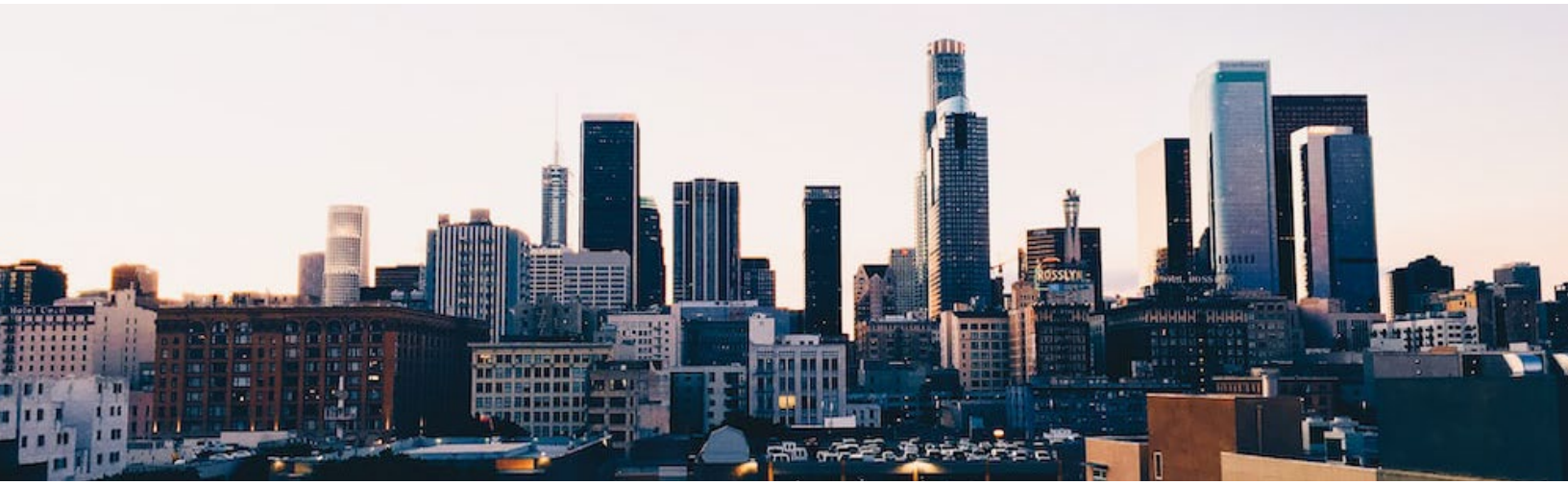
# CANCER IN LOS ANGELES COUNTY:

## *HUMAN PAPILLOMAVIRUS (HPV)-ASSOCIATED CANCERS 2000-2019*



LOS ANGELES COUNTY Cancer Surveillance Program

USC Norris Comprehensive Cancer Center
Keck Medicine of USC

Keck School of Medicine of USC

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## HUMAN PAPILLOMAVIRUS (HPV)-ASSOCIATED CANCERS 2000-2019

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**CSP website: https://csp.usc.edu**

**Cancer data access portal for Los Angeles County + all California: https://explorer.ccrcal.org/**

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As the most populous county in the United States (U.S.), with more than 10 million racially and ethnically diverse residents, Los Angeles County is an ideal place for cancer research. The vast disparities in cancer risk and outcomes among different population groups provide an important opportunity to more deeply examine cancer trends in order to inform community and geographically specific cancer control and prevention strategies. It was for this very reason a group of visionary faculty researchers at the University of Southern California Medical School (now the Keck School of Medicine) established the Los Angeles Cancer Surveillance Program (CSP).

For the past 50 years, the CSP has become a leader on the national and international stages for cancer surveillance and cancer epidemiological research with multitudes of contributions to the field. The CSP cancer data and its diverse demographics are a gold mine of information for not only scientific research, teaching and training the next generation of public health professionals, but also for serving community needs and building academic and community partnerships.

The CSP is a valued member and strong partner of the Norris Comprehensive Cancer Center whose aim is to make cancer a disease of the past, for which the CSP data plays a significant role. Likewise, the CSP leverages the expertise of Cancer Center scientists to ensure data are well used to achieve cancer prevention and control. The CSP also partners with the Keck School of Medicine, the University of Southern California, and the larger communities beyond. CSP informational reports like this one underscore the CSP's commitment to serving its local communities for the ultimate goal of improving cancer prevention, detection, treatment, and survival.

This report was prepared by the following researchers: Jennifer Tsui, PhD, MPH, Associate Professor, USC Department of Population and Public Health Sciences; Kalpana Dave, MPH, Doctoral Student, USC Department of Population and Public Health Sciences Doctoral Student; Kai-Ya Tsai, MSPH, CSP Analyst, USC Department of Population and Public Health Sciences; Laura K. Thompson, MPH, CSP Analyst, USC Department of Population and Public Health Sciences; Bibiana Martinez, MPH, Doctoral Student, USC Department of Population and Public Health Sciences; Lourdes Baezconde-Garbanati, PhD, MPH, Professor, USC Department of Population and Public Health Sciences and USC Norris Comprehensive Cancer Center Associate Director for Community Outreach and Engagement; Myles Cockburn, PhD, CSP Scientific Director and Professor, USC Department of Population and Public Health Sciences; Amie E. Hwang, PhD, Assistant Professor, USC Department of Population and Public Health Sciences; Lihua Liu, PhD, CSP Director and Associate Professor, USC Department of Population and Public Health Sciences.

HPV-associated cancers are declining in aggregate in the U.S. However, inequities in access to screening, treatment, and outcomes of these highly preventable cancers still exist in the United States. Examining the patterns and trends in incidence and mortality of HPV-associated cancers at the local level is critical for developing effective, targeted approaches for prevention.

Using 2000-2019 CSP data we examined the burden of HPV-associated cancers, defined by anatomic site of cervical cancer (CC), oropharyngeal cancer (OPC), and vagina, vulva, penis, anus combined, across race/ethnicity (with disaggregated ethnic subgroups for Asian/Pacific Islanders and Hispanics/Latinos), socioeconomic status (SES), and disease stage.

A total of 20,868 individuals were diagnosed with HPV-associated cancers from 2000-2019 in Los Angeles County. Among these patients, 44% were Non-Hispanic White (NHW), 34% were Hispanic, 10% were Non-Hispanic Black (NHB), and 10% were Asian/Pacific Islander (API). A higher proportion of cases were identified among low-SES (46% vs. 36%) and non-U.S. born (59% vs. 35%) relative to high-SES and U.S.-born patients, respectively. CC incidence rates declined over time ($p < 0.01$) and racial/ethnic disparities in incidence narrowed. Incidence among Hispanic women remained highest relative to other groups (age-adjusted incidence rate per 100,000: 11.6, 95% CI: 11.2-11.9) and increased between 2013-2019. The burden of regional-stage CC differed by ethnicity among Hispanic and API women, with higher proportions observed among Mexican (40.1%), Filipino (38.3%), and Korean women (40.3%). CC mortality rates were higher among NHB (rate ratio (RR): 4.0; 95% CI: 3.6-4.4) and Hispanic women (RR: 3.7; 95% CI: 3.5-3.9) compared to NHW women. While OPC burden was highest among NHWs overall, emerging racial/ethnic disparities were observed by sex: NHB women had higher risk (RR: 3.0; 95% CI: 2.0-4.0) compared to NHW females, and for NHB males (RR: 1.5; 95% CI: 1.3-2.0) compared to NHW males.

The CSP is the population-based cancer registry for Los Angeles County. It identifies and obtains information on all new cancer diagnoses made in the County. The CSP was organized in 1970 and operates within the administrative structure of the Keck School of Medicine and the Norris Comprehensive Cancer Center of the University of Southern California. In 1987, it became the regional registry for Los Angeles County for the then new California Cancer Registry. The CSP is one of three such regional registries collectively providing statewide cancer surveillance. In 1992, the CSP joined the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) program. This consortium of 16 population-based SEER registries provides the federal government with ongoing surveillance of cancer incidence and survival in the U.S. To date, the CSP database contains more than 1.7 million records, and about 47,000 incident cancers are added annually. The CSP is one of the most productive cancer registries in the world in terms of scientific contributions toward understanding the demographic patterns and the causes of specific cancers. The CSP data have contributed to more than 13,000 publications in scientific journals. The registry supports a large ongoing body of research funded mainly by the U.S. National Cancer Institute, other cancer research organizations, and the State of California.

The collection of cancer incidence data used in this study was supported by the California Department of Public Health pursuant to California Health and Safety Code Section 103885; the National Cancer Institute's Surveillance, Epidemiology and End Results Program under contract HHSN261201800015I awarded to the University of Southern California; and Centers for Disease Control and Prevention's (CDC) National Program of Cancer Registries, under cooperative agreement 5NU58DP006344. The ideas and opinions expressed herein are those of the authors and do not necessarily reflect the opinions of the State of California, Department of Public Health, the National Cancer Institute, and the Centers for Disease Control and Prevention or their Contractors and Subcontractors. Development of this monograph was supported in part by the Population Research Core of the USC Norris Comprehensive Cancer Center (5P30CA014089).

This work would not be possible without the work and dedication of CSP field technicians, other CSP staff members, and cancer registries across Los Angeles County and beyond.

## FREQUENCY AND DISTRIBUTION

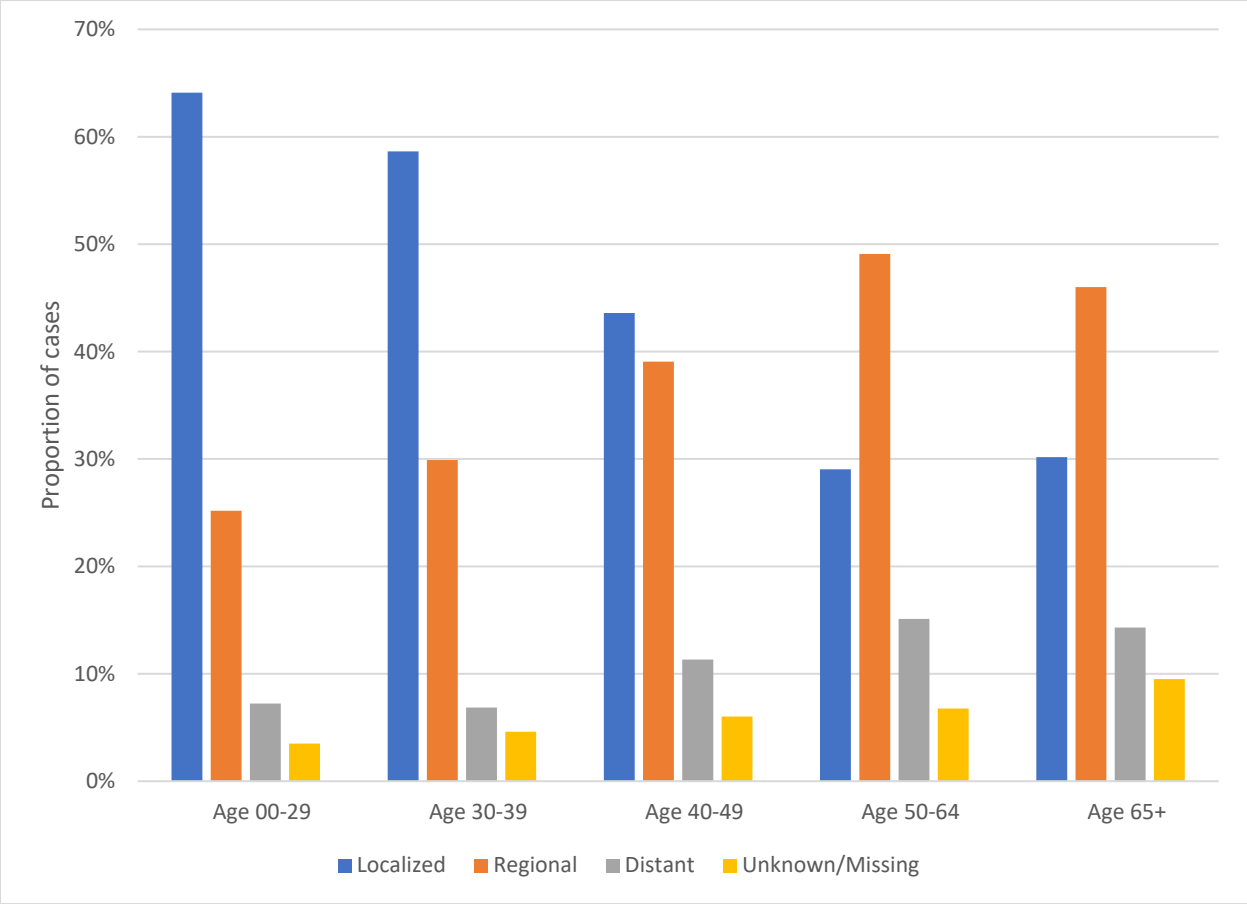
**Table 1.1.** Frequency and Distribution of Overall HPV-Associated Cancers by Sex, Age, Race/Ethnicity, Nativity, Socioeconomic Status, and Disease Stage, Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **Age (years)** | | | | | | |
| 0-29 | 24 | 0 | 405 | 3 | 429 | 2 |
| 30-39 | 171 | 2 | 2,043 | 15 | 2,214 | 11 |
| 40-49 | 905 | 13 | 2,848 | 20 | 3,753 | 18 |
| 50-64 | 3,141 | 45 | 4,292 | 31 | 7,433 | 36 |
| 65+ | 2,706 | 39 | 4,333 | 31 | 7,039 | 34 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 4,180 | 60 | 5,083 | 37 | 9,263 | 44 |
| Non-Hispanic Black | 830 | 12 | 1,338 | 10 | 2,168 | 10 |
| Hispanic | 1,453 | 21 | 5,643 | 41 | 7,096 | 34 |
| Asian/Pacific Islander | 381 | 5 | 1,659 | 12 | 2,040 | 10 |
| Other[$] | 103 | 1 | 198 | 1 | 301 | 1 |
| **Asian/Pacific Islander (API) Ethnicity** | | | | | | |
| Chinese | 91 | 24 | 400 | 24 | 491 | 24 |
| Japanese | 47 | 12 | 150 | 9 | 197 | 10 |
| Filipino | 77 | 20 | 427 | 26 | 504 | 25 |
| Korean | 71 | 19 | 283 | 17 | 354 | 17 |
| Vietnamese | 28 | 7 | 131 | 8 | 159 | 8 |
| Other API Groups* | 66 | 17 | 4,590 | 15 | 4,656 | 16 |
| **Hispanic Ethnicity** | | | | | | |
| Mexican | 521 | 36 | 2,156 | 38 | 2,677 | 38 |
| South or Central American | 170 | 12 | 1,255 | 22 | 1,425 | 20 |
| Other Hispanic Groups[#] | 766 | 53 | 2,249 | 40 | 3,015 | 42 |
| **Nativity: Hispanic** | | | | | | |
| Foreign-Born | 689 | 47 | 3,524 | 62 | 4,213 | 59 |
| U.S.-Born | 699 | 48 | 1,818 | 32 | 2,517 | 35 |
| **Socioeconomic Status** | | | | | | |
| Highest | 1,538 | 22 | 1,946 | 14 | 3,484 | 17 |
| Upper-Middle | 1,545 | 22 | 2,411 | 17 | 3,956 | 19 |
| Middle | 1,352 | 19 | 2,454 | 18 | 3,806 | 18 |
| Lower-Middle | 1,288 | 19 | 3,116 | 22 | 4,404 | 21 |
| Lowest | 1,224 | 18 | 3,994 | 29 | 5,218 | 25 |
| **Disease Stage** | | | | | | |
| Localized | 1,470 | 21 | 6,022 | 43 | 7,492 | 36 |
| Regional | 3,937 | 57 | 5,189 | 37 | 9,126 | 44 |
| Distant | 993 | 14 | 1,747 | 13 | 2,740 | 13 |
| Unknown | 547 | 8 | 963 | 7 | 1,510 | 7 |

[$]: Included American Indian and Other/Unknown/Missing groups.
*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).
[#]: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

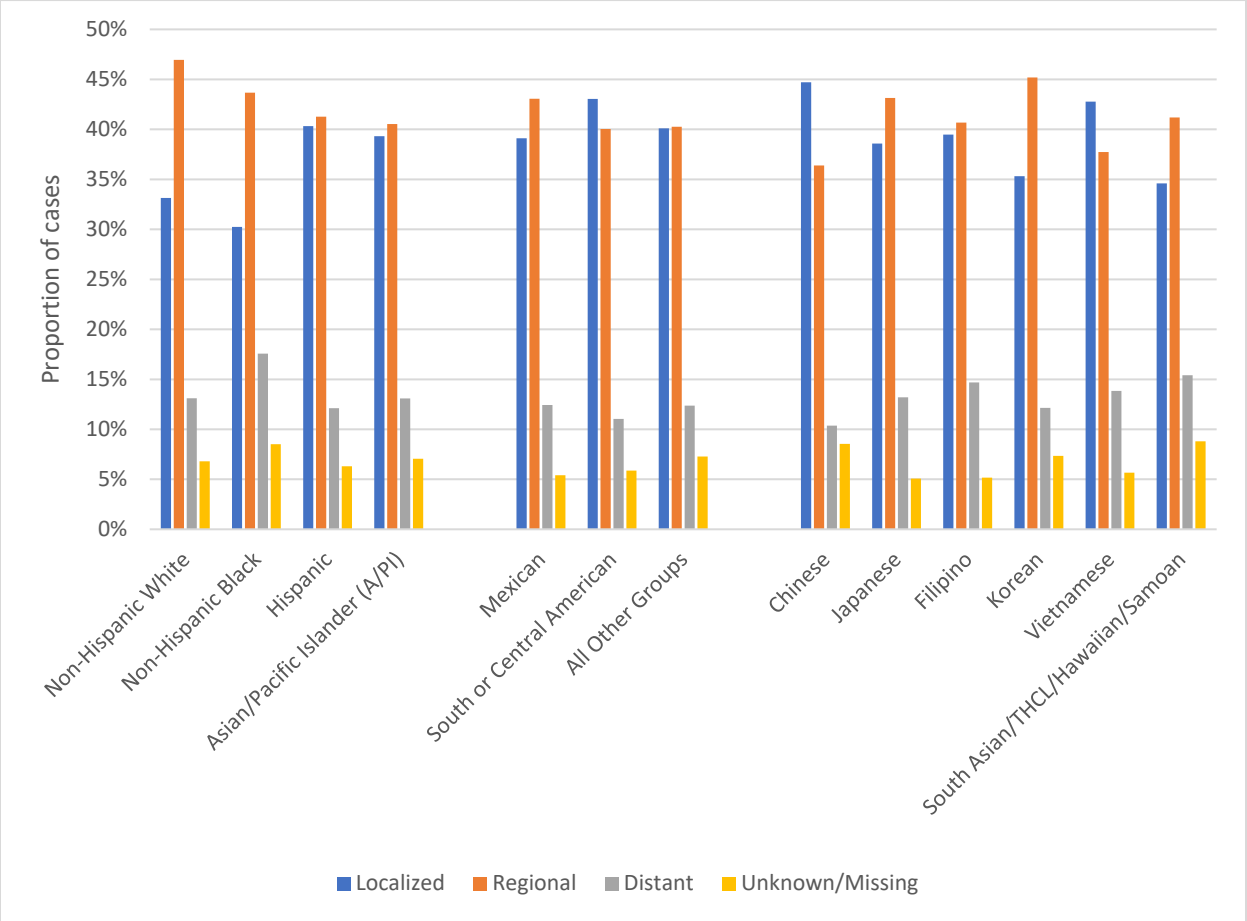
- A total of 20,868 individuals were diagnosed with cancer of the cervix, oropharynx, vagina, vulva, penis, or anus (HPV-associated cancer sites) from 2000-2019 in Los Angeles County.
- 69% of the patients were 50 years of age or older at diagnosis.
- 67% of patients were female.
- 55% of the patients were from Non-Hispanic Black, Hispanic, Asian/Pacific Islander, or other race and ethnic groups.
- A higher proportion of cases were identified among low-SES (46% vs. 36%).
- Overall, only 36% patients were diagnosed at early/localized stage.

**Figure 1.1a.** Disease Stage Distribution of Overall HPV-Associated Cancers by Age, Los Angeles County, 2000-2019.



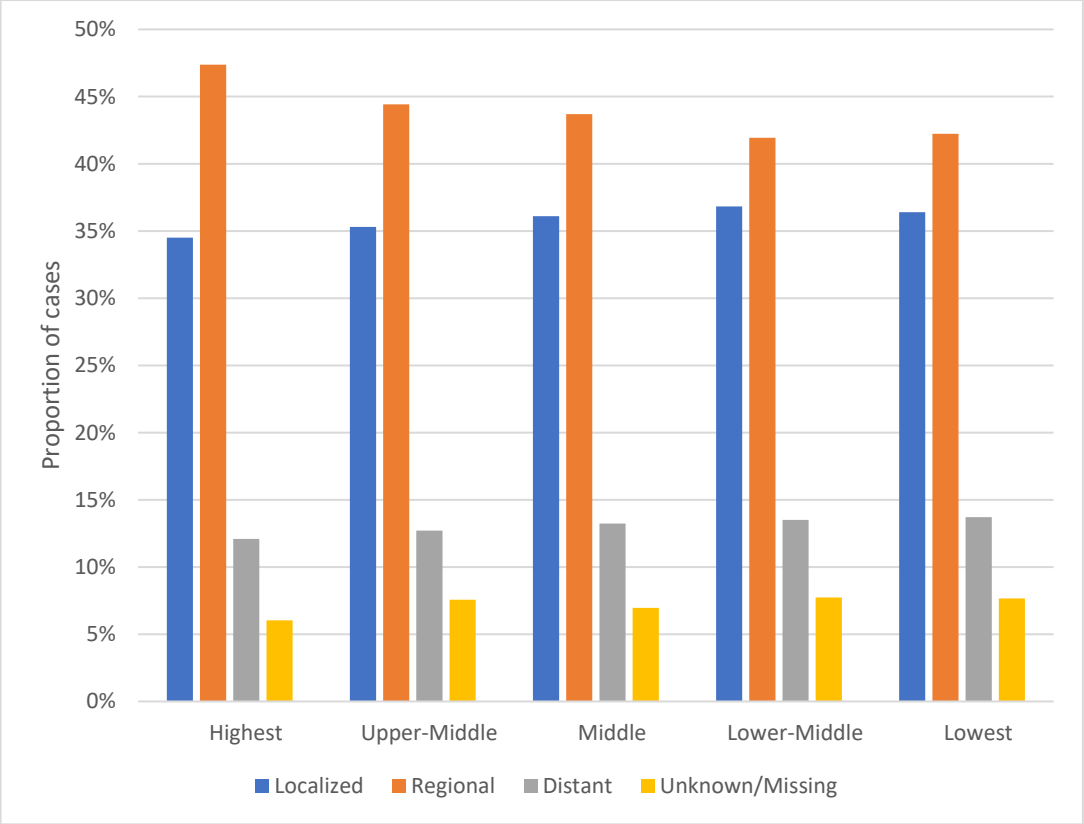

- Distant disease was more common among older patients and localized disease is more common among younger patients.

**Figure 1.1b.** Disease Stage Distribution of Overall HPV-Associated Cancers by Race/Ethnicity, Los Angeles County, 2000-2019.



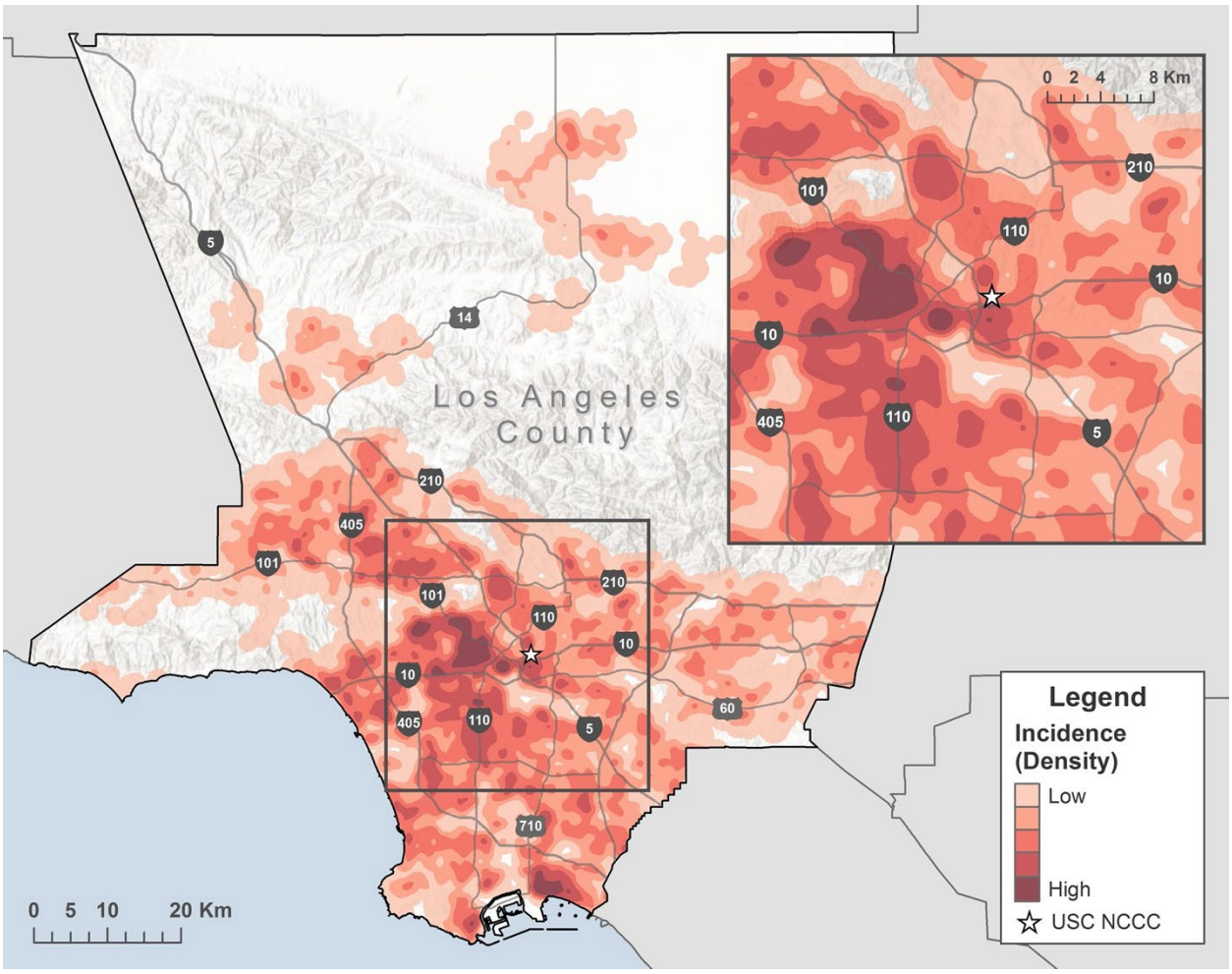

- Non-Hispanic Blacks had the highest proportion of distant disease (17.6%), while Chinese Americans have the lowest (10.4%).
- Overall Hispanic and APIs had higher proportion of localized disease at diagnosis (around 40%) than Non-Hispanic Whites (around 30%).

**Figure 1.1c.** Disease Stage Distribution of Overall HPV-Associated Cancers by Socioeconomic Status, Los Angeles County, 2000-2019.




- Patients of higher socioeconomic status were diagnosed with regional diseases more frequently.
- Patients of lower SES did not seem to have clear disadvantage in terms of disease stage at diagnosis, which is likely attributable to the targeted cervical cancer screening programs among the minority populations.

**Figure 1.1d.** Spatial Distribution of Overall HPV-Associated Cancer Incidence, Males and Females, Los Angeles County, 2000-2018.




Footnote/Metadata: Cancer data came from the California Cancer Registry (2000-2018), Sites: Cervical, Vaginal, Vulvar, Penile, Anal, oropharyngeal. Density distribution is based on latitude/longitude of patient address at diagnosis. Areas with sparse data have been suppressed. Additional details regarding case selection can be found in Data and Technical Notes on page 49. County boundaries were available from the US Census TIGER/Line Shapefiles (2010).

- The highest density of HPV-associated cancers was found in the neighborhoods northwest of downtown Los Angeles, downtown Los Angeles, and Long Beach.

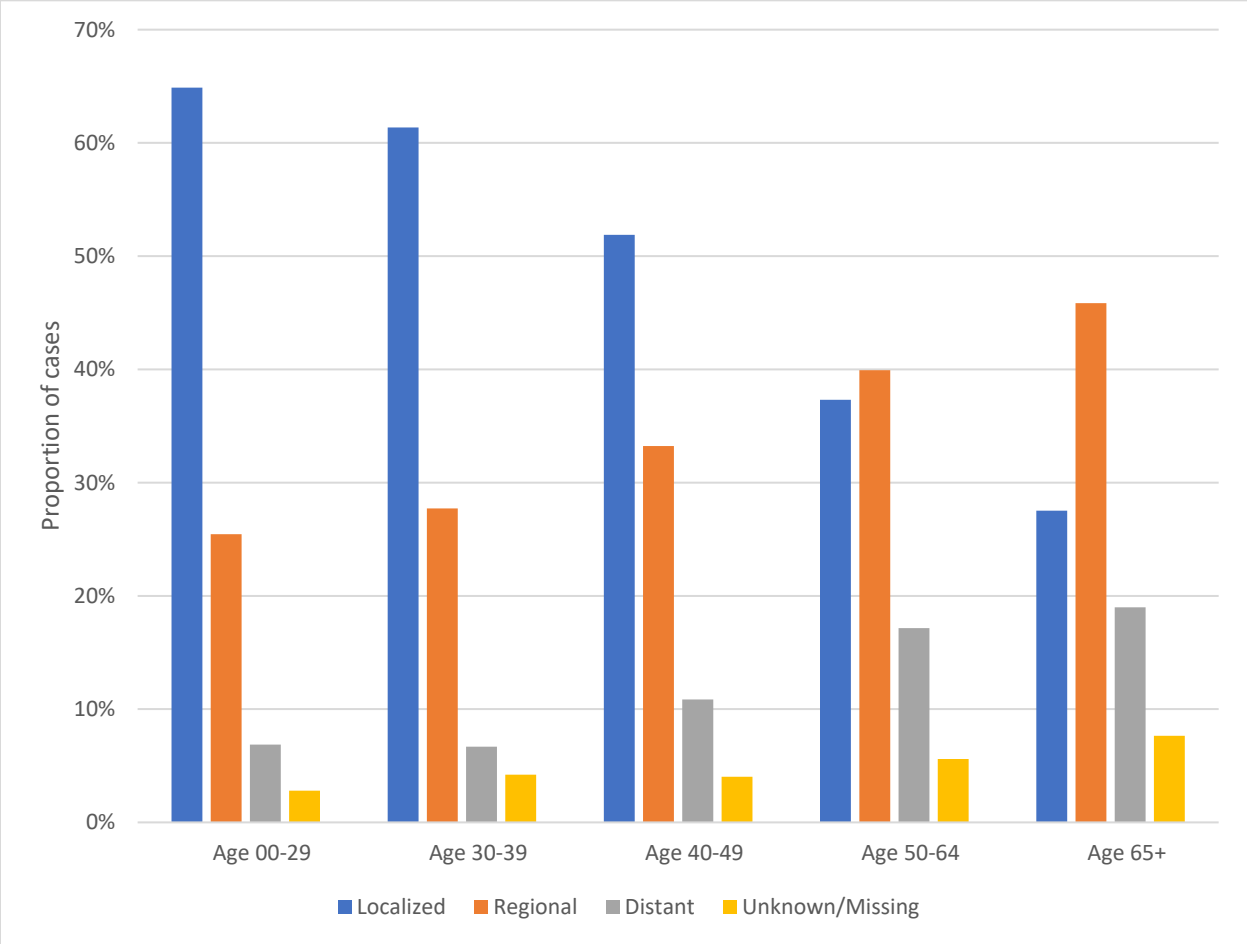
**Table 1.2.** Frequency and Distribution of Cervical Cancer by Sex, Age, Race/Ethnicity, Nativity, Socioeconomic Status, and Disease Stage (Females only), Los Angeles County, 2000-2019.

| | Female | |
|---|---|---|
| | **N** | **%** |
| **Age (years)** | | |
| 0-29 | 393 | 4 |
| 30-39 | 1,941 | 21 |
| 40-49 | 2,385 | 26 |
| 50-64 | 2,604 | 29 |
| 65+ | 1,779 | 20 |
| **Race/Ethnicity** | | |
| Non-Hispanic White | 2,277 | 25 |
| Non-Hispanic Black | 799 | 9 |
| Hispanic | 4,506 | 50 |
| Asian/Pacific Islander | 1,402 | 15 |
| Other[$] | 118 | 1 |
| **Asian/Pacific Islander Ethnicity** | | |
| Chinese | 332 | 24 |
| Japanese | 107 | 8 |
| Filipino | 388 | 28 |
| Korean | 243 | 17 |
| Vietnamese | 116 | 8 |
| Other Asian Groups* | 4,539 | 14 |
| **Hispanic Ethnicity** | | |
| Mexican | 1,834 | 41 |
| South or Central American | 1,005 | 22 |
| All Other Groups[#] | 1,680 | 37 |
| **Nativity: Hispanic** | | |
| Foreign-Born | 2,862 | 63 |
| U.S.-Born | 1,380 | 31 |
| **Socioeconomic Status** | | |
| Highest | 956 | 11 |
| Upper-Middle | 1,348 | 15 |
| Middle | 1,493 | 16 |
| Lower-Middle | 2,213 | 24 |
| Lowest | 3,092 | 34 |
| **Disease Stage** | | |
| Localized | 4,146 | 46 |
| Regional | 3,286 | 36 |
| Distant | 1,201 | 13 |
| Unknown | 469 | 5 |

[$]: Included American Indian and Other/Unknown/Missing groups.
*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).
[#]: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

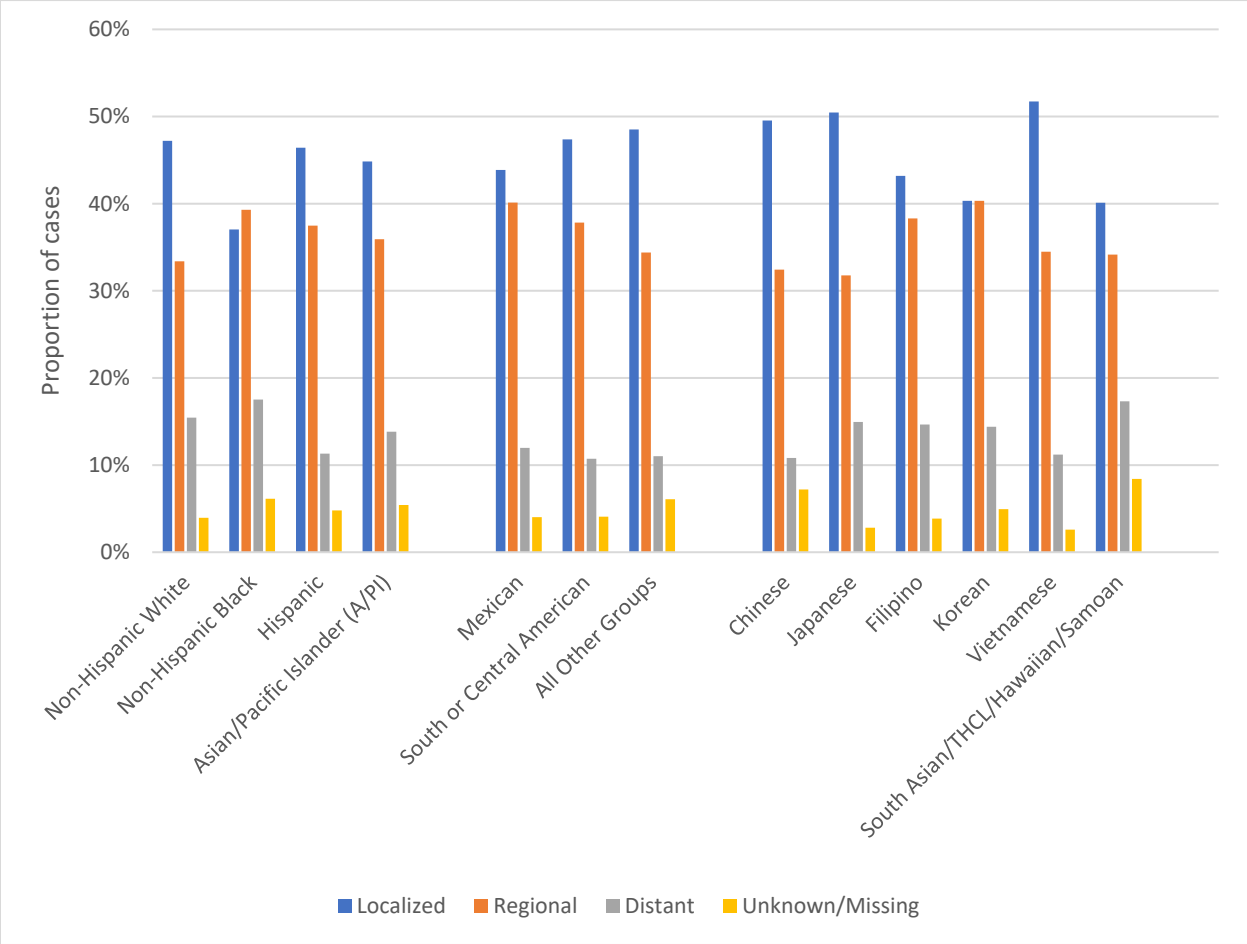
- A total of 9,102 women were diagnosed with cervical cancer from 2000-2019 in Los Angeles County.
- 50% of the patients were Hispanic, of which 41% are of Mexican ethnicity.
- Of the Hispanic patients, 63% were foreign-born.
- A much higher proportion of cervical cancer patients were diagnosed at localized stage than that of the overall HPV-associated cancers (46% vs. 36% Table 1.1).

**Figure 1.2a.** Disease Stage Distribution of Cervical Cancer by Age, Los Angeles County, 2000-2019.



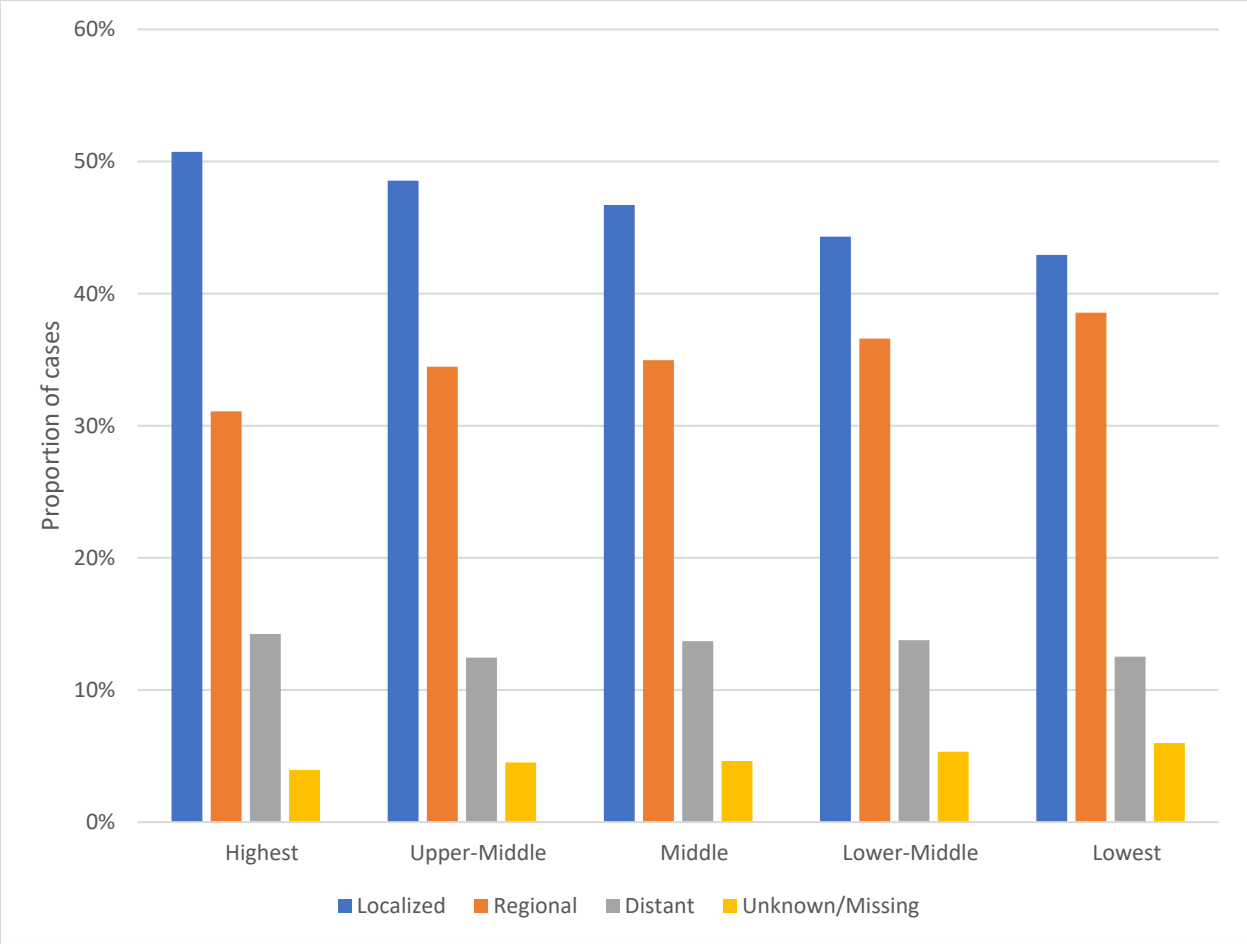

- Localized disease was more common among younger patients (65% for age 00-29, 61% for age 30-39, and 52% for age 40-49) compared to patients aged 65 or older (27.5%).
- Distant disease was more common among older patients (19% in age 65+ vs. 6.9% in age 00-29).

**Figure 1.2b.** Disease Stage Distribution of Cervical Cancer by Race/Ethnicity, Los Angeles County, 2000-2019.



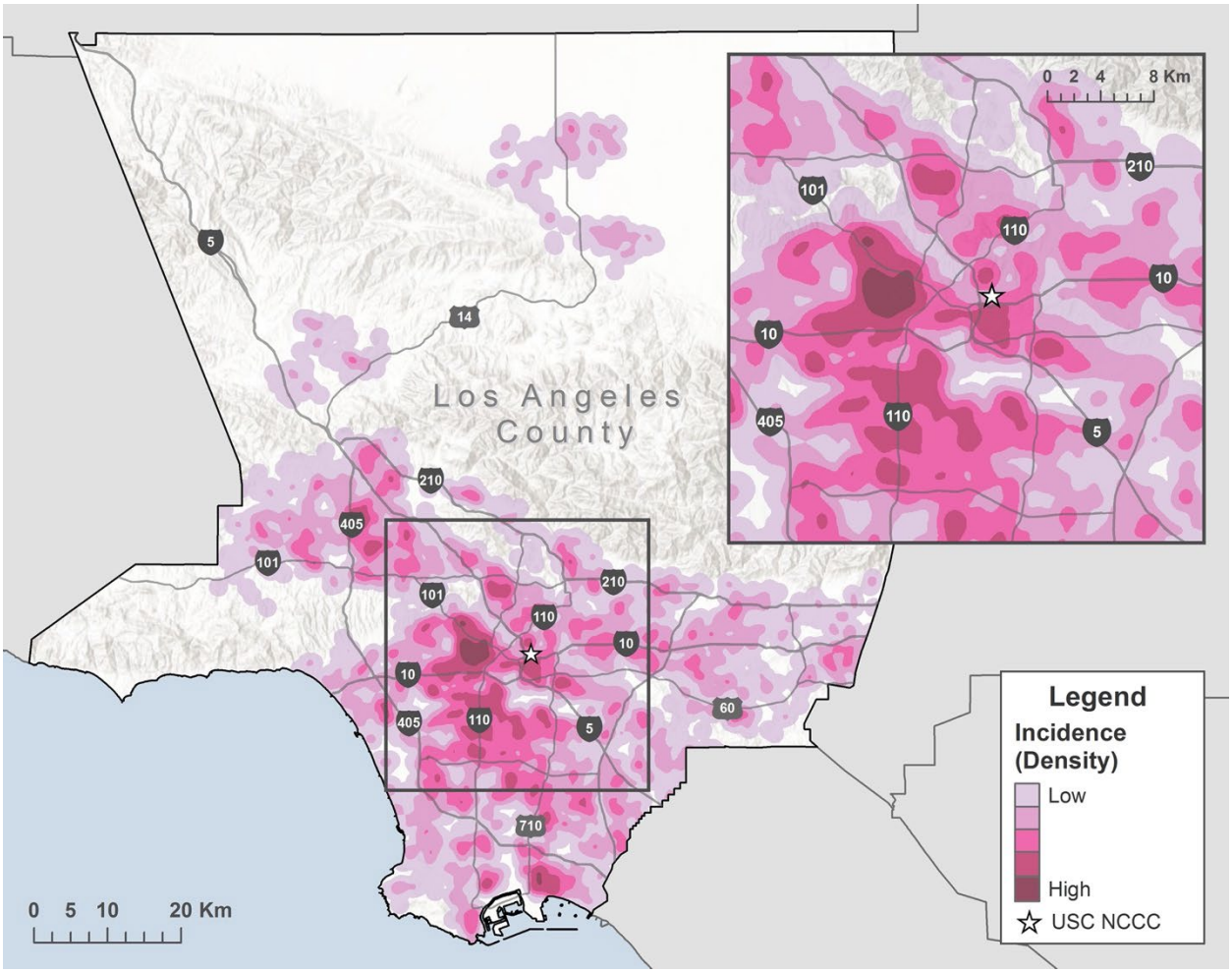

- Non-Hispanic Black women and South Asian/THCL/Hawaiian/Samoan women had the highest proportion of distant disease.
- Korean women and Mexican women had the highest proportion of regional disease.

**Figure 1.2c.** Disease Stage Distribution of Cervical Cancer by Socioeconomic Status, Los Angeles County, 2000-2019.




- Patients of higher socioeconomic status were diagnosed with localized diseases more frequently (50.7%), while patients of low socioeconomic status had the lowest proportion of localized disease at diagnosis (42.9%).
- More patients of lower socioeconomic status were diagnosed with regional diseases than higher socioeconomic status groups.

**Figure 1.2d.** Spatial Distribution of Late-Stage Cervical Cancer Incidence, Females (All Ages, Races, and Ethnicities), Los Angeles County, 2000-2018.




Footnote/Metadata: Cancer data came from the California Cancer Registry (2000-2018). Density distribution is based on latitude/longitude of patient address at diagnosis. Areas with sparse data have been suppressed. Additional details regarding case selection can be found in Data and Technical Notes on page 49. County boundaries were available from the US Census TIGER/Line Shapefiles (2010).

- The highest density of late-stage cervical cancer was found in the neighborhoods northwest of downtown Los Angeles and Long Beach.

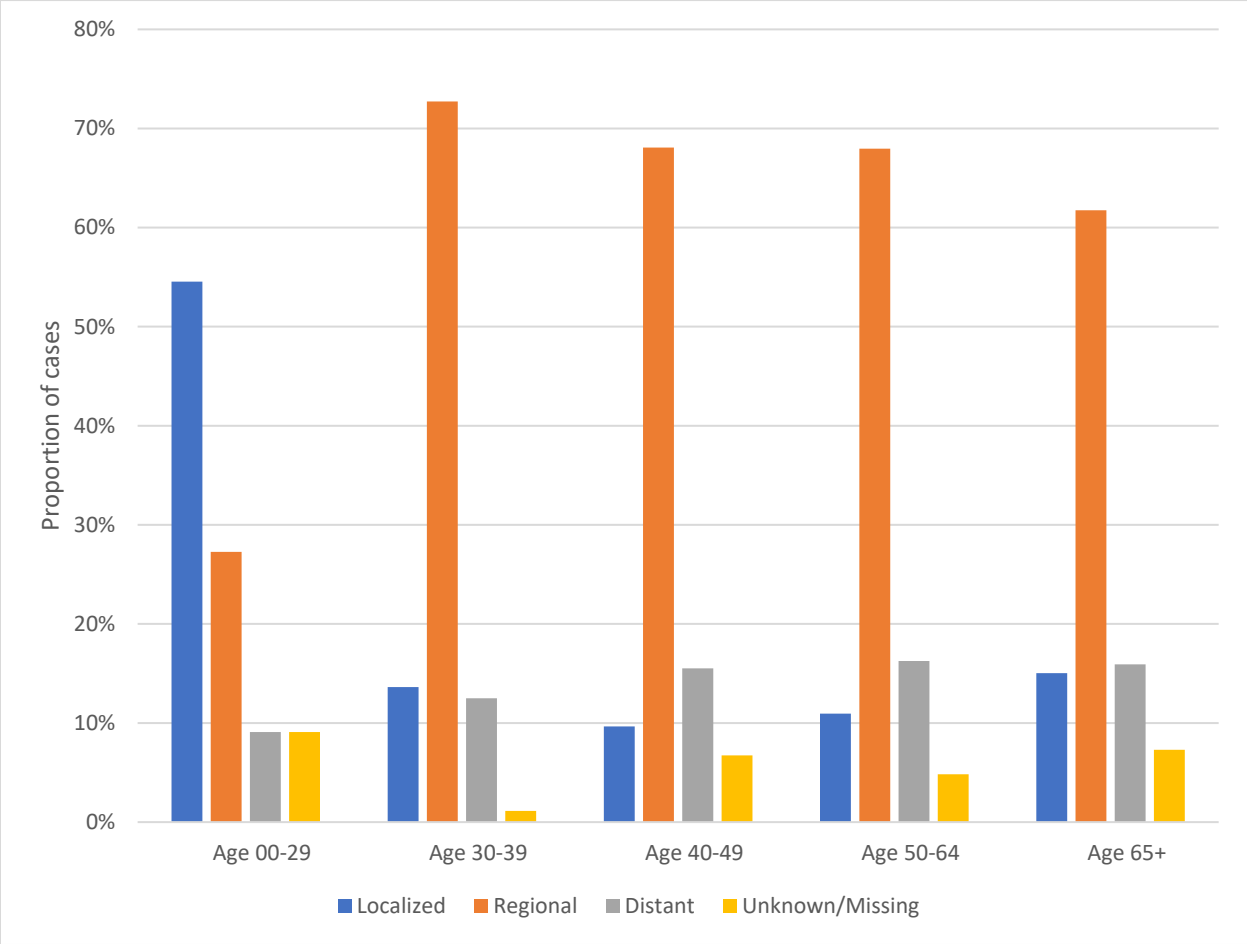
**Table 1.3.** Frequency and Distribution of Oropharyngeal Cancer by Sex, Age, Race/Ethnicity, Nativity, Socioeconomic Status, and Disease Stage, Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| **Age (years)** | | | | | | |
| 0-29 | 6 | 0 | 5 | 0 | 11 | 0 |
| 30-39 | 64 | 1 | 24 | 2 | 88 | 1 |
| 40-49 | 557 | 11 | 127 | 11 | 684 | 11 |
| 50-64 | 2,439 | 49 | 491 | 41 | 2,930 | 47 |
| 65+ | 1,942 | 39 | 558 | 46 | 2,500 | 40 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 3,175 | 63 | 715 | 59 | 3,890 | 63 |
| Non-Hispanic Black | 586 | 12 | 172 | 14 | 758 | 12 |
| Hispanic | 878 | 18 | 214 | 18 | 1,092 | 18 |
| Asian/Pacific Islander | 298 | 6 | 87 | 7 | 385 | 6 |
| Other [$] | 71 | 1 | 17 | 1 | 88 | 1 |
| **Asian/Pacific Islander Ethnicity** | | | | | | |
| Chinese | 65 | 22 | 16 | 18 | 81 | 21 |
| Japanese | 40 | 13 | 20 | 23 | 60 | 16 |
| Filipino | 63 | 21 | 15 | 17 | 78 | 20 |
| Korean | 57 | 19 | 11 | 13 | 68 | 18 |
| Vietnamese | 20 | 7 | 7 | 8 | 27 | 7 |
| Other Asian Groups* | 53 | 18 | 18 | 21 | 71 | 18 |
| **Hispanic Ethnicity** | | | | | | |
| Mexican | 281 | 32 | 58 | 27 | 339 | 31 |
| South or Central American | 103 | 12 | 38 | 18 | 141 | 13 |
| All Other Groups[#] | 496 | 56 | 120 | 56 | 616 | 56 |
| **Nativity: Hispanic** | | | | | | |
| Foreign-Born | 377 | 43 | 96 | 45 | 473 | 43 |
| U.S.-Born | 468 | 53 | 113 | 53 | 581 | 53 |
| **Socioeconomic Status** | | | | | | |
| Highest | 1,224 | 24 | 247 | 20 | 1,471 | 24 |
| Upper-Middle | 1,161 | 23 | 285 | 24 | 1,446 | 23 |
| Middle | 969 | 19 | 245 | 20 | 1,214 | 20 |
| Lower-Middle | 873 | 17 | 194 | 16 | 1,067 | 17 |
| Lowest | 781 | 16 | 234 | 19 | 1,015 | 16 |
| **Disease Stage** | | | | | | |
| Localized | 556 | 11 | 230 | 19 | 786 | 13 |
| Regional | 3,317 | 66 | 746 | 62 | 4,063 | 65 |
| Distant | 836 | 17 | 158 | 13 | 994 | 16 |
| Unknown | 299 | 6 | 71 | 6 | 370 | 6 |

[$]: Included American Indian and Other/Unknown/Missing groups.
*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).
[#]: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

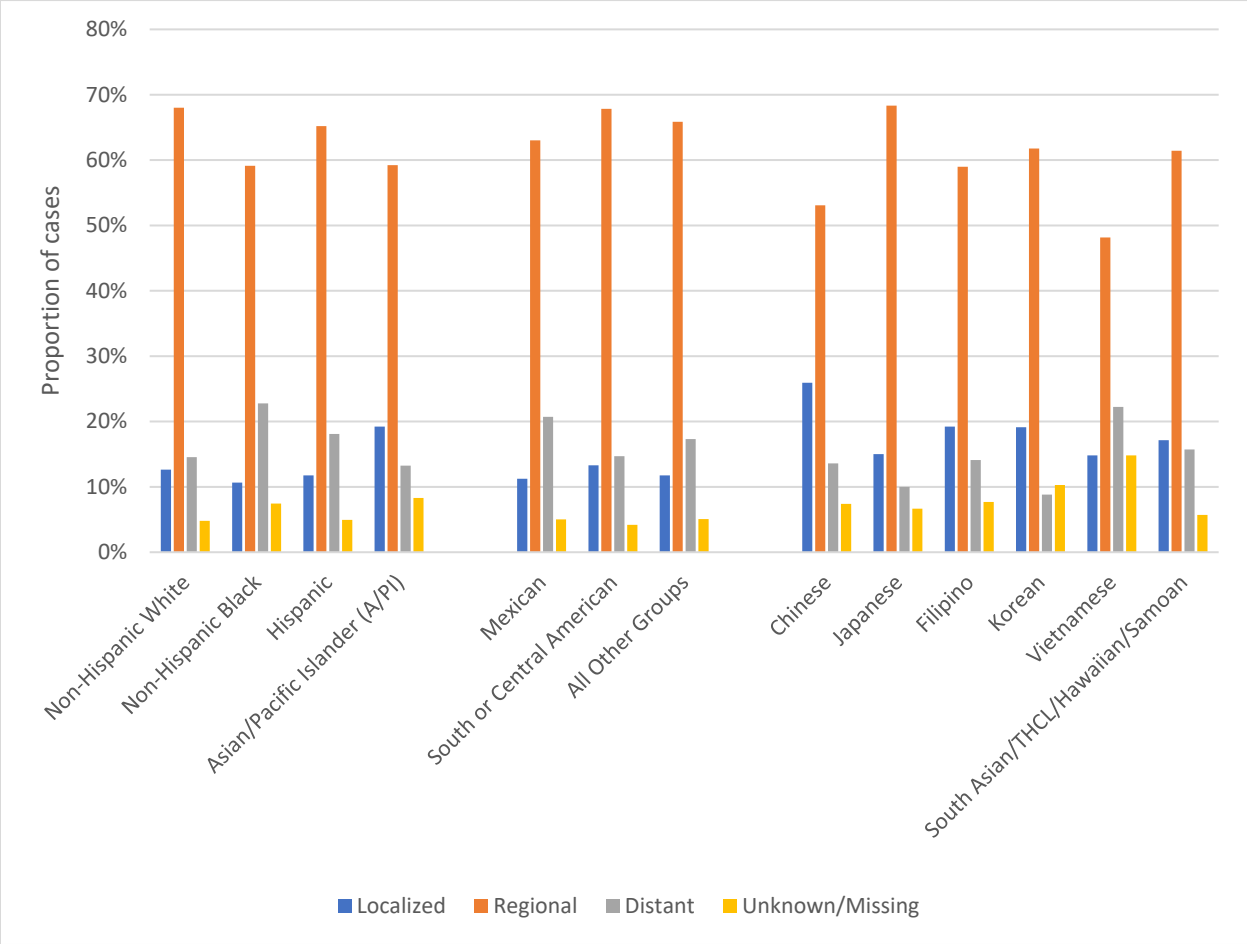
- A total of 6,213 patients were diagnosed with oropharyngeal cancer from 2000-2019.
- 87% of the patients were 50 years of age or older at diagnosis.
- 81% of patients were male.
- 63% of the patients were Non-Hispanic White males.

**Figure 1.3a.** Disease Stage Distribution of Oropharyngeal Cancer by Age, Los Angeles County, 2000-2019.



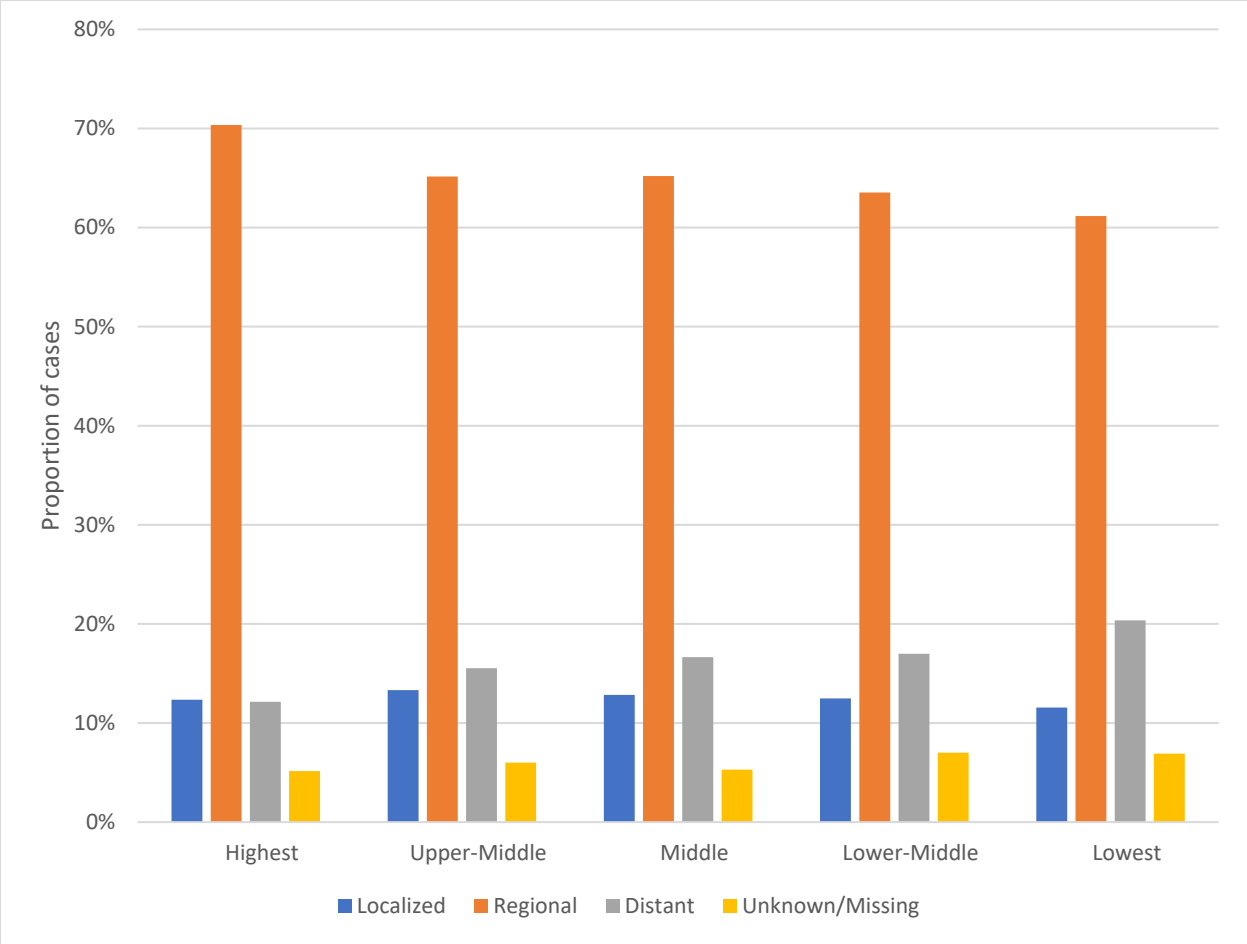

- Regional disease was most common among those age 30-39 years (72.7%). It was also high in patients 40-49 years (68.1%), 50-64 years (68.0%), and 65+ years (61.7%) of age.
- Localized disease was most common in age 00-29 (54.5%). Due to small number of cases in this group, data should be interpreted with caution.

**Figure 1.3b.** Disease Stage Distribution of Oropharyngeal Cancer by Race/Ethnicity, Los Angeles County, 2000-2019.



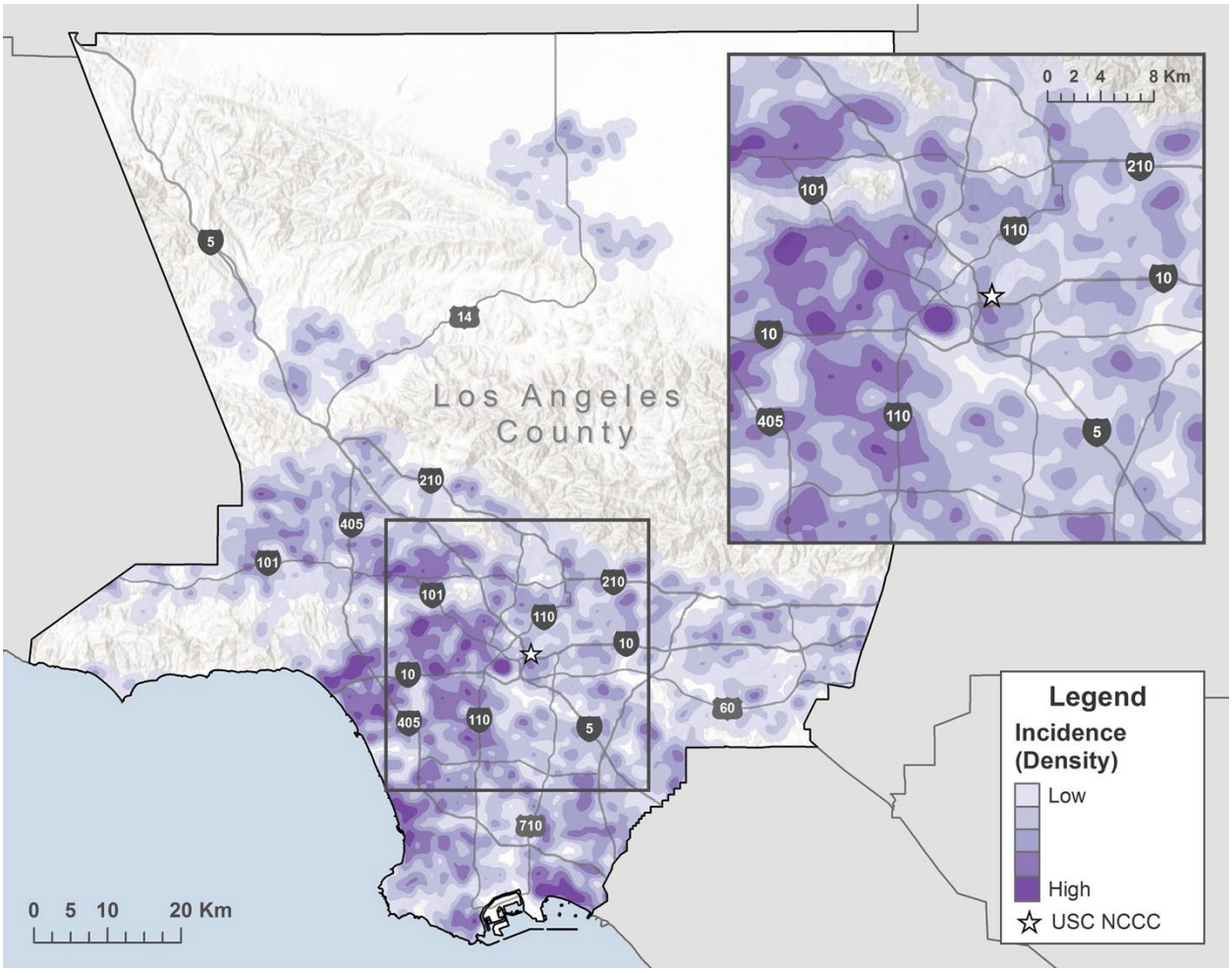

- Non-Hispanic Blacks had the highest proportion of distant disease (22.8%).
- Vietnamese patients had the second highest proportion of distant disease (22.2%), followed by Mexicans (20.7%).
- Koreans had the lowest proportion of distant disease (8.8%).

**Figure 1.3c.** Disease Stage Distribution of Oropharyngeal Cancer by Socioeconomic Status, Los Angeles County, 2000-2019.




- Regional disease was high across all socioeconomic statuses. The highest proportion of regional disease was among those with the highest socioeconomic status (70.4%).
- Distant disease was most common in low socioeconomic status individuals (20.4%).

**Figure 1.3d.** Spatial Distribution of Late-Stage Oropharyngeal Cancer Incidence, Males and Females (All Ages, Races and Ethnicities), Los Angeles County, 2000-2018.




Footnote/Metadata: Cancer data came from the California Cancer Registry (2000-2018). Density distribution is based on latitude/longitude of patient address at diagnosis. Areas with sparse data have been suppressed. Additional details regarding case selection can be found in Data and Technical Notes on page 49. County boundaries were available from the US Census TIGER/Line Shapefiles (2010).

- The highest density of late-stage oropharyngeal cancer was found in Santa Monica, Long Beach, downtown Los Angeles, West Hollywood, Hollywood Hills West, and Redondo Beach.).

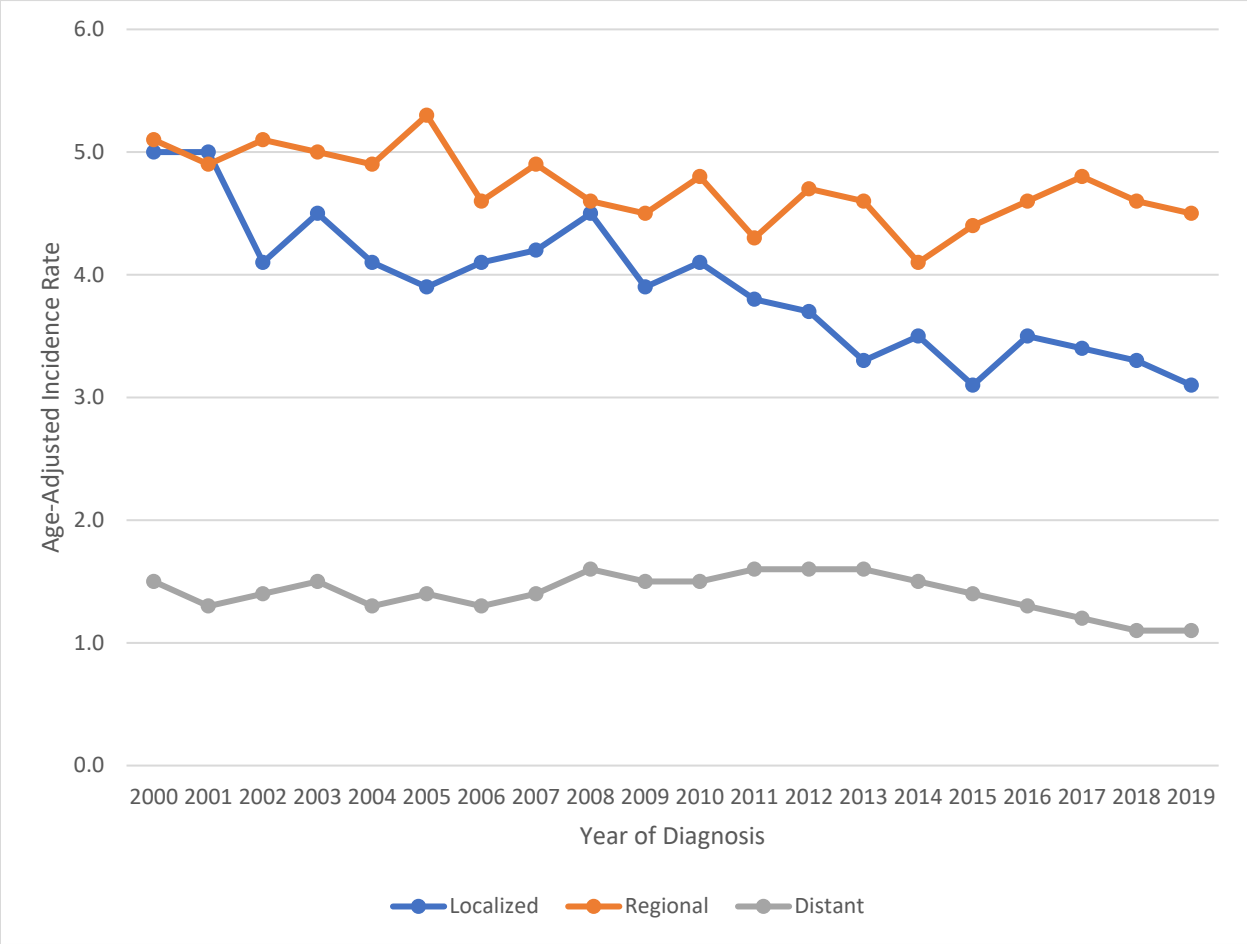
## INCIDENCE RATES

**Table 2.1.** Age-Adjusted Incidence Rates of Overall HPV-Associated Cancers by Sex (per 100,000), Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | AAIR | 95% CI | AAIR | 95% CI | AAIR | 95% CI |
| **Total** | **7.8 (7.6-8.0)** | | **13.7 (13.4-13.9)** | | **10.8 (10.6-10.9)** | |
| **Age (years)** | | | | | | |
| 0-29 | 0 | 0-0.1 | 0.8 | 0.7-0.9 | 0.4 | 0.4-0.5 |
| 30-39 | 1.2 | 1.0-1.4 | 14.0 | 13.4-14.6 | 7.5 | 7.2-7.9 |
| 40-49 | 6.4 | 6.0-6.8 | 20.1 | 19.4-20.9 | 13.3 | 12.9-13.7 |
| 50-64 | 19.9 | 19.3-20.7 | 25.4 | 24.6-26.2 | 22.7 | 22.2-23.3 |
| 65+ | 28.4 | 27.3-29.5 | 34.0 | 33.0-35.0 | 31.7 | 31.0-32.5 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 11.0 | 10.7-11.4 | 13.6 | 13.3-14.0 | 12.3 | 12.0-12.5 |
| Non-Hispanic Black | 10.0 | 9.5-10.9 | 13.3 | 12.6-14.1 | 11.9 | 11.4-12.4 |
| Hispanic | 5.2 | 5.0-5.5 | 15.2 | 14.8-15.6 | 10.5 | 10.2-10.7 |
| Asian/Pacific Islander | 2.7 | 2.4-3.0 | 9.6 | 9.1-10.0 | 6.5 | 6.2-6.7 |
| **Disease Stage** | | | | | | |
| Localized | 1.7 | 1.6-1.8 | 6.0 | 5.8-6.1 | 3.9 | 3.8-4.0 |
| Regional | 4.3 | 4.2-4.5 | 5.1 | 4.9-5.2 | 4.7 | 4.6-4.8 |
| Distant | 1.1 | 1.0-1.2 | 1.7 | 1.6-1.8 | 1.4 | 1.4-1.5 |
| Unknown | 0.6 | 0.6-0.7 | 0.9 | 0.9-1.0 | 0.8 | 0.7-0.8 |

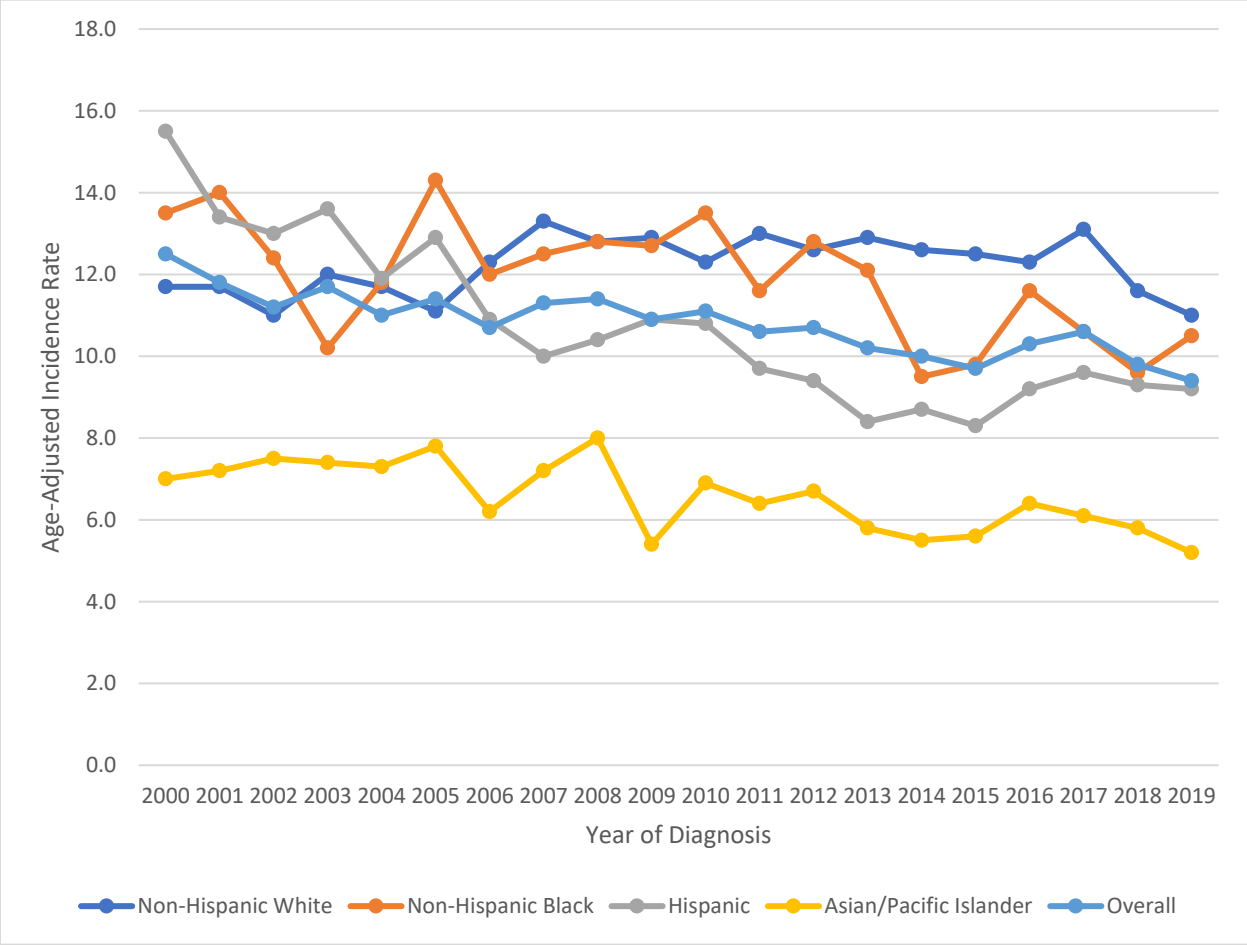
- Incidence of HPV-associated cancers increased with age and is highest in women age 65+.
- Hispanic women had the highest incidence of HPV-associated cancers in comparison to women from Non-Hispanic White, Non-Hispanic Black, and Asian/Pacific Islander race and ethnic groups.
- Overall, Asian/Pacific Islanders had lower incidence for both males and females in comparison to other race and ethnic groups.
- HPV-associated cancer incidence was high in Non-Hispanic White and Non-Hispanic Black males, but remained lower among males of Hispanic and Asian/Pacific Islander race and ethnic groups.
- Males were diagnosed with regional diseases more frequently, while females were diagnosed with localized diseases more frequently.

**Figure 2.1a.** Annual Age-Adjusted Incidence Rate Trends of Overall HPV-Associated Cancers by Disease Stage (per 100,000), Los Angeles County, 2000-2019.



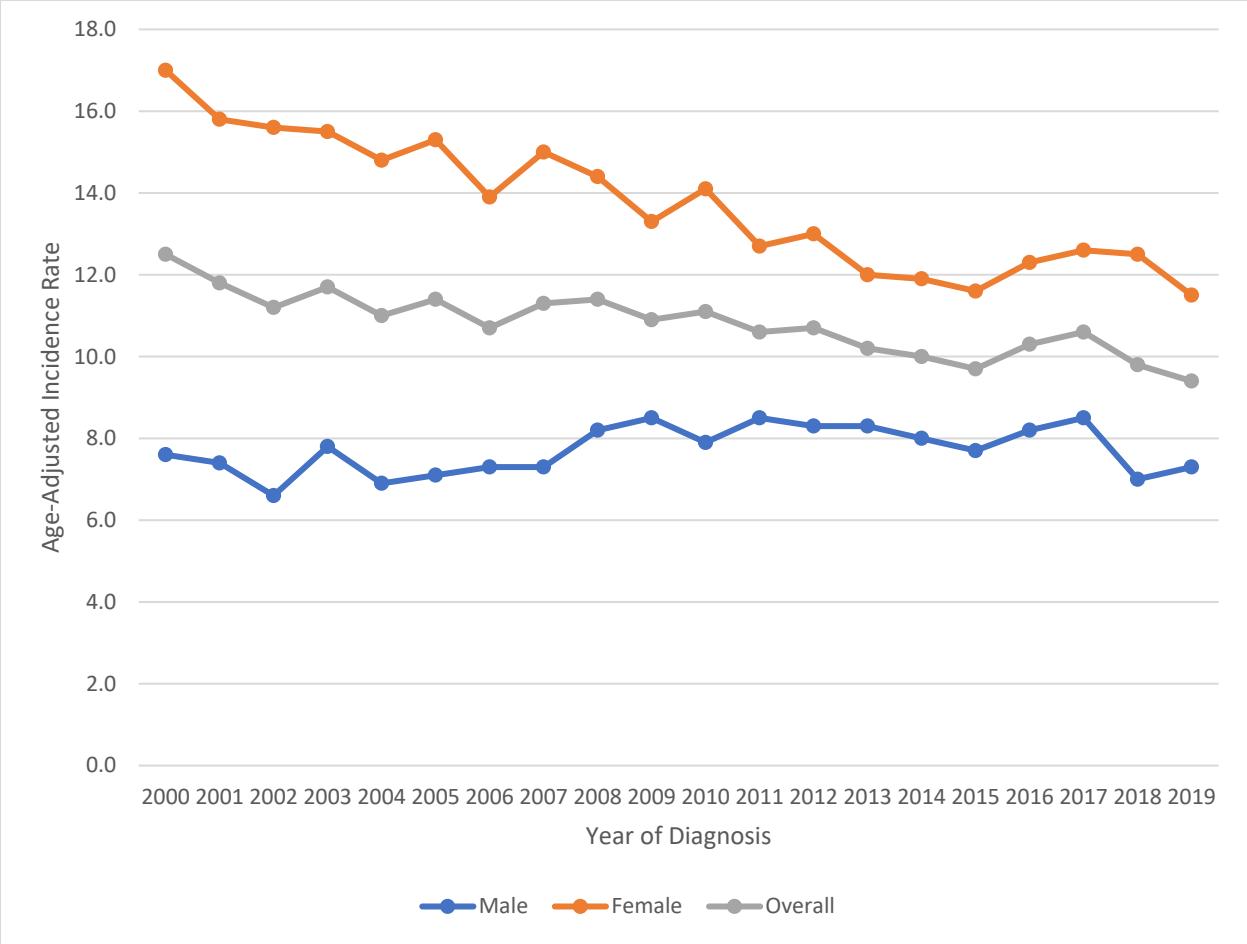

- The downward trend of incidence was more prominent for localized disease.
- Regional disease remained high and incidence of regional disease increased after 2014.

**Figure 2.1b.** Annual Age-Adjusted Incidence Rate Trends of Overall HPV-Associated Cancers by Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.




- Incidence of HPV-associated cancers showed a prominent downward trend for Non-Hispanic Blacks, Hispanics, and Asian/Pacific Islander race and ethnic groups.
- Incidence remained high for Non-Hispanic White individuals and decreased after 2017.
- Incidence remained lowest for Asian/Pacific Islanders across time.

**Figure 2.1c.** Annual Age-Adjusted Incidence Rate Trends of Overall HPV-Associated Cancers by Sex (per 100,000), Los Angeles County, 2000-2019.



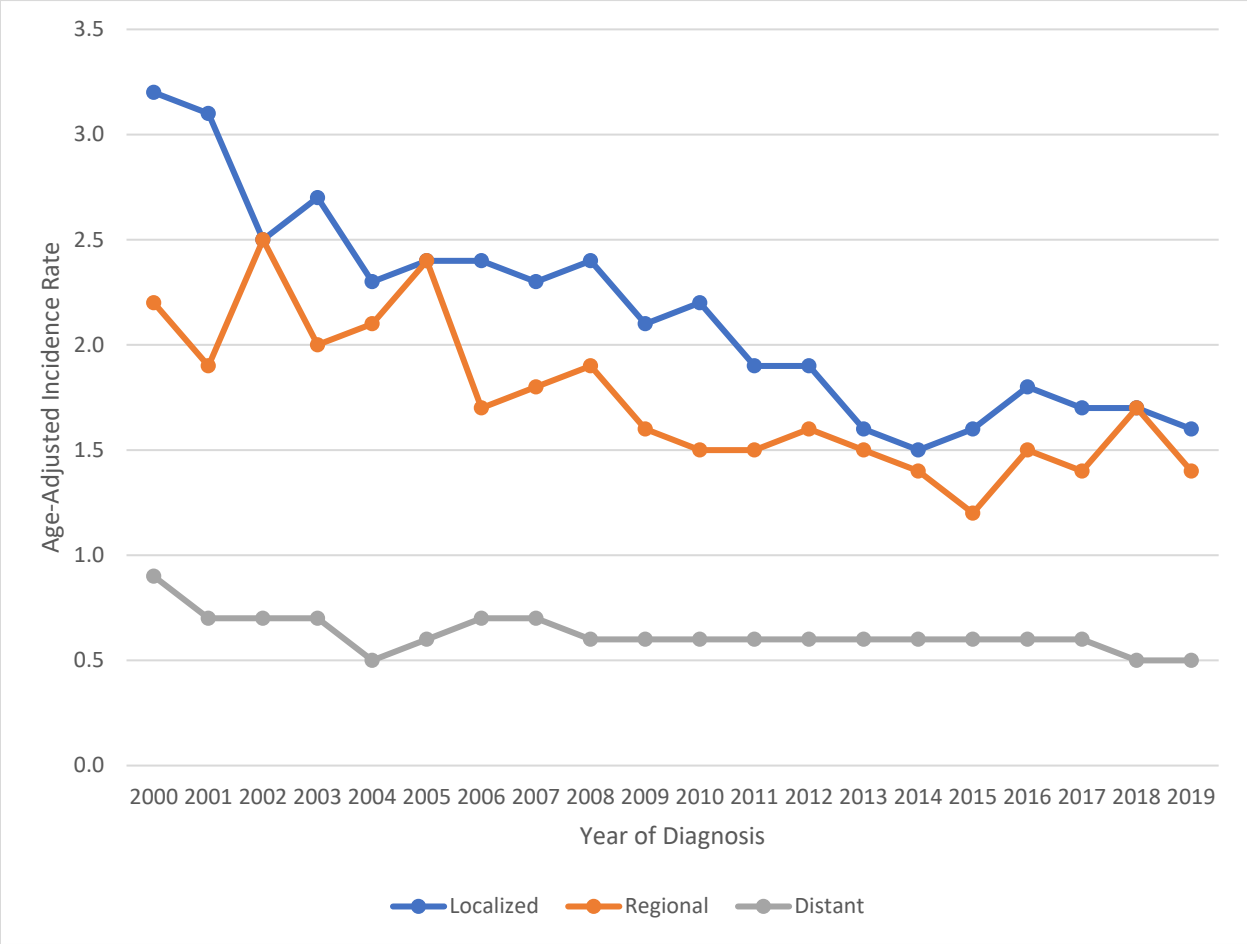

- Incidence of HPV-associated cancers was highest among females. There was a prominent downward trend of incidence for females.
- Males had the lowest incidence, but experienced a steady increase in incidence from 2007 onward.

**Table 2.2.** Age-Adjusted Incidence Rates of Cervical Cancer (per 100,000), Los Angeles County, 2000-2019.

| | Female | |
|---|---|---|
| | AAIR | 95% CI |
| **Total** | **9.0 (8.9-9.2)** | |
| **Age (years)** | | |
| 0-29 | 0.8 | 0.7-0.9 |
| 30-39 | 13.3 | 12.7-13.9 |
| 40-49 | 16.9 | 16.2-17.6 |
| 50-64 | 15.5 | 14.9-16.1 |
| 65+ | 14.0 | 13.4-14.7 |
| **Race/Ethnicity** | | |
| Non-Hispanic White | 6.9 | 6.7-7.3 |
| Non-Hispanic Black | 8.2 | 7.6-8.8 |
| Hispanic | 11.6 | 11.2-11.9 |
| Asian/Pacific Islander | 8.1 | 7.7-8.6 |
| **Disease Stage** | | |
| Localized | 4.2 | 4.0-4.3 |
| Regional | 3.2 | 3.1-3.4 |
| Distant | 1.2 | 1.1-1.2 |
| Unknown | 0.5 | 0.4-0.5 |

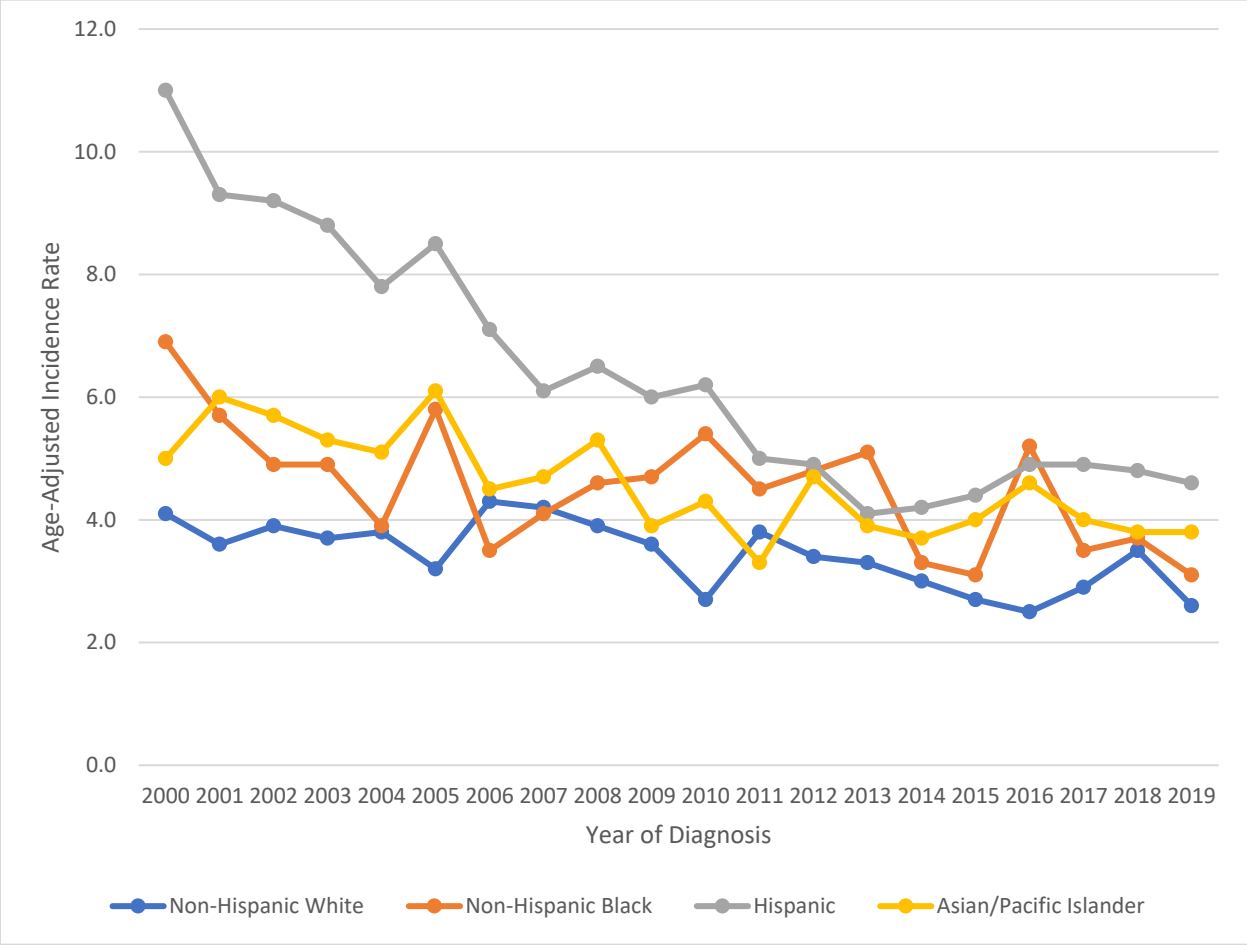
- The incidence of cervical cancer was the highest in women aged 40 through 49.
- Hispanic women had the highest incidence than other racial/ethnic groups.

**Figure 2.2a.** Annual Age-Adjusted Incidence Rate Trends of Cervical Cancer by Disease Stage (per 100,000), Los Angeles County, 2000-2019.




- There was a prominent downward trend of incidence of localized and regional disease. A slight increase in incidence of both localized and regional disease was seen after 2015, but incidence then declines after 2018.
- Localized disease continued to have the highest proportion of incidence across the 20-year period.

**Figure 2.2b.** Annual Age-Adjusted Incidence Rate Trends of Cervical Cancer by Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.



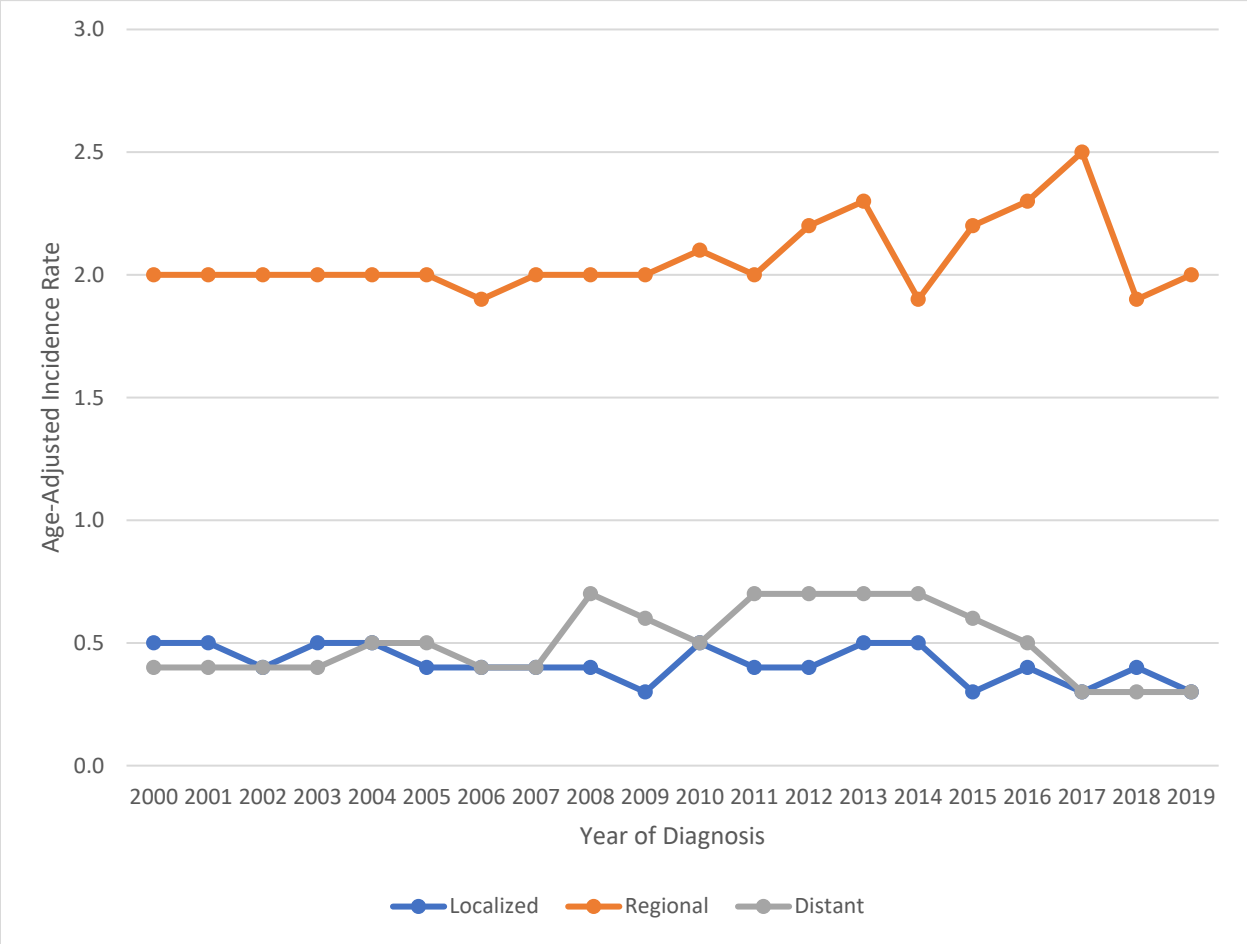

- There was an overall downward trend of incidence in cervical cancer for women of all race and ethnic groups.
- The decline in incidence was most prominent for Hispanic women. The wide racial/ethnic disparity in cervical cancer has narrowed over time for Hispanic women, but incidence in Hispanic women remains higher than that in all other race and ethnic groups.

**Table 2.3.** Age-Adjusted Incidence Rates of Oropharyngeal Cancer by Sex, (per 100,000), Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | AAIR | 95% CI | AAIR | 95% CI | AAIR | 95% CI |
| **Total** | **5.5 (5.4-5.7)** | | **1.1 (1.1-1.2)** | | **3.2 (3.1-3.3)** | |
| **Age (years)** | | | | | | |
| 0-29 | - | - | - | - | - | - |
| 30-39 | 0.4 | 0.3-0.6 | 0.2 | 0.1-0.2 | 0.3 | 0.2-0.4 |
| 40-49 | 3.9 | 3.6-4.3 | 0.9 | 0.7-1.0 | 2.4 | 2.2-2.6 |
| 50-64 | 15.5 | 14.9-16.1 | 2.9 | 2.6-3.1 | 8.9 | 8.6-9.2 |
| 65+ | 20.1 | 19.2-21.1 | 4.4 | 4.1-4.8 | 11.2 | 10.8-11.7 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 8.3 | 8.0-8.6 | 1.7 | 1.6-1.9 | 4.9 | 4.8-5.1 |
| Non-Hispanic Black | 7.1 | 6.5-7.7 | 1.6 | 1.4-1.9 | 4.0 | 3.7-4.3 |
| Hispanic | 3.2 | 3.0-3.5 | 0.6 | 0.6-0.7 | 1.8 | 1.7-1.9 |
| Asian/Pacific Islander | 2.1 | 1.8-2.3 | 0.5 | 0.4-0.6 | 1.2 | 1.1-1.3 |
| **Disease Stage** | | | | | | |
| Localized | 0.6 | 0.6-0.7 | 0.2 | 0.2-0.2 | 0.4 | 0.4-0.4 |
| Regional | 3.6 | 3.5-3.8 | 0.7 | 0.7-0.8 | 2.1 | 2.0-2.1 |
| Distant | 0.9 | 0.9-1.0 | 0.2 | 0.1-0.2 | 0.5 | 0.5-0.5 |
| Unknown | 0.3 | 0.3-0.4 | 0.1 | 0.1-0.1 | 0.2 | 0.2-0.2 |

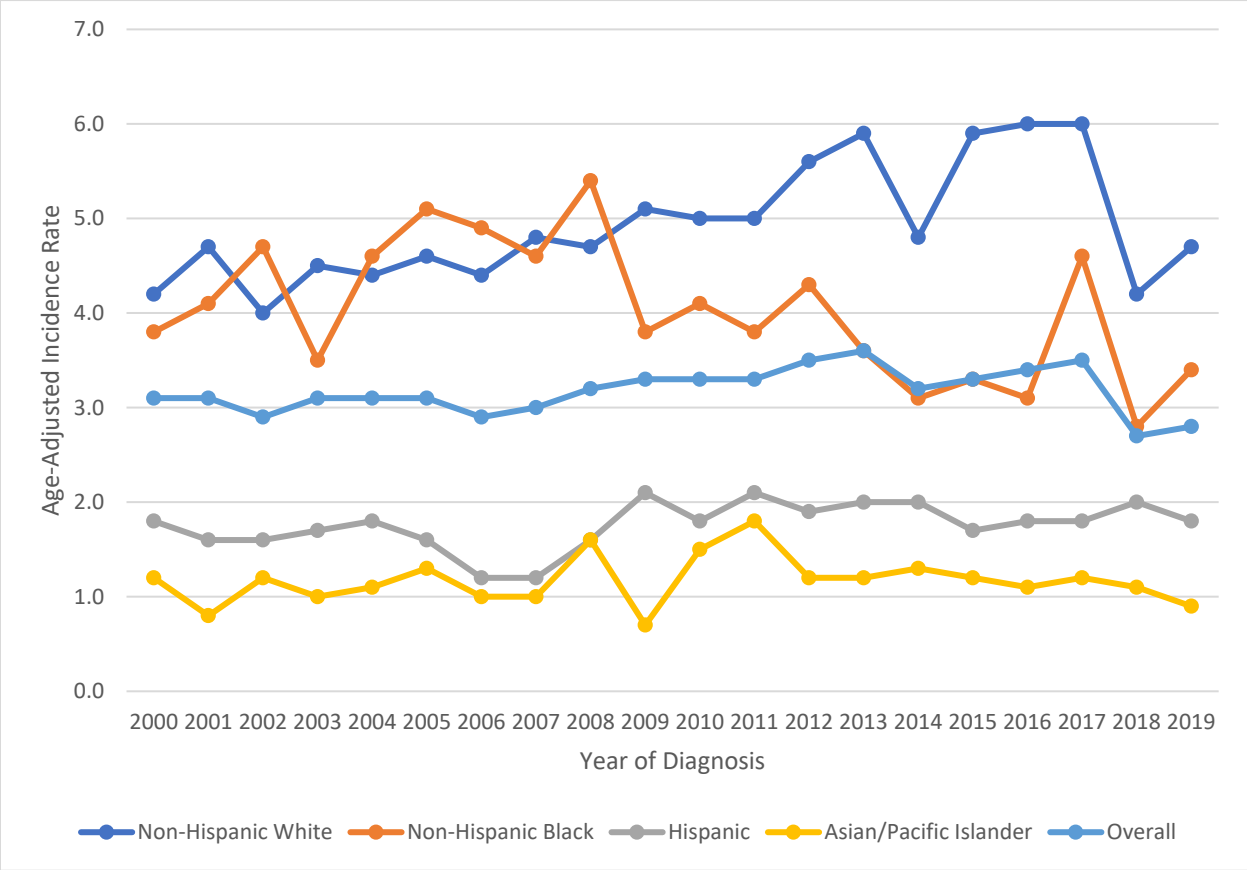
- The incidence of oropharyngeal cancer was highest in older males.
- Non-Hispanic White males had the highest incidence than other race/ethnic groups, followed by Non-Hispanic Black males.
- The incidence rate is the highest for regional compared to localized or distant stage disease.

**Figure 2.3a.** Annual Age-Adjusted Incidence Rate Trends of Oropharyngeal Cancer by Disease Stage (per 100,000), Los Angeles County, 2000-2019.



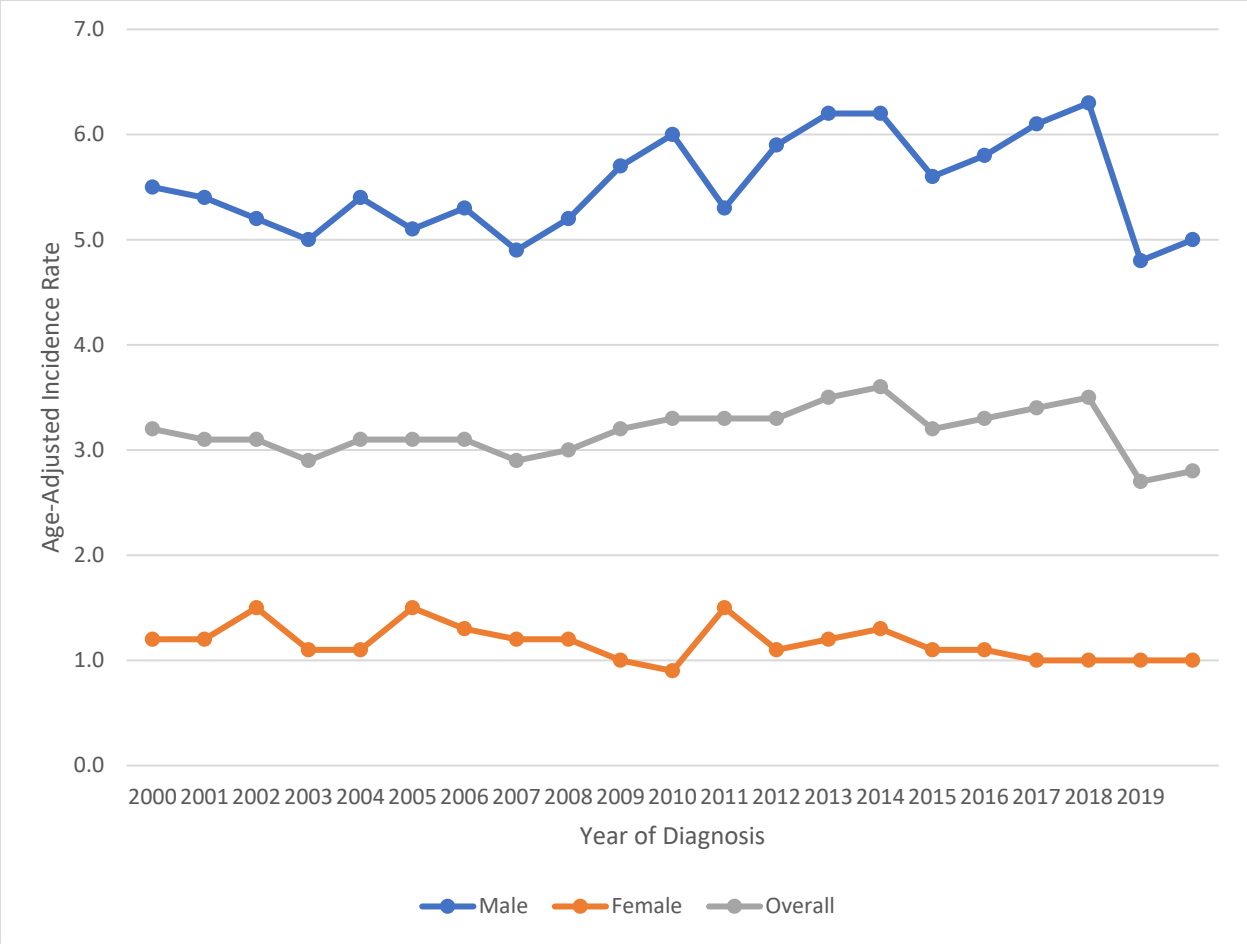

- Incidence of regional disease continued to remain high in comparison to localized or distant disease stages.
- Incidence of regional disease remained stable from 2000 to 2009 (AAIR: 2.0) until there was an increase in incidence after 2011 and again after 2014. Regional disease incidence declined after 2017.

**Figure 2.3b.** Annual Age-Adjusted Incidence Rate Trends of Oropharyngeal Cancer by Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.




- Non-Hispanic Whites and Non-Hispanic Blacks had the highest incidence than other race/ethnic groups until 2008.
- Incidence of oropharyngeal cancer continued to remain disproportionately higher in Non-Hispanic Whites from 2009 onward.
- The downward trend of incidence was more prominent for Non-Hispanic Blacks beginning after 2008.

**Figure 2.3c.** Annual Age-Adjusted Incidence Rate Trends of Oropharyngeal Cancer by Sex (per 100,000), Los Angeles County, 2000-2019.




- Incidence continued to remain high in male patients and low in female patients.
- Incidence in males increased after 2007, again after 2011, and again after 2015. It declined after 2018.

**Table 2.4.** Incidence Rate Ratio for Overall HPV-Associated Cancers by Sex and Race/Ethnicity, Los Angeles County, 2000-2019.

| | Male | Female | Male and Female |
|---|---|---|---|
| **Race/Ethnicity** | | | |
| Non-Hispanic White (Reference) | 1.0 | 1.0 | 1.0 |
| Non-Hispanic Black | 0.9 | 1.0 | 1.0 |
| Hispanic | 0.5 | 1.1 | 0.9 |
| Asian/Pacific Islander | 0.2 | 0.7 | 0.5 |

**Table 2.5.** Incidence Rate Ratio for Cervical Cancer among Females by Race/Ethnicity, Los Angeles County, 2000-2019.

| | Female |
|---|---|
| **Race/Ethnicity** | |
| Non-Hispanic White (Reference) | 1.0 |
| Non-Hispanic Black | 1.2 |
| Hispanic | 1.7 |
| Asian/Pacific Islander | 1.2 |

**Table 2.6.** Incidence Rate Ratio for Oropharyngeal Cancer by Sex and Race/Ethnicity, Los Angeles County, 2000-2019.

| | Male | Female | Male and Female |
|---|---|---|---|
| **Race/Ethnicity** | | | |
| Non-Hispanic White (Reference) | 1.0 | 1.0 | 1.0 |
| Non-Hispanic Black | 0.9 | 0.9 | 0.8 |
| Hispanic | 0.4 | 0.4 | 0.4 |
| Asian/Pacific Islander | 0.3 | 0.3 | 0.2 |

## MORTALITY

**Table 3.1.** Age-Adjusted Mortality Rates of Overall HPV-Associated Cancers by Sex, Age, and Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | AAMR | 95% CI | AAMR | 95% CI | AAMR | 95% CI |
| **Total** | **0.8 (0.7-0.8)** | | **3.8 (3.7-3.9)** | | **2.4 (2.3-2.5)** | |
| **Age (years)** | | | | | | |
| 0-29 | 0.0 | 0.0-0.0 | 0.1 | 0.1-0.1 | 0.0 | 0.0-0.1 |
| 30-39 | 0.2 | 0.1-0.2 | 2.1 | 1.9-2.4 | 1.1 | 1.0-1.3 |
| 40-49 | 0.4 | 0.3-0.5 | 4.4 | 4.0-4.7 | 2.4 | 2.2-2.6 |
| 50-64 | 1.2 | 1.1-1.4 | 7.3 | 6.9-7.7 | 4.4 | 4.2-4.6 |
| 65+ | 3.9 | 3.5-4.3 | 13.1 | 12.5-13.8 | 9.3 | 8.9-9.7 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 0.8 | 0.8-0.9 | 3.2 | 3.1-3.4 | 2.1 | 2.0-2.2 |
| Non-Hispanic Black | 1.2 | 1.0-1.5 | 5.0 | 4.6-5.5 | 3.4 | 3.1-3.7 |
| Hispanic | 0.7 | 0.6-0.8 | 4.5 | 4.3-4.7 | 2.8 | 2.6-2.9 |
| Asian/Pacific Islander | 0.4 | 0.3-0.5 | 2.7 | 2.5-3.0 | 1.7 | 1.6-1.8 |

- Females had higher mortality than males in general, but the difference is most notable for those over age 65.
- The highest cancer mortality rate was among Non-Hispanic Black females followed by Hispanic females.

**Table 3.2.** Age-Adjusted Mortality Rates of Cervical Cancer among Females by Age and Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.

| | Female | |
|---|---|---|
| | AAMR | 95% CI |
| **Total** | **2.9 (2.8-3.0)** | |
| **Age (years)** | | |
| 0-29 | 0.1 | 0.1-0.1 |
| 30-39 | 2.0 | 1.8-2.3 |
| 40-49 | 4.0 | 3.6-4.3 |
| 50-64 | 6.2 | 5.8-6.5 |
| 65+ | 8.0 | 7.5-8.5 |
| **Race/Ethnicity** | | |
| Non-Hispanic White | 2.1 | 1.9-2.2 |
| Non-Hispanic Black | 4.0 | 3.6-4.4 |
| Hispanic | 3.7 | 3.5-3.9 |
| Asian/Pacific Islander | 2.4 | 2.2-2.6 |

- Mortality increased with age. Women aged 65 and older experienced the highest rate of mortality from cervical cancer.
- The highest cervical cancer mortality rate was among Non-Hispanic Black women followed by Hispanic women.

**Table 3.3.** Age-Adjusted Mortality Rates of Oropharyngeal Cancer by Sex, Age, and Race/Ethnicity (per 100,000), Los Angeles County, 2000-2019.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | AAMR | 95% CI | AAMR | 95% CI | AAMR | 95% CI |
| **Total** | **0.3 (0.3-0.4)** | | **0.1 (0.1-0.1)** | | **0.2 (0.2-0.2)** | |
| **Age (years)** | | | | | | |
| 0-29 | 0.0 | 0.0-0.0 | 0.0 | 0.0-0.0 | 0.0 | 0.0-0.0 |
| 30-39 | 0.0 | 0.0-0.1 | 0.0 | 0.0-0.0 | 0.0 | 0.0-0.0 |
| 40-49 | 0.1 | 0.1-0.2 | 0.0 | 0.0-0.1 | 0.1 | 0.0-0.1 |
| 50-64 | 0.5 | 0.4-0.7 | 0.2 | 0.1-0.2 | 0.3 | 0.3-0.4 |
| 65+ | 1.7 | 1.4-2.0 | 0.5 | 0.4-0.7 | 1.0 | 0.9-1.2 |
| **Race/Ethnicity** | | | | | | |
| Non-Hispanic White | 0.4 | 0.3-0.4 | 0.1 | 0.1-0.1 | 0.2 | 0.2-0.3 |
| Non-Hispanic Black | 0.6 | 0.4-0.8 | 0.3 | 0.2-0.4 | 0.4 | 0.3-0.5 |
| Hispanic | 0.2 | 0.2-0.3 | 0.1 | 0.0-0.1 | 0.1 | 0.1-0.2 |
| Asian/Pacific Islander | 0.2 | 0.1-0.3 | 0.1 | 0.0-0.1 | 0.1 | 0.1-0.1 |

- Males had higher mortality than females in general, but the difference was most notable for those over age 65.
- Regardless of sex, non-Hispanic blacks had the highest oropharyngeal cancer mortality among all racial/ethnic groups.

**Table 3.4.** Mortality Rate Ratio for Overall HPV-Associated Cancers by Sex and Race/Ethnicity, Los Angeles County, 2000-2019.

| | Male | Female | Male and Female |
|---|---|---|---|
| **Race/Ethnicity** | | | |
| Non-Hispanic White (Reference) | 1.0 | 1.0 | 1.0 |
| Non-Hispanic Black | 1.5 | 1.6 | 1.6 |
| Hispanic | 0.9 | 1.4 | 1.3 |
| Asian/Pacific Islander | 0.5 | 0.8 | 0.8 |

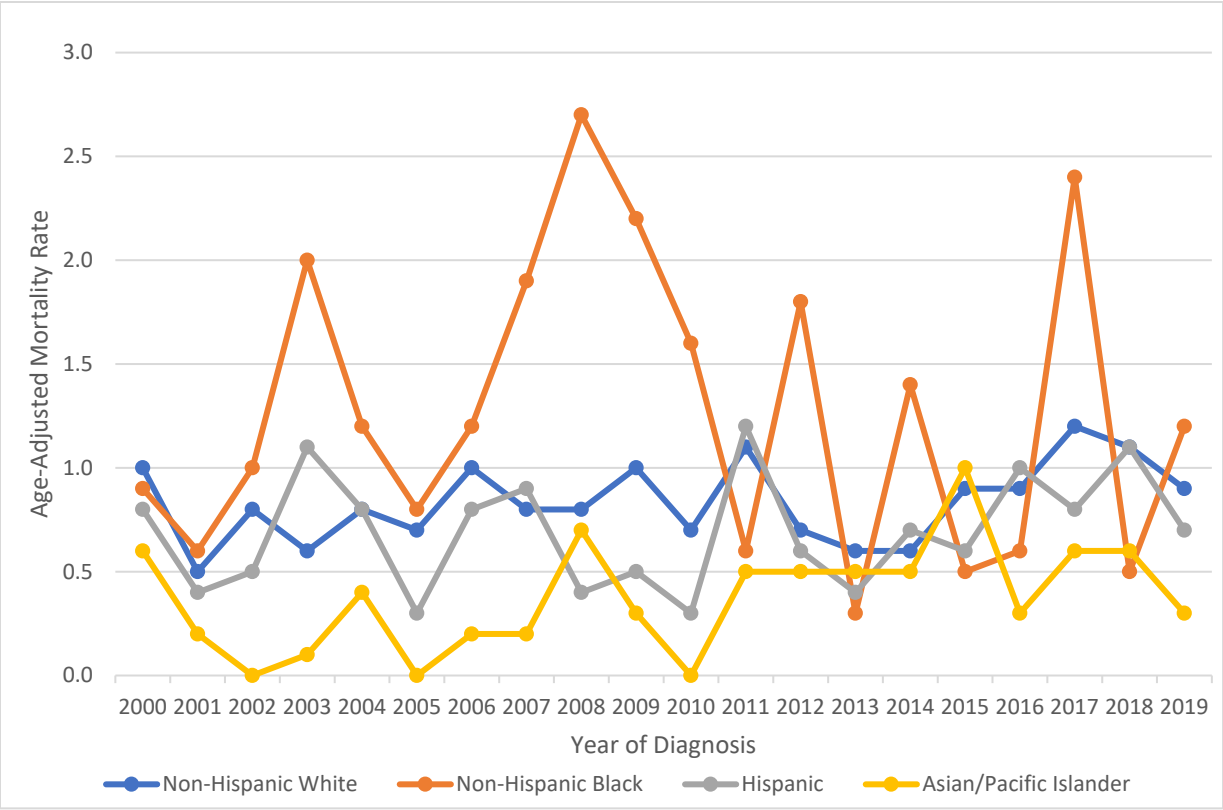
**Table 3.5.** Mortality Rate Ratio for Cervical Cancer among Females by Race/Ethnicity, Los Angeles County, 2000-2019.

| | Female |
|---|---|
| **Race/Ethnicity** | |
| Non-Hispanic White (Reference) | 1.0 |
| Non-Hispanic Black | 1.9 |
| Hispanic | 1.8 |
| Asian/Pacific Islander | 1.1 |

**Table 3.6.** Mortality Rate Ratio for Oropharyngeal Cancer by Sex and Race/Ethnicity, Los Angeles County, 2000-2019.

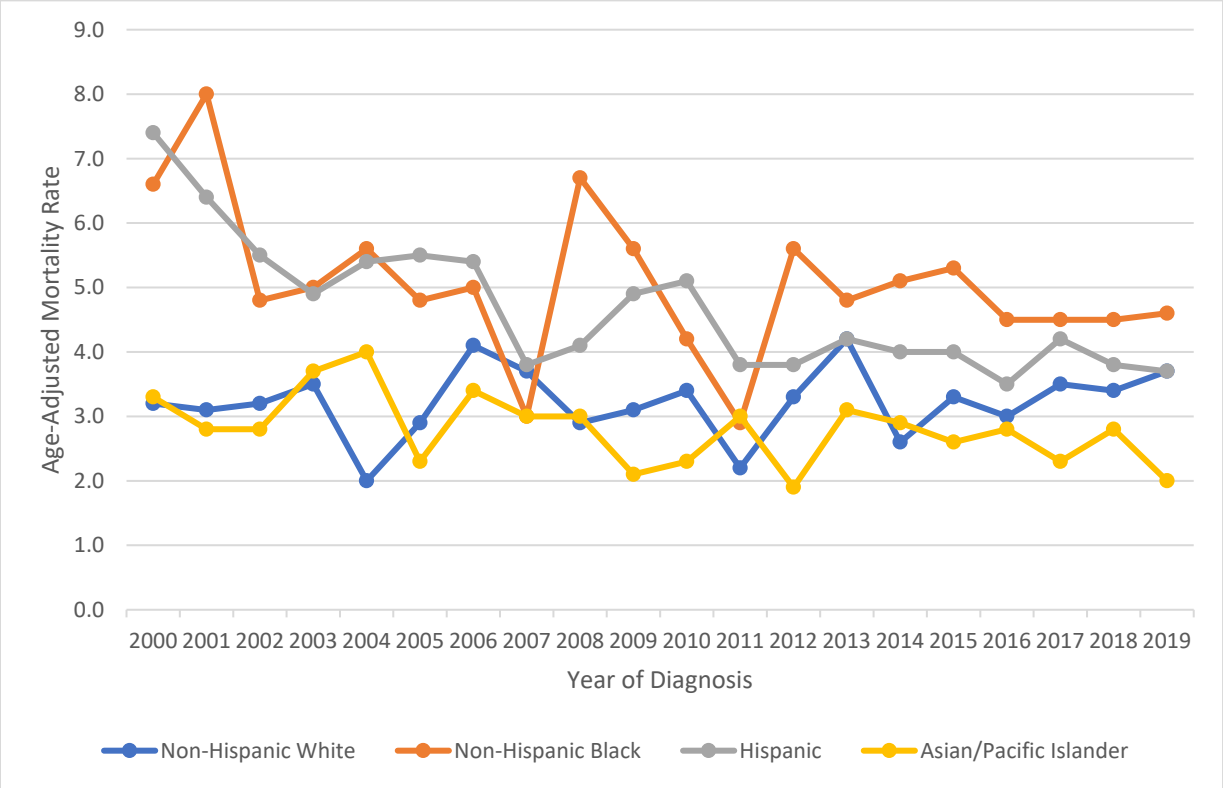
| | Male | Female | Male and Female |
|---|---|---|---|
| **Race/Ethnicity** | | | |
| Non-Hispanic White (Reference) | - | - | - |
| Non-Hispanic Black | 1.5 | 3.0 | 2.0 |
| Hispanic | 0.5 | 1.0 | 0.5 |
| Asian/Pacific Islander | 0.5 | 1.0 | 0.5 |

**Figure 3a.** Annual Age-Adjusted Mortality Rate Trends of Overall HPV-Associated Cancers by Race/Ethnicity among Males (per 100,000), Los Angeles County, 2000-2019.




- Mortality from HPV-associated cancer remained unstable for Non-Hispanic Black males over time.
- Although the mortality rates are unstable due to small numbers, the mortality rate for HPV cancers generally remained lower for Asian and Pacific Islander males.

**Figure 3b.** Annual Age-Adjusted Mortality Rate Trends of HPV-Associated Cancers by Race/Ethnicity among Females (per 100,000), Los Angeles County, 2000-2019.




- The significant disparity in mortality from HPV-associated cancer for Non-Hispanic Black women had reduced over time.
- Nonetheless, Non-Hispanic Black women still experienced the highest rate of death.
- This disparity in mortality from HPV-associated cancer for Hispanic women has also reduced over time, but they still had the second highest rate of death.

## SURVIVAL

**Table 4.1.** One- and Five-year Observed Survival from Overall HPV-Associated Cancers by Sex, Los Angeles County, 2000-2019.

| | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 Year Survival (%) | 95% CI | 5 Year Survival (%) | 95% CI | 1 Year Survival (%) | 95% CI | 5 Year Survival (%) | 95% CI |
| **Age (years)** | | | | | | | | |
| 0-29 | 94.7 | 68.1-99.2 | 72.9 | 46.4-87.8 | 92.4 | 89.2-94.7 | 77.0 | 72.2-81.1 |
| 30-39 | 93.8 | 88.4-96.7 | 67.1 | 58.5-74.3 | 94.5 | 93.3-95.4 | 79.9 | 77.9-81.8 |
| 40-49 | 89.7 | 87.3-91.6 | 72.0 | 68.6-75.2 | 92.7 | 91.7-93.7 | 74.5 | 72.7-76.3 |
| 50-64 | 86.7 | 85.3-87.9 | 62.8 | 60.9-64.8 | 87.6 | 86.5-88.7 | 63.8 | 62.0-65.4 |
| 65+ | 76.8 | 74.8-78.7 | 46.5 | 44.0-48.9 | 76.1 | 74.6-77.6 | 45.7 | 43.8-47.5 |
| **Race/Ethnicity** | | | | | | | | |
| Non-Hispanic White | 85.4 | 84.1-86.5 | 61.5 | 59.7-63.3 | 85.5 | 84.4-86.6 | 61.5 | 59.9-63.1 |
| Non-Hispanic Black | 76.7 | 73.3-79.8 | 43.7 | 39.6-47.6 | 80.0 | 77.5-82.3 | 53.2 | 50.0-56.2 |
| Hispanic | 82.5 | 80.2-84.6 | 57.4 | 54.3-60.4 | 88.8 | 87.9-89.7 | 68.0 | 66.5-69.4 |
| Asian/Pacific Islander | 86.5 | 82.1-89.9 | 60.4 | 54.3-66.0 | 88.6 | 86.8-90.2 | 66.9 | 64.2-69.4 |
| **Asian/Pacific Islander Ethnicity** | | | | | | | | |
| Chinese | 82.6 | 71.4-89.7 | 61.2 | 48.0-72.0 | 90.7 | 87.0-93.4 | 74.1 | 68.7-78.8 |
| Japanese | 82.4 | 64.9-91.7 | 50.6 | 32.4-66.3 | 92.0 | 85.7-95.6 | 65.5 | 55.8-73.6 |
| Filipino | 84.2 | 72.6-91.2 | 53.4 | 39.5-65.5 | 86.9 | 83.0-90.0 | 66.5 | 61.0-71.3 |
| Korean | 88.8 | 77.8-94.5 | 72.2 | 58.5-82.0 | 89.9 | 85.2-93.1 | 62.9 | 55.8-69.1 |
| Vietnamese | 95.8 | 73.9-99.4 | 71.3 | 46.7-86.0 | 91.3 | 84.4-95.2 | 75.2 | 65.9-82.3 |
| Other Asian Groups* | 90.1 | 77.9-95.8 | 54.6 | 37.7-68.8 | 84.0 | 78.5-88.3 | 58.8 | 51.6-65.4 |
| **Hispanic Ethnicity** | | | | | | | | |
| Mexican | 83.0 | 79.1-86.3 | 55.6 | 50.3-60.6 | 89.1 | 87.6-90.5 | 66.9 | 64.5-69.2 |
| South or Central American | 86.7 | 79.4-91.5 | 62.4 | 52.5-70.8 | 90.9 | 89.0-92.5 | 73.1 | 70.1-75.8 |
| All Other Groups[#] | 81.4 | 78.1-84.2 | 57.8 | 53.5-61.8 | 87.3 | 85.7-88.7 | 66.1 | 63.8-68.3 |
| **Socioeconomic Status** | | | | | | | | |
| Highest | 90.7 | 88.9-92.2 | 71.0 | 68.2-73.7 | 89.9 | 88.3-91.3 | 69.6 | 67.1-71.9 |
| Upper-Middle | 87.0 | 84.9-88.7 | 64.3 | 61.4-67.1 | 87.0 | 85.5-88.5 | 64.8 | 62.5-67.0 |
| Middle | 81.3 | 78.8-83.5 | 54.5 | 51.2-57.6 | 87.3 | 85.8-88.7 | 63.6 | 61.3-65.8 |
| Lower-Middle | 82.0 | 79.5-84.2 | 53.9 | 50.6-57.1 | 86.2 | 84.8-87.4 | 62.2 | 60.1-64.1 |
| Lowest | 77.4 | 74.6-79.8 | 47.7 | 44.4-50.9 | 85.7 | 84.5-86.9 | 63.6 | 61.9-65.3 |
| **Disease Stage** | | | | | | | | |
| Localized | 92.8 | 91.0-94.2 | 71.6 | 68.6-74.4 | 97.2 | 96.7-97.7 | 86.1 | 85.0-87.1 |
| Regional | 86.4 | 85.2-87.6 | 62.5 | 60.7-64.2 | 86.8 | 85.8-87.8 | 55.4 | 53.8-57.0 |
| Distant | 65.2 | 61.9-68.4 | 33.2 | 29.9-36.6 | 56.6 | 54.0-59.1 | 23.0 | 20.7-25.4 |
| Unknown | 79.0 | 74.5-82.8 | 49.8 | 44.4-55.0 | 77.5 | 74.2-80.5 | 49.9 | 45.8-53.8 |

CI: Confidence Interval

*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).

[#]: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

- The highest 5-year observed survival from overall HPV-associated cancer was found among Korean males and among Vietnamese females.
- Non-Hispanic Black males and females experience the lowest probability of survival from HPV-associated cancer than other race/ethnic groups.

**Table 4.2.** One- and Five-year Observed Survival from Invasive Cervical Cancer Among Females by Age, Race/Ethnicity, Socioeconomic Status and Disease Stage, Los Angeles County, 2000-2019.

| | 1 Year Survival (%) | 95% CI | 5 Year Survival (%) | 95% CI |
|---|---|---|---|---|
| **Age (years)** | | | | |
| 0-29 | 92.8 | 89.6-95.0 | 77.3 | 72.4-81.4 |
| 30-39 | 94.5 | 93.3-95.4 | 79.7 | 77.6-81.6 |
| 40-49 | 92.7 | 91.5-93.7 | 74.7 | 72.7-76.6 |
| 50-64 | 86.7 | 85.2-88.0 | 60.8 | 58.6-62.9 |
| 65+ | 74.1 | 71.7-76.2 | 44.2 | 41.5-46.9 |
| **Race/Ethnicity** | | | | |
| Non-Hispanic White | 85.9 | 84.3-87.3 | 63.9 | 61.6-66.0 |
| Non-Hispanic Black | 82.3 | 79.3-85.0 | 53.0 | 49.1-56.8 |
| Hispanic | 89.5 | 88.5-90.4 | 69.4 | 67.9-70.9 |
| Asian/Pacific Islander | 89.3 | 87.4-90.9 | 68.1 | 65.3-70.8 |
| **Asian/Pacific Islander Ethnicity** | | | | |
| Chinese | 92.1 | 88.4-94.7 | 75.8 | 70.0-80.6 |
| Japanese | 93.8 | 86.7-97.2 | 67.7 | 56.7-76.6 |
| Filipino | 86.9 | 82.8-90.1 | 66.4 | 60.7-71.5 |
| Korean | 90.4 | 85.6-93.7 | 64.6 | 57.2-71.1 |
| Vietnamese | 92.3 | 85.2-96.1 | 77.7 | 68.1-84.7 |
| Other Asian Groups* | 84.4 | 78.4-88.9 | 60.3 | 52.5-67.2 |
| **Hispanic Ethnicity** | | | | |
| Mexican | 89.3 | 87.7-90.7 | 67.9 | 65.4-70.3 |
| South or Central American | 91.3 | 89.3-93.0 | 74.7 | 71.5-77.6 |
| All Other Groups# | 88.6 | 86.8-90.1 | 67.7 | 65.1-70.2 |
| **Socioeconomic Status** | | | | |
| Highest | 89.9 | 87.7-91.8 | 70.4 | 67.0-73.5 |
| Upper-Middle | 88.4 | 86.4-90.1 | 67.8 | 64.9-70.4 |
| Middle | 88.4 | 86.5-90.0 | 65.2 | 62.4-67.8 |
| Lower-Middle | 87.3 | 85.8-88.8 | 65.2 | 62.8-67.4 |
| Lowest | 87.6 | 86.3-88.8 | 66.3 | 64.4-68.1 |
| **Disease Stage** | | | | |
| Localized | 98.5 | 98.0-98.8 | 90.3 | 89.2-91.3 |
| Regional | 88.0 | 86.8-89.1 | 55.2 | 53.3-57.2 |
| Distant | 53.9 | 50.9-56.9 | 19.3 | 16.8-21.9 |
| Unknown | 81.1 | 76.6-84.8 | 49.0 | 43.3-54.4 |

CI: Confidence Interval
*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).
#: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

- The highest 5-year observed survival from cervical cancer was found among Vietnamese females and the lowest among Non-Hispanic Black females.

**Table 4.3.** One- and Five-year Observed Survival from Invasive Oropharyngeal Cancer by Sex, Age, Race/Ethnicity, Socioeconomic Status and Disease Stage, Los Angeles County, 2000-2019.

| | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 Year Survival (%) | 95% CI | 5 Year Survival (%) | 95% CI | 1 Year Survival (%) | 95% CI | 5 Year Survival (%) | 95% CI |
| **Age (years)** | | | | | | | | |
| 0-29 | 83.3 | 27.3-97.5 | 83.3 | 27.3-97.5 | 100.0 | + | 75.0 | 12.8-96.1 |
| 30-39 | 92.6 | 81.5-97.2 | 73.4 | 59.3-83.3 | 95.8 | 73.9-99.4 | 87.1 | 65.2-95.7 |
| 40-49 | 88.8 | 85.7-91.3 | 75.9 | 71.8-79.5 | 85.6 | 77.3-91.1 | 65.0 | 54.7-73.6 |
| 50-64 | 86.3 | 84.8-87.7 | 62.8 | 60.5-64.9 | 83.7 | 79.6-87.0 | 60.1 | 54.8-65.0 |
| 65+ | 76.5 | 74.1-78.6 | 46.5 | 43.6-49.4 | 67.5 | 62.3-72.1 | 40.7 | 35.2-46.0 |
| **Race/Ethnicity** | | | | | | | | |
| Non-Hispanic White | 85.8 | 84.3-87.1 | 63.2 | 61.2-65.2 | 79.3 | 75.4-82.5 | 54.2 | 49.6-58.6 |
| Non-Hispanic Black | 73.0 | 68.7-76.7 | 40.6 | 35.9-45.3 | 61.1 | 52.3-68.8 | 34.5 | 26.2-42.9 |
| Hispanic | 80.2 | 77.1-82.9 | 54.8 | 50.8-58.5 | 85.3 | 79.0-89.8 | 65.2 | 56.8-72.3 |
| Asian/Pacific Islander | 85.9 | 80.9-89.6 | 61.2 | 54.4-67.3 | 80.2 | 67.8-88.3 | 60.7 | 46.2-72.3 |
| **Asian/Pacific Islander Ethnicity** | | | | | | | | |
| Chinese | 79.4 | 65.9-88.0 | 58.8 | 43.9-71.0 | 80.0 | 40.9-94.6 | 80.0 | 40.9-94.6 |
| Japanese | 82.8 | 63.4-92.4 | 50.2 | 30.7-66.9 | 86.7 | 56.4-96.5 | 52.1 | 21.7-75.7 |
| Filipino | 85.3 | 72.7-92.4 | 55.7 | 40.6-68.4 | 83.3 | 48.2-95.6 | 71.4 | 33.7-90.1 |
| Korean | 88.0 | 75.1-94.4 | 78.7 | 63.9-88.0 | 87.5 | 38.7-98.1 | 46.7 | 7.1-80.3 |
| Vietnamese | 94.4 | 66.6-99.2 | 69.3 | 41.1-85.9 | 80.0 | 20.4-96.9 | 60.0 | 12.6-88.2 |
| Other Asian Groups* | 90.7 | 77.1-96.4 | 55.1 | 36.7-70.2 | 62.3 | 27.7-84.0 | 41.6 | 13.1-68.4 |
| **Hispanic Ethnicity** | | | | | | | | |
| Mexican | 78.5 | 72.7-83.2 | 47.5 | 40.5-54.1 | 85.0 | 71.1-92.6 | 65.7 | 48.4-78.4 |
| South or Central American | 87.0 | 77.2-92.8 | 63.8 | 50.6-74.4 | 87.4 | 69.9-95.1 | 67.5 | 46.1-81.9 |
| All Other Groups# | 80.0 | 75.8-83.5 | 57.3 | 52.1-62.2 | 84.0 | 74.8-90.0 | 63.8 | 52.4-73.2 |
| **Socioeconomic Status** | | | | | | | | |
| Highest | 91.4 | 89.5-93.0 | 71.5 | 68.4-74.4 | 85.1 | 78.9-89.6 | 65.8 | 58.0-72.5 |
| Upper-Middle | 88.1 | 85.8-90.0 | 67.0 | 63.6-70.0 | 79.3 | 72.9-84.3 | 57.5 | 49.9-64.3 |
| Middle | 80.2 | 77.2-82.8 | 54.6 | 50.8-58.2 | 82.8 | 76.4-87.7 | 59.6 | 51.2-67.0 |
| Lower-Middle | 79.3 | 76.1-82.1 | 52.9 | 49.0-56.7 | 72.8 | 65.0-79.2 | 41.7 | 33.3-49.8 |
| Lowest | 73.4 | 69.8-76.6 | 43.3 | 39.3-47.3 | 68.5 | 61.2-74.7 | 42.5 | 34.9-49.9 |
| **Disease Stage** | | | | | | | | |
| Localized | 93.1 | 90.0-95.3 | 73.8 | 68.6-78.2 | 88.0 | 81.7-92.3 | 62.1 | 53.4-69.7 |
| Regional | 86.8 | 85.5-88.0 | 64.3 | 62.4-66.2 | 82.0 | 78.5-84.9 | 57.3 | 52.9-61.5 |
| Distant | 67.4 | 63.9-70.8 | 35.6 | 32.0-39.3 | 54.1 | 44.7-62.5 | 31.1 | 22.8-39.6 |
| Unknown | 75.6 | 69.2-80.9 | 50.7 | 43.2-57.6 | 51.2 | 35.1-65.2 | 39.6 | 24.3-54.6 |

CI: Confidence Interval + The statistic could not be calculated.
*: Included South Asian, Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS (not otherwise specified).
#: Included Puerto Rican, Cuban, Dominican Republic, Other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only.

- The highest 5-year observed survival from oropharyngeal cancer was found among Korean males and among Chinese females.
- Non-Hispanic Black males and females experience the lowest probability of survival oropharyngeal cancer than other race/ethnic groups.

## REGISTRY DATA COLLECTION

### THE DIVERSE POPULATION OF LOS ANGELES COUNTY

Los Angeles County is the most racially/ethnically diverse county in the U.S. The number of residents living in Los Angeles County exceeds 10 million, according to the 2018 population estimates. Hispanic or Latino individuals account for 48.5% of the County's total population, in contrast to 38.9% in California and 17.8% in the U.S.[1] The proportion of non-Hispanic Whites in Los Angeles County is 26.3%, as compared to 37.5% in California and 61.1% in the U.S.[1] About 8.5% of U.S. Latinos, 8.3% of U.S. Asian Americans, and 4.8% of U.S. Pacific Islanders live in Los Angeles County.[1] People of multi-race count for 3.9% of the County's total population, much higher than the national average of 3.2%.[1]

The 1.4 million Asian Americans in Los Angeles County include 0.4 million Chinese, 0.3 million Filipino, 0.2 million Korean, 0.1 million Japanese, 0.1 million Asian Indian and over 93,000 Vietnamese.[1] Los Angeles County is also home to more than 28,000 Native Hawaiians and Other Pacific Islanders.[1]

Among the 4.9 million self-reported Hispanics or Latinos in the County, 76% identify as Mexican, 8.4% Salvadoran, 5.2% Guatemalan, 1.0% Puerto Rican, 0.8% Cuban, 1.0% Honduran, 0.9% Nicaraguan, and 2.8% South American.[1]

About 3.5 million Los Angeles County residents are foreign-born; 14.7% of them entered the country since 2010. More than half (56.8%) of the total population five years of age or older speak a language other than English.[1]

The 2.7 million non-Latino White population also has highly diverse origins. The population of European origin includes large numbers of persons from Britain, Germany, Ireland, Italy, Russia, France, and other parts of Europe. In the past 30 years the County experienced a substantial influx of immigrants from Iran, Lebanon and the former Soviet Union. The Armenian community is estimated to be nearly 200,000. Over 53,000 individuals of Arabic descent live in Los Angeles County.[1]

Every numerically important religious group in the U.S. is represented by sizable populations. There is also a wide variation in socioeconomic and sociocultural characteristics of the Los Angeles County population. Occupation and industry data reflect the diversity one would expect of a large urban metropolis. In addition, Los Angeles County is characterized by geographic diversity, with regions of mountains, valleys, deserts, and seashores.

With its large and diverse populations, Los Angeles County is an ideal place for monitoring cancer occurrence and conducting epidemiological investigations.

## HOW CANCER IS REGISTERED

Under the California model of reporting, a passive cancer surveillance system has been implemented statewide, in which hospitals and other facilities where cancer is diagnosed or treated bear the responsibility for identifying and reporting cancer cases to the local regional registry within six months after the patient's diagnosis or treatment. Pathologists diagnosing cancer are required to submit an electronic copy of the pathology report within two weeks of diagnosis. Each hospital or other reporting facility is required to complete a full report known as an abstract, including stage and treatment information, on every cancer case seen at the facility. All completed abstracts are linked to the pathology reports to assure that one abstract is completed for each histologically-verified cancer diagnosis. In addition, any previously unrecognized cancer diagnoses among Los Angeles County residents, identified as a result of searching computerized death records, are traced back to patient records in hospitals or other facilities so that data can be abstracted, when possible, in a similar way to data found using pathology reports.

## USE OF CSP DATA FOR RESEARCH

The CSP data serve as a descriptive epidemiological resource to generate new hypotheses regarding specific cancer sites or histologic subtypes, monitor descriptive trends and patterns of cancer incidence, and identify demographic subgroups at high risk of cancer. A high priority is always placed on exploring demographic patterns and trends in cancer incidence among the racially and ethnically diverse population of Los Angeles County.

## CANCER DATA

Cancer data used in this report were based on new cancer cases diagnosed among the residents of Los Angeles County from January 1, 2000 to December 31, 2019. HPV-related cancers were defined as invasive tumors that occurred in the anatomic sites of Cervix (C53.0–C53.9), Vagina (C52.9), Vulvar (C51.0–C51.9), Penis (C60.0–60.9), Anus (C20.9, C21.0–C21.9), and Oropharynx (C01.9, C02.4, C02.8, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0, C10.1, C10.2, C10.3, C10.4, C10.8, C10.9, C14.0, C14.2, C14), as defined by the International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Histology codes of cervical carcinomas (8010–8671, 8940–8941) and squamous cell carcinomas (8050–8084, 8120–8131) for all non-cervical sites were included in the analysis.

Cancer patients were grouped by sex (male, female), age (0-29, 30-39, 40-49, 50-64, 65+ years old), race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, Asian/Pacific Islander), socioeconomic status (SES) (Highest, Upper-Middle, Middle, Lower-Middle, Lowest), and stage of disease at diagnosis (localized, regional, distant). Localized stage refers to cancer that has not spread from original location. Regional stage refers to cancer that has spread beyond original location to either nearby organs/lymph nodes, and distant stage refers to cancer that has spread to other parts of the body.

Asian/Pacific Islanders (API) were further categorized by ethnicity as Chinese, Japanese, Filipino, Korean, Vietnamese, and other API groups that included Southern Asians (including Indian, Pakistani, Sri Lankan, Nepalese, Bhutanese, and Sikkimese), Thai/Hmong/Cambodian/Laotian, Hawaiian/Samoan, and API NOS. Hispanic ethnicity was further categorized into Mexican, South or Central American, or all other groups that included Puerto Rican, Cuban, Dominican Republic, other specified Spanish/Hispanic origin, Spanish/Hispanic/Latino NOS, and surname match only. Nativity (foreign-born vs. U.S.-born) was derived from hospital reports, death certificates (if patient is deceased) or imputed from patient's social security number by its year of issuance.

The follow-up of cancer patients is conducted by the CSP through a combination of methods including information sharing from the reporting hospitals, record linkage with vital statistics, Social Security Administration, driver license information, and credit records. The follow-up information helps to determine the vital status of a cancer patient, calculate the survival time, and estimate the survival rate of the specific cancer.

## STATISTICAL METHODS

We provide cancer incident frequency (i.e., case count) and percentage distribution of cancer cases by patient demographics and tumor stage at diagnosis. In order to compare cancer risk levels among different groups, we calculate and present the age-adjusted incidence rates and age-adjusted mortality rates by considering the number of cancer occurrences and cancer related deaths, respectively, in relation to the size of the group's at-risk population. To preserve statistical stability of rate estimation and comply with the suppression rules set by the California Cancer Registry (CCR), case counts of less than 11 are not shown in tables and not used for calculating rates. Annual population estimates for 2000-2019 in Los Angeles County by aggregated racial/ethnic groups were provided by the CCR based on the county level estimates by the National Center for Health Statistics. Observed survival is the actual percentage of patients still alive at a specified time after the diagnosis of cancer. It considers deaths from all causes. As with all population-based cancer registries, the CSP does not directly contact patients for follow-up. The quality of follow-up information is critical to the survival evaluation. The accuracy of a patient's racial/ethnic classification depends largely on the patient's racial/ethnic identification recorded in the medical charts.

## MAP TECHNICAL NOTES

Case density distribution is based on latitude/longitude of patient address at diagnosis. Areas with sparse data have been suppressed. Cases that were not coded as malignant/invasive in both ICD-O-2 and ICD-O-3 were excluded. Late stage is defined as regional, distant, and unstaged cancers. Data were managed, analyzed, and mapped in ArcGIS 10.7.1 by the USC Norris Comprehensive Cancer Center Population Research Core. County boundaries were available from the U.S. Census TIGER/Line Shapefiles (2010).

**Figure 1.1d**
**ICD-O-3 Sites:** Cervical (C53.0–C53.9), Vaginal (C52.9), Vulvar (C51.0–C51.9), Penile (C60.0–60.9), Anal (C20.9, C21.0–C21.9), oropharyngeal (C01.9, C02.4, C02.8, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0, C10.1, C10.2, C10.3, C10.4, C10.8, C10.9, C14.0, C14.2, C14)
**Histology Codes:** Cervical carcinomas (8010–8671, 8940–8941), squamous cell carcinomas (8050–8084, 8120–8131) for all non-cervical sites.

**Figure 1.2d**
**ICD-O-3 Sites:** C53.0–C53.9
**Histology Codes:** 8010–8671, 8940–8941 (carcinomas).

**Figure 1.3d**
**ICD-O-3 Sites:** C01.9, C02.4, C02.8, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0, C10.1, C10.2, C10.3, C10.4, C10.8, C10.9, C14.0, C14.2, C14.8
**Histology Codes:** 8050–8084, 8120–8131 (squamous cell carcinoma)

## THE IMPORTANCE OF INVESTIGATING CANCER TRENDS

***To keep an eye on cancer rates***

Monitoring cancer rates provides clues about what causes cancer. When we observe a change in the rate of cancer that seems to follow a change in an environmental exposure, we consider the possibility of a link between the exposure and cancer. For example, at the beginning of last century, increasing lung cancer rates followed the introduction and increasing popularity of cigarettes and smoking.

***To monitor improvements in cancer outcomes***

While cancer prevention is our ultimate goal, efforts are also focused on successful treatment. An ultimate measure of treatment success is long-term survival, especially in the AYA age group with many more years of life expectancy. We seek to identify the factors associated with long-term survival to benefit future cancer patients.

***To know whether cancer control efforts are working***

We also monitor cancer rates to provide a "report card" on how well cancer prevention programs work. We generally expect that a successful intervention program, such as the introduction of the HPV (human papillomavirus) vaccine should be followed by a decline in cervical and other HPV-related cancer rates.

***To decide what resources are required to fight cancer***

Because cancer is such an important health problem and is costly in terms of treatment and social costs, such as loss of work time and quality of life, it is important to have a clear idea of the changing burden of cancer on society. Government officials and policymakers use trends in cancer rates to determine funding for screening, treatment and related social services, as well as to establish priorities for supporting effective research into the causes and prevention of cancer and the development of treatments.

***To see the effect of changes in cancer screening and detection methods***

Many things can cause changes in cancer rates, including changes in the distribution of the factors that cause the disease, changes in our ability to prevent or detect cancer early, changes in the population, changes in diagnostic criteria to define a type of cancer, and even simple random variation.

***To make cancer a disease of the past***

Keeping an eye on cancer rates provides clues about the causes of cancer, how successful we are at preventing cancer, and where we should focus our efforts in the future to make cancer a disease of the past.

## PROTECTION OF CONFIDENTIALITY

Confidentiality procedures at the CSP are rigidly formulated and maintained. All employees of the CSP sign a confidentiality pledge after being advised of the necessity for maintaining strict confidentiality of patient information, and are shown methods to assure this. Confidentiality of computerized data is assured by highly restricted access and protected by encryption. All reports and summaries produced for distribution by the CSP, such as those presented here, are in statistical form without any personal identifiers. All individual studies using confidential information obtained from the registry are individually reviewed by the California Protection of Human Subjects Board. For studies from outside investigators, review and approval by a federally approved institutional review board is required.

## REFERENCE

1. U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates.

## CERVICAL CANCER SCREENING GUIDELINES

The U.S. Preventive Services Task Force has updated its 2012 recommendation on screening for cervical cancer. These guidelines apply to all asymptomatic individuals with a cervix, regardless of sexual history, and are displayed in Figure 1 below. Women at increased risk for cervical cancer, such as those with HIV infection, in utero exposure to diethylstilbestrol, or previous precancerous lesion or cervical cancer, are not included in these screening guidelines and should get individualized follow-up.

**Figure 1.** U.S. Preventive Services Task Force Screening for Cervical Cancer Summary[1]

| Population | Women aged 21 to 29 years | Women aged 30 to 65 years | Women younger than 21 years, women older than 65 years with adequate prior screening, and women who have had a hysterectomy |
|---|---|---|---|
| Recommendation | Screen for cervical cancer every 3 years with cytology alone.<br><br>Grade: A | Screen for cervical cancer every 3 years with cytology alone, every 5 years with hrHPV testing alone, or every 5 years with cotesting.<br>Grade: A | Do not screen for cervical cancer.<br><br>Grade: D |

| | |
|---|---|
| Risk Assessment | All women aged 21 to 65 years are at risk for cervical cancer because of potential exposure to high-risk HPV types (hrHPV) through sexual intercourse and should be screened. Certain risk factors further increase risk for cervical cancer, including HIV infection, a compromised immune system, in utero exposure to diethylstilbestrol, and previous treatment of a high-grade precancerous lesion or cervical cancer. Women with these risk factors should receive individualized follow-up. |
| Screening Tests | Screening with cervical cytology alone, primary testing for hrHPV alone, or both at the same time (cotesting) can detect high-grade precancerous cervical lesions and cervical cancer. Clinicians should focus on ensuring that women receive adequate screening, appropriate evaluation of abnormal results, and indicated treatment, regardless of which screening strategy is used. |
| Treatments and Interventions | High-grade cervical lesions may be treated with excisional and ablative therapies. Early-stage cervical cancer may be treated with surgery (hysterectomy) or chemotherapy. |

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to https://www.uspreventiveservicestaskforce.org.

The American Cancer Society strongly recommends that individuals with a cervix begin screening at 25 years of age with a primary HPV test every 5 years through age 65 years. However, access to primary HPV testing may continue to be limited in many regions throughout the United States. In these settings, individuals ages 25 through 65 years may be screened with either HPV testing in combination with cytology every 5 years or cytology alone every 3 years.[2]

## CERVICAL CANCER SCREENING AMONG WOMEN IN LOS ANGELES COUNTY

**Table 1.** Percent of Women (Ages 21 to 65 Years) Who Reported Having a Pap Test Within the Past 3 Years, Los Angeles County Health Survey, 2018, 2015, and 2011.

| | 2018 | | 2015 | | 2011 | |
|---|---|---|---|---|---|---|
| | % | 95% CI | % | 95% CI | % | 95% CI |
| **Total** | 81.4 (79.4-83.5) | | 84.4 (82.5-86.3) | | 85.5 (83.8-87.3) | |
| **Age Group** | | | | | | |
| 21-24 | 60.2 | 50.9-69.5 | 70.3 | 61.8-78.8 | 74.8 | 66.4-83.3 |
| 25-29 | 82.8 | 76.5-89.1 | 91.0 | 86.5-95.5 | 86.9 | 81.2-92.6 |
| 30-39 | 85.7 | 81.8-89.5 | 86.5 | 82.8-90.1 | 91.3 | 88.5-94.1 |
| 40-49 | 84.8 | 80.8-88.7 | 87.0 | 83.5-90.4 | 86.5 | 83.3-89.7 |
| 50-59 | 84.1 | 80.3-88.0 | 84.6 | 81.0-88.2 | 83.3 | 79.9-86.8 |
| 60-65 | 77.2 | 71.4-83.0 | 79.1 | 73.5-84.6 | 80.2 | 74.3-86.1 |
| **Race/Ethnicity** | | | | | | |
| Hispanic | 82.3 | 79.5-85.0 | 85.7 | 83.0-88.3 | 89.5 | 87.4-91.6 |
| White | 82.6 | 79.0-86.2 | 86.6 | 83.6-89.6 | 85.5 | 81.9-89.2 |
| African American | 82.4 | 76.4-88.4 | 89.3 | 85.1-93.4 | 91.5 | 87.9-95.1 |
| Asian | 73.6 | 65.2-82.1 | 73.9 | 67.1-80.7 | 68.6 | 62.2-75.1 |
| **Education** | | | | | | |
| Less than high school | 83.4 | 79.1-87.6 | 84.5 | 80.5-88.5 | 90.0 | 87.2-92.7 |
| High school | 81.2 | 76.1-86.4 | 83.5 | 79.0-88.0 | 80.5 | 75.3-85.7 |
| Some college or trade school | 78.4 | 74.0-82.8 | 82.6 | 78.7-86.6 | 84.6 | 80.7-88.4 |
| College or post graduate degree | 82.8 | 79.5-86.1 | 86.9 | 84.4-89.5 | 85.3 | 82.5-88.2 |
| **Federal Poverty Level[1]** | | | | | | |
| 0%-99% FPL | 77.5 | 72.9-82.0 | 84.2 | 80.5-87.8 | 85.6 | 81.9-89.2 |
| 100%-199% FPL | 82.1 | 78.2-86.0 | 81.7 | 77.7-85.7 | 82.5 | 78.5-86.4 |
| 200%-299% FPL | 79.3 | 73.3-85.3 | 79.3 | 72.7-86.0 | 86.4 | 82.0-90.9 |
| 300% or above FPL | 84.9 | 81.7-88.1 | 88.4 | 85.9-91.0 | 87.3 | 84.6-89.9 |
| **Disability** | | | | | | |
| Yes | 80.1 | 75.8-84.5 | 82.4 | 78.3-86.4 | 82.7 | 78.6-86.8 |
| No | 81.7 | 79.4-84.1 | 84.9 | 82.8-87.0 | 86.2 | 84.3-88.2 |
| **Service Planning Area** | | | | | | |
| Antelope Valley | 76.7 | 68.4-85.0 | 89.3 | 85.7-92.8 | 83.9 | 76.0-91.8 |
| San Fernando | 79.8 | 75.4-84.2 | 88.2 | 85.1-91.3 | 86.6 | 82.9-90.3 |
| San Gabriel | 80.9 | 75.2-86.5 | 81.2 | 76.3-86.1 | 80.9 | 76.4-85.4 |
| Metro | 80.9 | 74.4-87.4 | 78.4 | 71.6-85.1 | 84.9 | 79.6-90.1 |
| West | 90.2 | 83.9-96.5 | 88.7 | 82.6-94.9 | 82.9 | 73.7-92.1 |
| South | 82.4 | 76.9-87.8 | 84.2 | 78.8-89.7 | 90.2 | 86.3-94.1 |
| East | 79.6 | 73.5-85.7 | 85.9 | 80.7-91.2 | 86.8 | 82.2-91.4 |
| South Bay | 82.8 | 77.6-88.0 | 83.1 | 77.5-88.6 | 87.7 | 83.5-91.9 |

Source: 2018, 2015, & 2011 Los Angeles County Health Survey; Office of Health Assessment and Epidemiology, Los Angeles County Department of Public Health.

[1] Based on the U.S. Census 2016 Federal Poverty Level (FPL) thresholds which for a family of four (2 adults, 2 dependents) correspond to annual incomes of $24,339 (100% FPL), $48,678 (200% FPL), and $73,017 (300% FPL).

## OROPHARYNGEAL CANCER SCREENING GUIDELINES

There is currently no recommendation for the screening of oropharyngeal cancer in asymptomatic adults.[3] Regular dental or physician check-up with examination of the entire oral cavity is important in early detection. However, adults at increased risk for oropharyngeal cancer include those who use tobacco, drink excessive amounts of alcohol, or have HPV. It is important that these individuals receive an annual oral cancer screening.

## HPV VACCINATION GUIDELINES

The Centers for Disease Control and Prevention (CDC)'s Advisory Committee on Immunization Practices (ACIP) recommends routine HPV vaccination at 11 or 12 years of age.[4] Vaccination can begin as early as age 9 and is also strongly recommended for individuals up to 26 years of age if they were not adequately vaccinated before. For those who are 27 through 45 years of age, HPV vaccination benefits can be discussed with a clinical provider.

The HPV vaccine is a series of either two or three doses, depending on age. This vaccine prevents new HPV infections and is most effective if given prior to exposure to the HPV. Most adults who are sexually active have already been exposed to the virus. No serious adverse events have been associated with the HPV vaccine. The most common adverse event reported is local reaction(s) at site of injection.

**Table 2.** Percent of Adult Women (Ages 18 to 26 Years) Who Have Received At least One Dose of HPV Vaccine, Los Angeles County Health Survey, 2018 and 2011.

| | 2018 | | 2011 | |
|---|---|---|---|---|
| | % | 95% CI | % | 95% CI |
| **Total** | 58.0 (51.1-64.9) | | 24.1 (19.1-29.1) | |
| **Race/Ethnicity** | | | | |
| Hispanic | 56.5 | 47.5-65.5 | 16.6 | 11.4-21.8 |
| White | 66.6 | 50.0-83.1 | 37.2 | 24.5-49.9 |
| African American | 60.3 | 42.5-78.2 | 32.8* | 16.5-49.1 |
| Asian | 53.0 | 33.3-72.6 | 24.7* | 7.3-42.1 |
| **Education** | | | | |
| Less than high school | - | - | 13.1* | 4.6-21.7 |
| High school | 58.7 | 46.7-70.6 | 31.2 | 20.9-41.5 |
| Some college or trade school | 63.3 | 52.0-74.6 | 22.2 | 13.9-30.6 |
| College or post graduate degree | 56.9 | 43.4-70.4 | 31.1 | 17.9-44.3 |
| **Federal Poverty Level** | | | | |
| 0%-99% FPL | 47.9 | 34.3-61.4 | 18.9 | 11.0-26.8 |
| 100%-199% FPL | 55.7 | 43.8-67.6 | 25.2 | 15.3-35.1 |
| 200%-299% FPL | 69.5 | 54.6-84.4 | 31.1 | 17.6-44.7 |
| 300% or above FPL | 61.8 | 47.6-76.1 | 26.5 | 16.2-36.8 |
| **Service Planning Area** | | | | |
| Antelope Valley | 55.7 | 29.2-82.2 | 14.0* | 0.0-27.9 |
| San Fernando | 53.3 | 38.9-67.8 | 22.1* | 11.8-32.4 |
| San Gabriel | 57.9 | 39.1-76.8 | 23.9* | 11.4-36.4 |
| Metro | 60.2 | 42.4-78.1 | 17.0* | 5.4-28.6 |
| West | - | - | - | - |
| South | 63.0 | 47.2-78.7 | 22.8* | 11.7-33.9 |
| East | 60.2 | 40.8-79.6 | 31.1* | 17.0-45.2 |
| South Bay | 56.0 | 37.0-75.0 | 26.5* | 11.8-41.2 |

Source: 2018, 2011, & 2007 Los Angeles County Health Surveys; Office of Health Assessment and Epidemiology, Los Angeles County Department of Public Health.

* The estimate is statistically unstable and therefore many not be appropriate to use for planning or policy purposes. Estimates from the 2007 survey have a relative standard error ≥ 23% and were not reported for this reason.

- For the purposes of confidentiality, results with cell sizes less than 5 are not reported.

**Table 3.** Percent of Adolescents (Ages 11 to 17 Years) Who Have Received at Least One Dose of HPV Vaccine, by Gender, Los Angeles County Health Survey, 2018.

| | Male | | Female | | Male and Female | |
|---|---|---|---|---|---|---|
| | % | 95% CI | % | 95% CI | % | 95% CI |
| **Total** | 41.2 (36.7-45.7) | | 53.4 (48.7-58.2) | | 47.2 (43.9-50.5) | |
| **Adolescent Characteristics** | | | | | | |
| **Race/Ethnicity** | | | | | | |
| Hispanic | 42.6 | 36.8-48.3 | 49.5 | 43.2-55.7 | 45.8 | 41.5-50.0 |
| White | 42.8 | 32.8-52.7 | 61.1 | 51.7-70.6 | 52.5 | 45.5-59.6 |
| African American | 40.6 | 28.6-52.7 | 49.4 | 34.4-64.3 | 44.8 | 35.3-54.3 |
| Asian | 27.3 | 12.9-41.6 | 60.7 | 44.5-77.0 | 45.1 | 33.2-57.0 |
| **Respondent/Parent Characteristics** | | | | | | |
| **Race/Ethnicity** | | | | | | |
| Hispanic | 40.5 | 34.5-46.5 | 49.9 | 43.6-56.2 | 44.9 | 40.5-49.3 |
| White | 46.0 | 37.2-54.8 | 61.5 | 52.5-70.6 | 54.3 | 47.8-60.7 |
| African American | 39.8 | 27.7-51.8 | 49.8 | 35.3-64.3 | 44.6 | 35.3-54.0 |
| Asian | 19.6* | 7.2-32.0 | 54.9 | 35.4-74.5 | 38.5 | 25.3-51.6 |
| **Education** | | | | | | |
| Less than high school | 38.1 | 29.4-46.8 | 49.5 | 39.7-59.4 | 43.3 | 36.7-49.9 |
| High school | 51.6 | 40.3-62.9 | 46.3 | 34.8-57.9 | 49.2 | 41.1-57.3 |
| Some college or trade school | 41.0 | 31.2-50.8 | 53.0 | 43.3-62.7 | 46.8 | 39.7-53.8 |
| College or post graduate degree | 38.7 | 31.6-45.8 | 59.1 | 51.2-67.0 | 49.7 | 44.2-55.2 |
| **Federal Poverty Level[1]** | | | | | | |
| 0%-99% FPL | 44.7 | 36.2-53.3 | 48.8 | 39.8-57.9 | 46.7 | 40.4-52.9 |
| 100%-199% FPL | 37.1 | 28.6-45.7 | 52.6 | 43.1-62.1 | 44.1 | 37.6-50.5 |
| 200%-299% FPL | 35.3 | 23.6-46.9 | 37.8 | 25.9-49.7 | 36.5 | 28.2-44.8 |
| 300% or above FPL | 43.3 | 35.6-51.0 | 63.7 | 56.0-71.3 | 54.2 | 48.5-59.8 |
| **Service Planning Area** | | | | | | |
| Antelope Valley | 38.8 | 22.5-55.1 | 40.5 | 24.9-56.0 | 39.6 | 28.2-51.0 |
| San Fernando | 40.2 | 30.9-49.5 | 53.6 | 42.8-64.4 | 47.0 | 39.9-54.2 |
| San Gabriel | 44.0 | 31.4-56.6 | 50.5 | 37.6-63.4 | 47.1 | 38.1-56.1 |
| Metro | 42.2 | 30.7-53.6 | 47.6 | 32.8-62.4 | 44.7 | 35.4-53.9 |
| West | 47.7 | 34.3-61.1 | 66.2 | 53.2-79.2 | 57.6 | 47.8-67.4 |
| South | 39.4 | 28.1-50.6 | 41.9 | 29.9-53.9 | 40.6 | 32.4-48.9 |
| East | 38.3 | 25.5-51.1 | 56.0 | 43.1-68.8 | 47.1 | 37.6-56.5 |
| South Bay | 41.5 | 30.1-53.0 | 65.7 | 55.3-76.2 | 53.1 | 44.7-61.4 |

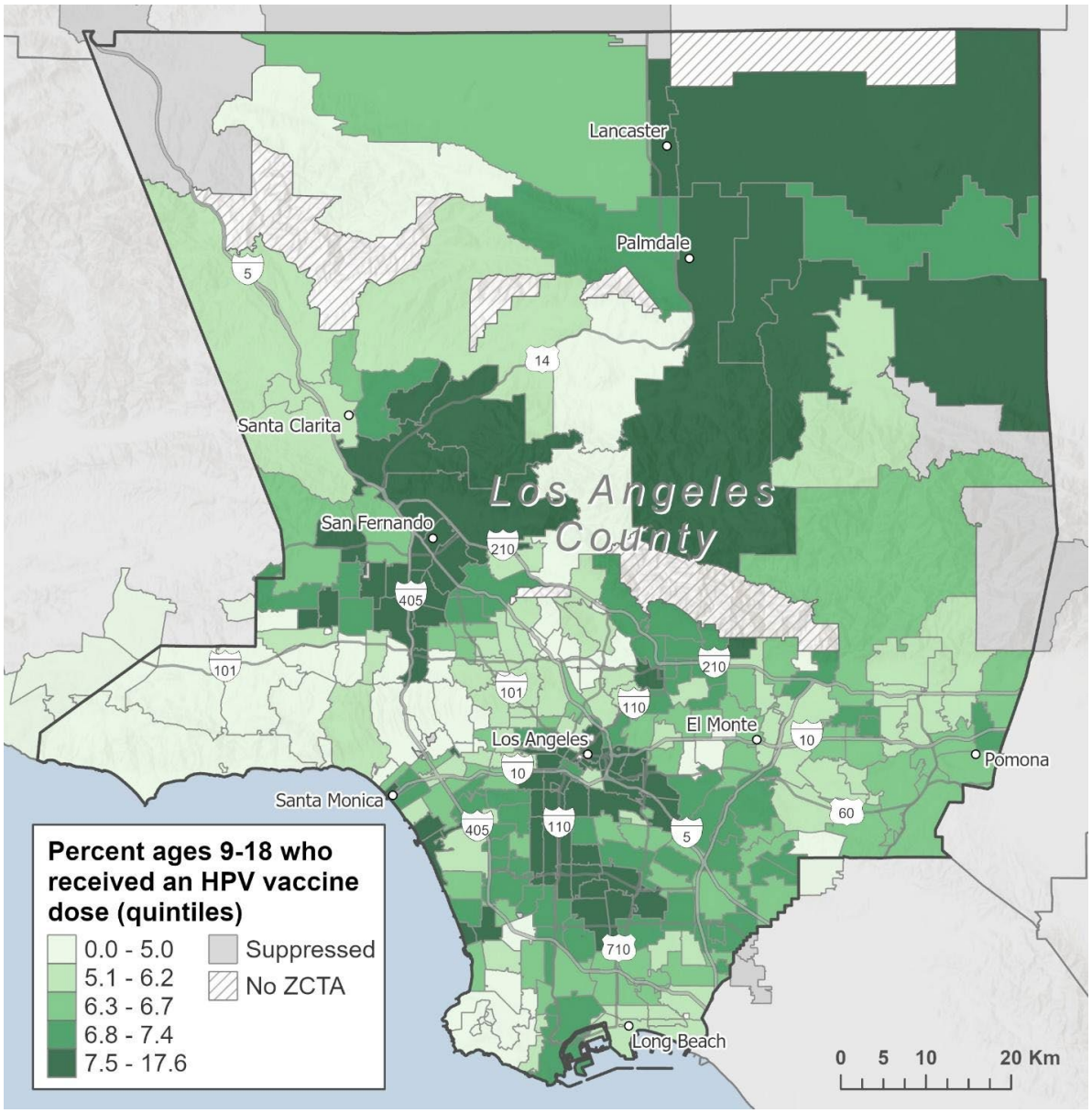
Source: 2018 Los Angeles County Health Survey; Office of Health Assessment and Epidemiology, Los Angeles County Department of Public Health.

* The estimate is statistically unstable and therefore many not be appropriate to use for planning or policy purposes.

[1] Based on the U.S. Census 2016 Federal Poverty Level (FPL) thresholds which for a family of four (2 adults, 2 dependents) correspond to annual incomes of $24,339 (100% FPL), $48,678 (200% FPL), and $73,017 (300% FPL).

## HPV VACCINATION AMONG ADOLESCENTS IN LOS ANGELES COUNTY

**Figure 2.** Average Annual Percent of Persons Who Received at least 1 HPV Vaccine Dose, Ages 9-18, by ZIP Code Tabulation Area (ZCTA), Los Angeles County, January 2007-October 2021, California Immunization Registry (CAIR).




Footnote/Metadata: Immunization data came from the California Department of Public Health Center for Infectious Diseases. Data represent the count of persons per ZIP Code who received a vaccine dose between the ages of 9-18 from 1/1/2017–10/31/2021 divided by the 2010 Census Decennial population count for those ages 9-18 per ZCTA and divided by the total number of years of vaccination data (n=5). ZIP Codes with counts of <11 persons were suppressed. Patients listing a PO Box ZIP Code could not be mapped and were excluded. Data were managed, analyzed, and mapped in ArcGIS Pro 2.8 by the USC Norris Comprehensive Cancer Center Population Research Core. County and ZCTA boundaries were available from the US Census TIGER/Line Shapefiles (2010).

- The highest HPV vaccination rates for those ages 9 to 18 were found in central Los Angeles County, San Fernando and surrounding areas, and northeast Los Angeles County (Lancaster and Palmdale).

## CERVICAL CANCER PREVENTION AND CONTROL INITIATIVES AT THE NORRIS COMPREHENSIVE CANCER CENTER (NCCC)

The Norris Comprehensive Cancer Center currently has several initiatives targeting cervical cancer prevention and control. These efforts aim to reduce the cervical cancer and HPV related disparities in marginalized communities in Los Angeles County.

### The National Outreach Network Community Health Educator (NON-CHE) Program

These educational workshops are offered to increase knowledge of clinical trials, HPV infection awareness, and vaccination uptake for Hispanic/Latinx residents of Los Angeles County that are 18 years or older. Health educators deliver the workshops in Spanish and English. This program is based out of the Office of Community Outreach and Engagement (COE). For more information visit: https://uscnorriscancer.usc.edu/non-che-program/.

### Es Tiempo

This campaign is in the Boyle Heights area of Los Angeles County. It utilizes the purple jacaranda trees that bloom between April to June as a cue for women to get screened for cervical cancer, get the HPV vaccine, and to get their children vaccinated as well. This campaign is a partnership with USC Norris, the Keck School of Medicine, the Annenberg School for Communication and Journalism, the Designmatters Program at the Art Center College of Design, and the Center for Health Equity in the Americas. For more information go to: https://designmattersatartcenter.org/proj/es-tiempo/.

### Tamale Lesson

This is a video-based intervention that encourages Latino/x women to get screened for cervical cancer. The multimedia intervention includes a video, a magazine type of article and other deliverables in both Spanish and English. The story revolves around a discussion about HPV infection during preparations for a quinceañera, a coming of age celebration, planned for the 15th birthday for the youngest daughter of the Olivers, a Mexican American family. A discussion of HPV infection, the HPV vaccine and screening takes place among the Oliver sisters, the mother and a close family friend. To view Tamale Lesson go to: https://m.youtube.com/watch?v=Lyhv9KmLroc.

**Partnership with USC Neighborhood Academic Initiative to Understand Parental HPV Vaccine Hesitancy**

This partnership project, funded by the National Cancer Institute 2020-2021, between USC Norris Comprehensive Cancer Center (NCCC) and USC Leslie and William McMorrow Neighborhood Academic Initiative (NAI) focused on understanding HPV vaccine hesitancy in low-uptake communities within the NCCC catchment area (Los Angeles County), including Hispanic/Latino and Chinese communities. Parents of adolescents, ages 9-17 years, completed the survey in either English, Spanish, or Chinese, and one-fifth reported high HPV vaccine hesitancy and >50% reported concerns about safety or side effects. . High medical mistrust was also associated with high parental HPV vaccine hesitancy. The USC NCCC team developed infographics (below) in multiple languages to address hesitancy issues raised by parents and is in the process of developing a multilevel intervention to engage both adolescents and parents in vaccination.

**Partnership with Chinatown Service Center to Improve Equity in Cervical Cancer Screening**

This partnership project, funded by Health Resources Services Administration, aims to increase equitable access to cancer screening and referral for care and treatment by enhancing education, case management, outreach, and other enabling services, or coordination within Chinatown Service Center (CSC). As one of 11 community health centers funded for “first-of-its-kind” partnerships with NCI-Cancer Centers, USC Norris Comprehensive will deploy outreach specialists and patient navigators to increase capacity and workforce development for cervical cancer screening outreach, uptake, referral, and follow-up care for populations served by CSC.

HRSA Health Center Program

華埠服務中心
Chinatown Service Center

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