Cancer Statistics for Hispanics/Latinos, 2018

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Abstract: Cancer is the leading cause of death among Hispanics/Latinos, who represent the largest racial/ethnic minority group in the United States, accounting for 17.8% (57.5 million) of the total population in the continental United States and Hawaii in 2016. In addition, more than 3 million Hispanic Americans live in the US territory of Puerto Rico. Every 3 years, the American Cancer Society reports on cancer occurrence, risk factors, and screening for Hispanics in the United States based on data from the National Cancer Institute, the North American Association of Central Cancer Registries, and the Centers for Disease Control and Prevention. For the first time, contemporary incidence and mortality rates for Puerto Rico, which has a 99% Hispanic population, are also presented. An estimated 149,100 new cancer cases and 42,700 cancer deaths will occur among Hispanics in the continental United States and Hawaii in 2018. For all cancers combined, Hispanics have 25% lower incidence and 30% lower mortality compared with non-Hispanic whites, although rates of infection-related cancers, such as liver, are up to twice as high in Hispanics. However, these aggregated data mask substantial heterogeneity within the Hispanic population because of variable cancer risk, as exemplified by the substantial differences in the cancer burden between island Puerto Ricans and other US Hispanics. For example, during 2011 to 2015, prostate cancer incidence rates in Puerto Rico (146.6 per 100,000) were 60% higher than those in other US Hispanics combined (91.6 per 100,000) and 44% higher than those in non-Hispanic whites (101.7 per 100,000). Prostate cancer is also the leading cause of cancer death among men in Puerto Rico, accounting for nearly 1 in 6 cancer deaths during 2011-2015, whereas lung cancer is the leading cause of cancer death among other US Hispanic men combined. Variations in cancer risk are driven by differences in exposure to cancer-causing infectious agents and behavioral risk factors as well as the prevalence of screening. Strategies for reducing cancer risk in Hispanic populations include targeted, culturally appropriate interventions for increasing the uptake of preventive services and reducing cancer risk factor prevalence, as well as additional funding for Puerto Rico-specific and subgroup-specific cancer research and surveillance. CA: Cancer J Clin. 2018;68:425-445. © 2018 American Cancer Society.

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Introduction

Hispanics are the second largest racial/ethnic group in the United States after non-Hispanic whites (NHWs). The US Census Bureau estimated that approximately 57.5 million Hispanics lived in the continental United States and Hawaii in 2016, comprising 17.8% of the total population and more than one-third of the populations in some Southern and Western states (eg, California, Texas, and New Mexico).1,2 In addition, more than 3 million Hispanic US citizens live in Puerto Rico, a US territory where 98.9% of the population identifies as Hispanic. The term Hispanic is used to refer to persons of Mexican, Cuban, Puerto Rican, South or Central American, Dominican, or other Spanish descent. According to US Census Bureau estimates, the majority of Hispanics in the continental US
and Hispanic origin for these states was not available for one or more years between 1990 and 1996. All other mortality trends (1990-2016) exclude deaths from Louisiana, New Hampshire, and Oklahoma because information on Hispanic origin for these states was not available for one or more years between 1990 and 1996. All other mortality statistics for the United States combined were based on data from all 50 states and the District of Columbia.

All cancer cases were classified according to the International Classification of Diseases for Oncology. Causes of death were classified according to the International Classification of Diseases 9th and 10th revisions. Incidence and death rates are expressed per 100,000 population and were calculated using SEER*Stat software (version 8.3.5) based on population estimates from the US Census Bureau and age adjusted to the 2000 US standard population. Ten-year trends in incidence and mortality during 2006 through 2015 are based on the average annual percent change in rates using joinpoint regression analysis (Joinpoint version 4.6.0.0; National Cancer Institute, Rockville, Maryland). Trends were deemed increasing or decreasing when the slope of the fitted line segment was statistically different from zero (2-sided \(P\) value < .05).

**Puerto Rico Incidence and Mortality**

The Puerto Rico Central Cancer Registry has collected information on cancer cases in the territory since 1950 and joined the NPCR in 1997. Incidence data for Puerto Rico

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**Materials and Methods**

**Incidence and Mortality**

Cancer incidence data in the United States are collected and disseminated 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 population-based incidence and survival data, covering approximately 28% of the US population and 38% of US Hispanics in the most recent time period, and began coding Hispanic ethnicity in 1992. Twelve SEER registries were the source for incidence trends from 1992 through 2015 (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 (2013–2015) and 5-year cause-specific survival rates (2008–2014). Cause–specific survival is a net-survival measure that relies on specified cause of death instead of life tables, which are necessary for calculating relative survival and have historically been 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 derived SEER summary stage 2000 (2004 and later). The lifetime probability of developing cancer was calculated using the NCI’s DevCan software (version 6.7.6).

The North American Association of Central Cancer Registries (NAACCR) compiles and reports incidence data for 1995 forward from US cancer registries that participate in the SEER program and/or the NPCR and certifies registries according to data quality, completeness, and timeliness. Data that met the NAACCR’s highest quality certification standards were the source for 5-year average annual incidence rates (2011–2015), stage at diagnosis (2011–2015), and the 2018 new cancer case projections (2006–2015) for the United States combined.

Mortality data by Hispanic origin for the United States have been available since 1990 from the CDC’s National Center for Health Statistics. However, long-term mortality trends (1990–2016) exclude deaths from Louisiana, New Hampshire, and Oklahoma because information on Hispanic origin for these states was not available for one or more years between 1990 and 1996. All other mortality statistics for the United States combined were based on data from all 50 states and the District of Columbia.

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have historically been available through the CDC’s United States Cancer Statistics; however, the registry first achieved NAACCR gold certification for the most recent data submission year (2017), indicating the highest levels of data completeness, quality, and reliability. Puerto Rico mortality rates (2011-2015) for selected cancers herein were previously published in volume 3 of NAACCR’s *Cancer Incidence in North America.*

Puerto Rico cancer incidence and mortality rates are presented for all races and ethnicities combined; however, because the population is 98.9% Hispanic, rates are unlikely to be influenced by cases among non-Hispanics.

Projected Cancer Cases and Deaths in 2018

The most recent year for which cancer incidence and mortality data are available lags 2 to 4 years behind the current year because of the time required for data collection, compilation, and dissemination. Therefore, we projected the numbers of new cancer cases and deaths among Hispanics in the continental US and Hawaii in 2018 to provide an estimate of the contemporary cancer burden. First, the complete number of cases diagnosed each year from 2006 through 2015 was estimated by applying age-specific and sex-specific incidence rates, based on data from 46 states that met NAACCR’s high quality standards for all 10 years (covering 96% of the US Hispanic population), to the corresponding US Census Bureau’s population estimates. Estimated case counts were adjusted for delays in case reporting using age-specific, composite delay factors derived from the NAACCR 2017 data submission (personal communication, Don Green [Information Management Services on behalf of NAACCR] and Eric Feuer [NCI]). Then, case counts were projected to 2018 based on the average annual percent change from 2006 through 2015 generated by joinpoint regression modeling. 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 2002 through 2016. For the complete details of this methodology, please refer to Chen et al.

Risk Factors and Screening

Data on behavioral risk factors (cigarette smoking, excess body weight, physical inactivity, and alcohol consumption),

### Estimated New Cases*

|           | Males |     | Females |     |
|-----------|-------|-----|---------|-----|
| Prostate  | 13,900| 21% | Breast  | 24,000| 29% |
| Colon & rectum | 7,900 | 12% | Thyroid | 6,800 | 8%  |
| Lung & bronchus | 5,600 | 8%  | Uterine corpus | 6,700 | 8%  |
| Kidney & renal pelvis | 4,800 | 7%  | Colon & rectum | 6,500 | 8%  |
| Liver & intrahepatic bile duct | 4,500 | 7%  | Lung & bronchus | 5,000 | 6%  |
| Non-Hodgkin lymphoma | 3,900 | 6%  | Non-Hodgkin lymphoma | 3,500 | 4%  |
| Leukemia | 3,200 | 5%  | Kidney & renal pelvis | 3,200 | 4%  |
| Urinary bladder | 2,900 | 4%  | Leukemia | 2,500 | 3%  |
| Pancreas | 2,300 | 3%  | Ovary | 2,500 | 3%  |
| Stomach | 2,200 | 3%  | Uterine cervix | 2,400 | 3%  |
| All sites | 67,400 | 100% | All sites | 81,700 | 100% |

### Estimated Deaths

|           | Males |     | Females |     |
|-----------|-------|-----|---------|-----|
| Lung & bronchus | 3,500 | 16% | Breast | 3,200 | 16% |
| Liver & intrahepatic bile duct | 2,700 | 12% | Lung & bronchus | 2,600 | 13% |
| Colon & rectum | 2,400 | 11% | Colon & rectum | 1,800 | 9%  |
| Prostate | 2,000 | 9%  | Pancreas | 1,600 | 8%  |
| Pancreas | 1,700 | 8%  | Liver & intrahepatic bile duct | 1,300 | 6%  |
| Stomach | 1,100 | 5%  | Ovary | 1,100 | 5%  |
| Leukemia | 1,000 | 5%  | Uterine corpus | 1,000 | 5%  |
| Non-Hodgkin lymphoma | 1,000 | 4%  | Leukemia | 900 | 4%  |
| Kidney & renal pelvis | 900 | 4%  | Stomach | 800 | 4%  |
| Brain & other nervous system | 700 | 3%  | Non-Hodgkin lymphoma | 700 | 3%  |
| All sites | 22,300 | 100% | All sites | 20,400 | 100% |

*Estimates are rounded to the nearest 100 and exclude basal and squamous cell skin cancers and in situ carcinoma except urinary bladder. Estimates exclude Puerto Rico and other US territories. Rankings are based on modeled projections and may differ from the most recent observed data.
receipt of cancer screening, and vaccination coverage were obtained from national population-based surveys. All statistics for adults in the continental US and Hawaii were derived from the National Health Interview Survey (NHIS)\(^{22}\) with the exception of excess body weight, which was obtained from the National Health and Nutrition Examination Survey (NHANES).\(^{23}\) Risk factor and cancer screening information by Hispanic subgroup for adults is limited in NHIS and is available only for Mexicans. Human papillomavirus vaccination coverage among adolescents in the continental US and Hawaii was obtained from the National Immunization Survey for Teens.\(^{24}\) Previously published estimates from the Behavioral Risk Factor Surveillance System were used for risk factor and screening prevalence in Puerto Rico; these estimates are not directly comparable to NHIS or NHANES estimates. NHIS and NHANES were analyzed using SUDAAN (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**

The following sections present cancer incidence, survival, and mortality statistics for Hispanics in the continental US and Hawaii; data are presented separately for Puerto Rico.

**Overall Cancer Occurrence**

**Incidence**

In 2018, approximately 149,100 new cancer cases are expected to be diagnosed among Hispanics living in the continental United States and Hawaii (Figure 1). The most commonly diagnosed cancers among Hispanic men are prostate (21%), colorectal (12%), and lung and bronchus (lung) (8%) cancers, whereas the most commonly diagnosed cancers among Hispanic women are breast (29%), thyroid (8%), and uterine corpus (8%) cancers. The distribution of cancers in US Hispanics varies from that in the general population because of differences in lifestyle and environmental factors as well as the substantially younger age structure of the population. In 2016, the median age among Hispanics was 27 years compared with 42 years among NHWs.\(^ {2}\) Thyroid cancer has become the second most commonly diagnosed cancer in Hispanic women both because it has a younger median age at diagnosis compared with other cancers (age 50 years vs 65 years for all sites combined among women)\(^ {25}\) and because incidence rates increased rapidly over the past few decades (Figure 2).\(^ {7}\) Conversely, lung cancer accounts for a lower percentage of cases among Hispanic men and women (8% and 6%, respectively) than among men and women in the general US population (14% and 13%, respectively),\(^ {26}\) reflecting both the low smoking prevalence among Hispanics and the older median age at diagnosis for lung cancer (age 70 years).\(^ {5,25}\)

The lifetime probability of developing cancer among US Hispanic men and women is 36% and 35%, respectively, compared with 40% and 39%, respectively, among NHWs, although probabilities vary by cancer types (Table 1). Incidence rates among Hispanic men and women are 25% lower than those among NHWs overall.
(Table 2) and are lower for every age group except those aged 5 to 14 years, among whom rates are similar (data not shown). The cancer profile in US Hispanics resembles that in Latin America, because one-third of the population is foreign-born (Table 3) and thus appears to maintain much of the cancer risk of their country of origin. For example, as an aggregated group, Hispanics are less likely than NHWs to be diagnosed with the 4 most common cancers (prostate, breast, lung and bronchus, and colorectal) but have a higher risk of infection-related cancers (stomach, liver, and cervix) (Table 2), which, with the exception of liver cancer, occur more frequently in Latin American countries. However, incidence varies substantially by nativity and duration of residence, with rates in some groups approaching or surpassing those of NHWs, particularly among US-born Hispanics.

From 2006 through 2015, overall cancer incidence rates declined by 2.3% per year among Hispanic men, similar to trends in NHW men, but increased slightly by 0.4% annually among Hispanic women, compared with stable rates in NHW women (Figure 3 and Table 4). However, an analysis

### TABLE 1. Probability (%) of Developing Invasive Cancer During Selected Age Intervals by Race/Ethnicity and Sex, United States, 2013 Through 2015*

|                  | AGE <50 YEARS |                       | AGE ≥50 YEARS |                       | ALL AGES |                       |
|------------------|---------------|------------------------|---------------|------------------------|----------|------------------------|
|                  | HISPANIC (%)  | NH WHITE (%)           | HISPANIC (%)  | NH WHITE (%)           | HISPANIC | NH WHITE (%)           |
| **All cancer types** |               |                        |               |                        |          |                        |
| Male             | 2.6 (1 in 39) | 3.8 (1 in 26)          | 36.3 (1 in 3) | 40.3 (1 in 2)          | 36.1 (1 in 3) | 39.9 (1 in 3)          |
| Female           | 4.6 (1 in 22) | 6.2 (1 in 16)          | 32.3 (1 in 3) | 36.6 (1 in 3)          | 34.6 (1 in 3) | 39.2 (1 in 3)          |
| **Breast**       |               |                        |               |                        |          |                        |
| Female           | 1.5 (1 in 65) | 2.1 (1 in 48)          | 8.7 (1 in 12) | 11.8 (1 in 8)          | 9.9 (1 in 10) | 13.2 (1 in 8)          |
| **Colorectum**   |               |                        |               |                        |          |                        |
| Male             | 0.3 (1 in 372)| 0.4 (1 in 248)         | 4.5 (1 in 22) | 4.3 (1 in 23)          | 4.5 (1 in 22) | 4.3 (1 in 23)          |
| Female           | 0.3 (1 in 380)| 0.4 (1 in 270)         | 3.7 (1 in 27) | 3.8 (1 in 26)          | 3.9 (1 in 26) | 4.0 (1 in 25)          |
| **Kidney & renal pelvis** |           |                        |               |                        |          |                        |
| Male             | 0.2 (1 in 497)| 0.2 (1 in 410)         | 2.2 (1 in 45) | 2.1 (1 in 48)          | 2.3 (1 in 43) | 2.2 (1 in 46)          |
| Female           | 0.2 (1 in 628)| 0.2 (1 in 647)         | 1.3 (1 in 76) | 1.1 (1 in 91)          | 1.4 (1 in 70) | 1.2 (1 in 83)          |
| **Liver & intrahepatic bile duct** |          |                        |               |                        |          |                        |
| Male             | 0.1 (1 in 1,206)| <0.1 (1 in 2,089)     | 2.4 (1 in 42) | 1.2 (1 in 87)          | 2.3 (1 in 43) | 1.1 (1 in 89)          |
| Female           | <0.1 (1 in 3,037)| <0.1 (1 in 3,708)   | 1.2 (1 in 87) | 0.5 (1 in 215)         | 1.1 (1 in 87) | 0.5 (1 in 212)         |
| **Lung & bronchus** |              |                        |               |                        |          |                        |
| Male             | 0.1 (1 in 1,557)| 0.2 (1 in 615)         | 4.6 (1 in 22) | 7.4 (1 in 14)          | 4.4 (1 in 23) | 7.0 (1 in 14)          |
| Female           | 0.1 (1 in 1,454)| 0.2 (1 in 555)         | 3.5 (1 in 28) | 6.7 (1 in 15)          | 3.5 (1 in 29) | 6.5 (1 in 15)          |
| **Prostate**     |               |                        |               |                        |          |                        |
| Male             | 0.1 (1 in 772) | 0.2 (1 in 457)         | 10.9 (1 in 9) | 11.2 (1 in 9)          | 10.4 (1 in 10) | 10.6 (1 in 9)          |
| **Stomach**      |               |                        |               |                        |          |                        |
| Male             | 0.1 (1 in 1,074)| <0.1 (1 in 2,166)     | 1.6 (1 in 64) | 0.9 (1 in 117)         | 1.6 (1 in 64) | 0.8 (1 in 119)         |
| Female           | 0.1 (1 in 1,111)| <0.1 (1 in 3,176)     | 1.1 (1 in 89) | 0.4 (1 in 233)         | 1.2 (1 in 85) | 0.4 (1 in 227)         |
| **Thyroid**      |               |                        |               |                        |          |                        |
| Male             | 0.1 (1 in 768) | 0.2 (1 in 408)         | 0.4 (1 in 255)| 0.5 (1 in 190)         | 0.5 (1 in 200) | 0.7 (1 in 137)         |
| Female           | 0.7 (1 in 139)| 1.0 (1 in 104)         | 1.1 (1 in 90) | 1.1 (1 in 95)          | 1.8 (1 in 56) | 2.0 (1 in 51)          |
| **Uterine cervix** |              |                        |               |                        |          |                        |
| Female           | 0.3 (1 in 346)| 0.3 (1 in 353)         | 0.5 (1 in 185)| 0.3 (1 in 340)         | 0.8 (1 in 123) | 0.6 (1 in 177)         |
| Uterine corpus   |               |                        |               |                        |          |                        |
| Female           | 0.3 (1 in 316)| 0.3 (1 in 347)         | 2.3 (1 in 43) | 2.8 (1 in 36)          | 2.6 (1 in 39) | 3.0 (1 in 34)          |

NH indicates non-Hispanic.

**NOTE:** Percentages and "1 in" numbers may not be equivalent due to rounding. Data exclude Puerto Rico.

*For those who are free of cancer at the beginning of each age interval.

All sites exclude basal cell and squamous cell skin cancers and in situ cancers except urinary bladder.
based on more complete US population coverage indicated that rates among Hispanic women appear to have stabilized in recent years. Although incidence rates continue to be higher in Hispanic men than women, rates are converging (Figure 3). The male-to-female rate ratio has narrowed from 1.48 (95% confidence interval [95% CI], 1.42-1.54) in 1992 to 1.07 (95% CI, 1.04-1.10) in 2015.

Stage at diagnosis and survival
Hispanics are generally less likely than NHWs to be diagnosed with cancer at an early stage, with the largest disparities for melanoma and female breast cancer (Figure 4). Less access to high-quality care because of lower socioeconomic status contributes to this disparity, although some studies have shown that Hispanics are at higher risk of advanced-stage diagnosis even when socioeconomic status and health care access are similar. Surprisingly, however, 5-year survival among Hispanics is generally similar to that among NHWs except for melanoma, for which Hispanics, especially men, have reduced survival (78.9% [95% CI, 76.2%-81.4%] versus 87.8% [95% CI, 87.4%-88.1%]) (Figure 5). This so-called Hispanic paradox is partly because of incomplete death ascertainment, especially for more fatal cancers, caused in part by logistical challenges associated with case follow-up for reasons such

| TABLE 2. Cancer Incidence And Mortality Rates And Ratios Comparing Hispanics With Non-Hispanic Whites, United States, 2011 Through 2016 |
|---------------------------------------------------------------|
| **INCIDENCE, 2011 TO 2015**                                   |
|                                                               |
| **MALE**                                                     |
|                                                               |
| HISPANIC | NH WHITE | RATE RATIO† | HISPANIC | NH WHITE | RATE RATIO† | HISPANIC | NH WHITE | RATE RATIO† |
| All sites  | 377.6     | 505.5       | 0.75*   | 329.9     | 438.4       | 0.75*   | 138.2     | 197.3       | 0.70*   |
| Breast (female) | 19.7     | 10.3       | 1.91*   | 7.8       | 3.6        | 2.18*   | 13.3      | 8.3        | 1.60*   |
| Colorectum | 1.2       | 0.7        | 1.79*   | 2.5       | 1.1        | 2.31*   | 0.6       | 0.4        | 1.42*   |
| Gallbladder | 1          | 1          | 0.98*   | 1.0       | 1.0        | 1.00*   | 0.3       | 0.3        | 0.97    |
| Liver & intrahepatic bile duct | 24.6      | 24.6       | 0.90*   | 57.4      | 57.4       | 1.00*   | 2.5       | 2.5        | 1.00*   |
| Lung & bronchus | 39.2     | 74.3       | 0.53*   | 24.6      | 57.4       | 0.43*   | 25.3      | 54.1       | 0.47*   |
| Prostate | 91.6      | 101.7      | 0.90*   | 15.9      | 18.1       | 0.88*   | 4.0       | 1.7        | 2.41*   |
| Stomach | 12.5      | 7.8        | 1.61*   | 7.7       | 3.5        | 2.18*   | 0.3       | 0.3        | 0.97    |
| Testis | 4.7       | 6.8        | 0.69*   | 0.3       | 0.3        | 0.97    | 0.3       | 0.3        | 0.97    |
| Thyroid | 5.4       | 8.2        | 0.67*   | 20.6      | 23.0       | 0.90*   | 0.6       | 0.5        | 1.05    |
| Uterine cervix | 9.6       | 7.1        | 1.36*   | 9.6       | 7.1        | 1.36*   | 2.6       | 2.1        | 1.26*   |
| **FEMALE**                                                   |
|                                                               |
| HISPANIC | NH WHITE | RATE RATIO† | HISPANIC | NH WHITE | RATE RATIO† | HISPANIC | NH WHITE | RATE RATIO† |
| All sites  | 138.2     | 197.3       | 0.70*   | 96.4      | 141.8       | 0.68*   | 14.3      | 20.6       | 0.69*   |
| Breast (female) | 1     | 1          | 0.98*   | 1.0       | 1.0        | 1.00*   | 0.3       | 0.3        | 0.97    |
| Colorectum | 7.8       | 3.5        | 2.18*   | 7.8       | 3.5        | 2.18*   | 0.3       | 0.3        | 0.97    |
| Gallbladder | 1.1       | 1.1        | 1.00*   | 1.1       | 1.1        | 1.00*   | 0.3       | 0.3        | 0.97    |
| Liver & intrahepatic bile duct | 3.6       | 3.6        | 1.00*   | 3.6       | 3.6        | 1.00*   | 1.0       | 1.0        | 1.00*   |
| Lung & bronchus | 2.5      | 2.5        | 1.00*   | 2.5      | 2.5        | 1.00*   | 1.0       | 1.0        | 1.00*   |
| Prostate | 28.8      | 34.2       | 0.84*   | 28.8      | 34.2       | 0.84*   | 28.8      | 34.2       | 0.84*   |
| Stomach | 2.5       | 1.1        | 2.31*   | 2.5       | 1.1        | 2.31*   | 2.5       | 1.1        | 2.31*   |
| Testis | 1         | 1          | 1.00*   | 1         | 1          | 1.00*   | 1         | 1          | 1.00*   |
| Thyroid | 20.6      | 23.0       | 0.90*   | 20.6      | 23.0       | 0.90*   | 20.6      | 23.0       | 0.90*   |
| Uterine cervix | 9.6       | 7.1        | 1.36*   | 9.6       | 7.1        | 1.36*   | 2.6       | 2.1        | 1.26*   |

*NH indicates non-Hispanic. Rates are per 100,000 and age adjusted to the 2000 US standard population. Rates exclude Puerto Rico. *The difference between the rates for Hispanics and non-Hispanic whites is significant (P < .05). †Ratio is the unrounded Hispanic rate divided by the corresponding unrounded non-Hispanic white rate.

| TABLE 3. Socioeconomic Characteristics (%) by Race/Ethnicity and Hispanic Origin, United States, 2012 Through 2016 |
|---------------------------------------------------------------|
|                                                               |
| **HISPANIC**                                                  |
|                                                               |
|               | MEXICAN | PUERTO RICAN | CUBAN | CENTRAL AMERICAN | SOUTH AMERICAN | DOMINICAN | ALL |
| Foreign-born   | 34.8     | 32.7         | 1.6    | 56.9           | 62.4           | 54.7      | 3.9 |
| Income below federal poverty level | 23.5     | 24.6         | 25.4   | 18.7           | 14.2           | 26.8      | 10.6 |
| Speak English "not well" or "not at all"* | 25.4     | 25.4         | 12.8   | 33.5           | 21.5           | 30.8      | 11.3 |
| Less than high school diploma, adults aged ≥25 years | 34.4     | 39.8         | 22.1   | 20.5           | 14.5           | 31.2      | 8.0 |

* Among respondents ≥5 years who indicated that a language other than English was spoken at home. Respondents were asked to rank English-speaking ability as "not at all," "not well," "well," or "very well." Source: US Census Bureau, American Community Survey, Public Use Microdata File, 2012-2016.
as return migration after diagnosis ("salmon bias"). A selectively healthy immigrant population also may bias survival statistics for US Hispanics.36,37 Survival differences are also likely influenced to some extent by differences in age structure, as survival statistics herein are unadjusted for age.

**Mortality**

Cancer is the leading cause of death among Hispanics in the continental US and Hawaii, followed by heart disease, based on recorded vital statistics data for 2016 (Table 5). In 2018, an estimated 42,700 Hispanic men and women will die from cancer (Figure 1). Among men, the most common causes of cancer death are lung (16%), liver (12%), and colorectal (11%) cancers, whereas among women, the most common causes of cancer death are breast (16%), lung (13%), and colorectal (9%) cancers. Notably, lung cancer accounts for a

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### TABLE 4. FIXED INTERVAL TRENDS (AVERAGE ANNUAL PERCENT CHANGE) IN CANCER INCIDENCE AND DEATH RATES, UNITED STATES, 2006 THROUGH 2016

|                     | INCIDENCE, 2006 TO 2015 | MORTALITY, 2007 TO 2016 |
|---------------------|-------------------------|-------------------------|
|                     | HISPANIC | NH WHITE | HISPANIC | NH WHITE |
| All sites           |          |          |          |          |
| Male                | -2.3*    | -1.8*    | -1.6*    | -1.6*    |
| Female              | 0.4*     | 0.1      | -1.0*    | -1.3*    |
| Breast              |          |          |          |          |
| Female              | 0.4*     | 0.3      | -1.1*    | -1.8*    |
| Colon and rectum    |          |          |          |          |
| Male                | -2.3*    | -2.6*    | -1.6*    | -2.3*    |
| Female              | -1.7*    | -2.3*    | -2.3*    | -2.1*    |
| Gallbladder         |          |          |          |          |
| Male                | 0.1      | -0.4     | -2.3*    | -1.7*    |
| Female              | -1.8*    | -1.2*    | -2.7*    | -2.2*    |
| Liver and intrahepatic bile duct |          |          |          |          |
| Male                | 0.8      | 3.0*     | 1.5*     | 2.3*     |
| Female              | 2.8*     | 4.0*     | 1.2*     | 2.3*     |
| Lung and bronchus   |          |          |          |          |
| Male                | -2.0*    | -2.6*    | -3.5*    | -3.3*    |
| Female              | -0.3     | -1.4*    | -1.4*    | -2.3*    |
| Prostate            |          |          |          |          |
| Male                | -6.1*    | -5.7*    | -2.7*    | -2.1*    |
| Female              | -0.9*    | -1.2*    | -2.9*    | -2.9*    |
| Thyroid             |          |          |          |          |
| Male                | 3.9*     | 3.7*     | 0.8      | 1.4*     |
| Female              | 3.8*     | 3.2*     | 0.0      | 0.2*     |
| Stomach             |          |          |          |          |
| Male                | -2.0*    | -1.2*    | -2.9*    | -2.9*    |
| Female              | -0.9*    | -1.4*    | -1.8*    | -3.1*    |
| Uterine cervix†     |          |          |          |          |
| Male                | -4.0*    | -0.3     | -2.3*    | -0.1     |
| Female              | -4.0*    | -0.3     | -2.3*    | -0.1     |

NH indicates non-Hispanic.

Incidence trends are based on 1992-2015 delay-adjusted incidence rates from the oldest Surveillance, Epidemiology, and End Results (SEER) 12 registries. Mortality trends are based on 1990-2016 mortality rates and exclude data from Louisiana, New Hampshire, and Oklahoma.

NOTE: Incidence and mortality trends are not directly comparable due to differences in data years and population coverage. Rates exclude data from Puerto Rico.

*The average annual percent change was significantly different from zero (P < .05).

†Unadjusted for hysterectomy prevalence.
FIGURE 4. Stage Distribution for Selected Cancers in Hispanic and Non-Hispanic Whites, United States, 2011 to 2015.
Percentages may not total 100 because of rounding. NH indicates non-Hispanic. Data exclude cases diagnosed in Puerto Rico.

FIGURE 5. Five-Year Cause-Specific Survival Rates (%) by Ethnicity, 2008 to 2014.
Patients were diagnosed from 2008 through 2014, and all were followed through 2015.
NH indicates non-Hispanic. Data are based on the SEER 17 registry areas. *Liver includes the intrahepatic bile duct.
much lower proportion of cancer deaths among Hispanics than among the general population (14% of deaths versus about 25%, respectively), whereas liver cancer accounts for a much higher proportion, particularly among men (12% versus 6%, respectively).26

Overall cancer death rates are approximately 30% lower in Hispanics than in NHWs (Table 2). However, the rates in Hispanics aged younger than 30 years are the same as those in NHWs except for males aged 15 to 24 years, among whom rates in Hispanics are slightly higher (4.6 [95% CI, 4.4–4.9] vs 3.7 [95% CI, 3.6–3.9] per 100,000 population, respectively, during 2012-2016) (data not shown), which may reflect the lower survival in young Hispanic males for testicular cancer, which is the most commonly diagnosed cancer in this age group, and leukemia, which is more common in young Hispanics than in NHWs.12,38,39

There are also marked differences in cancer death rates between Hispanic subpopulations.40,41 For example, colorectal cancer (CRC) death rates among men in Florida are nearly twice as high in Cubans as in Mexicans (18.9 per 100,000 vs 10.2 per 100,000, respectively, during 2008-2012).42 Similarly, there is also substantial heterogeneity in cancer death rates by nativity. For example, cancer death rates in US-born Hispanic men living in Texas were 61% higher than those in foreign-born Hispanic men (201.4 per 100,000 vs 124.8 per 100,000, respectively, during 2008-2012) and were similar to those in NHW men (210.1 per 100,000 population).28

Cancer death rates among Hispanics peaked 4 years later than those among NHWs and, since the mid-1990s, have been decreasing slightly more rapidly in men than in women (Figure 3). Rates in Hispanic men and NHW women converged in the mid-2000s and have since remained similar. From 2007 through 2016, cancer death rates in Hispanics declined by 1.6% per year among men and by 1.0% per year among in women, consistent with the declines in NHWs (Table 4).

### 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 24,000 new cases and 3200 deaths expected in 2018. Both incidence and death rates are approximately 30% lower in Hispanics than in NHWs (Table 2), largely because of differences in detection practice (incidence only) and reproductive patterns and other hormonal factors that influence breast cancer risk.42 Both younger age at first birth and higher parity are

| HISPANIC | NH WHITE |
|----------|----------|
| RANK | NO. OF DEATHS | PERCENT TOTAL DEATHS | DEATH RATE* | RANK | NO. OF DEATHS | PERCENT TOTAL DEATHS | DEATH RATE* |
| Cancer | 1 | 39,263 | 21 | 110.8 | 2 | 466,467 | 22 | 160.7 |
| Heart diseases | 2 | 37,799 | 20 | 116.5 | 1 | 500,631 | 23 | 168.5 |
| Accidents (unintentional injuries) | 3 | 15,711 | 8 | 31.3 | 4 | 121,641 | 6 | 53.8 |
| Cerebrovascular diseases | 4 | 10,283 | 5 | 32.3 | 5 | 107,491 | 5 | 36.1 |
| Diabetes | 5 | 8,546 | 5 | 25.0 | 7 | 53,399 | 3 | 18.5 |
| Alzheimer’s disease | 6 | 6,833 | 4 | 24.4 | 6 | 97,779 | 5 | 31.8 |
| Chronic liver disease & cirrhosis | 7 | 6,141 | 3 | 14.7 | 12 | 29,432 | 1 | 11.0 |
| Chronic lower respiratory diseases | 8 | 5,287 | 3 | 17.3 | 3 | 135,268 | 6 | 46.0 |
| Nephritis, nephrotic syndrome, & nephrosis | 9 | 3,775 | 2 | 11.5 | 10 | 35,246 | 2 | 11.9 |
| Intentional self-harm (suicide) | 10 | 3,668 | 2 | 6.7 | 9 | 36,531 | 2 | 17.0 |
| All causes | 188,254 | 100 | 528.6 | 2,133,463 | 100 | 748.3 |

NH indicates non-Hispanic.

NOTE: Death rates are not directly comparable to those published in prior years due to updated population denominator data. Data exclude deaths from Puerto Rico.

*Rates are per 100,000 and age adjusted to the 2000 US standard population.
associated with lower breast cancer risk and are more common in Hispanic women, particularly among those who are foreign-born.\textsuperscript{43} For example, breast cancer mortality rates in foreign-born Mexican women living in California were 28% lower than those in their US-born counterparts (12.9 per 100,000 population vs 18.0 per 100,000 population, respectively, during 2008–2012).\textsuperscript{29} Similarly, an analysis of Florida vital statistics data indicated that, compared with other Hispanic subgroups, Puerto Rican and Cuban women had the highest breast cancer mortality rates, approaching those of NHW women, consistent with the lower parity in these groups.\textsuperscript{41}

Breast cancer incidence rates in Hispanic women have generally increased since at least 1992 (Figure 2); from 2006 to 2015, breast cancer incidence rates among Hispanic women generally increased on average by 0.4% annually, in contrast to a stable trend among NHW women. Increases during the 1990s are attributed to increased detection of preclinical disease because of the rapid uptake of mammography screening. In contrast to incidence trends, the breast cancer death rate declined from 1990 to 2016 by 29% in Hispanic women (from 19.6 per 100,000 population to 13.9 per 100,000 population) (Figure 6) and by 39% in NHW women (from 33.2 per 100,000 population to 20.1 per 100,000 population). From 2007 to 2016, death rates declined by 1.1% per year in Hispanic women and by 1.8% per year in NHW women (Table 4), reflecting improvements in early detection and treatment.\textsuperscript{44}

Hispanics are less likely than NHWs to be diagnosed with breast cancer at a localized stage (57% vs 65%) (Figure 4), likely because of lower mammography utilization (Table 6) and delayed follow-up after an abnormal mammogram.\textsuperscript{45,46} Research is conflicted about differences in breast cancer survival between Hispanic and NHW women. Recent analyses from the California Cancer Registry and the National Comprehensive Cancer Network Breast Cancer Outcomes Database indicated that, despite a larger proportion of advanced-stage, high-tumor grade, and aggressive molecular characteristics, Hispanic women have a lower risk of breast cancer–specific death than NHW women after controlling for sociodemographics, tumor characteristics, and treatment factors.\textsuperscript{47,48} However, multivariate analysis studies of SEER registry data report a borderline increased risk of breast cancer death for Hispanic women.\textsuperscript{34,49} The current 5-year survival rate (cases diagnosed during 2008–2014) based on SEER data are similar for Hispanic women (88%) and NHW women (89%) (Figure 5), although the gap is slightly greater among women aged younger than 50 years (88% in Hispanics vs 92% in NHWs).\textsuperscript{8}

**Colon and rectum**

In 2018, an estimated 14,400 Hispanic men and women will be diagnosed with CRC and 4200 will die from the disease (Figure 1). CRC incidence rates among Hispanics are approximately 7% to 16% lower than those among NHWs, and death rates are 13% to 26% lower (Table 2). However, the rates vary substantially between Hispanic subgroups and by nativity. For example, a study of Texas residents indicated that
CRC mortality rates in US-born Hispanics (24.1 per 100,000 men and 12.6 per 100,000 women during 2008–2012) were double those in foreign-born Hispanics (11.6 per 100,000 and 6.3 per 100,000 men and women, respectively) and approached or surpassed those in NHWs (18.1 per 100,000 and 12.6 per 100,000 men and women, respectively).28

The current rate of decline is similar in Hispanics and NHWs for incidence as well as mortality (approximately 2% per year) (Table 4). However, the decline in CRC incidence rates in the United States began later and initially was slower in Hispanics than in NHWs. As a result, the 32% lower risk of disease experienced by Hispanics in 1992 has narrowed substantially, especially among men.7 Trends vary by state; a recent analysis of California Cancer Registry and vital statistics data indicated that CRC incidence and mortality rates in the state are already converging among men as a result of stable or slowly declining rates among Hispanic men in contrast to larger declines among NHWs.50

The proportion of Hispanics diagnosed with CRC at a localized stage is similar to that in NHWs (Figure 4), despite lower CRC screening prevalence among Hispanics, particularly among the uninsured (Table 6). Overall survival is likewise similar (Figure 5) but may differ after adjusting for other factors, particularly by subsite (cause-specific survival by subsite is unavailable, because a large proportion of rectal cancer deaths are misclassified as deaths from colon cancer). For example, in 2 analyses of California Cancer Registry data, overall CRC-specific mortality among Hispanics was 7% to 11% lower than that among NHWs after adjusting for sociodemographic, treatment, and other clinical factors,47 but an earlier analysis found a 16% increased risk of death among Hispanics for rectal cancer.51

Lung and bronchus
In 2018, an estimated 10,600 Hispanic men and women will be diagnosed with lung cancer, and 6100 will die from

### TABLE 6. Cancer Screening Test Use (%), Adults, United States, 2015

|                  | HISPANIC | HISPANIC SUBGROUPS | NH WHITES |
|------------------|----------|--------------------|-----------|
|                  | UNINSURED (AGE ≤64 YEARS) | MEXICAN | PUERTO RICAN | CUBAN | CENTRAL/SOUTH AMERICAN | DOMINICAN | UNINSURED (AGE ≤64 YEARS) |
| **Cervical cancer screening (women aged 21-65 years)**<sup>*</sup> | 77 | 64 | 77 | 79 | 82 | 77 | 81 | 83 | 58 |
| Pap test within the past 3 years | 79 | 67 | 78 | 80 | 84 | 81 | 82 | 85 | 61 |
| **Breast cancer screening (women aged ≥40 years)** | 46 | 22 | 44 | 50 | 40 | 50 | 48 | 50 | 20 |
| Mammogram within the past year | 61 | 34 | 60 | 67 | 51 | 67 | 59 | 65 | 28 |

**Colorectal cancer screening**<sup>‡</sup>

|                  | HISPANIC | HISPANIC SUBGROUPS | NH WHITES |
|------------------|----------|--------------------|-----------|
|                  | UNINSURED (AGE ≥45 YEARS) | MEXICAN | PUERTO RICAN | CUBAN | CENTRAL/SOUTH AMERICAN | DOMINICAN | UNINSURED (AGE ≥45 YEARS) |
| Overall         | 42 | 13 | 38 | 53 | 48 | 42 | 37 | 56 | 25 |
| Ages ≥50 years  | 50 | 14 | 46 | 62 | 51 | 52 | 40 | 65 | 30 |
| Males           | 41 | § | 37 | 52 | 50 | 45 | § | 57 | 23 |
| Ages ≥50 years  | 50 | § | 45 | 65 | 48 | 55 | § | 66 | 30 |
| Females         | 43 | 9 | 40 | 53 | 46 | 41 | 35 | 56 | 28 |
| Ages ≥50 years  | 50 | 10 | 47 | 60 | 56 | 50 | § | 65 | 32 |

NH indicates non-Hispanic; Pap, Papanicolaou.

<sup>1</sup>Among women with intact uteri.
<sup>2</sup>Pap test in the past 3 years among women 21 to 65 years of age OR Pap test and human papillomavirus test within the past 5 years among women 30 to 64 years of age.
<sup>3</sup>Fecal occult blood test (FOBT) in past year, sigmoidoscopy in past 5 years, or colonoscopy in past 10 years. Utilization of computed tomography colonography (CTC) in the past 5 years was <2% and incorporating CTC into the overall screening estimates did not alter results and is not included in the above estimates.
<sup>4</sup>Estimate not provided due to instability.

NOTE: Estimates are age adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Estimates exclude Puerto Rico.

Source: National Health Interview Survey, 2015.
the disease (Figure 1). Among Hispanics, lung cancer is the leading cause of cancer death in men and the second leading cause of cancer death in women; however, compared with NHWs, lung cancer incidence and death rates are approximately 50% lower in men and 60% lower in women (Table 2), reflecting historic differences in smoking.

### TABLE 7. Current Cigarette Smoking, Electronic Cigarette Use, and Alcohol Consumption (%), Adults Aged 18 Years and Older, United States, 2017

|                        | HISPANIC | NH WHITE |                  |                  |                  |
|------------------------|----------|----------|------------------|------------------|------------------|
|                        | MALE | FEMALE | TOTAL | MALE | FEMALE | TOTAL |
| Cigarette smoking*     | 13   | 7      | 10    | 17   | 15     | 16    |
| Origin†                |       |        |       |      |        |       |
| Puerto Rican           | 19   | 16     | 17    | ---  | ---    | ---   |
| Mexican                | 15   | 7      | 11    | ---  | ---    | ---   |
| Cuban                  | 10   | 11     | 10    | ---  | ---    | ---   |
| Dominican              | **   | **     | 6     | ---  | ---    | ---   |
| Central/South American | 9    | 4      | 6     | ---  | ---    | ---   |
| Education (ages 25 years and older) |       |        |       |      |        |       |
| ≤12 years, no diploma  | 19   | 6      | 12    | 45   | 39     | 42    |
| GED                    | **   | 23     | 17    | 48   | 39     | 44    |
| HS diploma             | 11   | 8      | 9     | 26   | 24     | 25    |
| Some college           | 13   | 11     | 12    | 18   | 19     | 19    |
| College degree         | 9    | 4      | 6     | 7    | 5      | 6     |
| Poverty status‡        |       |        |       |      |        |       |
| Poor                   | 17   | 9      | 12    | 34   | 35     | 34    |
| Near poor              | 15   | 7      | 11    | 33   | 25     | 29    |
| Non poor               | 11   | 6      | 9     | 14   | 11     | 12    |
| Health insurance status (ages 18 to 64 years) |       |        |       |      |        |       |
| Uninsured              | 16   | 7      | 12    | 39   | 35     | 37    |
| Insured                | 12   | 8      | 10    | 17   | 15     | 16    |
| Immigration status§    |       |        |       |      |        |       |
| US-born (including territories) | 15 | 11   | 13    | 17   | 15     | 16    |
| Foreign-born           | 11   | 4      | 8     | 16   | 6      | 11    |
| E-cigarette use¶       | 2    | **     | 2     | 4    | 3      | 4     |
| Alcohol consumption#   | 66   | 50     | 58    | 75   | 72     | 73    |
| Light                  | 32   | 26     | 29    | 33   | 38     | 35    |
| Moderate               | 19   | 5      | 12    | 28   | 12     | 20    |
| Heavy                  | 4    | 2      | 3     | 6    | 7      | 6     |
| Binge                  | 31   | 15     | 23    | 36   | 27     | 31    |

GED indicates General Educational Development high school equivalency; HS, high school; NH, Non-Hispanic.
*Ever smoked 100 cigarettes in lifetime and smoking every day or some days at time of survey.
†Estimates based on 2016 and 2017 National Health Interview Survey data combined.
‡Poor: <99% of poverty threshold. Near poor: 100% to ≤199% of poverty threshold. Non poor: ≥200% of poverty threshold.
§US-born includes those born in a US territory.
¶Using e-cigarettes every day or some days at time of survey.
#Current consumption: ≥12 drinks in lifetime and ≥1 drink in past year. Light: ≥12 drinks in lifetime and ≤3 drinks/week in past year. Moderate: ≥12 drinks in lifetime and (male) 3-14 drinks/week in past year or (female) 3-7 drinks/week in past year. Heavy: ≥12 drinks in lifetime and (male) >14 drinks/week in past year or (female) >7 drinks/week in past year. Binge: current drinker and (male) ≥5 or (female) ≥4 drinks on at least one day in the past year.
**Estimate not provided due to instability.

NOTE: Estimates are age adjusted to the 2000 US standard population. Estimates in this report may differ from earlier reports due to revised weights issues for the National Health Interview Survey. Data exclude Puerto Rico.
Source: National Health Interview Surveys, 2016 and 2017.
Approximately 80% of all lung cancer deaths in the United States are caused by cigarette smoking among all races combined, and smoking prevalence is nearly 40% lower in Hispanics than in NHWs, with substantial variation by sex, subgroup, and nativity but surprisingly less heterogeneity by poverty status (compared to NHWs) (Table 7). Heterogeneity in lung cancer rates within the Hispanic population reflects these diverse smoking patterns. For example, in a study of Florida vital statistics data, the lung cancer death rate in Cuban men (49.4 per 100,000 during 2008-2012) was almost double that in Mexican men (26.2 per 100,000), because Cubans historically have been more likely to smoke and to be heavy smokers. Overall, Hispanic smokers are more likely to be light smokers (≤10 cigarettes per day) and intermittent smokers (nondaily smokers, regardless of cigarettes per day) than NHWs. However, it is unclear whether Hispanics have lower lung cancer risk compared with NHWs after adjusting for smoking history, particularly at lower levels of smoking. A previous analysis reported lower risk of lung cancer among low-level smokers (≤10 cigarettes per day) in Hispanics compared with NHWs. However, a recent analysis of a large female cohort indicated that the lower risk in Hispanics compared with NHWs at similar levels of smoking was largely attenuated by fully adjusting for socioeconomic and clinical factors.

Although SEER data indicate that declines in incidence rates in Hispanic women have leveled off in the most recent time period, an analysis of national cancer registry data reported that incidence rates among Hispanic women declined by approximately 1% per year from 2010 to 2014. Because of larger declines among men, lung cancer incidence rates in young Hispanic and non-Hispanic white women born since the mid-1960s exceed those of men. Lung cancer death rates among Hispanics have been declining for 2 decades in men, but only since 2003 in women (Figure 6), similar to trends in NHWs. From 2007 through 2016, lung cancer death rates decreased by 3.5% per year in Hispanic men and by 1.4% per year in Hispanic women (Table 4).

Hispanic patients are more likely than NHW patients to be diagnosed at a distant stage of lung cancer (54% vs 51%) (Figure 4), although stage-specific survival rates are similar. For example, the 5-year survival for regional stage disease is 34.0% (95% CI, 31.8%-36.1%) in Hispanic patients compared with 32.6% (95% CI, 32.1%-33.2%) in NHW patients. 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.

Prostate
In 2018, there will be about 13,900 new cases of prostate cancer in Hispanic men and 2000 deaths from the disease (Figure 1). Incidence rates in the United States range widely by race/ethnicity and are highest in non-Hispanic blacks (179.2 per 100,000 during 2011-2015) and lowest in Asians and Pacific Islanders (56.0 per 100,000); rates in Hispanics (91.6 per 100,000) are most similar to those in NHWs (101.7 per 100,000) (Table 2). It is believed that the substantial heterogeneity in prostate cancer incidence rates by country of origin largely reflects differences in disease detection through screening with the prostate-specific antigen (PSA) test, given that well-established risk factors are limited to age and African ancestry.

Prostate cancer incidence and death rates are decreasing rapidly for men in all racial and ethnic groups. In Hispanic men, incidence and death rates have dropped by 42% and 49%, respectively, since the mid-1990s (Figures 2 and 6). In the most recent decade of available data, incidence and death rates fell annually by 6.1% and 2.7%, respectively, similar to declines among NHWs (Table 4). Declines in incidence rates have accelerated in recent years in both groups, likely reflecting US Preventive Services Task Force recommendations against the routine use of the PSA test for average-risk men aged 75 and older in 2008 and for all men in 2012.

Most prostate cancers are diagnosed at an early stage. Hispanic men are somewhat less likely than NHW men to be diagnosed with localized stage disease (71% vs 74%) (Figure 4), 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. The 5-year survival rate for all stages combined is 93% in Hispanic men and 94% in NHW men (Figure 5).

Cancer Sites With Higher Rates for Hispanics
Liver and intrahepatic bile duct
In 2018, an estimated 6500 Hispanic men and women will be diagnosed with liver cancer, and 4000 will die from the disease. The burden of liver cancer in the United States is particularly high among racial and ethnic minority groups, and incidence rates in Hispanics are double those in NHWs (Table 2). Notably, the risk of liver cancer in US-born Hispanics is double that in immigrants, especially among men; this is in contrast to Asian/Pacific Islanders, among whom rates are higher in the foreign-born. For example, liver cancer death rates in US-born Mexican men residing in California were nearly double those of foreign-born Mexican men in the state (21.6 per 100,000 vs 11.8 per 100,000 during 2008-2012). The cause for this pattern is unclear but may reflect greater acculturation and a higher prevalence of risk factors for liver cancer, such as hepatitis C virus (HCV) infection, higher alcohol use, obesity, and type 2 diabetes, among those who are US-born.
Trends in liver cancer mortality mirror those for incidence because of the high fatality rate (Figures 2 and 6). Patterns of liver cancer occurrence in Hispanics have been 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 for men have doubled in both Hispanics and NHWs but have begun to level off in Hispanic men, which may reflect an influx of immigrants with lower risk or a maturation of the liver cancer burden associated with HCV infection in baby boomers (those born between 1945 and 1965). From 2006 through 2015, incidence rates for Hispanics increased by 2.8% per year in women but were stable in men (Table 4). The long-term increase in the United States has been attributed primarily to the hepatitis C virus infection epidemic, which began in the 1960s and peaked in the late 1980s. Although the overall prevalence of HCV appears to be similar between NHWs and Hispanics, one study indicated that Puerto Ricans had a substantially higher prevalence of chronic HCV infection than other Hispanic subgroups.

The rise in obesity and type 2 diabetes likely also has contributed to liver cancer trends in more recent years. Although obesity prevalence has begun to level off in NHWs in the past decade, it has continued to increase among Mexicans, particularly men (Figure 7). Among all Hispanic adults aged 20 years and older combined, 51% of women and 43% of men were obese in 2015 and 2016, compared with 38% of both NHW men and women. In addition, Hispanics are twice as likely as NHWs to report being diagnosed with type 2 diabetes and are 50% more likely to die from the disease, although occurrence varies substantially by subpopulation. Notably, diabetes was the second leading cause of death in Mexico in 2015.

Five-year survival for liver cancer is approximately 20% for both Hispanics and NHWs (Figure 5). Even for the 43% of Hispanic patients who are diagnosed with localized disease (Figure 4), 5-year survival is only 34% compared to 37% in NHWs.

**Stomach (gastric cancer)**

An estimated 3900 Hispanic men and women will be diagnosed with gastric cancer in 2018, and 1900 will die from the disease. Like liver cancer, gastric cancer rates in Hispanics are similar to those in Asians/Pacific Islanders, blacks, and American Indians/Alaska natives and are about double those in NHWs (Table 2). There is also variation among Hispanic subgroups, with death rates in Central/South Americans more than 2-fold those in Cubans.

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. More than 90% of gastric cancers are adenocarcinomas classified as proximal (cardia) or distal (noncardia) based on tumor site. The ethnic disparity in gastric cancer is driven wholly by noncardia tumors, for which the incidence rate is 6.0 per 100,000 in Hispanics compared with 2.1 per 100,000 in NHWs; the rate for cardia tumors is slightly lower in Hispanics (1.5 per 100,000) than in NHWs (2.3 per 100,000). Chronic infection with *Helicobacter pylori* (*H. pylori*) is the strongest risk factor for noncardia gastric cancer but is inversely associated with cardia tumors, for which risk factors include obesity and chronic gastroesophageal reflux disease. According to population-based NHANES estimates, the *H. pylori* infection prevalence 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. South America has the second highest *H. pylori* prevalence worldwide after Africa.

Stomach cancer incidence and death rates have been declining among Hispanics residing in the United States since at least the early 1990s (Figure 6). Reasons for the decline are complex and not well understood but are thought to be caused in part by declining *H. pylori* prevalence as a result of improved hygiene and advances in food preservation (eg,
Cent birth cohorts have been slower among Hispanics compared with NHWs, likely because of immigration. The pace of the decline in stomach cancer rates also has been more rapid historically in NHWs than in Hispanics but has accelerated in recent years among Hispanics, particularly men: from 2007 through 2016, death rates for stomach cancer declined by approximately 2% per year in Hispanic women compared with 3% per year in NHWs and Hispanic men (Table 4).

Hispanic patients are less likely to be diagnosed with localized stage disease than NHWs (24% vs 28%), for which survival is approximately 70% for both groups. The 5-year survival for noncardia tumors is higher for NHWs (39.0% [95% CI, 37.8%-40.3%]) than for Hispanics (34.2% [95% CI, 32.5%-35.9%]), whereas the rate for cardia tumors is more similar (25.4% [95% CI, 24.2%-26.6%] vs 22.7% [95% CI, 19.6%-26.0%], respectively).

**Uterine cervix**

In 2018, an estimated 2400 Hispanic women will be diagnosed with cervical cancer (Figure 1), and 600 will die from the disease. Hispanic and non-Hispanic black women have the highest incidence of cervical cancer in the United States, with rates in Hispanics 36% higher than those in NHW women (Table 2). The variation in rates between Hispanic subgroups in part may reflect differences in background rates in immigrant countries of origin, which vary up to 3-fold across Central and South America, as well as differences in access to and uptake of cervical cancer screening (Table 6).

Between 1992 and 2015, incidence rates for cervical cancer declined by more than one-half in Hispanic women (from 21.1 per 100,000 to 8.2 per 100,000) and by 33% in NHW women (from 8.8 per 100,000 to 5.9 per 100,000), whereas death rates declined by greater than 30% from 1990 to 2016 in both groups (Figures 2 and 6). These declines are largely because of uptake of the Papanicolaou (Pap) test for cervical cancer screening. During the most recent 10 years of available data, both incidence and mortality continued to decline rapidly in Hispanic women but began to stabilize in NHW women (Table 4). However, an analysis of national cancer registry data with more complete population coverage suggests declines in incidence also may be leveling off among Hispanic women.

According to NAACCR data, Hispanic women are about as likely as NHW women to be diagnosed with local stage disease (42% vs 44%, respectively), despite a lower prevalence of cervical cancer screening (79% vs 85%, respectively) (Table 6). In addition, overall 5-year survival for cervical cancer is slightly higher for Hispanics (72%) than for NHWs (70%) (Figure 5), although, when confined to women aged younger than 50 years, Hispanic women have slightly lower 5-year survival (77% vs 80%).

The available 9-valent human papillomavirus (HPV) vaccine has the potential to avert nearly 90% of all cancers caused by HPV. In 2016, HPV vaccine initiation was substantially higher in Hispanic girls and boys aged 13 to 17 years (71% and 68%, respectively) than in NHWs (60% and 50%). Similarly, the percentage of Hispanic adolescents who had completed the vaccination series was higher than among NHWs for both girls (55% vs 46%, respectively) and boys (46% vs 35%, respectively).

**Gallbladder**

Gallbladder cancer is one of the few cancers that occur more often in women than in men. In 2018, an estimated 1000 Hispanic women will be diagnosed with gallbladder cancer. Hispanic women in the United States have the second highest incidence and mortality rates after American Indian/Alaska Native women. The incidence rate in Hispanic women (2.5 per 100,000) is double that of Hispanic men (1.2 per 100,000) and NHW women (1.1 per 100,000) and triple that of NHW men (0.7 per 100,000) (Table 2). There is limited information on gallbladder cancer by Hispanic subgroup in the United States, largely because of the disease’s rarity and low survival. Globally, the disease burden has a unique distribution, with the highest occurrence by far in Chile, where rates in women are more than 3 times higher than those in any other country. Rates are also high in Mexico and in some South American countries (eg, Uruguay, Argentina, and Colombia), although they are similar to those in the United States for most of Central America and Cuba.

Reasons for the higher risk among women, and among Hispanic women in particular, are not well understood. The strongest known risk factor for gallbladder cancer is chronic gallstones (cholelithiasis); however, only a small percentage (range, 1%-3%) of those with the condition develop cancer, and the presence of stones is neither sufficient nor necessary for the development of malignancy. Some risk factors for cholesterol gallstones, which are more prevalent and more strongly linked to gallbladder cancer than other gallstone types, are more common in Hispanics than non-Hispanics, including excess body weight, physical inactivity, and higher parity. In addition, older age, exogenous estrogen use, and certain hereditary factors that affect cholesterol secretion in the bile also increase cholesterol gallstone risk. Hormonal factors that influence the risk of gallstone disease may contribute to higher gallbladder cancer rates among women. Gallbladder cancer risk also is increased through chronic cholecystitis (inflammation), which may be due to multiple causes, including gallstones, primary sclerosing cholangitis, and possibly certain infections.
Gallbladder cancer incidence and mortality trends are similar because of the high fatality rate. Over the past decade, sex-specific patterns were similar in NHWs and Hispanics, with incidence declining by approximately 1% to 2% per year in women and remaining stable in men, whereas death rates declined by approximately 2% to 3% per year in all groups (Table 4).

Gallbladder cancer typically does not present symptoms until it is advanced, resulting in a late stage at diagnosis and a poor prognosis. Five-year survival, which is similar by sex, is 23% among Hispanics and 20% among NHWs. Approximately 1 in 10 patients are diagnosed at a localized stage, for which 5-year survival is approximately 64% among Hispanics.

**Childhood leukemia**

Leukemia incidence in Hispanics is 31% lower than in NHWs among adults (those aged 20 years), but about 20% higher in children (those aged birth-14 years) for both acute lymphocytic leukemia (ALL) and acute myeloid leukemia (AML), the 2 major pediatric subtypes. Reasons for the higher rates in Hispanic children are not understood, but may result from variation in collective genetic and environmental exposures. Hispanic children also have inferior leukemia survival, which appears to stem from a higher likelihood of relapse, perhaps because of differences in drug efficacy that might be overcome with a more individualized chemotherapy regimen. The 5-year survival rate for ALL is 90% in Hispanic children and 95% in NHW children, whereas survival for AML is 68% and 74%, respectively. Incidence trends from 1992 through 2015 are generally similar for Hispanics and NHWs based on SEER data; from 2006 to 2015, rates for ALL increased slightly, by approximately 1% per year, but were stable for AML. Death rates (2007-2016) for ALL declined by 3.6% per year in both groups, but for AML declined by approximately 1% per year in both groups, but for AML declined by approximately 1% per year in NHWs and were stable in Hispanics.

### TABLE 8. Cancer Incidence and Mortality Rates Comparing Puerto Rico to the Continental US and Hawaii, 2011-2015

| INCIDENCE | PUERTO RICO | NHWs | OTHER US HISPANICS | MORTALITY RATES |
|-----------|-------------|------|-------------------|-----------------|
|           | RATE        | RATE | RATE RATIO<sup>†</sup> | RATE          | RATE RATIO<sup>†</sup> | RATE | RATE RATIO<sup>†</sup> | RATE | RATE RATIO<sup>†</sup> |
| All sites |             |      |                   |                |                  |      |                   |      |                  |
| Male      | 412.8       | 505.5| 0.82*             | 377.6         | 1.09*            | 152.7| 200.6             | 140.6|
| Female    | 325.7       | 438.4| 0.74*             | 329.9         | 0.98*            | 94.6 | 143.6             | 97.1 |
| Breast (female) | 93.2  | 130.1| 0.72*             | 93.0          | 1.00             | 17.9 | 20.8              | 14.3 |
| Colon & rectum |      |      |                   |                |                  |      |                   |      |                  |
| Male      | 52.5        | 44.6 | 1.18*             | 41.7          | 1.26*            | 19.7 | 16.9              | 14.7 |
| Female    | 35.1        | 34.2 | 1.03              | 28.8          | 1.22*            | 12.2 | 12.1              | 9.0  |
| Liver & intrahepatic bile duct |      |      |                   |                |                  |      |                   |      |                  |
| Male      | 12.8        | 10.3 | 1.24*             | 19.7          | 0.65*            | 9.2  | 8.2               | 13.1 |
| Female    | 4.2         | 3.6  | 1.17*             | 7.8           | 0.54*            | 3.6  | 3.4               | 5.9  |
| Lung & bronchus |     |      |                   |                |                  |      |                   |      |                  |
| Male      | 24.7        | 74.3 | 0.33*             | 39.2          | 0.63*            | 19.8 | 56.3              | 26.5 |
| Female    | 12.3        | 57.4 | 0.21*             | 24.6          | 0.50*            | 8.9  | 39.0              | 13.3 |
| Prostate  | 146.6       | 101.7| 1.44*             | 91.6          | 1.60*            | 26.7 | 18.2              | 16.2 |
| Stomach   |             |      |                   |                |                  |      |                   |      |                  |
| Male      | 10.6        | 7.8  | 1.37*             | 12.5          | 0.85*            | 6.8  | 3.4               | 6.7  |
| Female    | 6.3         | 3.5  | 1.80*             | 7.7           | 0.82*            | 3.5  | 1.7               | 4.0  |
| Thyroid   |             |      |                   |                |                  |      |                   |      |                  |
| Male      | 10.7        | 8.2  | 1.32*             | 5.4           | 1.97*            | 0.4  | 0.5               | 0.5  |
| Female    | 42.2        | 23.0 | 1.84*             | 20.6          | 2.05*            | 0.3  | 0.4               | 0.7  |
| Uterine cervix | 12.9 | 7.1  | 1.82*             | 9.6           | 1.34*            | 2.5  | 2.1               | 2.6  |

NHW indicates non-Hispanic white in the continental US and Hawaii. Puerto Rico incidence data include all races/ethnicities combined. Rates are age adjusted to the 2000 US standard population.

<sup>†</sup>The difference between the rates is significant (P < .05).

<sup>∥</sup>Ratio is the unrounded rate in the population in the continental US and Hawaii divided by the corresponding unrounded Puerto Rico rate.

<sup>‡</sup>Mortality rates for Puerto Rico were derived from Copeland et al.; mortality rate ratios are unavailable.
Cancer Occurrence in Puerto Rico

High-quality incidence data from the Puerto Rico Central Cancer Registry provide a new and important opportunity to assess the current disease burden and identify opportunities for cancer control in the territory. Puerto Rico residents are especially vulnerable to cancer disparities because of socioeconomic inequalities; in 2016, approximately 44% of the population lived in poverty,85 compared with 19% of other US Hispanics and 9% of NHWs.86 Although the percentage of individuals in Puerto Rico without health insurance was comparatively low in 2015 (6%), nearly one-half (49%) of the population was insured by Medicaid, compared with 20% in the continental United States (all races/ethnicities combined).87 In addition, previous studies have suggested that cancer trends in Puerto Rico differ strikingly from those of the continental United States and Hawaii.19,88‒91

For example, one study reported increasing CRC incidence and mortality rates among men in Puerto Rico in the early 2000s, when trends among all races/ethnicities combined were rapidly declining in the continental United States.89 According to newly available data for the most recent 5 years (2011-2015), CRC and prostate cancer incidence rates among men in Puerto Rico were 18% and 44% higher, respectively, than those among NHWs (Table 8), in contrast to lower rates among other US Hispanics combined. Conversely, lung cancer incidence rates were substantially lower among island Puerto Ricans compared to both NHWs and other US Hispanics. However, Puerto Rico incidence rates for infection-related cancers surpassed those in NHWs but were lower than those in other US Hispanics, with the exception of cervical cancer. Rates for gallbladder cancer and childhood leukemia, which also disproportionately burden US Hispanics, were similar between island Puerto Ricans and NHWs (data not shown).

Mortality differences generally mirrored those for incidence, with higher rates among men in Puerto Rico compared with those in NHWs for cancers of the prostate (26.7 per 100,000 vs 18.2 per 100,000 during 2011-2015, respectively) and colorectum (19.7 per 100,000 vs 16.9 per 100,000, respectively).13,20 Notably, despite having breast cancer incidence rates similar to those in other US Hispanics, women in Puerto Rico had 26% higher breast cancer mortality rates during 2011 through 2015 (17.9 per 100,000 vs 14.2 per 100,000, respectively) (Table 8). Breast cancer is the leading cause of death among women in Puerto Rico, accounting for 18% of cancer deaths during 2011-2015, whereas prostate cancer is the leading cancer cause of death among men in Puerto Rico (17% of cancer deaths). This is in contrast to the continental US and Hawaii, in which lung cancer is the leading cause of cancer death in each state except among women in Utah (all races combined).13 It is important to note that cancer occurrence in island Puerto Ricans and Puerto Ricans living in the continental US and Hawaii also differ substantially, although analyses using contemporary data are needed.55,92 In addition, contemporary differences between Puerto Rico and other US Hispanics should be compared to earlier studies with caution due to the rapidly changing composition of the Hispanic population in the continental US and Hawaii.

Cancer patterns in Puerto Rico likely reflect underlying cancer risk factors as well as differences in health care access and infrastructure; however, data on risk factors and cancer screening prevalence are limited to data from the Behavioral Risk Factor Surveillance System (BRFSS), which are not directly comparable to estimates from NHIS and NHANES previously presented herein. A recent analysis of BRFSS data for all races/ethnicities combined found lower current cigarette smoking prevalence in Puerto Rico (11%) than in any US state except Utah (9%) in 2015,94 which may reflect the effects of high cigarette excise taxes in the territory. However, prevalence is similar or higher for other risk factors associated with urbanization, such as obesity (30% for both Puerto Rico and median US), physical inactivity (47% versus 26% US median), and diabetes (27% versus 16%).93 Additionally, colorectal cancer screening and cervical cancer screening are substantially lower in Puerto Rico compared with the US overall.94 Conversely, higher use of the PSA test in the territory compared to the continental US and Hawaii overall has been reported.90 While this likely influences prostate cancer incidence rates in the territory, it does not explain the higher mortality rates.

There are also several challenges for Puerto Rico’s health care system that likely impact cancer care, including an ongoing government debt crisis, outmigration of healthcare personnel, and federal disenfranchisement. For example, Puerto Rico is largely excluded from major national legislation, such as most components of the Patient Protection and Affordable Care Act.95,96 These issues are complex and interwoven; in 2015, the disparity in federal support for health care resources in Puerto Rico compared with states was estimated to account for approximately $25 billion of Puerto Rico’s $70 billion debt.96 In particular, federal assistance to the Medicaid program in Puerto Rico functions as an annual block grant, with the federal government matching up to a set maximum; in contrast, state programs have no annual cap on the amount to which the federal matching assistance percentage applies. However, Puerto Rico does receive assistance through some federal cancer control programs, such as the CDC’s National Breast and Cervical Cancer Early Detection Program, which provides low-income and uninsured women access to breast and cervical cancer screening.
Cancer control efforts in Puerto Rico in the aftermath of Hurricane Maria, which caused severe devastation to the territory in September 2017, require careful monitoring and evaluation to determine the resulting effects on cancer outcomes.\(^9\) Cancer care and surveillance are greatly hampered by population displacement and disruptions in infrastructure resulting from natural disasters, as was the case in the Gulf states after Hurricane Katrina.\(^9\) However, these conditions have been exacerbated in Puerto Rico: more than one-third of the territory’s hospitals still lacked electricity nearly 3 months post-Maria.\(^9\) Recent analyses have estimated that one-third of the greater than 1000 excess deaths that occurred after the hurricane through December 2017 were because of delayed or interrupted health care.\(^9,10\)

Data Limitations and Future Challenges

Although “Hispanic” is a term that encompasses an extremely heterogeneous population with various lifestyle behaviors and cancer risks, conventionally reported Hispanic cancer data in the United States are reported in aggregate, masking important differences between subpopulations. In addition, data on cancer in Hispanics have only been available for the past 3 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 and thus may be less accurate than self-reported ethnicity and result in undercounting Hispanics.\(^10\) In addition, although classification has improved substantially over time, mortality data for Hispanics also should be interpreted with caution because of potential inconsistencies in reporting ethnicity on death certificates.\(^10\) Although some states reported Hispanic origin on death certificates as early as 1979, an Hispanic origin item was not added to the US Standard Death Certificate until 1989, and the revision was not adopted by every state until 1997. The influence of undocumented immigration status on cancer incidence and mortality rates is likely minor, as these individuals have a low cancer risk because of their young age and because census estimates attempt to account for this population. Finally, although the projected numbers of new cancer cases and deaths provide a reasonably accurate estimate of the current cancer burden in the United States, they cannot be used to track trends over time because they are model based; instead, we recommend the use of age-standardized or age-specific cancer death rates from the National Center for Health Statistics and cancer incidence rates from SEER or NAACCR.

Conclusions

Although cancer risk in US Hispanics overall is generally low compared with other groups, rates among Hispanic descendants approach or surpass those in NHWs, which will result in a growing cancer burden given that the majority of Hispanic population growth is driven by birth rather than immigration. Furthermore, newly available cancer incidence rates for Puerto Rico highlight a concerning burden of CRC and prostate cancer in addition to a higher occurrence of infection-related cancers, especially given ongoing health care infrastructure challenges that have been exacerbated by the recent hurricane. Efforts to further progress in cancer control among Hispanics in the US, including Puerto Rico, must consider the substantial 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 Puerto Rico–specific and subgroup-specific cancer research and surveillance.

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