity in cancer occurrence is reflected in the prevalence of risk factors, such as tobacco
use, alcohol consumption, obesity, and exposure to infectious agents.

**Tobacco**

Smoking remains the single largest preventable cause of disease and premature death in the United States, despite dramatic reductions in smoking prevalence during the past several decades.\(^{53}\) Overall, Hispanic adults are less likely to use tobacco compared with NHWs or blacks.\(^{84}\) In 2014, 11.2% of Hispanics and 18.3% of NHWs were current cigarette smokers (Table 6). Furthermore, studies have shown Hispanics to more often be low-intensity smokers (consuming 5 or fewer cigarettes per day).\(^{85}\) Among Hispanic adults, smoking prevalence is twice as high in men (14.8%) as in women (7.6%), and also varies widely by subgroup, ranging from 7.9% in Central/South Americans to 19.9% among Puerto Ricans. However, Cubans are the heaviest smokers, with double the lifetime pack-years of Puerto Ricans.\(^{54}\) In 2014, approximately 1% of Hispanics were E-cigarette users, compared to 2% of NHWs.\(^{84}\) Although overall smoking prevalence is lower in Hispanics than NHWs, Hispanics are less interested in quitting and are less likely to use smoking cessation aids or receive a physician’s advice to quit, which may be in part due to barriers in access to care.\(^{86}\)

In contrast to marked sex differences for adults, smoking rates among Hispanic boys (15.0%) and girls (13.1%) were similar in 2013.\(^{87}\) Overall smoking prevalence for Hispanic youth (14.0%) was lower than that for NHWs (18.6%). The prevalence of E-cigarette use in the past 30 days, which increased rapidly among US high school students from 2% in 2011 to 13% in 2014, was 15.3% in both Hispanics and NHWs in 2014.\(^{88}\)

**Obesity**

Being overweight or obese increases the risk of several cancers, including, but not limited to, colorectal, postmenopausal breast, endometrial, kidney, gallbladder, and esophageal cancers.\(^{89,90}\) Increasing rates for some obesity-related cancers, as well as the growing burden of diabetes (itself an independent risk factor), are thought to reflect the recent obesity epidemic in the United States.\(^{91,92}\) Diabetes incidence and prevalence has leveled off nationally, but continues to increase among Hispanics.\(^{93}\) Moreover, Hispanics rank highest in the prevalence of metabolic syndrome, at 38.6% for 2011 through 2012.\(^{94}\) Both diabetes and metabolic syndrome are strongly associated with liver cancer,\(^{95,96}\) for which the risk in Hispanics is among the highest in the country.\(^{97}\)

The prevalence of obesity increased rapidly from 1976 to 2003 across all races/ethnicities. Although rates have since stabilized for NHWs, they continue to increase among Mexicans, particularly men (Fig. 8).\(^{21,98}\) In 2011 through 2012, the prevalence of obesity among Hispanics was 41% in men and 45% in women compared with 33% among both NHW men and women (Fig. 9). According to

![FIGURE 9. Prevalence (%) of Obesity Among Adults Aged 20 to 74 Years and Youth Aged 6 to 11 Years by Race/Ethnicity and Sex, United States, 2011 to 2012.](image)
Hispanics; in 2013, the prevalence of current alcohol consumption among Hispanics likely reflects social customs and attitudes within the Hispanic culture. However, patterns of alcohol consumption may be shifting in younger Hispanics; in 2013, the prevalence of current alcohol consumption among high school students was comparable between Hispanics (37.5%) and NHWs (36.3%).

Infectious agents

**H. pylori.** Chronic infection with *H. pylori* causes stomach cancer and gastric lymphoma. In the United States, *H. pylori* seroprevalence has declined in younger birth cohorts; however, these declines have been slower among Hispanics compared with NHWs. According to population-based NHANES estimates, *H. pylori* infection is 3 times higher among Mexicans than among NHWs (64% vs 21%, respectively) and is particularly high among foreign-born Hispanics, reflecting higher *H. pylori* prevalence in immigrant countries of origin.

**Hepatitis B virus (HBV) and hepatitis C virus (HCV).** Chronic infection with HBV or HCV causes liver cancer and increases the risk of non-Hodgkin lymphoma. HBV is primarily prevented with vaccination, which has been available since 1982. In 2014, 90.5% of Hispanic adolescents received at least 3 HBV vaccine doses, which was comparable to coverage among NHWs (92.2%). Most new infections in the United States occur in unvaccinated adults through injection drug use and sexual contact. Diabetes increases the risk of HBV infection through the sharing of diabetes-care equipment. Therefore, at the time of diabetes diagnosis, vaccination is recommended for those aged 19 to 59 years who are unvaccinated. According to NHANES data for 1999 through 2008, chronic HBV infection was low in both Mexicans and NHWs (0.03% and 0.11%, respectively). Chronic HBV infection in Latin American countries is rare with the exception of Caribbean, tropical, and Andean South American regions, resulting in higher chronic HBV infection rates among immigrants from these countries.

In contrast to HBV, infection with HCV, which was discovered in 1989, is not vaccine-preventable. However, strategies to cure the infection and prevent hepatocellular carcinoma have evolved rapidly. HCV genotype-specific treatment can now result in sustained virologic response rates of approximately 90%. In 2013, the US Preventive Services Task Force recommended one-time testing for all adults born between 1945 and 1965 and periodic screening for high-risk adults, such as injection drug users. A recent study found similarly low HCV testing in Hispanics (11.5%) and NHWs (12.4%). Based on NHANES data for 2003 to 2010, approximately 3.6 million individuals are infected with HCV, 2.7 million of whom are chronically infected, representing 1% of the US population. However, these data substantially underestimate prevalence, perhaps by as much as 1 million, because they exclude homeless and institutionalized individuals, who are disproportionately infected. NHANES estimates for the 1945 to 1970 birth cohort indicate similar infection prevalence (antibody to HCV) among Mexicans (2.7%) and NHWs (2.8%). HCV prevalence appears to vary by Hispanic subgroup, but information is limited. A recent analysis of data from the Hispanic Community Health Study/Study of Latinos reported the highest seroprevalence among those of Puerto Rican descent and the lowest among those of South American descent. Overall, HCV-related deaths are higher among Hispanics than NHWs, likely due to less access to HCV screening and treatment.

**Human papillomavirus (HPV).** There are over 100 types of HPV, at least 12 of which are oncogenic. Persistent HPV infection causes nearly all cervical cancers; 90% of anal cancers; greater than 60% of oropharyngeal cancers; and 40% of vaginal, vulvar, and penile cancers. The 2015 Advisory Committee on Immunization Practices recommends that girls and boys initiate a 3-dose HPV vaccination beginning at age 11 to 12 years and catch-up vaccination for females aged 13 to 26 years and males aged 13 to 26 years. American Cancer Society (ACS) guidelines are similar but lack a recommendation for males because efficacy trials were completed before the guidelines were published in 2007. Currently, the 3 US Food and Drug Administration-approved HPV vaccine options: a bivalent vaccine, a quadrivalent
vaccine, and a 9-valent vaccine. All protect against HPV types 16 and 18, which cause 70% of all cervical cancers, although a lower percentage in Hispanic women.\textsuperscript{135-137} The quadrivalent vaccine also protects against nononcogenic HPV types 6 and 11, which cause 90% of genital warts. The 9-valent vaccine protects against these HPV types, as well as HPV types 31, 33, 45, 52, and 58, which account for an additional 15% of cervical cancers.\textsuperscript{133}

Although Hispanic girls (those aged 13-17 years) are more likely to initiate HPV vaccination than NHWs (66.3% vs 56.1%), completion rates for the 3-dose series are similar (72.8% vs 70.6%).\textsuperscript{117} Hispanic boys (those aged 13-17 years) also have higher rates of initiation (54.2% vs 36.4% in NHWs), but comparable completion rates (57.2% vs 57.9%). The Vaccines for Children Program, which covers vaccine costs for uninsured and underinsured children and teens, has helped to diminish disparities in childhood vaccination between Hispanics and NHWs.\textsuperscript{138}

Human immunodeficiency virus (HIV). Individuals infected with HIV are at increased risk for acquired immunodeficiency syndrome (AIDS)-defining cancers (ie, Kaposi sarcoma, non-Hodgkin lymphoma, and cervical cancer) as well as non-AIDS-defining cancers (eg, Hodgkin lymphoma, liver cancer, and lung cancer),\textsuperscript{139} and also have higher cancer-specific mortality.\textsuperscript{140} Elevated cancer risk is caused by HIV-associated immunosuppression and a higher likelihood of coinfection with HCV, HBV, HPV, and Epstein-Barr virus.\textsuperscript{141-143} The prevalence of HIV infection in Hispanics is more than 2-fold higher than in whites.\textsuperscript{144} In 2008, approximately 900 per 100,000 Hispanic males in the United States were infected with HIV, compared with 420 per 100,000 white males; the rate in Hispanic females (263 per 100,000) was 4 times higher than that in white females (66 per 100,000).\textsuperscript{144} In 2013, the incidence of new HIV cases in Hispanics was nearly 3 times higher than in whites (18.7 vs 6.6 per 100,000 population),\textsuperscript{145} with the largest percentage in the South (35%) and West (32%).\textsuperscript{146} The majority of HIV cases among Hispanics are in men (86%), particularly those who have sex with men. A systematic review reported that Hispanics, particularly those who are foreign born, are at greater risk of delayed HIV/AIDS diagnosis, but that survival after the initiation of antiretroviral therapy is comparable to that of NHWs, thus highlighting the need for more timely diagnosis in Hispanics.\textsuperscript{147}

Cancer Screening

The majority of Hispanics face barriers to health care, including a lack of health insurance and cultural and language differences, that often result in the lower use of cancer screening tests.\textsuperscript{26,148}

Cervical cancer screening

Regular use of Pap and HPV tests followed by appropriate and timely treatment reduces cervical cancer incidence and death.\textsuperscript{149} The ACS recommends Pap testing every 3 years for women aged 21 to 29 years and HPV and Pap co-testing every 5 years for women aged 30 to 65 years (triennial Pap testing is acceptable). Although Hispanic women have historically been less likely to participate in cervical cancer screening compared with NHW women, the gap has narrowed in recent decades.\textsuperscript{150-152} In 2013, 77% of Hispanic women were up-to-date with cervical cancer screening compared with 83% of NHW women; however, rates in

### TABLE 7. Cancer Screening Test Use (%), Adults, United States, 2013

| Test                          | HISPANIC | HISPANIC SUBGROUPS | NON-HISPANIC |
|-------------------------------|----------|--------------------|-------------|
|                               | ALL UNINSURED | MEXICAN | PUERTO RICAN | CUBAN | CENTRAL/ SOUTH AMERICAN | DOMINICAN | ALL UNINSURED |
| Cervical cancer screening     |          |                    |            |
| (women aged 21–65 years)*     |          |                    |            |
| Papanicolaou test within the  | 77.1     | 64.1               | 76.9        | 82.7  | 73.3                 | 75.6      | 80.4        | 82.8    | 57.3   |
| past 3 years                  |          |                    |            |
| Breast cancer screening       |          |                    |            |
| (women aged ≥40 years)        |          |                    |            |
| Mammogram within the past     | 45.9     | 23.1               | 46.1        | 49.3  | 40.4                 | 45.3      | 49.6        | 52.1    | 18.9   |
| year                         |          |                    |            |
| Mammogram within the past 2   | 61.6     | 37.6               | 61.1        | 65.2  | 52.3                 | 65.5      | 64.4        | 66.4    | 38.1   |
| years                         |          |                    |            |
| Colorectal cancer screening   |          |                    |            |
| (adults aged ≥50+ years)†     |          |                    |            |
| Overall                       | 44.9     | 11.0               | 44.6        | 56.8  | 38.6                 | 40.5      | 38.6        | 60.5    | 29.8   |
| Males                         | 42.0     | 11.3               | 43.4        | 49.7  | 34.7                 | 37.3      | 51            | 60.4    | 21.3   |
| Females                       | 47.6     | 10.7               | 46.3        | 63.2  | 43.3                 | 43.2      | 44.2        | 60.8    | 36.6   |

Percent estimates are age-adjusted to the 2000 US standard population. Persons of Hispanic/Latino origin may be of any race.

*Among women with intact uteri.

†Fecal occult blood test within the past year, sigmoidoscopy within past 5 years, or colonoscopy within past 10 years.

‡Estimate not provided due to instability.

Source: National Center for Health Statistics, National Health Interview Surveys, 2012 and 2013. Public-use data file and documentation (available at cdc.gov/nchs/nhis.htm).
Hispanics ranged from 73% in Cuban women to 83% in Puerto Rican women (Table 7). The prevalence of Pap testing among uninsured Hispanic women (64%) is higher than among uninsured NHW women (57%), perhaps because low-income minorities are more adept at accessing safety net and subsidized programs.153

Breast cancer screening

The ACS has recommended annual mammography beginning at age 40 years for women at average risk of breast cancer since 1997.154 (New guidelines are expected to be published in the fall of 2015.) Mammography prevalence among Hispanic women remains lower than among NHWs, despite a narrowing gap.155,156 In 2013, 62% of Hispanic women aged 40 years and older had undergone a mammogram within the past 2 years compared with 66% of NHWs (Table 7). Among Hispanic subgroups, Cuban women were the least likely to have had a mammogram within the past 2 years. Variations in screening prevalence may be related to differences in access to health care.157 Lower frequency of and longer intervals between mammograms, as well as lack of timely follow-up after an abnormal mammogram, are thought to contribute to the higher percentage of advanced-stage breast cancers detected among Hispanics compared with NHWs.158,159

CRC screening

Screening reduces both the incidence and mortality of CRC. The ACS recommends that screening begin at age 50 years for individuals at average risk of disease with either colonoscopy every 10 years, computed tomography colono-graphy every 5 years, high-sensitivity (greater than 50%) stool tests (either guaiac-based fecal occult blood test or fecal immunochemical test) annually, or flexible sigmoidoscopy every 5 years.160 Screening should begin before age 50 years for individuals at high or increased risk of the disease, which includes those with a family history of CRC or adenomatous polyps. In 2013, Hispanics aged 50 years and older were less likely than NHWs to report being current for CRC screening according to guidelines (45% vs 61%) (see Table 7 footnote for specific definition). The difference in screening prevalence is largely driven by the lower use of colonoscopy in Hispanics, because FOBT use is similar.161,162 Cubans and Dominicans are the least likely to have had a recent screening test for CRC. Screening uptake is especially low among uninsured Hispanics, among whom only 11% reported a recent test (Table 7).

Prostate cancer screening

Currently, routine screening for prostate cancer is not recommended for men at average risk. The ACS 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.163 Overall, 24% of Hispanic men aged 50 years and older underwent PSA testing within the past year compared with 37% of NHWs.164 Nationwide data on the use of shared decision-making for PSA testing among Hispanics is lacking, although it is likely suboptimal given the low use of informed decision-making overall, particularly among men with lower educational attainment.165

Lung cancer screening

In 2013, the ACS 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 aged 55 to 74 years who have at least a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.166 Data are limited concerning the use of low-dose computed tomography for lung cancer screening in community practice. However, a study of 2010 NHIS data indicated there was little absolute difference between Hispanics (0.8%) and NHWs (1.3%) among high-risk former and current smokers.167

Data Limitations and Future Challenges

Although the projected numbers of new cancer cases and deaths provide a reasonably accurate estimate of the current cancer burden among Hispanics in the US, these estimates should be interpreted with caution. First, they are model-based and may vary considerably over time for reasons other than changes in cancer occurrence, particularly for less common cancer sites. Second, methods are updated over time to take advantage of new statistical techniques and improved cancer surveillance. Therefore, we recommend the use of age-standardized or age-specific cancer death rates from the NCHS and cancer incidence rates from SEER or NAACCR for tracking changes in cancer occurrence over time.

Data regarding cancer incidence and mortality rates in Hispanics have only been available for the past 2 decades. Uniform coding of ethnicity in SEER registries began in 1992 and is based on medical records or through a match to a Spanish surname list. This method may be less accurate than self-reported ethnicity and result in undercounting Hispanics.168 The influence of undocumented immigration status on cancer incidence rates is likely minor because these individuals have a low cancer risk due to their young age and because census estimates attempt to account for this population. Mortality data for Hispanics should also be interpreted with caution because of potential inconsistencies in reporting ethnicity on death certificates, although classification has improved substantially over time.169 Although some states reported Hispanic origin on death certificates as early as 1979, a Hispanic origin item was not added to the US Standard Certificate of Death until 1989, and the revision was not adopted by every state until 1997. In addition, as mentioned earlier, cancer survival rates for Hispanics are artificially inflated compared with those for NHWs because...
of a higher likelihood of missing death data.\textsuperscript{30} Furthermore, although “Hispanic” is a term that encompasses an extremely heterogeneous population with varying lifestyle behaviors and cancer risks, conventionally reported Hispanic cancer data in the US are reported in aggregate, masking important differences between subpopulations. In addition, much of the data concerning risk factors and screening relied on self-reports, which are subject to inaccurate recall.

Conclusions

A large and increasing proportion of US residents are of Hispanic origin, among whom growth is now primarily driven by births as opposed to immigration. Hispanic descendants have higher cancer rates than first-generation immigrants, which may influence the future cancer burden. Efforts to further progress in cancer control must consider the dramatic differences in cancer risk within this heterogeneous population. Effective strategies for decreasing cancer rates among Hispanics include the use of culturally appropriate lay health advisors and patient navigators; targeted, community-based intervention programs to increase screening and vaccination rates and encourage healthy lifestyle behaviors; and further funding for subgroup- and site-specific research.

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