

HPV-Associated Cancers in Texas, 2011-2015

Prepared by the Texas Cancer Registry
Texas Department of State Health Services

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Background

- Human papillomaviruses (HPVs) are associated with increased risk of at least seven different types of cancer.
- This statistical report describes the burden of HPV-associated cancers in Texas, focusing on the most recent 5 years of data available—2011 to 2015.

Implications for Public Health Practice:

- The burden of HPV-associated cancers may be reduced through efforts aimed at preventing and controlling HPV infection.
- Comprehensive cancer control strategies, including use of evidence-based interventions to prevent HPV infection, could help decrease the incidence of these cancers in Texas.

What are human papillomaviruses?

Human papillomaviruses (HPVs) are a group of more than 200 related viruses. More than 40 HPV types can be easily spread through direct sexual contact, from the skin and mucous membranes of infected people to the skin and mucous membranes of their partners. Other HPV types are responsible for non-genital warts, which are not sexually transmitted. Sexually transmitted HPV types fall into two categories:

- Low-risk HPVs, which do not cause cancer but can cause skin warts on or around the genitals and anus. For example, HPV types 6 and 11 cause 90% of all genital warts. HPV types 6 and 11 also cause recurrent respiratory papillomatosis, a less common disease in which benign tumors grow in the air passages leading from the nose and mouth into the lungs.
- High-risk HPVs, which can cause cancer. About a dozen high-risk HPV types have been identified. Two of these, HPV types 16 and 18, are responsible for most HPV-caused cancers.

Most high-risk HPV infections occur without any symptoms, go away within 1 to 2 years, and do not cause cancer. Some HPV infections, however, can persist for many years. Persistent infections with high-risk HPV types can lead to cell changes that, if untreated, may progress to cancer.

Percent of Cancers Attributable to HPV

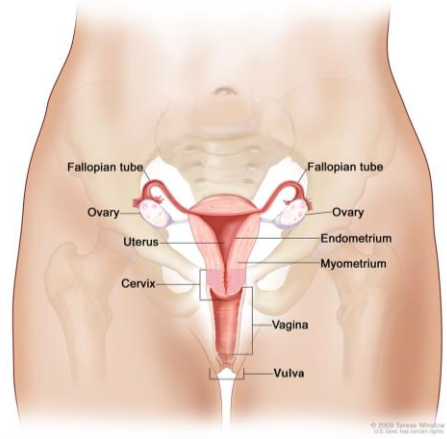
In the United States, high-risk HPV types cause approximately **3% of all cancer cases among women** and **2% of all cancer cases among men**.

- **Cervical cancer:** Virtually all cases of cervical cancer are caused by HPV, and two HPV types, 16 and 18, are responsible for about 70% of all cases.
- **Anal cancer:** About 95% of anal cancers are caused by HPV. Most of these are caused by HPV type 16.
- **Oropharyngeal cancers** (cancers of the middle part of the throat—including the soft palate, the base of the tongue, and the tonsils): About 70% of oropharyngeal cancers are caused by HPV. In the United States, more than half of cancers diagnosed in the oropharynx are linked to HPV type 16.
- Among rarer cancers, HPV causes—
 - About 70% of **vaginal** and **vulvar cancers**
 - More than 60% of **penile cancer**
 - About 90% of **rectal cancer**

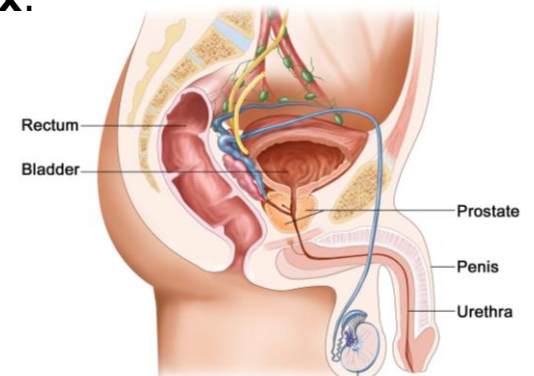
Sources: HPV and Cancer, National Cancer Institute (NCI). <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-fact-sheet>; HPV-Associated Cancer Statistics, Centers for Disease Control and Prevention (CDC). <https://www.cdc.gov/cancer/hpv/statistics/index.htm>

What are HPV-Associated Cancers?

- In this report, HPV-associated cancers are defined as those that occur in specific anatomic sites with specific cell types where HPV is often found, because the TCR, along with other cancer registries, do not routinely collect information about HPV status.
- The specific cell types include carcinomas of the **cervix** and squamous cell carcinomas of the **vagina, vulva, penis, anus, rectum, and oropharynx**.

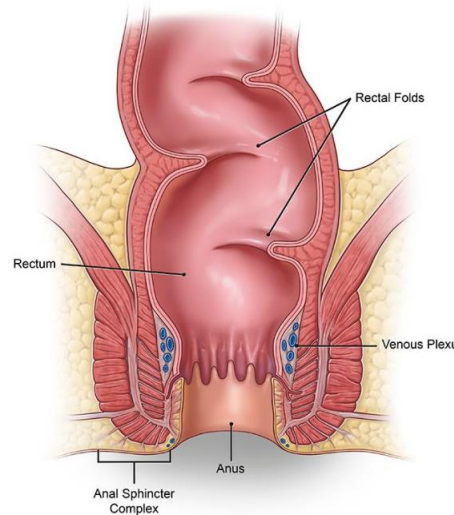
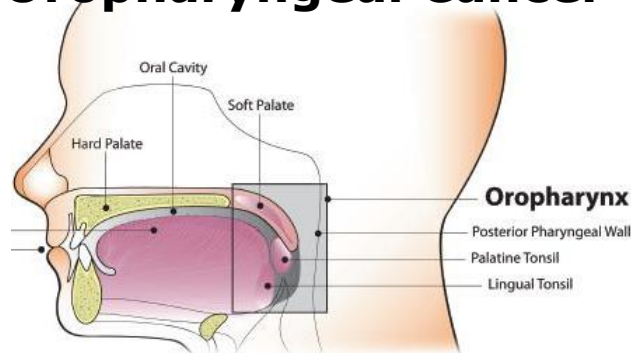


Cervical Cancer
Vaginal Cancer
Vulvar Cancer



Penile Cancer

Oropharyngeal Cancer



Anal Cancer
Rectal Cancer

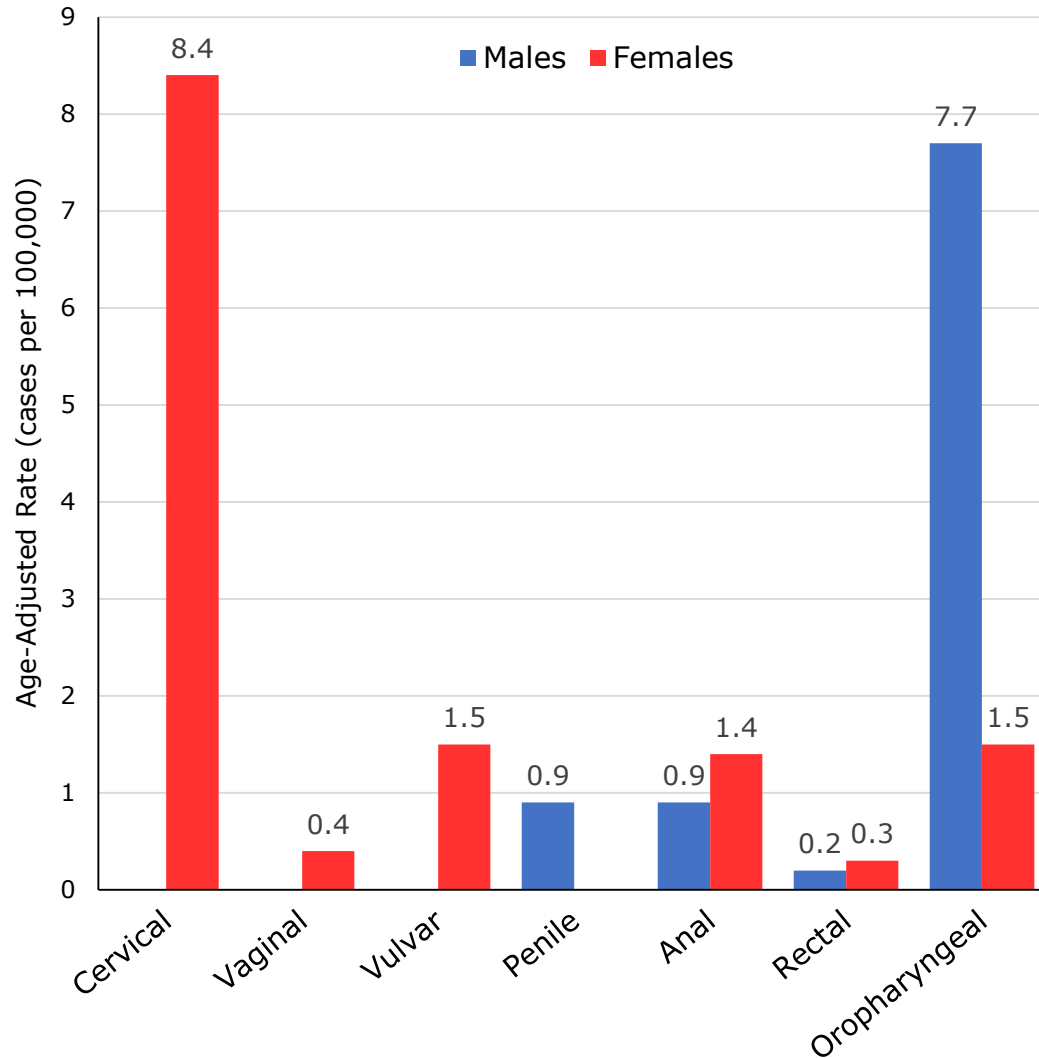
Age-Adjusted Incidence Rates, HPV-Associated Cancers, Texas, 2011-2015

- From 2011 to 2015, a total of 15,353 cases of HPV-associated cancers were diagnosed in Texas.
- Incidence rates were highest for cervical cancer compared to rates for other HPV-associated cancers, at 8.4 cases per 100,000 women.
- HPV-associated oropharyngeal cancer was the most common type of cancer overall, with 6,076 cases diagnosed from 2011-2015.
- HPV-associated vaginal and anal cancers were both relatively rare with incidence rates of 0.4 and 0.3 per 100,000 respectively.

	Rate	Confidence Interval		Count
		Lower	Upper	
Cervical Cancer (<i>females only</i>)	8.4	8.2	8.7	5,525
Vaginal Cancer (<i>females only</i>)	0.4	0.4	0.5	285
Vulvar Cancer (<i>females only</i>)	1.5	1.4	1.6	1,026
Penile Cancer (<i>males only</i>)	0.9	0.8	1.0	520
Anal Cancer	1.2	1.1	1.3	1,589
Rectal Cancer	0.3	0.2	0.3	332
Oropharyngeal Cancer	4.4	4.3	4.5	6,076
All HPV-Associated Cancers	11.6	11.5	11.8	15,353

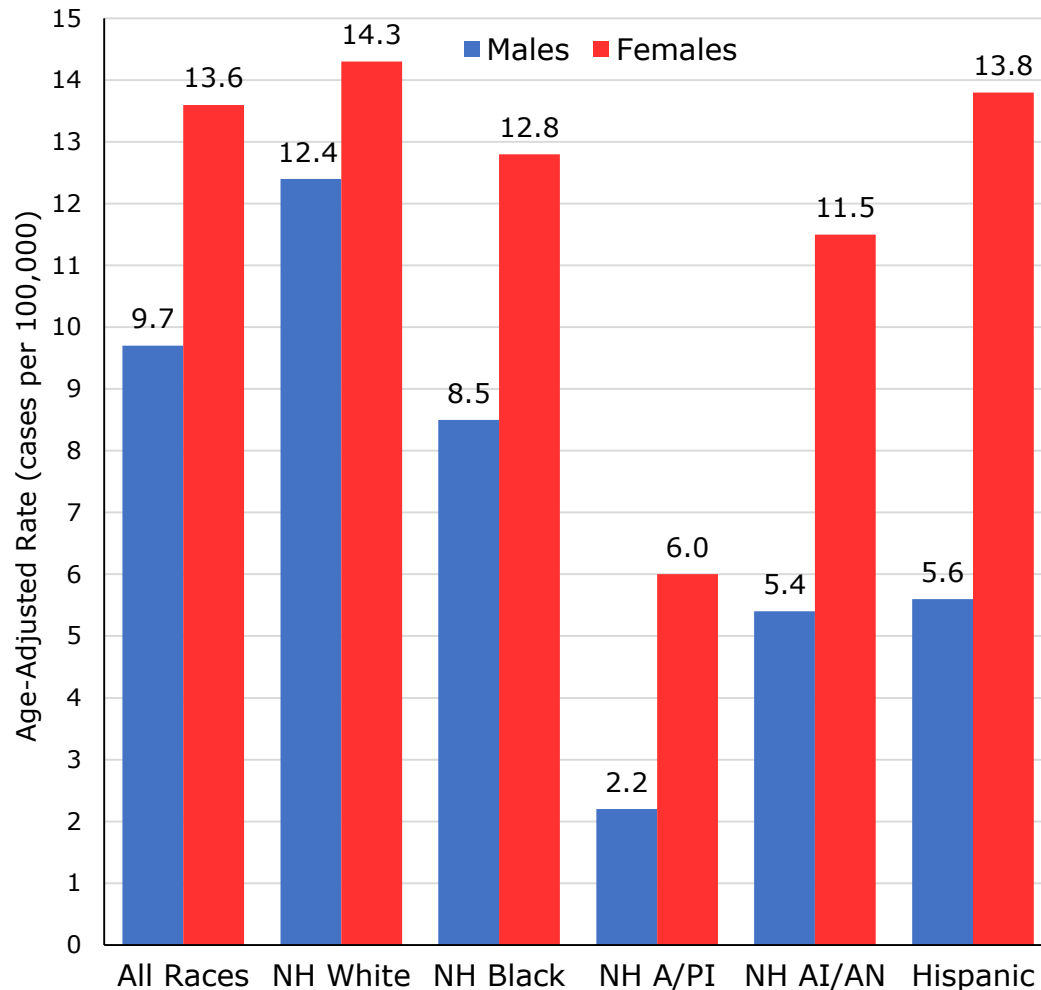
Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population (19 age groups - Census P25-1130). Confidence Intervals (CI) are 95% for rates (Tiwarei mod). Confidence intervals provide a range of values that have a specified probability of containing the rate or trend. For 95% confidence intervals, it can be stated that 95% of the time the true rate will lie within these limits. Counts are total cases for the 5 year period, 2011-2015.

HPV-Associated Cancer Incidence Rates by Sex and Cancer Site, 2011-2015



- In women, incidence rates were highest for cervical cancer compared to rates for other HPV-associated cancers.
- In men, incidence rates were highest for oropharyngeal cancer compared to rates for other HPV-associated cancers.
- Oropharyngeal cancer incidence rates were 5 times higher in men than in women.
- HPV-associated rectal cancer is rare in both men and women at 0.2 and 0.3 cases per 100,000 respectively.

HPV-Associated Cancer Incidence Rates by Sex and Race/Ethnicity, 2011-2015

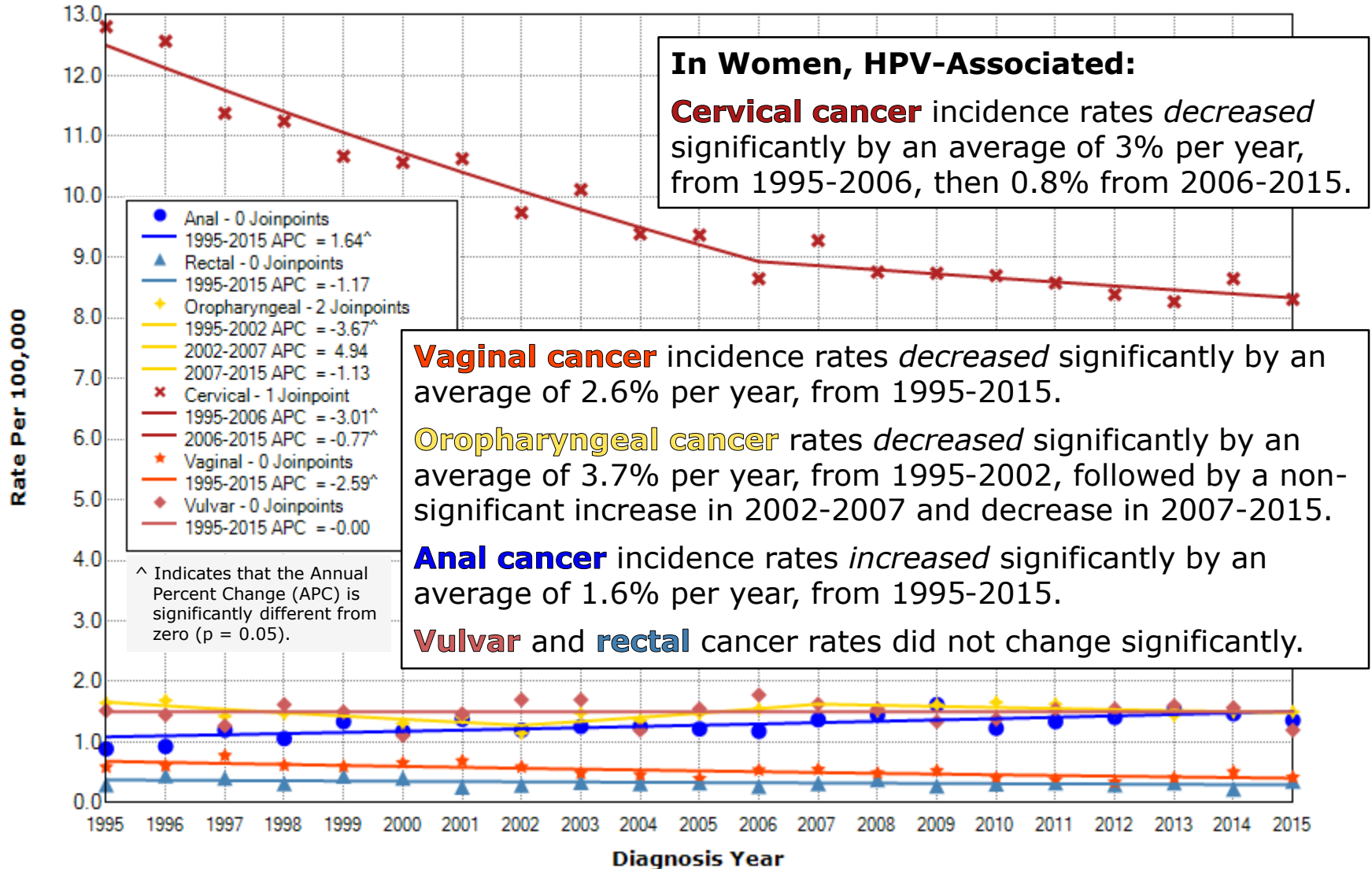


- Women had higher incidence rates of HPV-associated cancers than men for all race/ethnicity groups.
- Non-Hispanic Whites had the highest rates of HPV-associated cancers, among both men and women.
- Non-Hispanic Asians/Pacific Islanders had the lowest rates of HPV-associated cancer for both men and women.
- Incidence rates in women were more than twice the rates of men for Non-Hispanic Asians/Pacific Islanders, American Indians/Native Alaskans, and Hispanics.

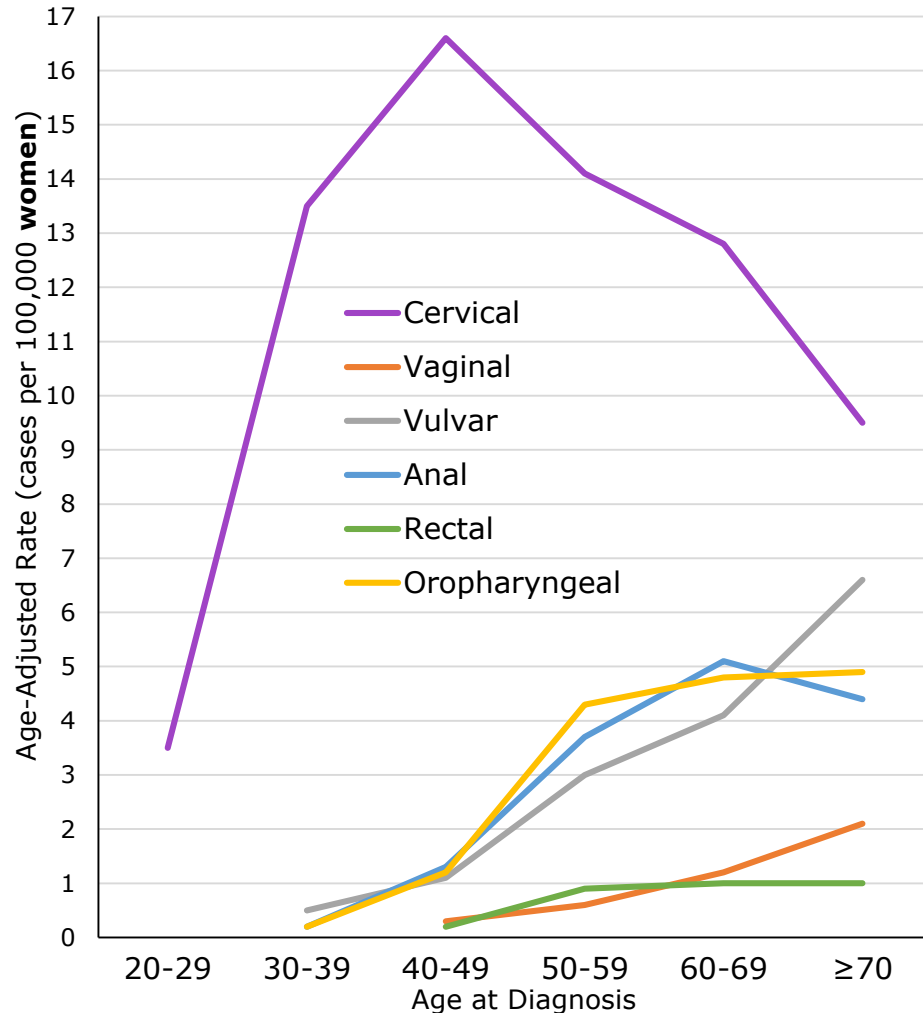
NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native

Based on: HPV-Associated Cancers Rates by Race and Ethnicity, CDC. <https://www.cdc.gov/cancer/hpv/statistics/race.htm>

Trends in HPV-Associated Cancer Incidence Rates by Cancer Site, Women, 1995-2015



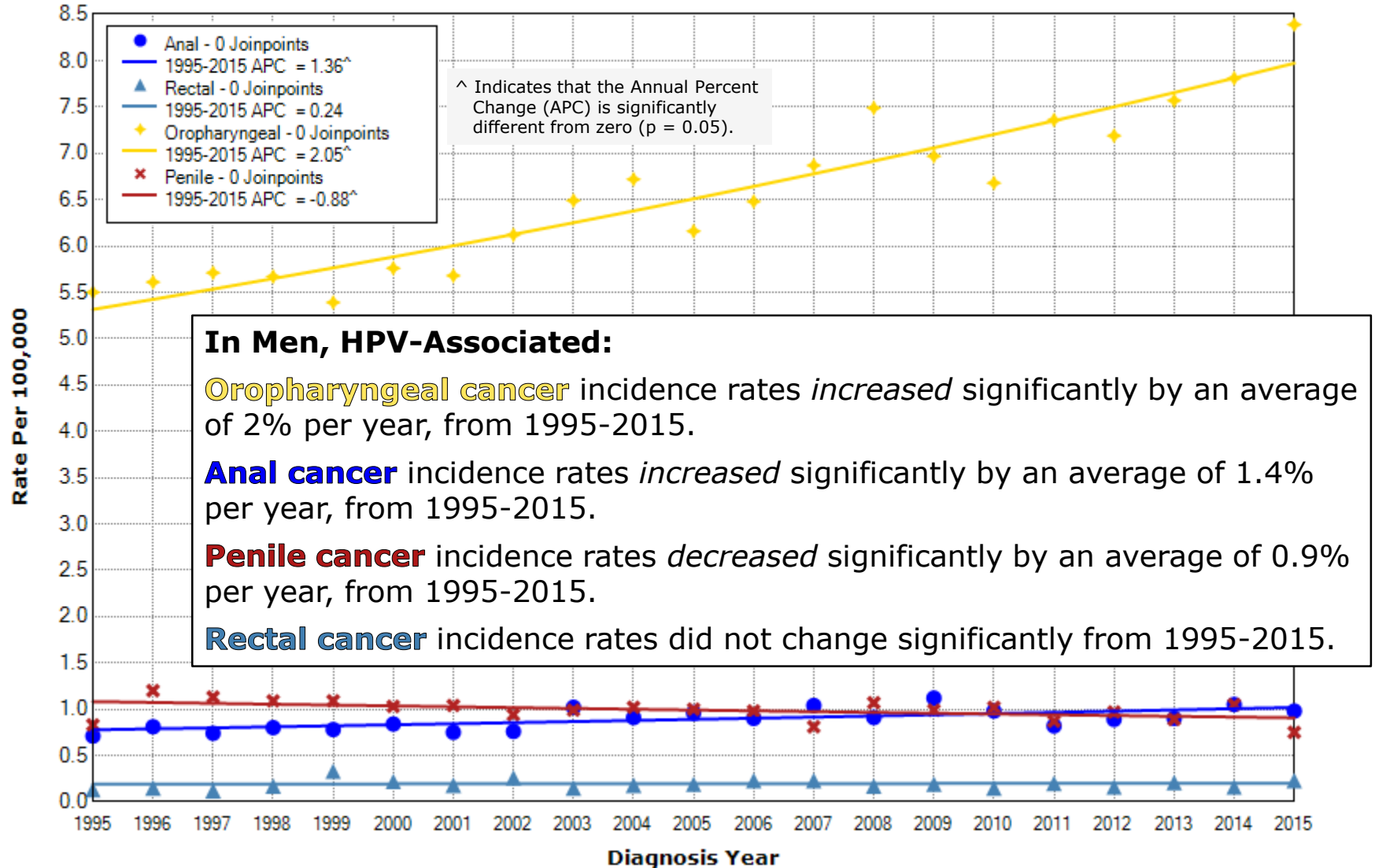
HPV-Associated Cancer Incidence by Site and Age at Diagnosis, Women, 2011-2015



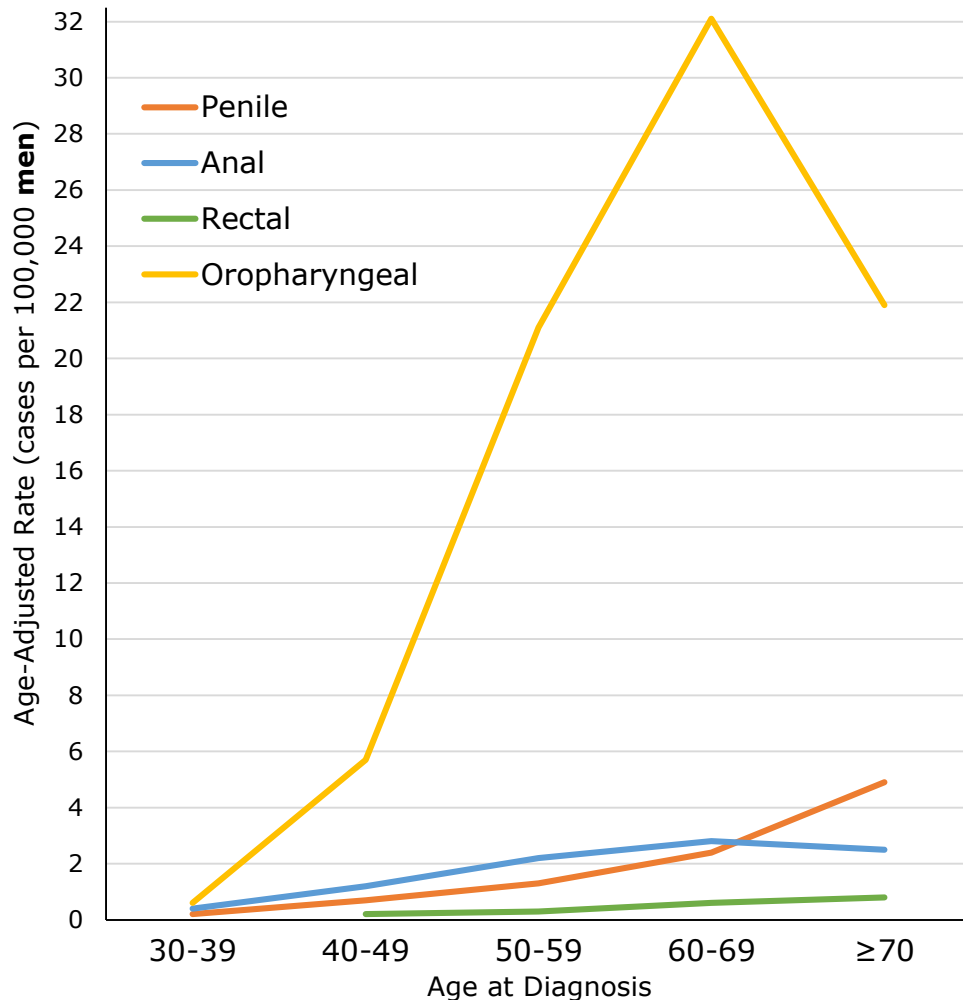
- Cervical cancer incidence rates were higher than all other HPV-associated cancer rates across all ages, peaking between ages 40-49, at 16.6 cases per 100,000, then decreasing after age 50.
- Vaginal and vulvar cancer rates steadily increased with age, peaking at age ≥ 70 , at 2.1 and 6.6 per 100,000 respectively.
- Oropharyngeal cancer incidence rates increased with age, leveling off at 4 to 5 cases per 100,000 at age 50 and older.
- Anal cancer rates peaked at age 60-69, at 5.1 cases per 100,000 women, while rectal cancer rates were low (≤ 1.0 per 100,000) across all ages.
- HPV-associated cancers (at any site) were rare in women age 19 and younger.

Rates are not shown for age groups with fewer than 16 cases; based on <https://www.cdc.gov/cancer/hpv/statistics/age.htm>.

Trends in HPV-Associated Cancer Incidence Rates by Cancer Site, Men, 1995-2015



HPV-Associated Cancer Incidence by Site and Age at Diagnosis, Men, 2011-2015



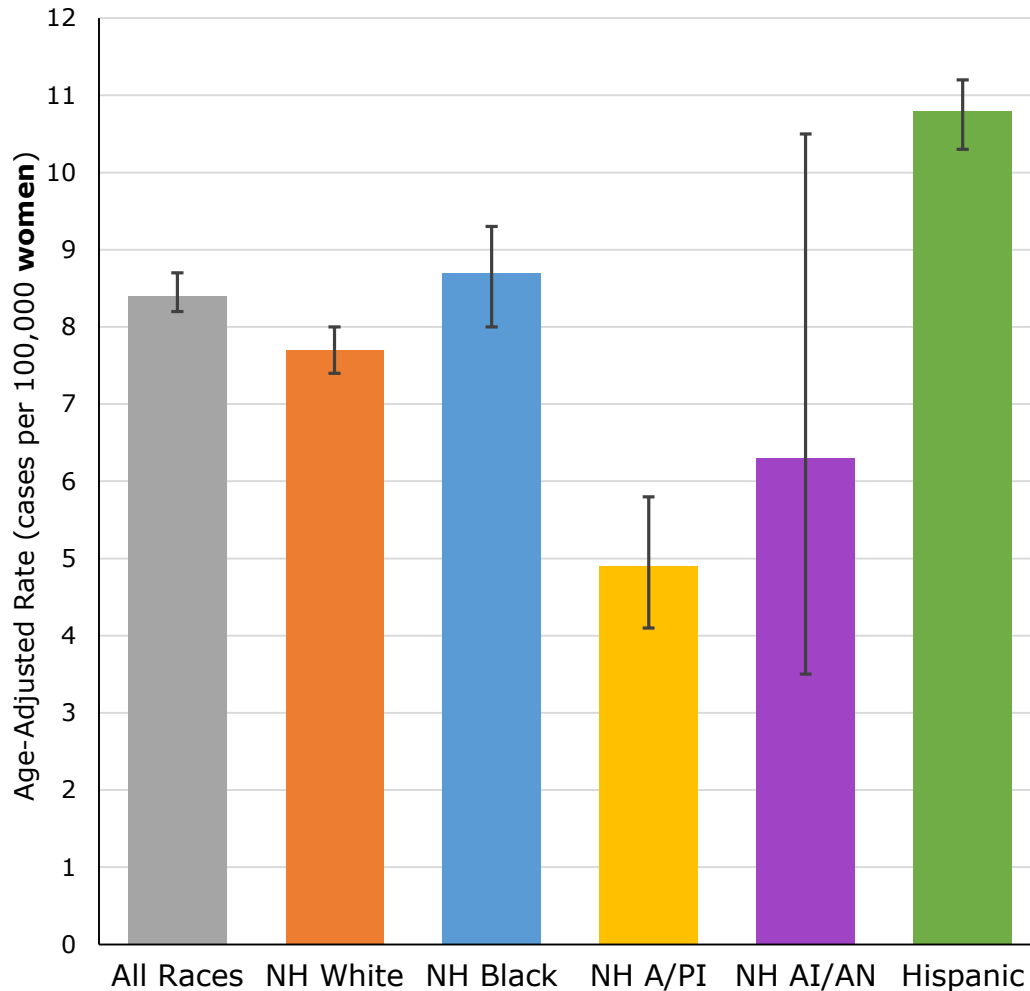
- Oropharyngeal cancer incidence rates were higher than rates for all other HPV-associated cancer types across all ages, and peaked at 32.1 per 100,000 in men aged 60-69.
- Incidence rates of penile cancer continually increased with age, with 4.9 cases per 100,000 in men aged 70 and older.
- Anal cancer incidence rates peaked between age 60-69, at 2.8 cases per 100,000 men, while rectal cancer incidence rates were low (≤ 1.0 per 100,000) across all ages.
- HPV-associated cancers (at any site) were rare in men age 29 and younger.

Rates are not shown for age groups with fewer than 16 cases; based on <https://www.cdc.gov/cancer/hpv/statistics/age.htm>.

HPV-Associated Cancers in Texas, 2011-2015

Incidence Trends for Specific Cancer Sites

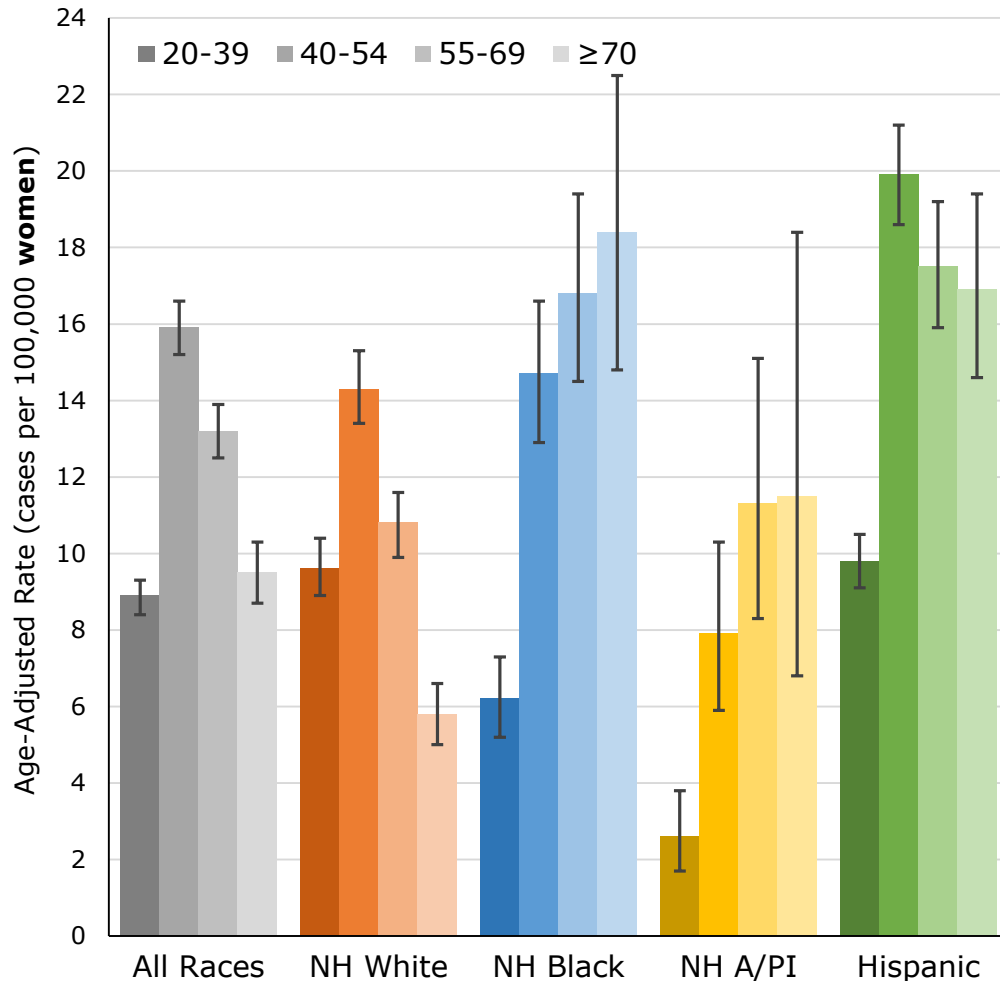
HPV-Associated Cervical Cancer Incidence Rates by Race/Ethnicity, 2011-2015



- Hispanic women had the highest rates of HPV-associated cervical cancer at 10.8 cases per 100,000 women.
- Incidence rates were similar in Non-Hispanic (NH) White and NH Black women, at 7.7 and 8.7 cases per 100,000 respectively.
- Cervical cancer incidence rates were lowest among NH Asian/Pacific Islander women, at 4.9 cases per 100,000.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native

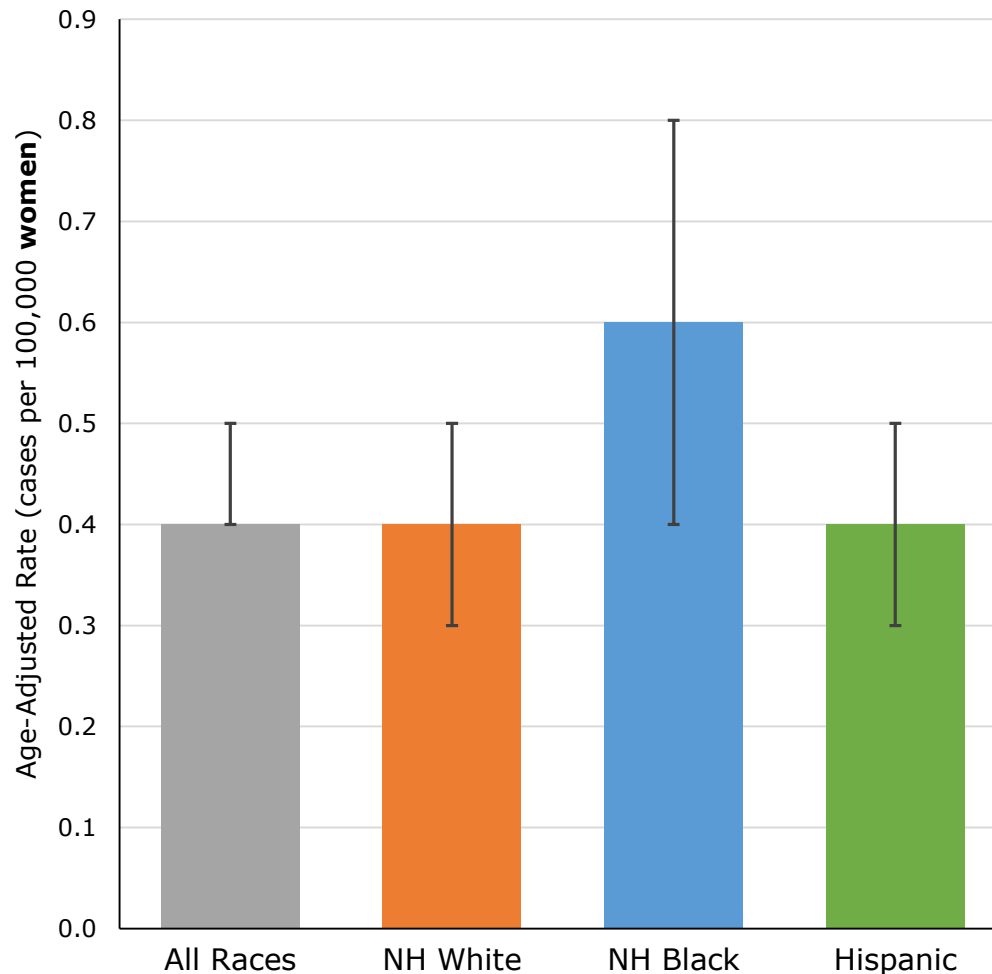
HPV-Associated Cervical Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015



- Cervical cancer incidence rates were highest among Hispanic women age 55-69, at 19.9 cases per 100,000 women.
- In Non-Hispanic (NH) White and Hispanic women, rates peaked at age 40-54, however, among NH Black and NH Asian/Pacific Islander women, incidence rates continually increased with age.
- Rates for NH American Indian/Alaskan Native women are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; Data for NH American Indian/Alaskan Native groups are not shown due to unstable rates, large confidence intervals, and low case counts.

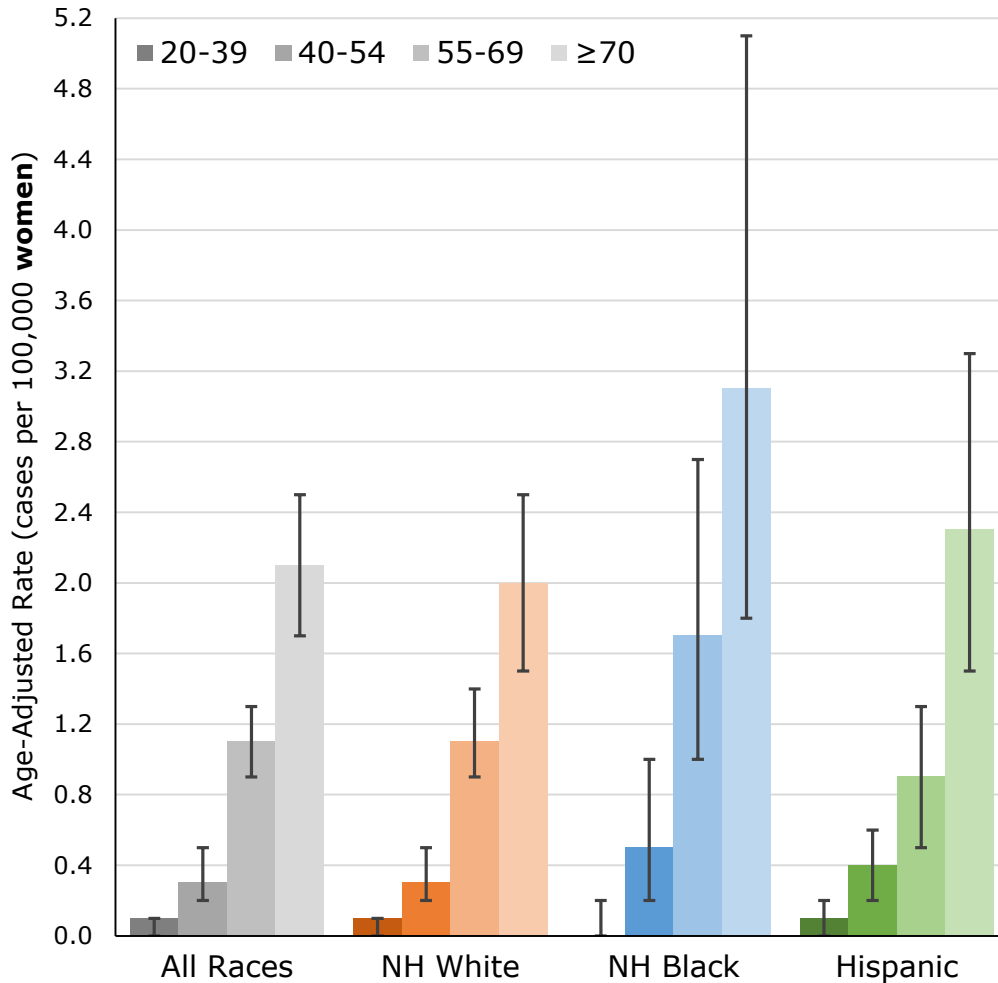
HPV-Associated Vaginal Cancer Incidence Rates by Race/Ethnicity, 2011-2015



- Vaginal cancer is relatively rare, with fewer than 1 case per 100,000 across all race/ethnicity groups.
- Non-Hispanic (NH) Black women had the highest incidence rate at 0.6 cases per 100,000 women.
- The incidence rate was 0.4 cases per 100,000 in both NH White and Hispanic women.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

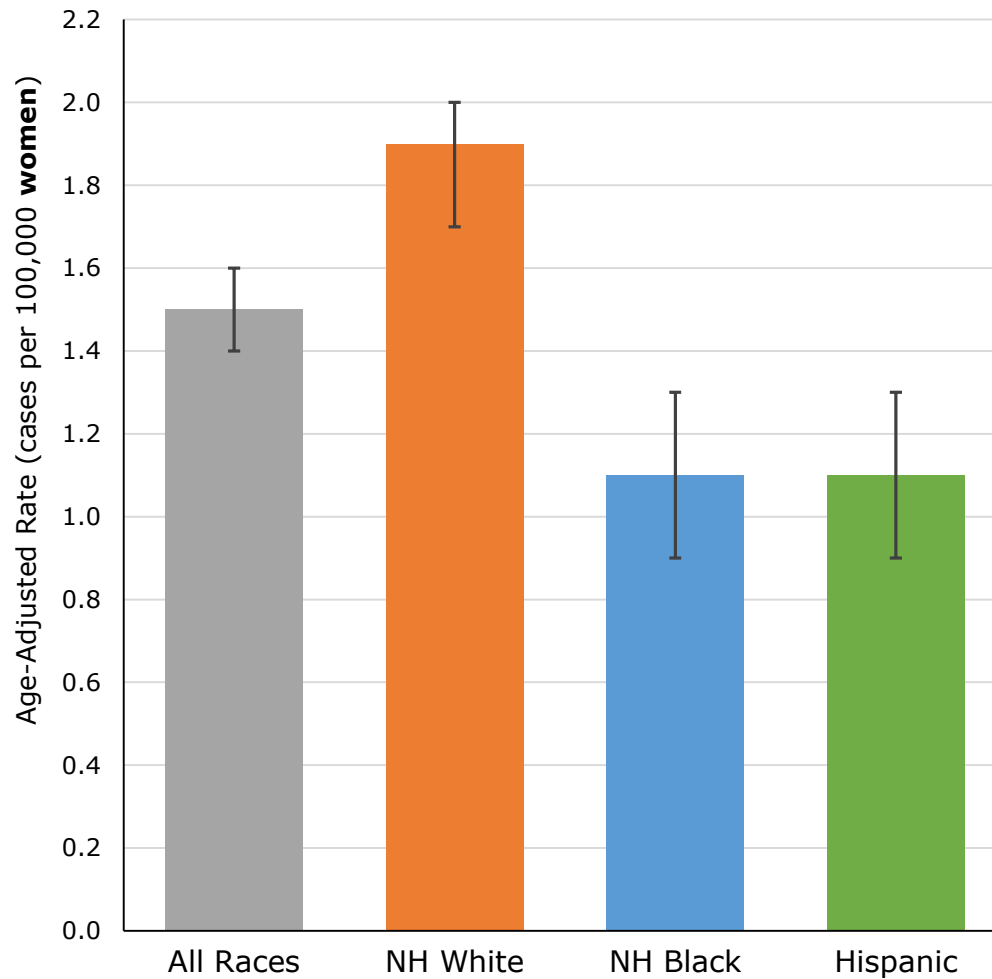
HPV-Associated Vaginal Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015



- Vaginal cancer incidence rates increased with age across all race/ethnicity groups, and peaked at age ≥ 70 .
- Non-Hispanic (NH) Black women had the highest incidence rates among women age 40 and older.
- Incidence rates were highest in NH Black women age 70 and older at 3.1 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

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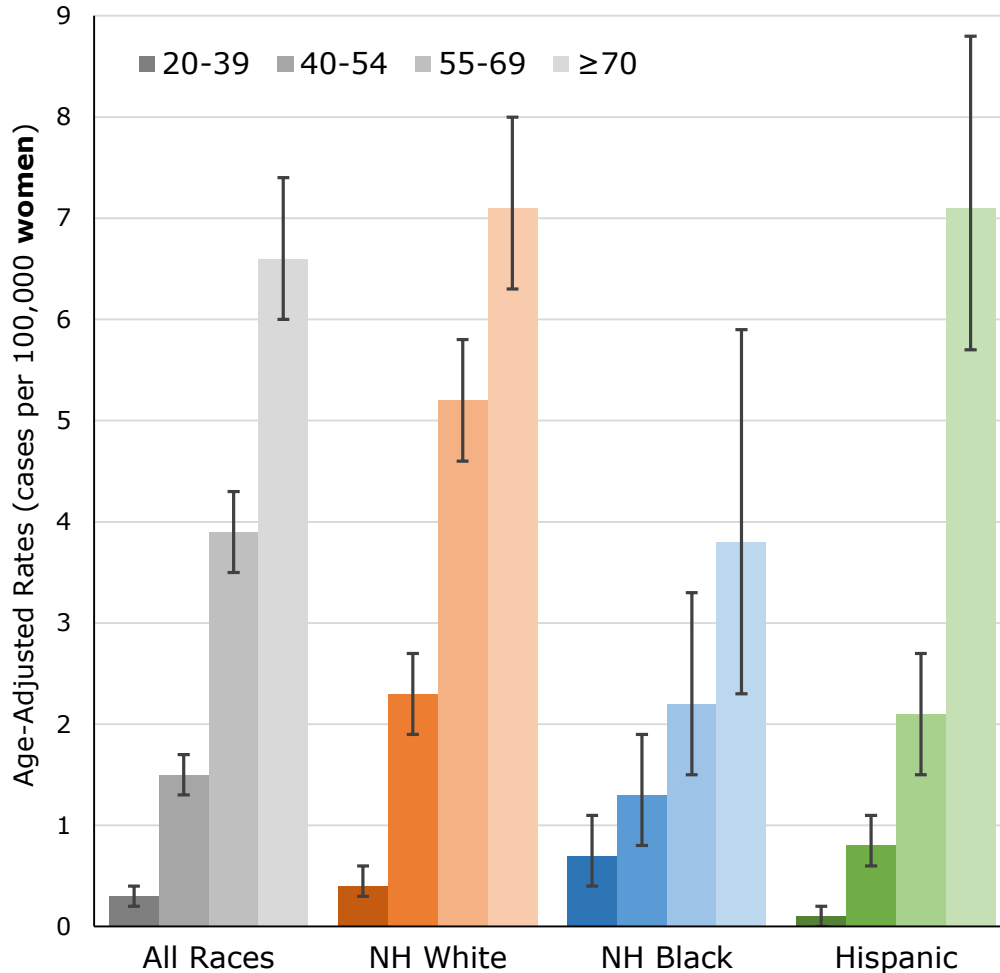
HPV-Associated Vulvar Cancer Incidence Rates by Race/Ethnicity, 2011-2015



- Vulvar cancer incidence rates were highest in Non-Hispanic (NH) White women, at 1.9 cases per 100,000.
- Rates were lowest in both Hispanic and NH Black women at 1.1 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

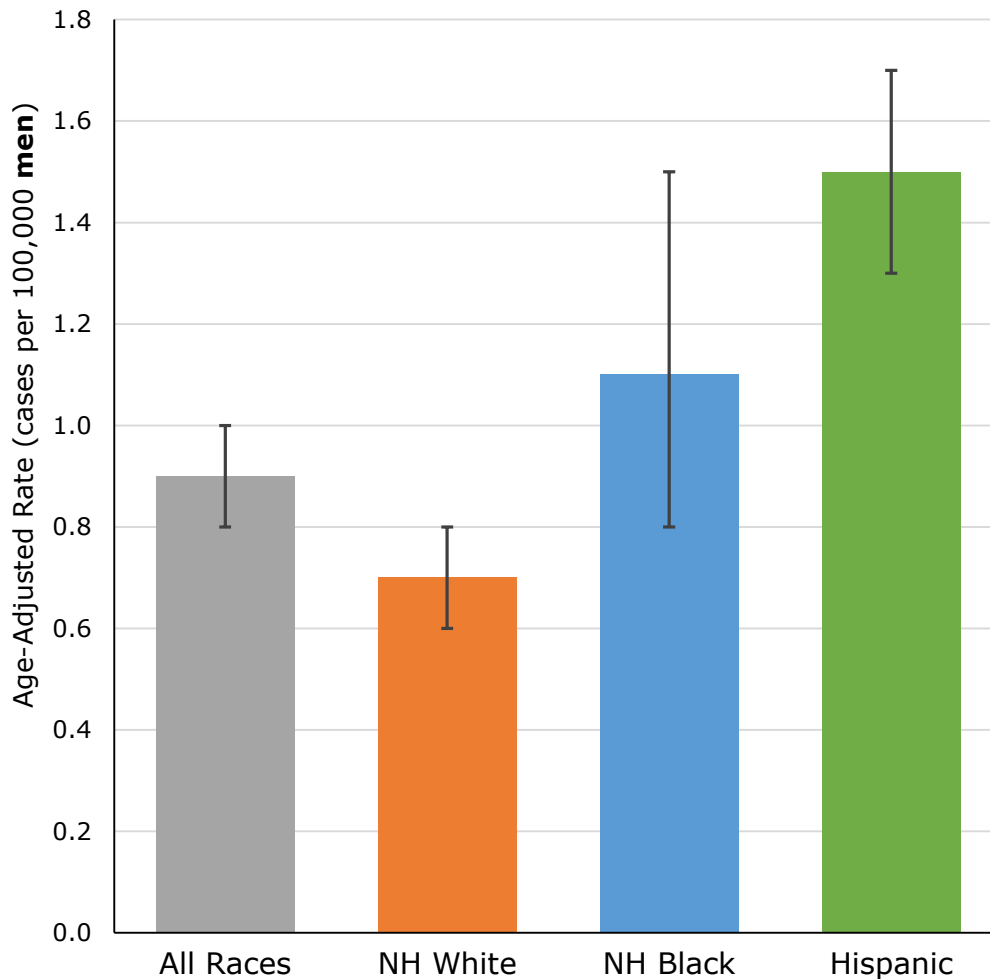
HPV-Associated Vulvar Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015



- Vulvar cancer incidence rates increased with age across all race/ethnicity groups, and peaked at age 70 and older.
- Incidence rates were highest in Hispanic and Non-Hispanic (NH) White women, age 70 and older, at 7.1 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

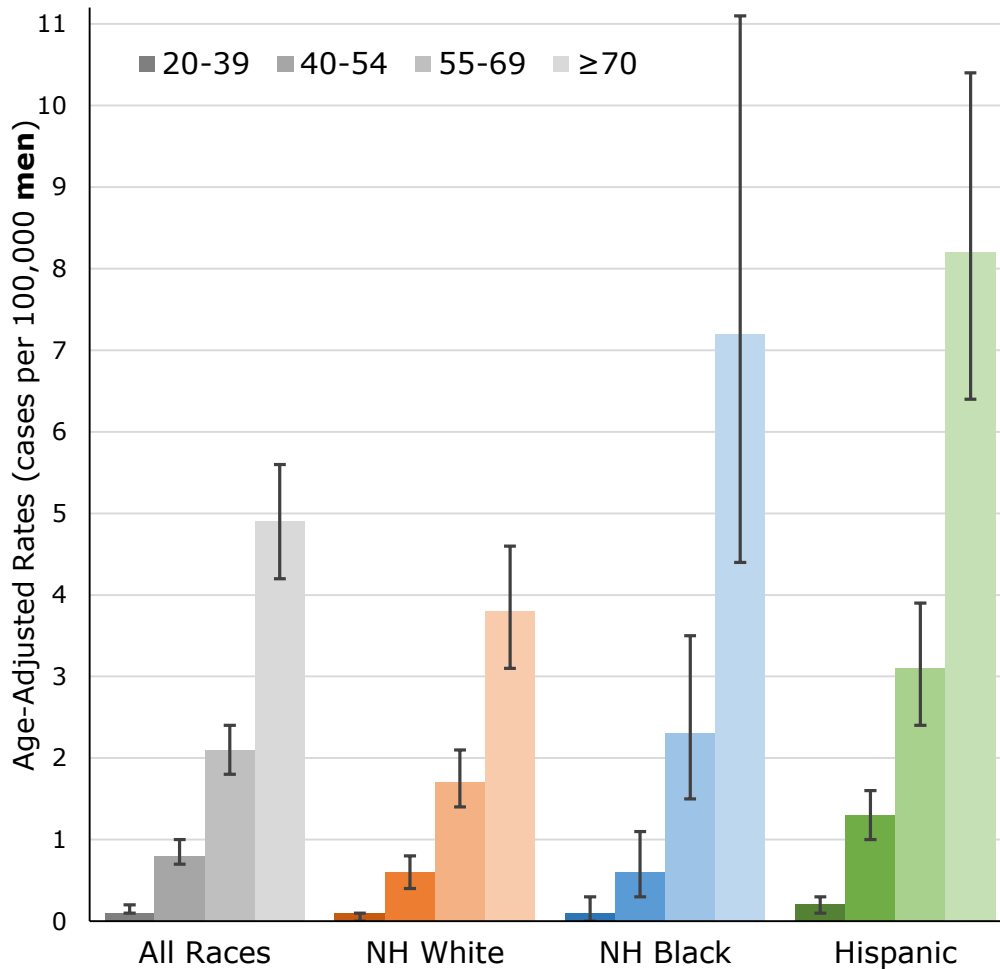
HPV-Associated Penile Cancer Incidence Rates by Race/Ethnicity, 2011-2015



- Penile cancer incidence rates were highest in Hispanic men, at 1.5 cases per 100,000.
- Rates were lowest among Non-Hispanic (NH) White men at 0.7 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

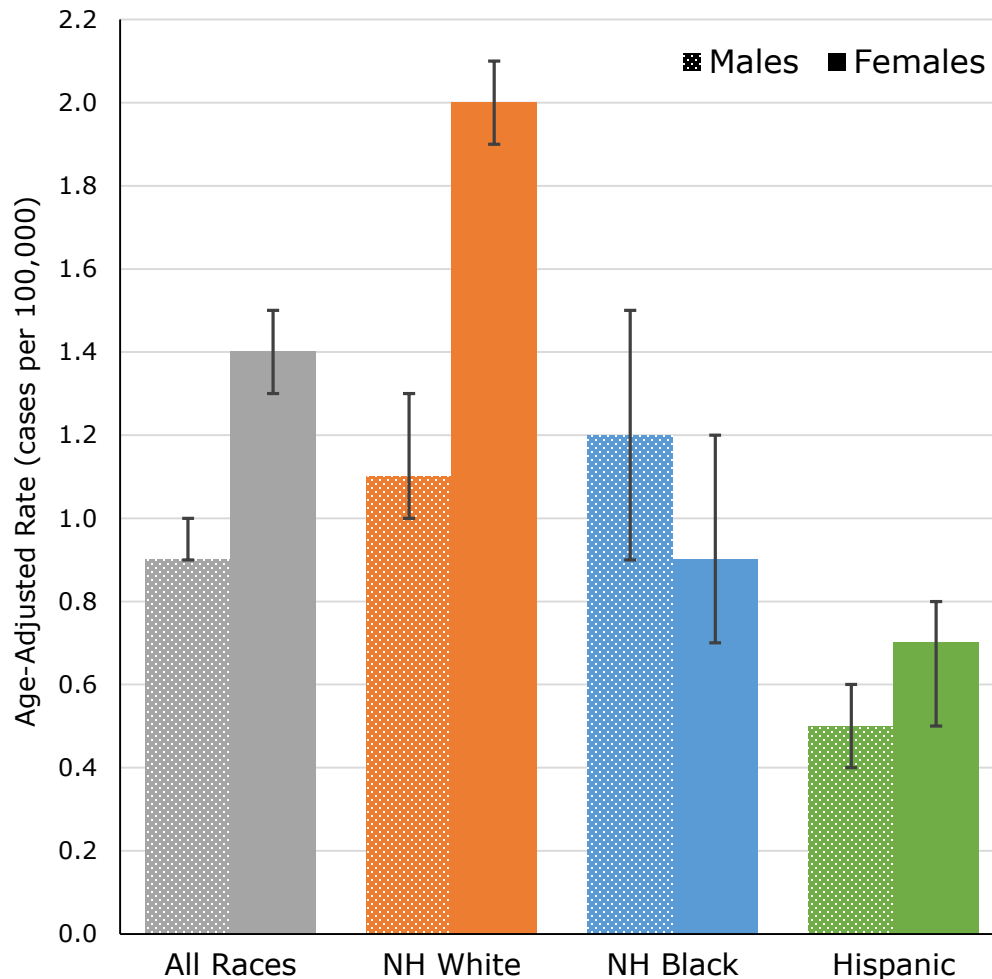
HPV-Associated Penile Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015



- Overall, penile cancer was relatively rare in men age 54 and younger.
- Penile cancer incidence rates increased with age across all race/ethnicity groups, with rates being higher in Hispanic men than other groups across all ages.
- Rates were highest in Hispanic men age 70 and older, at 8.2 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

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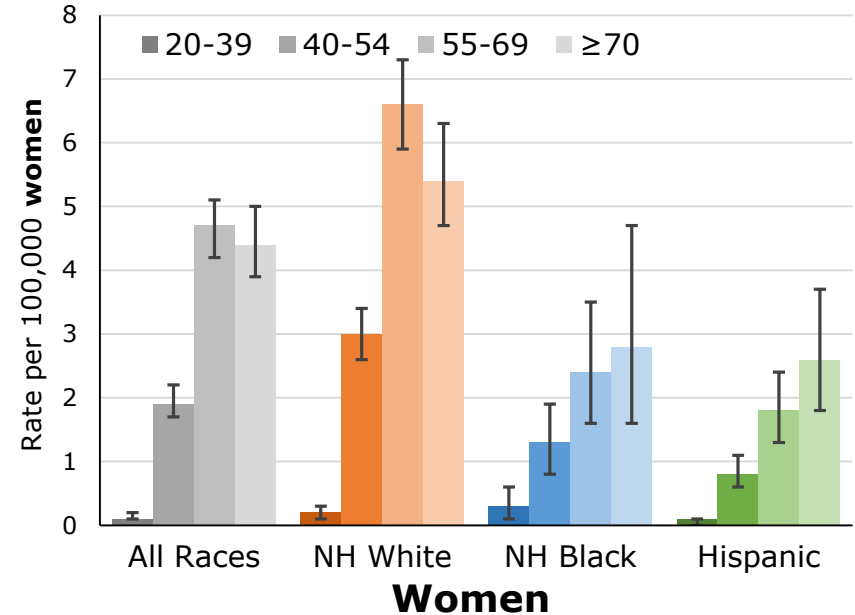
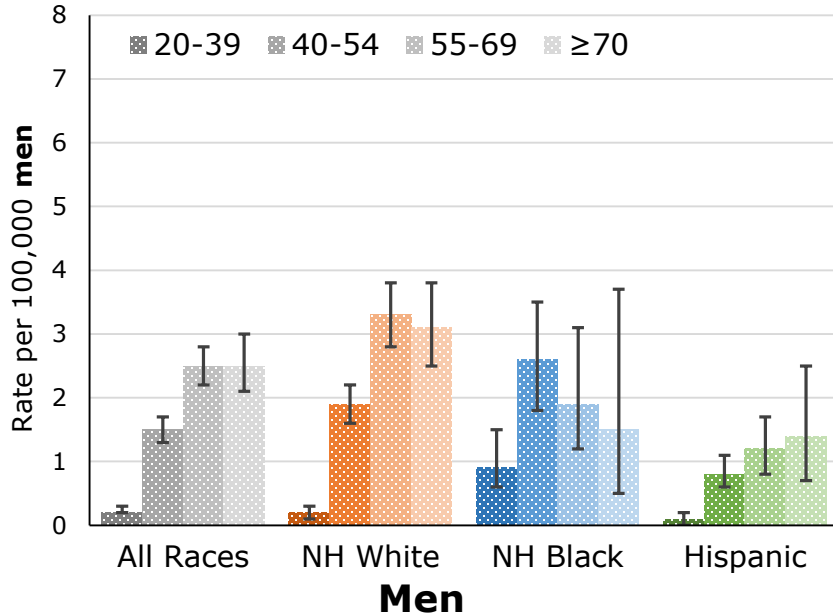
HPV-Associated Anal Cancer Incidence Rates by Sex and Race/Ethnicity, 2011-2015



- Anal cancer incidence rates were higher in women than in men, except for Non-Hispanic (NH) Blacks, where rates were higher in men than women (1.2 and 0.9 cases per 100,000 respectively).
- For men, NH Black men had the highest incidence rate at 1.2 cases per 100,000.
- For women, NH White women had the highest incidence rate at 2.0 cases per 100,000.
- Rates were lowest for both men and women among Hispanics.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

HPV-Associated Anal Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015

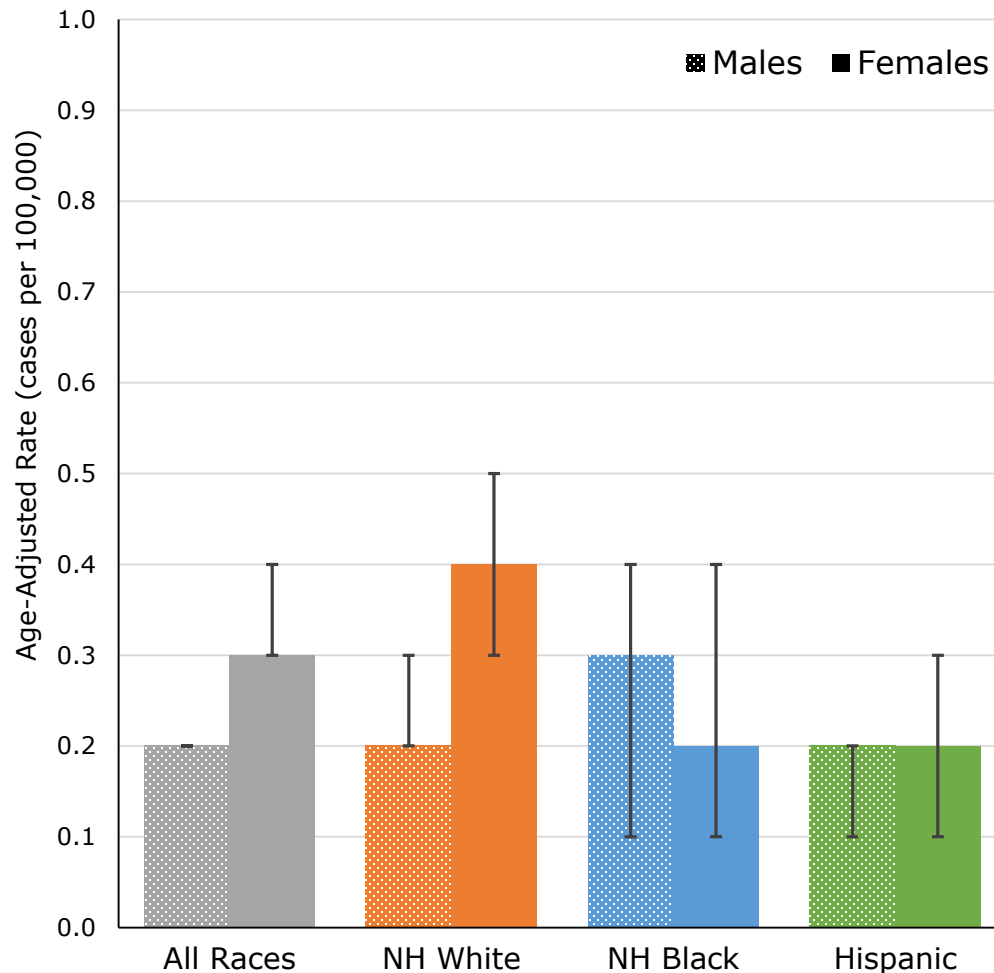


- Anal cancer incidence rates were highest in Non-Hispanic (NH) White men age 55-69, peaking at 3.3 cases per 100,000 men.
- In NH Black men, rates peaked at age 40-54, whereas among Hispanic men, rates continued to increase with age.
- Rates were lowest in Hispanic men across all age groups.

- Anal cancer incidence rates were highest in NH White women age 55-69, peaking at 6.6 cases per 100,000 women.
- In NH Black and Hispanic women, incidence rates continued to increase with age.
- Rates were lowest in Hispanic women across all age groups.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

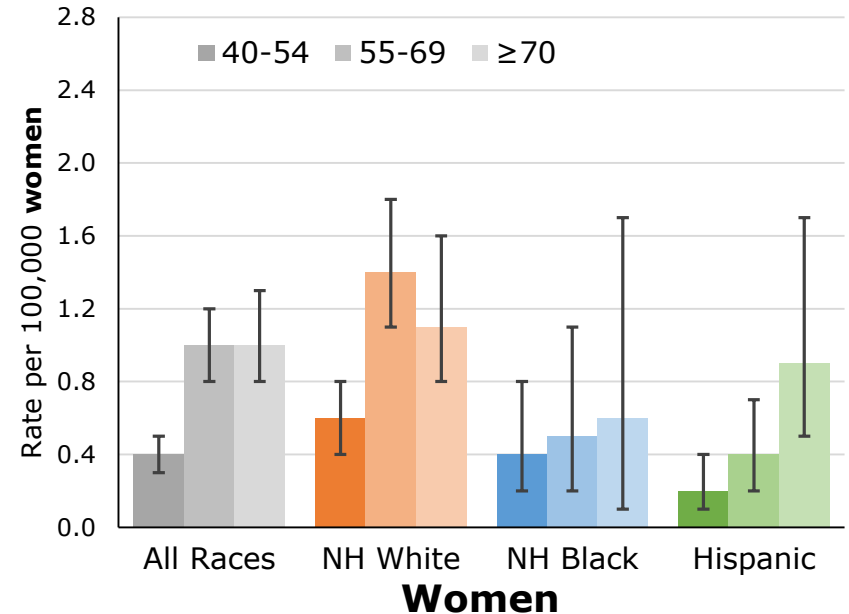
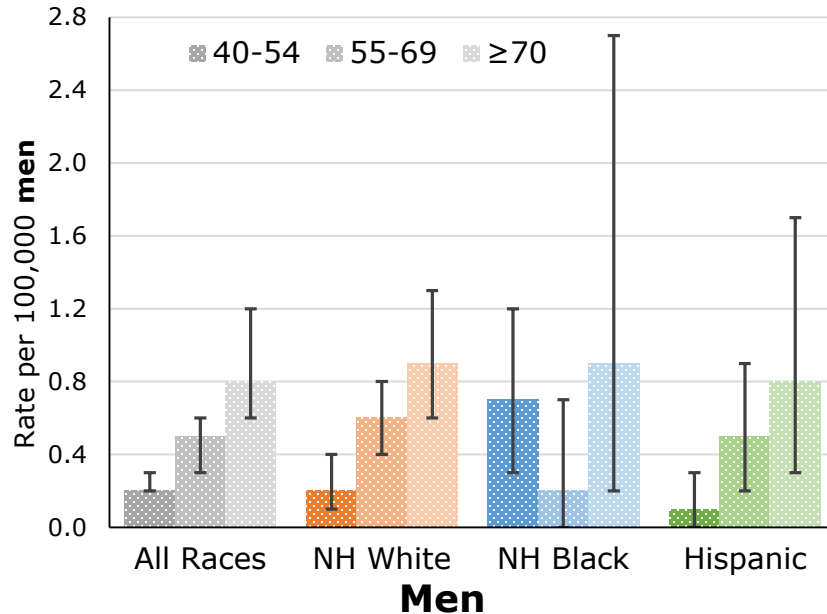
HPV-Associated Rectal Cancer Incidence Rates by Sex and Race/Ethnicity, 2011-2015



- Rectal cancer is relatively rare, with fewer than 1 case per 100,000 across all race/ethnicity groups, in males and females.
- Rectal cancer incidence rates were highest in Non-Hispanic (NH) White women, at 0.4 cases per 100,000.
- Rates for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

HPV-Associated Rectal Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis, 2011-2015

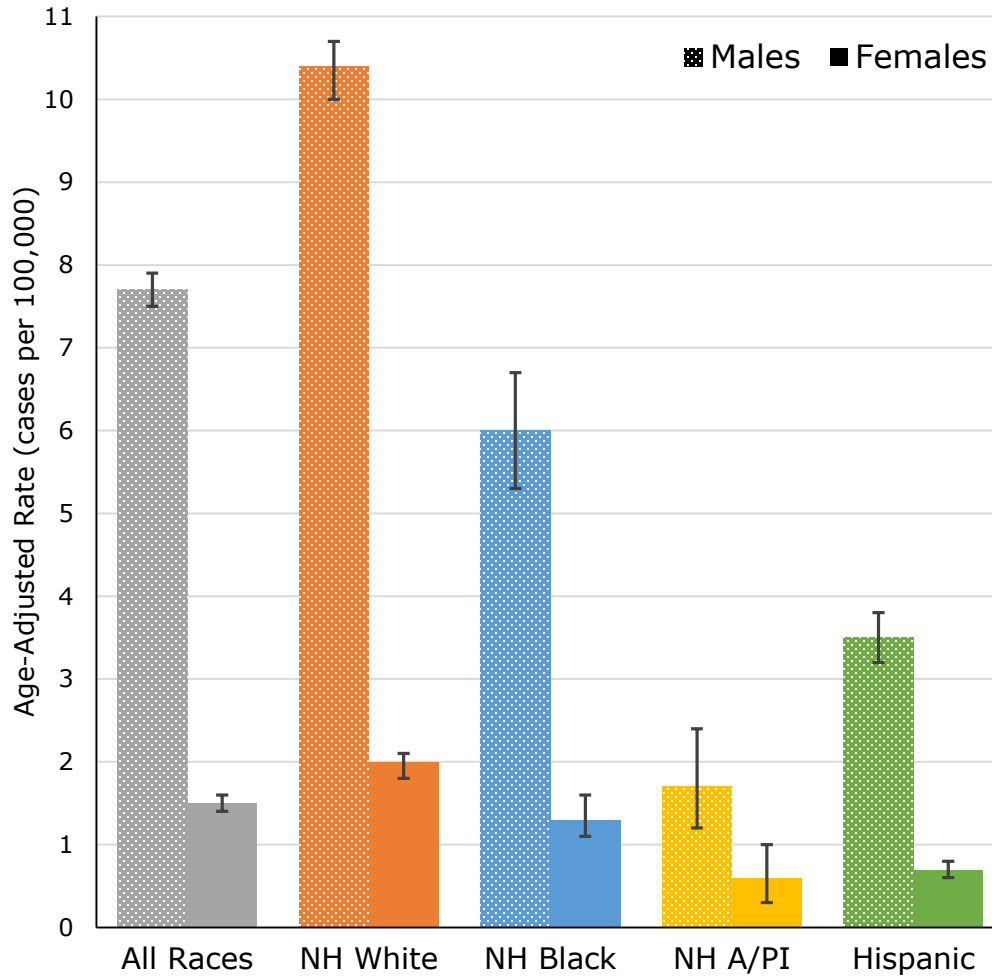


- Rectal cancer incidence rates were highest in men age 70 and older across all groups, at 0.8-0.9 cases per 100,000.
- Rates increased with age, except in NH Black men, where rates were lower in men age 55-69, then higher among age ≥70 (0.2, 0.9 cases per 100,000 respectively). However, caution should be used when interpreting due to large confidence intervals.

- Rectal cancer incidence rates were highest in NH White women age 55-69, peaking at 1.4 cases per 100,000 women.
- In NH Black women and Hispanic women, rates continued to increase with age.
- Overall, rectal cancer was extremely rare in those age 39 and younger.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native and NH Asian/Pacific Islander race/ethnicity groups are not shown due to unstable rates, large confidence intervals, and low case counts.

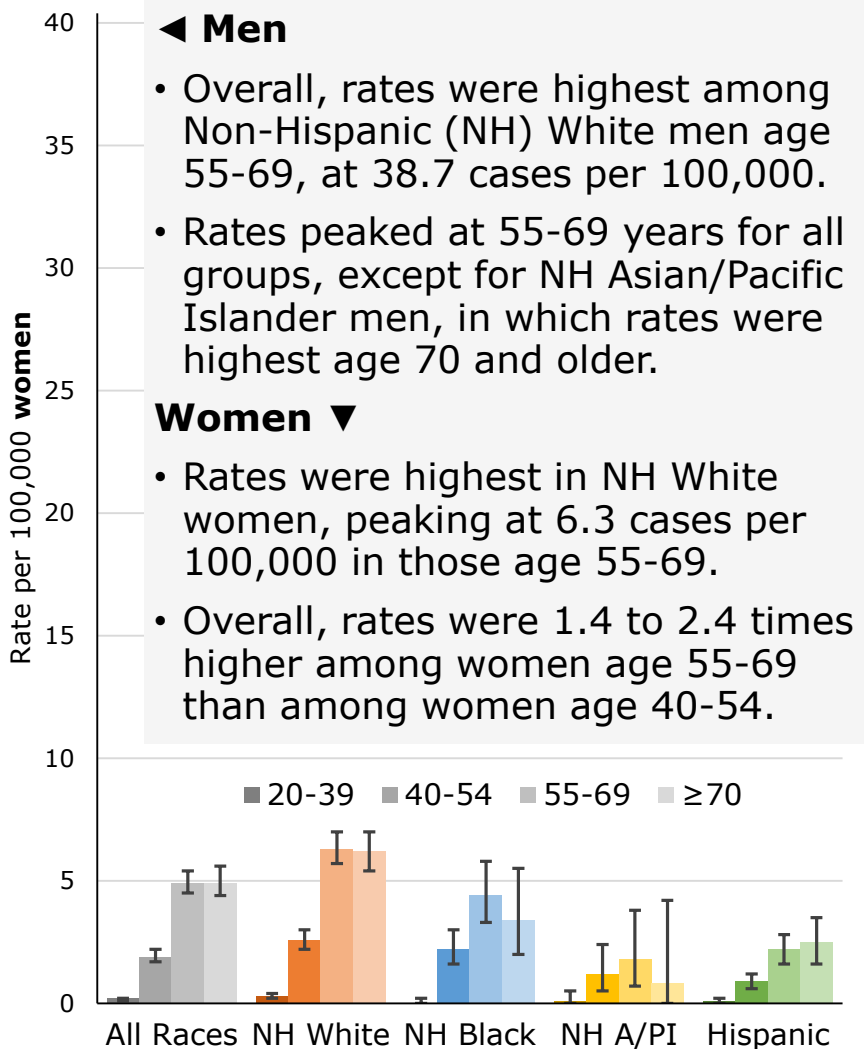
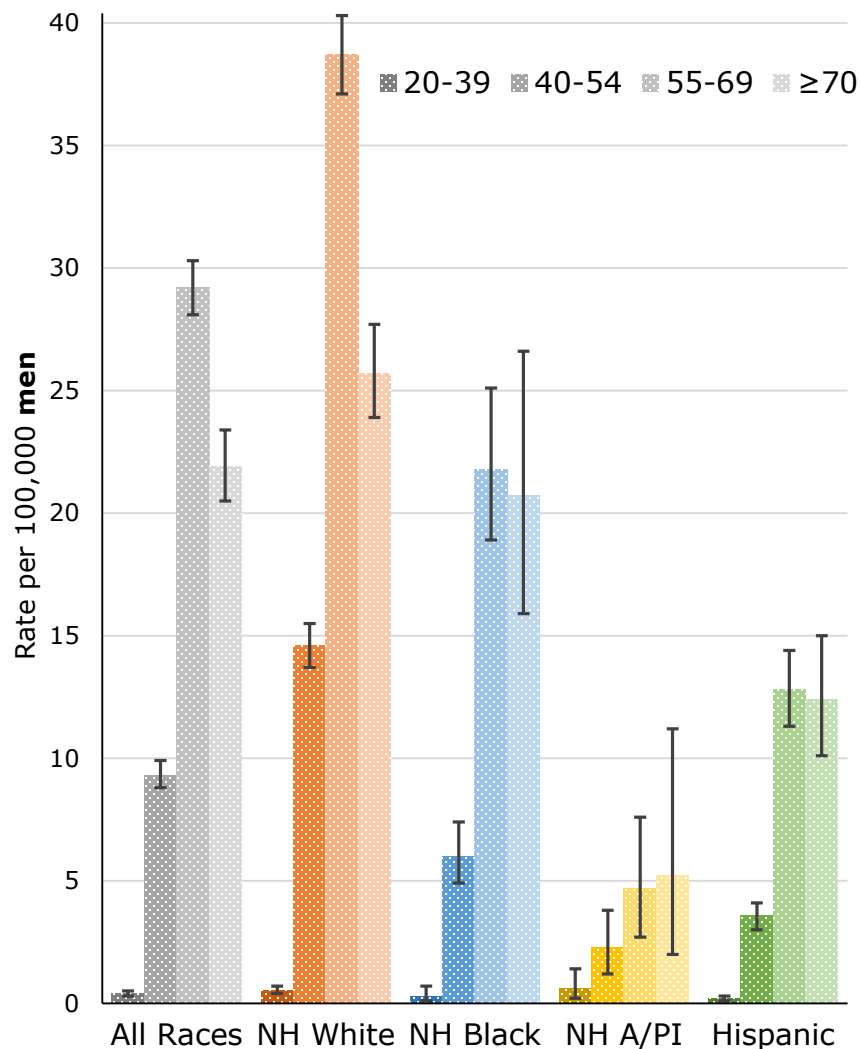
HPV-Associated Oropharyngeal Cancer Incidence Rates by Sex and Race/Ethnicity, 2011-2015



- Incidence rates of oropharyngeal cancer were higher in men than women across all race/ethnicity groups.
- Rates were approximately 5 times higher in men than in women, for Non-Hispanic (NH) Whites, NH Blacks, and Hispanics.
- Rates were only 2.8 times higher in NH Asian/Pacific Islander men than in women.
- Incidence rates of oropharyngeal cancer were highest among NH White men at 10.4 cases per 100,000 and lowest among NH Asian/Pacific Islander women at 0.6 cases per 100,000.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; Data for NH American Indian/Alaskan Native groups are not shown due to unstable rates, large confidence intervals, and low case counts.

HPV-Associated Oropharyngeal Cancer Incidence Rates by Race/Ethnicity and Age, 2011-2015



Men

- Overall, rates were highest among Non-Hispanic (NH) White men age 55-69, at 38.7 cases per 100,000.
- Rates peaked at 55-69 years for all groups, except for NH Asian/Pacific Islander men, in which rates were highest age 70 and older.

Women

- Rates were highest in NH White women, peaking at 6.3 cases per 100,000 in those age 55-69.
- Overall, rates were 1.4 to 2.4 times higher among women age 55-69 than among women age 40-54.

NH = Non-Hispanic; Data for NH American Indian/Alaskan Native groups are not shown due to unstable rates, large confidence intervals, and low case counts.

Technical Notes

- HPV-associated cancers were defined as cancers at specific anatomic sites with specific cell types in which HPV DNA is frequently found.
 - Cervical cancers were limited to carcinomas only (ICD-O-3 histology codes 8010 to 8671 and 8940 to 8941)
 - All other cancer sites—vaginal, vulvar, penile, anal, rectal, oropharyngeal—were limited to squamous cell carcinomas only (ICD-O-3 histology codes 8050 to 8084 and 8120 to 8131).
 - Primary site and histology criteria from Viens LJ, Henley SJ, Watson M, et al. Human Papillomavirus-Associated Cancers — United States, 2008–2012. MMWR Morb Mortal Wkly Rep 2016;65:661–666. <https://www.cdc.gov/mmwr/volumes/65/wr/mm6526a1.htm>
- Data for Non-Hispanic American Indian/Alaskan Native and Non-Hispanic Asian/Pacific Islander race/ethnicity groups are not shown in all tables/graphs due to unstable rates, large confidence intervals, and low case counts.
- Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population (19 age groups - Census P25-1130). Confidence Intervals (CI) are 95% for rates (Tiwari mod). Confidence intervals provide a range of values that have a specified probability of containing the rate or trend. For 95% confidence intervals, it can be stated that 95% of the time the true rate will lie within these limits.
- Data Source: Texas Cancer Registry (www.dshs.texas.gov/tcr) SEER*Stat Database, 1995-2015 Incidence, Texas statewide, created December 2017, based on NPCR-CSS Submission, cut-off 11/13/2017.

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- Image Sources—NCI: <https://www.cancer.gov/types/vaginal>, <https://www.cancer.gov/types/penile>; UT MD Anderson Cancer Center: <https://www.mdanderson.org/cancer-types/rectal-cancer/rectal-cancer-facts.html>; CDC: https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm

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The Texas Cancer Registry (TCR) recognizes the following whose financial support is essential to accomplishing the Registry's mission for our State.

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- We acknowledge the Centers for Disease Control and Prevention (CDC) for its financial support under Cooperative Agreement #1NU58DP006308.

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- Texas Department of State Health Services
- Texas Health and Human Services Commission
- Cancer Prevention and Research Institute of Texas

The TCR also wants to thank all cancer reporters for their hard work and collaboration. Cancer reporters help us meet national high quality and timeliness standards, and enable us to serve as the primary source of cancer data in Texas.