



Department of
Health

HPV-Associated Cancer

Tennessee, 2009-2018

HPV-Associated Cancer -- Tennessee, 2009-2018

Table of Contents

Overview	1
All Sites	2-3
Oral Cavity and Oropharynx	4
Cervix	5
Vagina	6
Vulva	7
Penis	8
Anus	9
Technical Notes	10
Appendix A -- Map of HPV-Associated Cancer Incidence Rates by County	11
Appendix B -- Detailed Counts and Rates by Health Department Region and County	12-16
Appendix C -- Detailed Counts and Rates by Cancer Type and Demographic Group	17-19

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HPV and HPV-Associated Cancer -- Overview

What is the Human Papilloma Virus (HPV)?

HPV is a group of more than 200 related viruses, some of which are spread through sexual contact. Sexually transmitted HPV types fall into two groups, low risk and high risk. [1]

- Most low-risk HPV strains do not cause symptoms and disappears when the body builds immunity to the virus. These strains have no association with cancer but can lead to warts around the genitals, anus, mouth, or throat. [1]
- High-risk HPVs can cause several types of cancer. There are about 14 high-risk HPV types, but only two, types 16 and 18, are responsible for most HPV-associated cancers. [1]

How common is HPV?

Nearly all sexually active people are infected with HPV within months to a few years of becoming sexually active. [1]

How is HPV transmitted?

HPV passes easily between sexual partners. It can be transmitted through any intimate skin-to-skin contact, including vaginal–penile sex, penile–anal sex, penile–oral sex, vaginal–oral sex, and use of sex toys or other objects. Condoms and dental dams can lower the chance of HPV transmission but do not prevent it completely. [1]

What cancers are caused by HPV?

Sometimes HPV infections are not successfully controlled by the immune system. When a high-risk HPV infection persists for many years, it can lead to cell changes that, if untreated, may get worse over time and become cancer. Long-lasting infections with high-risk HPVs can cause cancer in parts of the body where HPV infects cells, such as in the oral cavity and oropharynx (back of the tongue, throat, tonsils), cervix, vagina, vulva, penis and anus. [1]

How can HPV be prevented?

HPV vaccination provides strong protection against new HPV infections and offers the most protection when given at ages 9-12. Since the vaccine has been in use in the United States, HPV infections and cervical precancers (abnormal cells on the cervix that can lead to cancer) have dropped significantly. HPV vaccination is estimated to prevent up to 90% of HPV-related cancers. [1,2]

Are there screening tests for HPV-associated cancer?

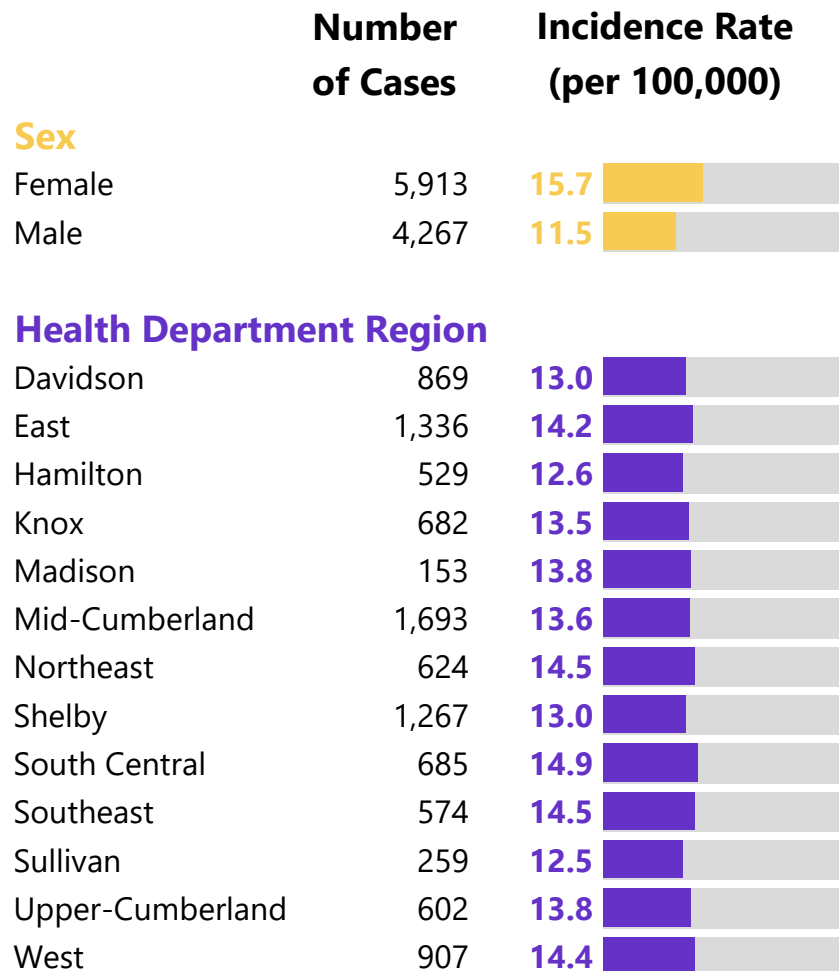
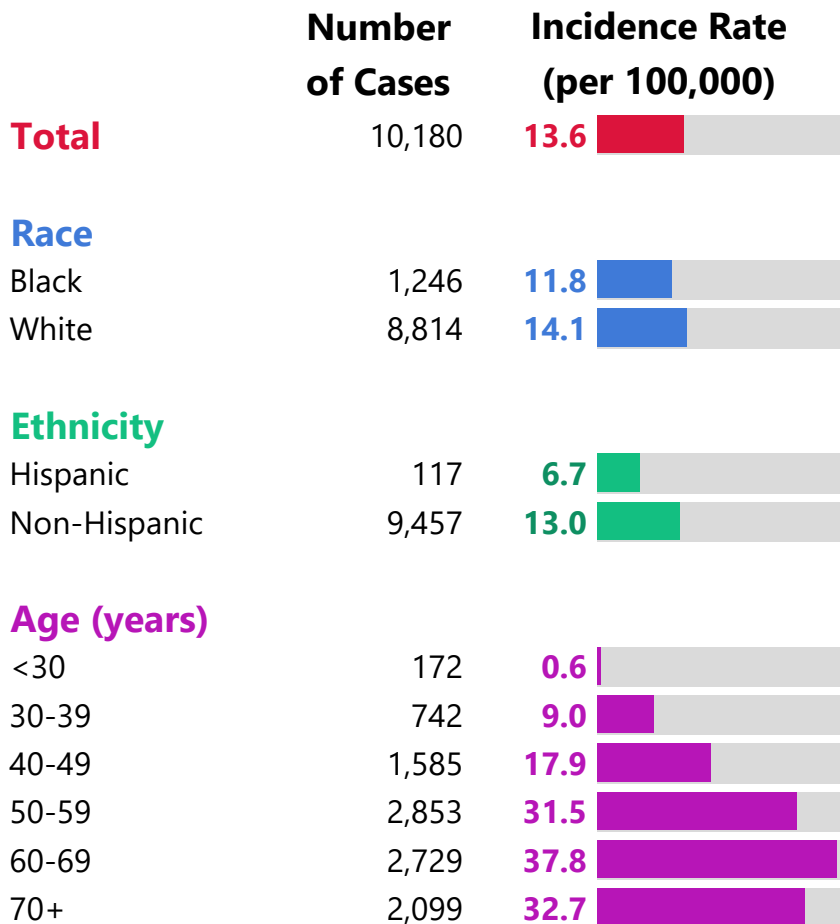
Currently, cervical cancer is the only HPV-associated cancer for which FDA-approved screening tests are available. Screening for cervical cancer is an important part of routine health care for people who have a cervix. This includes women and transgender men who still have a cervix. Screening includes: HPV testing which checks for high-risk HPV types in cervical cells; Pap testing which checks for cervical cell changes that can be caused by high-risk HPV; and HPV/Pap cotesting which checks for both high-risk HPV types and cervical cell changes. [1]

HPV-Associated Cancer -- All Sites

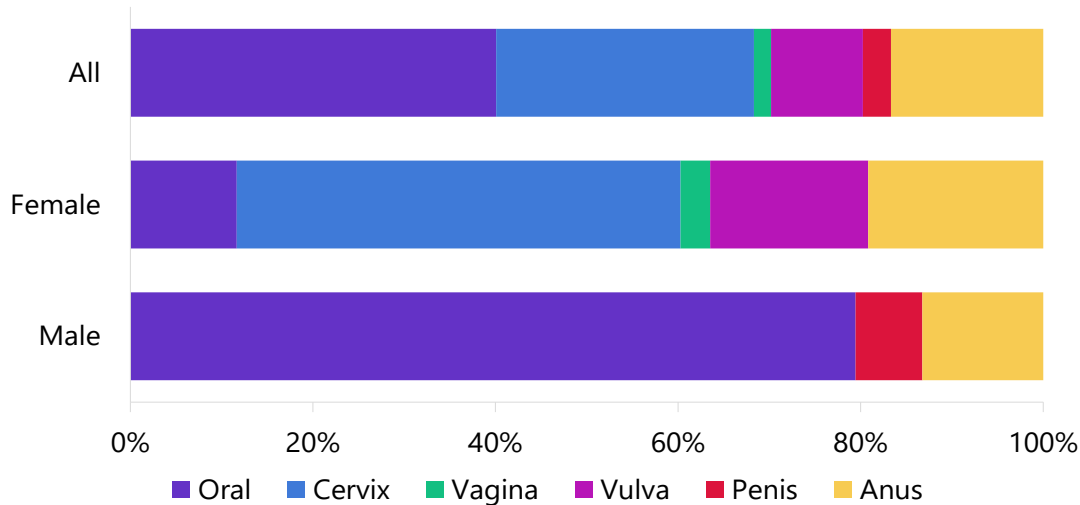
Tennessee, 2009-2018

Long-lasting infections with high-risk Human Papilloma Virus (HPV) can cause cancer in parts of the body where HPV infects cells, such as in the oral cavity and oropharynx, cervix, vagina, vulva, penis, and anus. In the United States, high-risk HPVs cause 3% of all cancers in women and 2% of all cancers in men. [1]

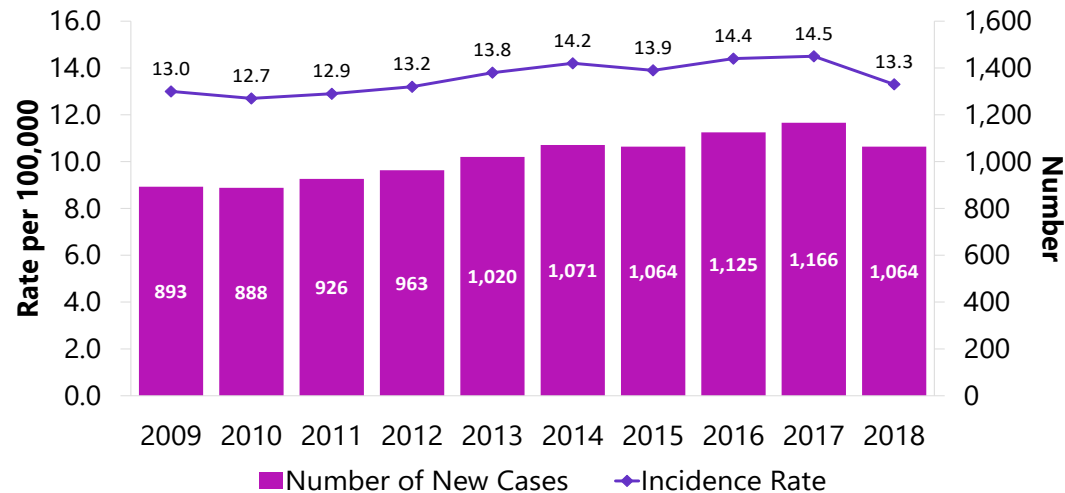
The following charts show the total number of Tennesseans newly diagnosed with HPV-associated cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



Distribution of HPV-Associated Cancers by Sex



Trends in HPV-Associated Cancers



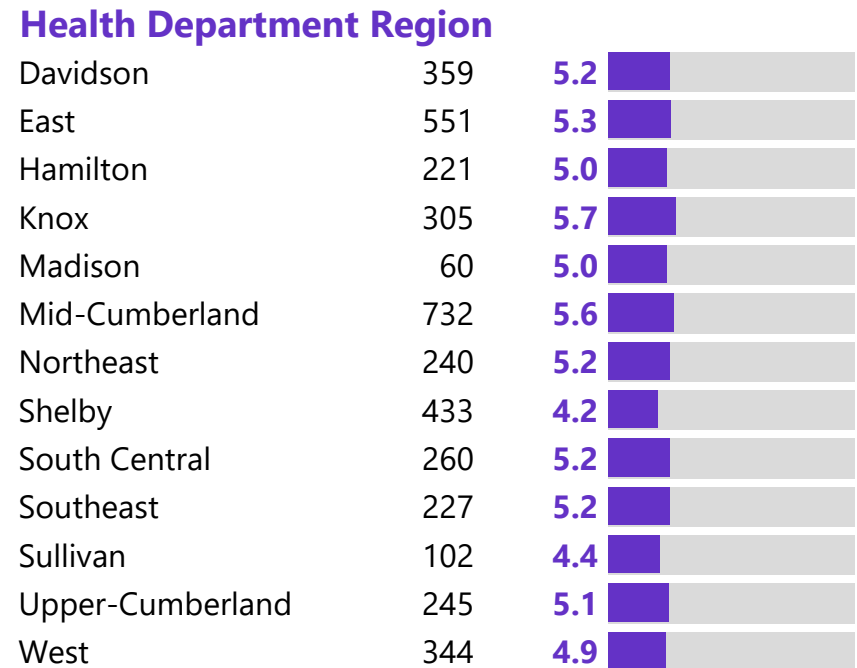
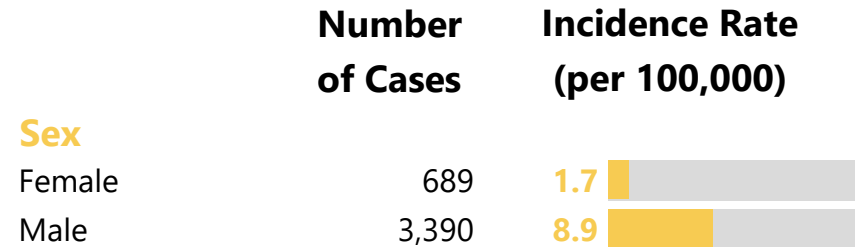
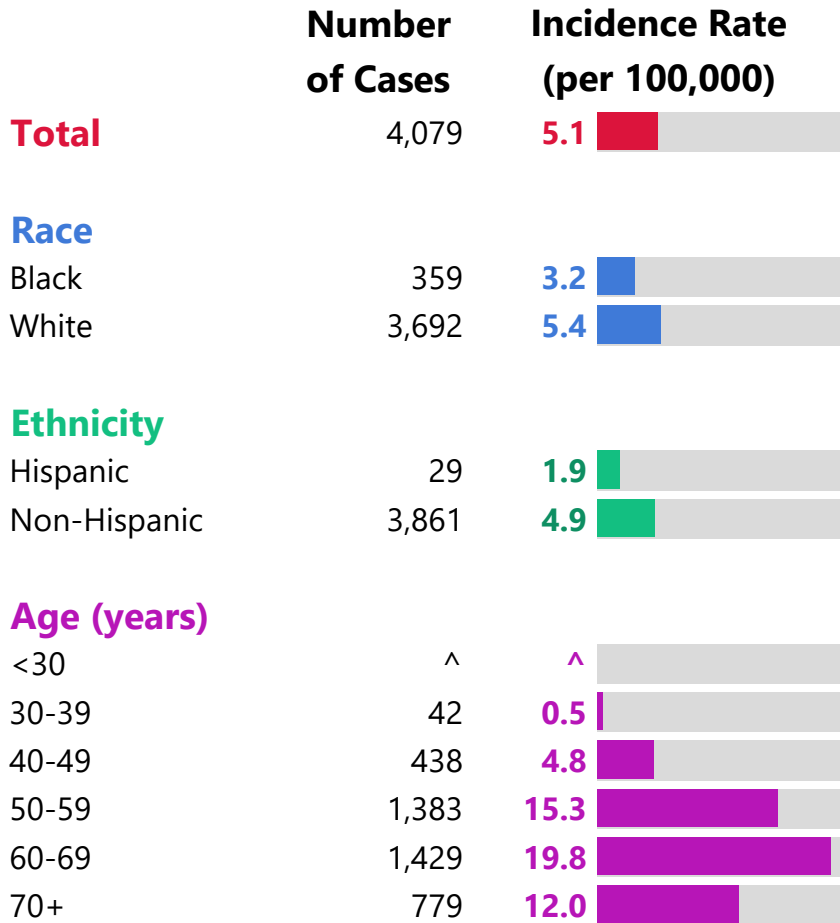
- Between 2009 and 2018, 10,180 Tennesseans were diagnosed with an HPV-associated cancer.
- Each year during this time period, approximately 14 out of every 100,000 people in the state were diagnosed with an HPV-associated cancer.
- Cervical cancer is the most common HPV-associated cancer among women, while oral/oropharyngeal cancer is most common among men.
- Women are more likely than men to be diagnosed with anal cancer.
- Whites are more likely than blacks to be diagnosed with oral cancer, while blacks are more likely to be diagnosed with cervical cancer.
- Non-Hispanics are more likely than Hispanics to be diagnosed with an HPV-associated cancer.
- HPV-Associated cancers tend to increase with increasing age, with the exception of cervical cancer, which is most common among women aged 30-59.
- Between 2009 and 2018, there was an increase in the incidence rate for HPV-associated cancer, primarily due to an increase in anal cancer. The incidence of other types of HPV-associated cancer remained stable during this time period.

HPV-Associated Cancer -- Oral Cavity and Oropharynx

Tennessee, 2009-2018

Most oral and oropharyngeal (back of the tongue, throat, tonsils) cancers (70%) are caused by the Human Papilloma Virus (HPV). The number of new oral/oropharyngeal cancer cases is increasing each year, and these cancers are now the most common HPV-associated cancer in the United States. [1]

The following charts show the total number of Tennesseans newly diagnosed with oral and oropharyngeal cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



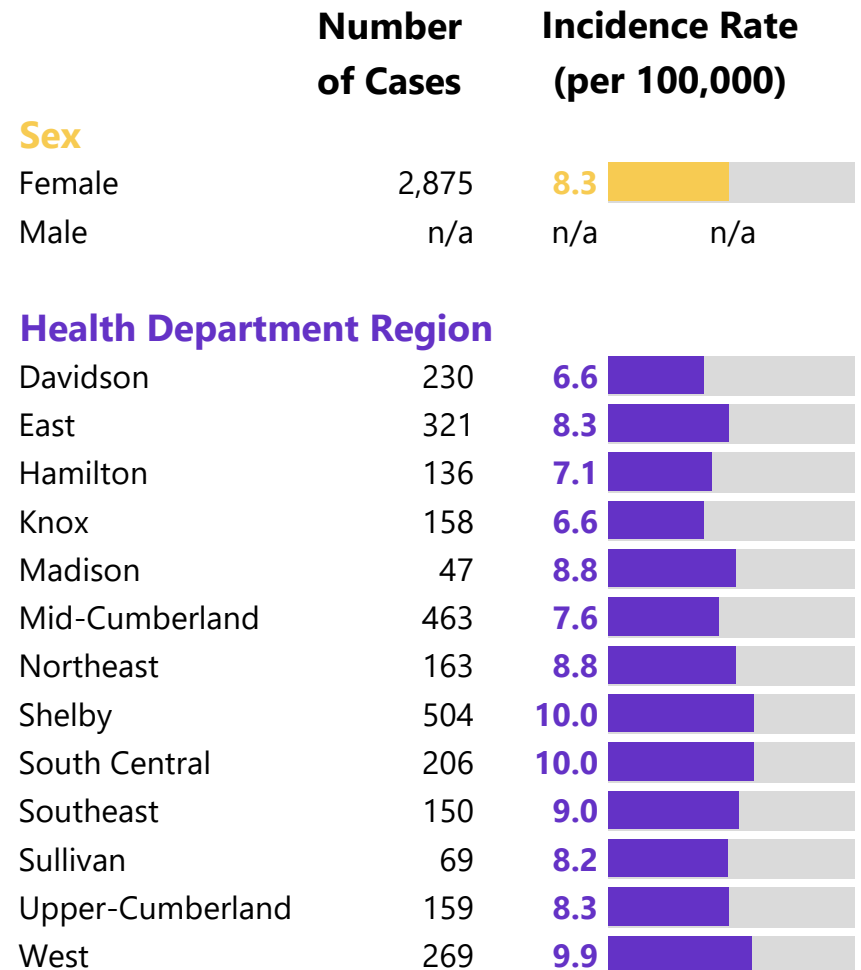
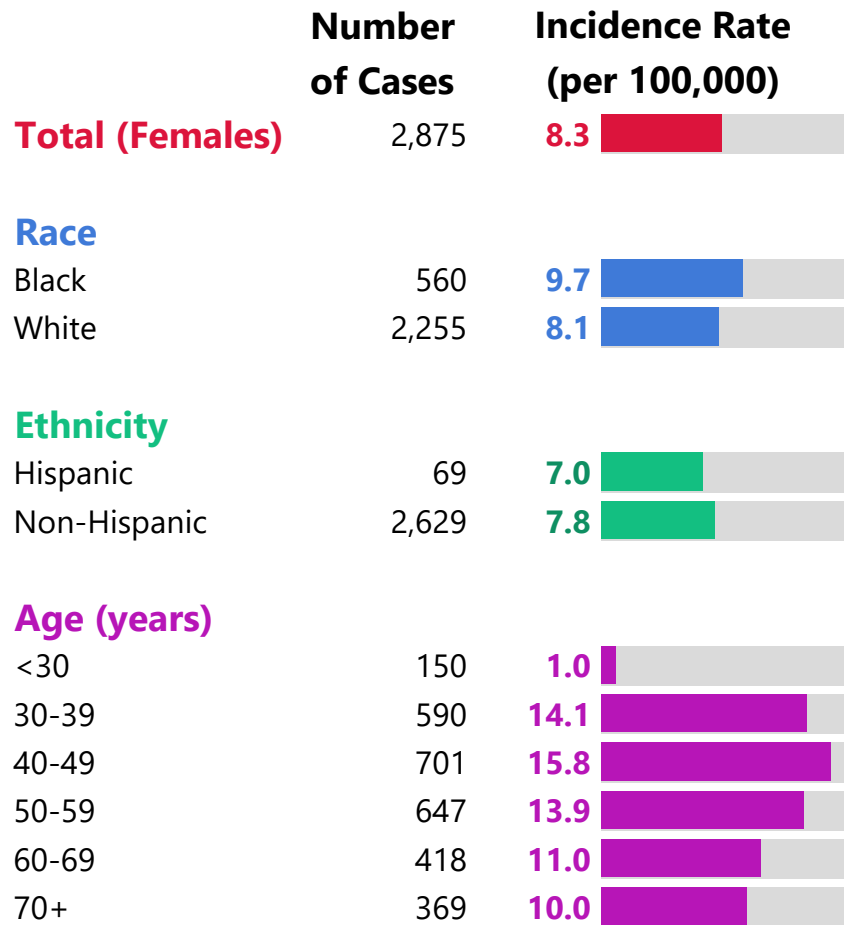
^ Data not shown due to fewer than 11 cases.

HPV-Associated Cancer -- Cervix

Tennessee, 2009-2018

Virtually all cervical cancers are caused by the Human Papilloma Virus (HPV). Routine screening can prevent most cervical cancers by allowing health care providers to find and remove precancerous cells before they develop into cancer. As a result, cervical cancer incidence and mortality rates in the United States are decreasing. [1]

The following charts show the total number of Tennessee women newly diagnosed with cervical cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.

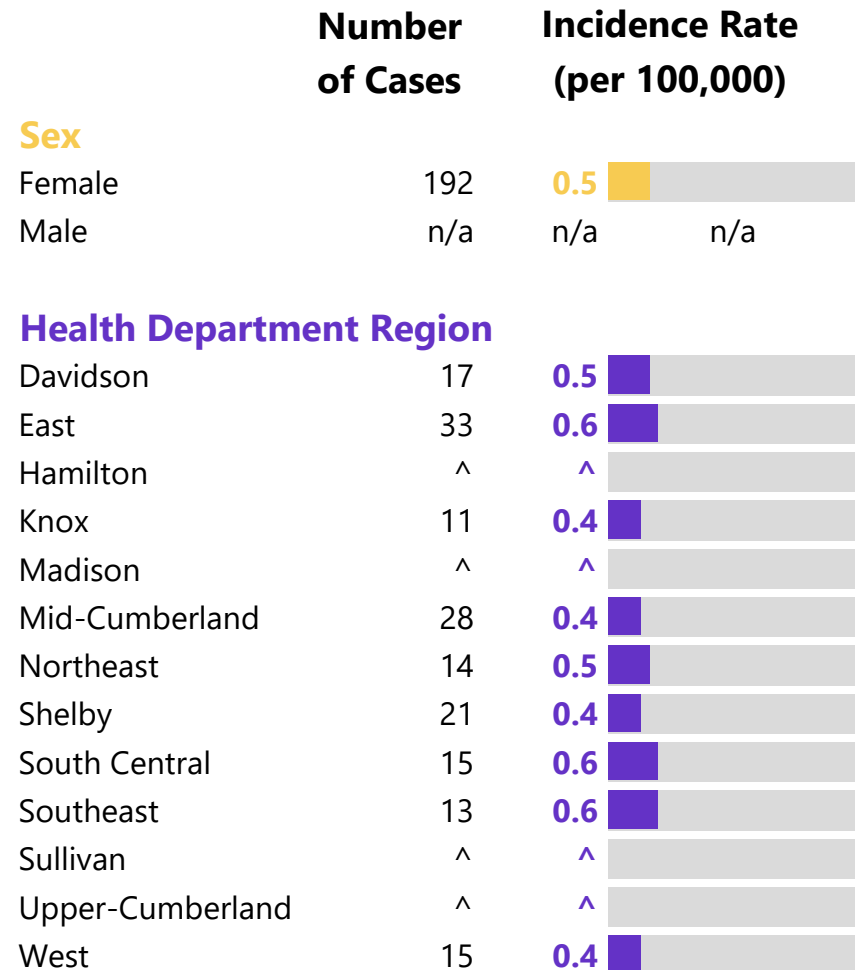
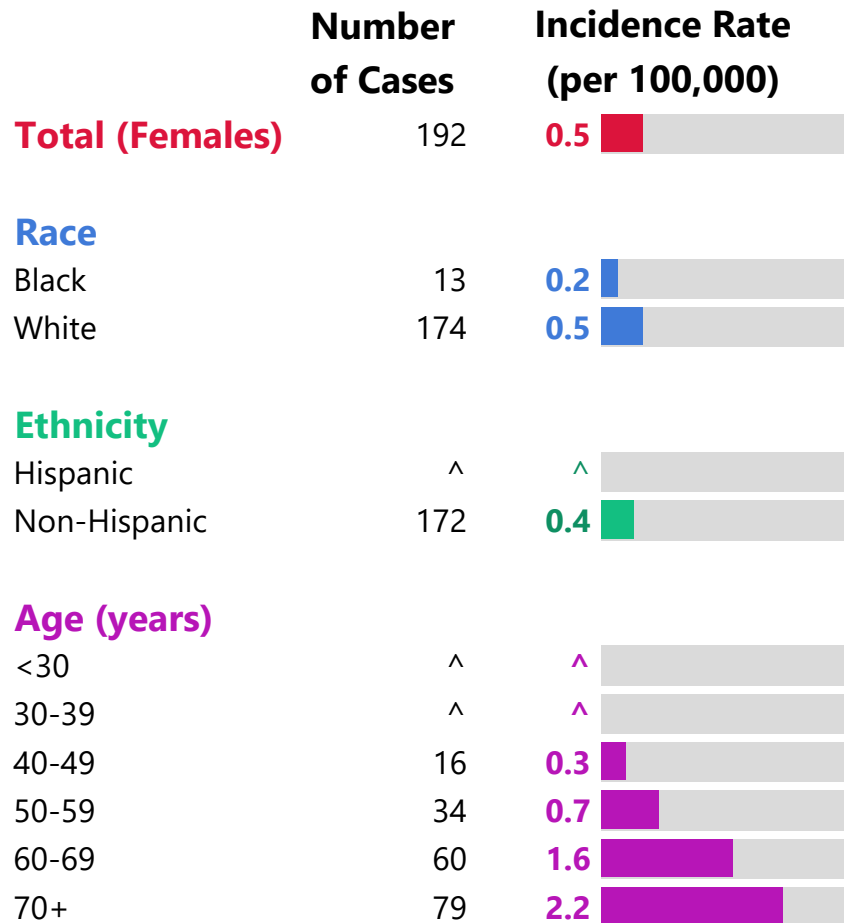


HPV-Associated Cancer -- Vagina

Tennessee, 2009-2018

Vaginal cancer is a rare cancer that occurs mainly in older women (average age at time of diagnosis is 67 years compared to 48 years for cervical cancer). Most vaginal cancers (75%) are caused by the Human Papilloma Virus (HPV). [1,3]

The following charts show the total number of Tennessee women newly diagnosed with vaginal cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



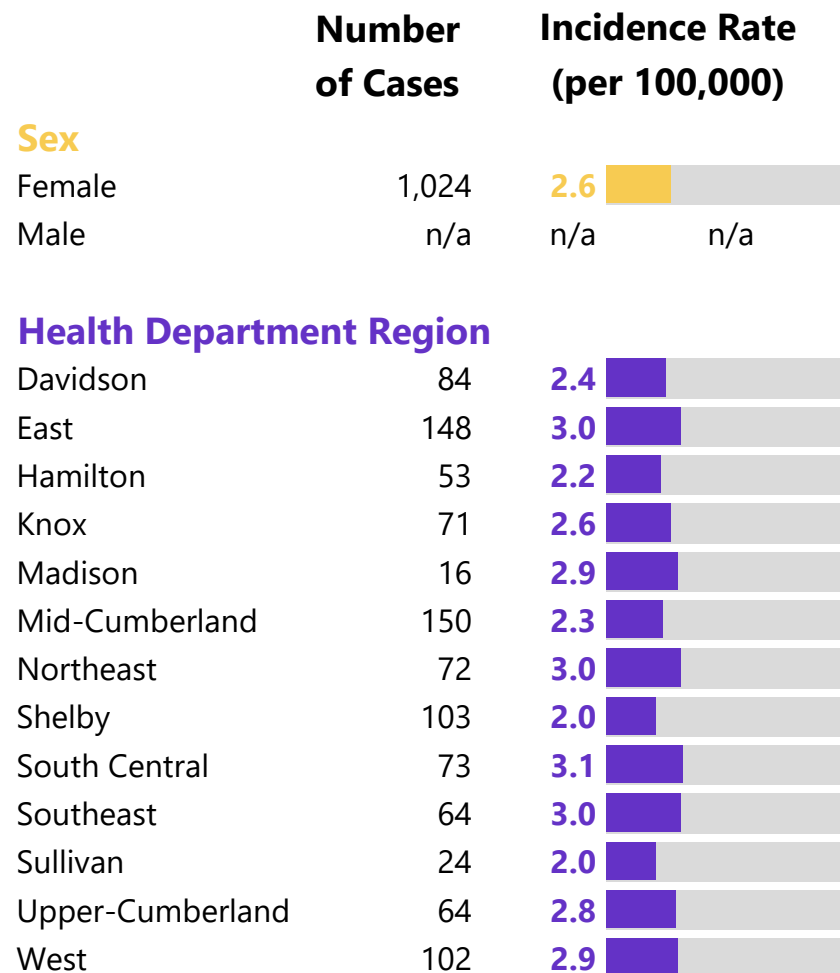
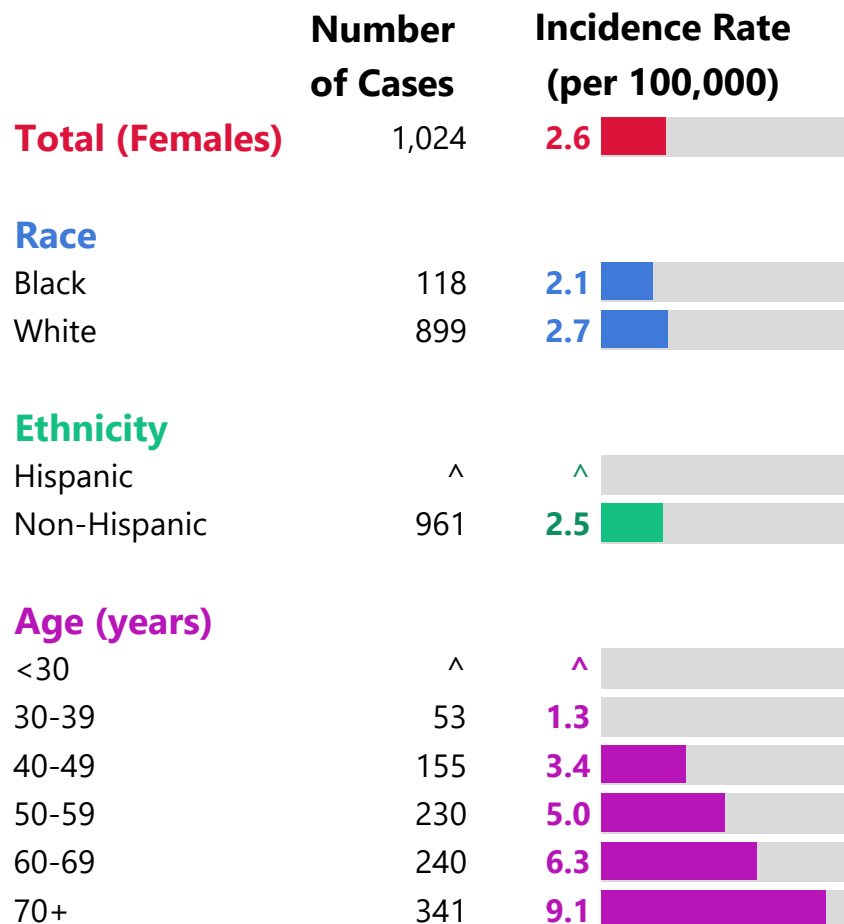
^ Data not shown due to fewer than 11 cases.

HPV-Associated Cancer -- Vulva

Tennessee, 2009-2018

In the United States, vulvar cancer accounts for nearly 6% of cancers of the female reproductive organs and 0.7% of all cancers in women. Most vulvar cancers (70%) are caused by the Human Papilloma Virus (HPV). [1,4]

The following charts show the total number of Tennessee women newly diagnosed with vulvar cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



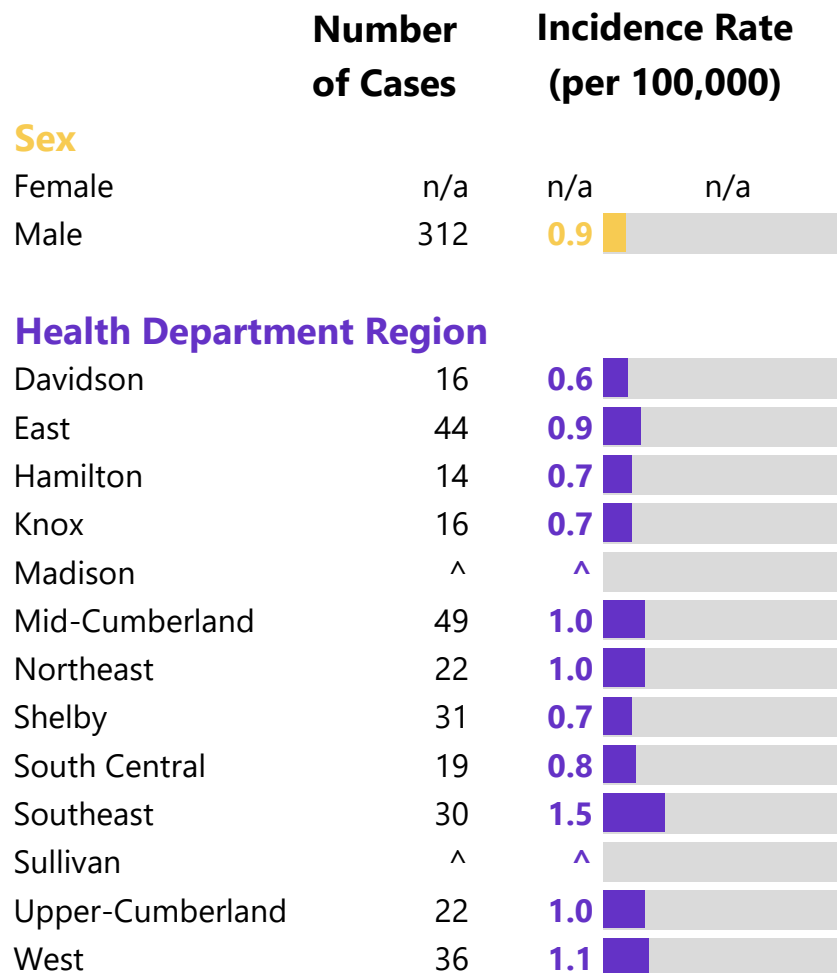
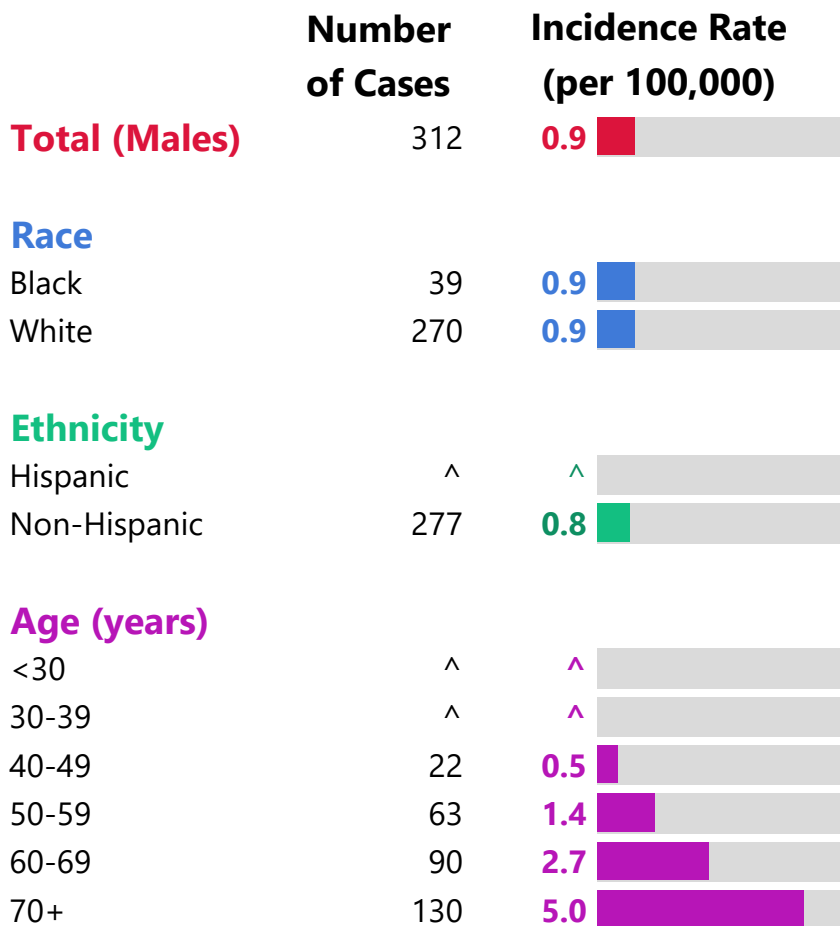
^ Data not shown due to fewer than 11 cases.

HPV-Associated Cancer -- Penis

Tennessee, 2009-2018

Penile cancer is uncommon in the United States and makes up less than 1% of all cancer diagnosed in men. Most penile cancers (over 60%) are caused by the Human Papilloma Virus (HPV). [1,5]

The following charts show the total number of Tennessee men newly diagnosed with penile cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



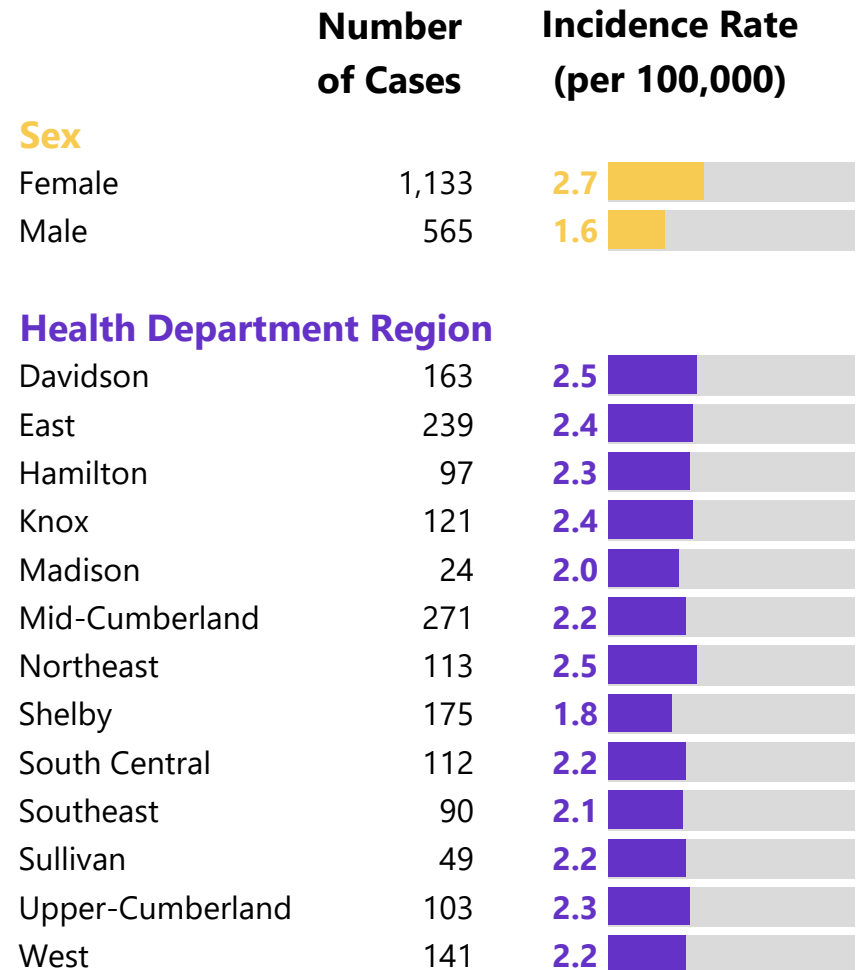
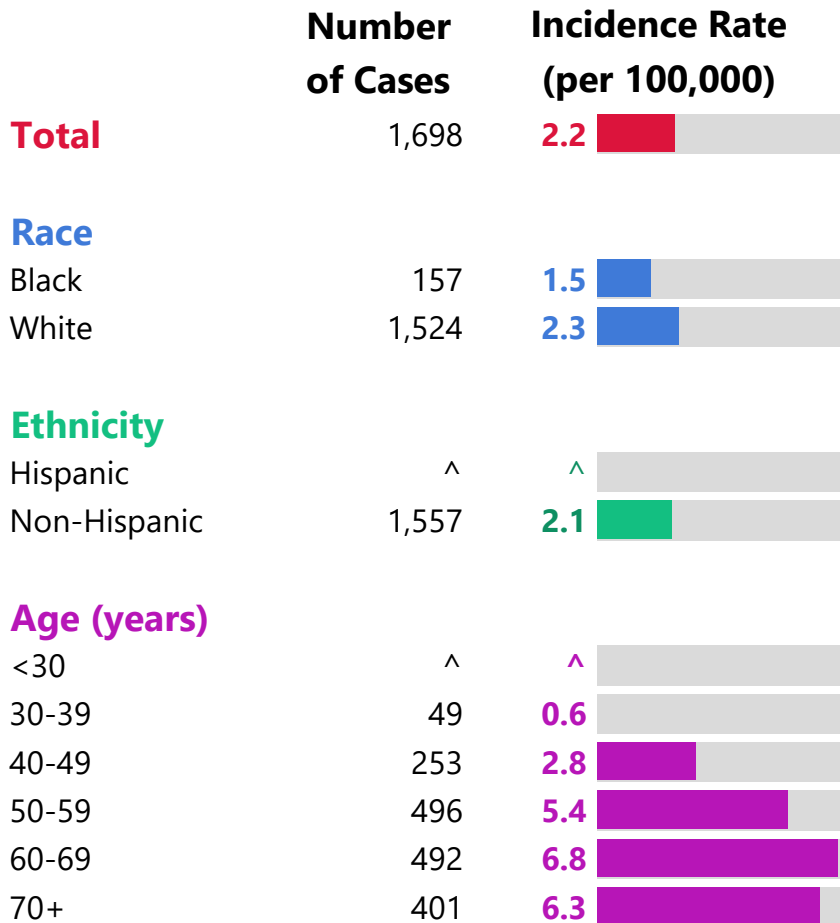
^ Data not shown due to fewer than 11 cases.

HPV-Associated Cancer -- Anus

Tennessee, 2009-2018

Over 90% of anal cancers are caused by the Human Papilloma Virus (HPV). The number of new cases and the number of deaths from anal cancer are increasing in the United States each year. [1]

The following charts show the total number of Tennesseans newly diagnosed with anal cancer between 2009 and 2018, and the average, annual rate of newly diagnosed cases (i.e. the incidence rate) during this time period.



^ Data not shown due to fewer than 11 cases.

Technical Notes

Data Source: Tennessee Cancer Registry, Division of Population Health Assessment, Tennessee Department of Health. Number of cases are the total number of cases diagnosed between 2009-2018. Incidence rates are average, annual rates per 100,000 during this same time period and are age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130). Confidence intervals (Tiwari mod) are 95% for rates (95% CI). Data are suppressed when the number of cases is less than 11.

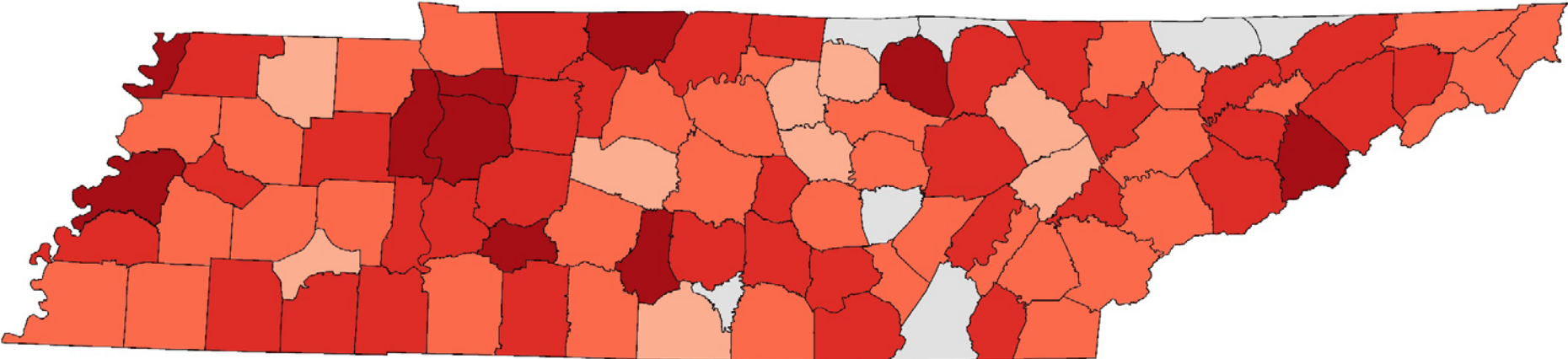
When making comparisons across groups (e.g. females vs. males or blacks vs. whites), it is recommended that 95% confidence intervals be considered (provided in Appendix B and Appendix C). If the 95% CIs for two groups do not overlap, then the difference between them can be considered statistically significant. If they do overlap, then the difference may not be statistically significant. Comparisons made in the text of the report are all statistically significant unless otherwise specified.

HPV-associated cancers were defined as cancers at specific anatomic sites with specific cell types in which HPV DNA frequently is found. All cancers were microscopically confirmed. Cervical cancers (International Classification of Diseases for Oncology, Third Edition [ICD-O-3] site codes C53.0–C53.9) were limited to invasive carcinomas (ICD-O-3 histology codes 8010–8671, 8940–8941). Vaginal (ICD-O-3 site code C52.9), vulvar (ICD-O-3 site codes C51.0–C51.9), penile (ICD-O-3 site codes C60.0–60.9), anal (including rectal SCC; ICD-O-3 site code C20.9, C21.0–C21.9), and oropharyngeal (ICD-O-3 site codes 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 and C14.8) cancer sites were limited to invasive squamous cell carcinomas (ICD-O-3 histology codes 8050–8084, 8120–8131).

References:

1. HPV and Cancer -- National Cancer Institute. Accessed 3/30/21 at www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer
2. When to Get HPV Vaccine -- Centers for Disease Control and Detection. Accessed 3/31/21 at www.cdc.gov/hpv/parents/vaccine.html
3. Key Statistics for Vaginal Cancer -- American Cancer Society. Accessed 3/30/21 at www.cancer.org/cancer/vaginal-cancer/about/key-statistics.html
4. Key Statistics for Vulvar Cancer -- American Cancer Society. Accessed 3/30/21 at www.cancer.org/cancer/vulvar-cancer/about/key-statistics.html
5. Penile Cancer: Statistics -- American Society of Clinical Oncology. Accessed 3/30/21 at www.cancer.net/cancer-types/penile-cancer/statistics

HPV-Associated Cancer -- All Sites Tennessee, 2009-2018



Incidence Rate per 100,000



Tennessee Rate: 13.6/100,000

^ Data not shown due to fewer than 11 cases.

Appendix B - Detailed Counts and Rates by Health Department Region and County

State/Region/County	All Sites			Oral			Cervix		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
Tennessee	10,180	13.6	(13.4-13.9)	4,079	5.1	(4.9-5.2)	2,875	8.3	(8.0-8.6)
East Region	1,336	14.2	(13.4-15.1)	551	5.3	(4.8-5.7)	321	8.3	(7.4-9.3)
Anderson County	141	14.6	(12.1-17.3)	59	5.3	(4.0-6.9)	33	8.2	(5.5-11.7)
Blount County	210	14.2	(12.3-16.4)	81	4.8	(3.8-6.0)	52	8.2	(6.0-10.8)
Campbell County	67	13.3	(10.2-17.2)	24	4.0	(2.6-6.2)	17	8.0	(4.5-13.1)
Claiborne County	65	17.5	(13.3-22.6)	20	4.8	(2.9-7.6)	19	11.6	(6.7-18.5)
Cocke County	88	19.3	(15.3-24.2)	36	7.7	(5.3-10.9)	22	10.9	(6.6-16.9)
Grainger County	43	14.8	(10.5-20.3)	19	5.7	(3.4-9.3)	11	8.1	(3.9-15.1)
Hamblen County	99	12.7	(10.3-15.6)	49	5.9	(4.3-7.9)	18	5.5	(3.2-8.8)
Jefferson County	94	14.7	(11.8-18.2)	42	6.1	(4.3-8.4)	26	9.2	(5.9-13.7)
Loudon County	107	14.5	(11.7-17.9)	55	6.6	(4.9-8.8)	21	8.7	(5.2-13.6)
Monroe County	74	12.9	(10.0-16.5)	25	4.2	(2.6-6.3)	18	7.8	(4.5-12.5)
Morgan County	23	8.3	(5.2-12.7)	12	3.8	(1.9-7.0)	^	^	^
Roane County	75	10.2	(7.9-13.1)	31	3.8	(2.5-5.5)	18	6.9	(4.0-11.2)
Scott County	39	16.7	(11.8-22.9)	^	^	^	14	13.1	(7.1-22.1)
Sevier County	182	15.9	(13.6-18.5)	79	6.1	(4.8-7.7)	39	8.7	(6.1-12.0)
Union County	29	12.3	(8.1-18.1)	11	4.4	(2.1-8.2)	^	^	^
Mid-Cumberland Region	1,693	13.6	(12.9-14.3)	732	5.6	(5.2-6.0)	463	7.6	(7.0-8.4)
Cheatham County	66	14.5	(11.1-18.7)	31	6.1	(4.1-8.8)	13	6.2	(3.2-10.8)
Dickson County	94	15.9	(12.8-19.6)	40	6.4	(4.5-8.8)	26	9.3	(6.0-13.9)
Houston County	23	21.7	(13.5-33.5)	^	^	^	^	^	^
Humphreys County	48	18.9	(13.8-25.6)	23	8.1	(5.1-12.6)	14	12.1	(6.3-21.2)

^ Data not shown due to fewer than 11 cases.

Appendix B - Detailed Counts and Rates by Health Department Region and County

State/Region/County	All Sites			Oral			Cervix		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
Montgomery County	232	14.7	(12.8-16.8)	85	5.3	(4.2-6.6)	77	9.3	(7.3-11.7)
Robertson County	142	18.9	(15.8-22.3)	66	7.9	(6.0-10.1)	39	11.7	(8.3-16.0)
Rutherford County	353	13.1	(11.8-14.6)	153	5.6	(4.8-6.6)	102	7.1	(5.8-8.7)
Stewart County	23	13.9	(8.6-21.5)	^	^	^	^	^	^
Sumner County	287	14.5	(12.8-16.3)	122	5.7	(4.8-6.9)	69	7.6	(5.9-9.7)
Trousdale County	13	12.8	(6.7-22.5)	^	^	^	^	^	^
Williamson County	225	9.9	(8.6-11.4)	113	4.8	(4.0-5.8)	52	4.8	(3.5-6.3)
Wilson County	187	13.0	(11.2-15.1)	83	5.2	(4.1-6.5)	54	8.4	(6.3-11.0)
Northeast Region	624	14.5	(13.4-15.7)	240	5.2	(4.5-5.9)	163	8.8	(7.5-10.4)
Carter County	98	13.3	(10.7-16.4)	42	5.2	(3.7-7.2)	26	8.4	(5.4-12.5)
Greene County	129	15.3	(12.6-18.3)	48	5.5	(4.0-7.4)	32	8.7	(5.8-12.5)
Hancock County	^	^	^	^	^	^	^	^	^
Hawkins County	102	14.6	(11.8-17.9)	41	5.8	(4.1-7.9)	27	8.6	(5.5-12.7)
Johnson County	31	13.6	(9.0-19.7)	11	4.1	(2.0-7.8)	10	11.9	(5.5-22.6)
Unicoi County	31	14.0	(9.2-20.4)	12	4.2	(2.1-7.8)	10	11.7	(5.4-21.9)
Washington County	224	15.2	(13.2-17.4)	84	5.3	(4.2-6.6)	53	8.3	(6.1-10.9)
South Central Region	685	14.9	(13.8-16.1)	260	5.2	(4.5-5.8)	206	10.0	(8.6-11.5)
Bedford County	82	16.3	(12.9-20.3)	30	5.6	(3.8-8.1)	28	11.5	(7.6-16.8)
Coffee County	103	15.9	(12.9-19.4)	39	5.5	(3.9-7.6)	26	9.3	(6.0-13.8)
Giles County	48	14.0	(10.1-18.9)	16	4.1	(2.3-7.0)	17	12.1	(6.8-19.6)
Hickman County	50	17.0	(12.5-22.7)	21	6.5	(4.0-10.2)	17	14.1	(8.0-23.0)
Lawrence County	77	14.9	(11.6-18.8)	26	4.6	(3.0-6.9)	26	11.1	(7.1-16.6)

^ Data not shown due to fewer than 11 cases.

Appendix B - Detailed Counts and Rates by Health Department Region and County

State/Region/County	All Sites			Oral			Cervix		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
Lewis County	28	18.3	(11.9-27.2)	16	9.4	(5.2-15.9)	^	^	^
Lincoln County	48	11.0	(8.0-14.9)	20	4.2	(2.5-6.8)	14	6.9	(3.6-11.9)
Marshall County	69	20.0	(15.5-25.5)	29	7.6	(5.0-11.1)	19	11.5	(6.8-18.2)
Maury County	129	13.3	(11.1-15.9)	46	4.4	(3.2-5.9)	36	7.9	(5.5-11.0)
Moore County	^	^	^	^	^	^	^	^	^
Perry County	16	15.8	(8.6-26.9)	^	^	^	^	^	^
Wayne County	27	13.2	(8.6-19.6)	^	^	^	13	16.9	(8.5-29.7)
Southeast Region	574	14.5	(13.3-15.7)	227	5.2	(4.6-6.0)	150	9.0	(7.6-10.6)
Bledsoe County	24	13.7	(8.6-20.9)	11	5.9	(2.9-11.1)	^	^	^
Bradley County	177	14.9	(12.8-17.4)	61	5.0	(3.8-6.5)	47	8.7	(6.3-11.7)
Franklin County	72	14.3	(11.0-18.2)	25	4.6	(2.9-6.9)	17	8.0	(4.5-13.1)
Grundy County	26	15.5	(9.9-23.4)	^	^	^	^	^	^
McMinn County	81	12.3	(9.6-15.4)	31	4.2	(2.8-6.1)	18	6.9	(4.0-11.1)
Marion County	56	16.3	(12.1-21.4)	29	7.4	(4.9-10.8)	10	7.6	(3.5-14.0)
Meigs County	23	13.2	(8.1-20.7)	13	7.6	(3.8-13.9)	^	^	^
Polk County	28	13.1	(8.5-19.4)	12	5.1	(2.6-9.3)	^	^	^
Rhea County	65	17.3	(13.2-22.3)	30	6.5	(4.3-9.4)	22	14.2	(8.7-21.6)
Sequatchie County	22	12.7	(7.8-19.7)	^	^	^	^	^	^
Upper-Cumberland Region	602	13.8	(12.7-15.0)	245	5.1	(4.5-5.8)	159	8.3	(7.0-9.8)
Cannon County	29	16.0	(10.6-23.6)	^	^	^	9	11.5	(5.0-22.8)
Clay County	^	^	^	^	^	^	^	^	^
Cumberland County	131	16.5	(13.5-20.1)	57	6.6	(4.8-8.8)	31	10.4	(6.7-15.2)

^ Data not shown due to fewer than 11 cases.

Appendix B - Detailed Counts and Rates by Health Department Region and County

State/Region/County	All Sites			Oral			Cervix		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
DeKalb County	19	8.2	(4.9-13.2)	^	^	^	^	^	^
Fentress County	37	15.0	(10.3-21.3)	18	6.9	(4.0-11.3)	^	^	^
Jackson County	17	10.9	(6.1-18.3)	^	^	^	^	^	^
Macon County	38	14.7	(10.3-20.4)	12	4.2	(2.2-7.5)	14	11.1	(5.9-18.8)
Overton County	55	19.8	(14.7-26.1)	21	7.2	(4.4-11.3)	14	10.8	(5.7-18.7)
Pickett County	^	^	^	^	^	^	^	^	^
Putnam County	115	13.6	(11.2-16.4)	44	4.6	(3.4-6.3)	34	8.7	(5.9-12.4)
Smith County	27	11.2	(7.3-16.6)	12	5.0	(2.5-9.0)	^	^	^
Van Buren County	^	^	^	^	^	^	^	^	^
Warren County	68	13.4	(10.3-17.1)	30	5.3	(3.5-7.6)	19	8.1	(4.8-12.9)
White County	44	13.1	(9.4-17.7)	21	6.1	(3.8-9.6)	^	^	^
West Region	907	14.4	(13.5-15.4)	344	4.9	(4.4-5.5)	269	9.9	(8.7-11.2)
Benton County	45	20.4	(14.5-28.1)	21	8.3	(5.0-13.2)	^	^	^
Carroll County	58	17.0	(12.7-22.3)	22	5.9	(3.6-9.1)	16	11.7	(6.5-19.2)
Chester County	20	11.1	(6.7-17.3)	^	^	^	^	^	^
Crockett County	24	16.2	(10.2-24.5)	^	^	^	12	16.5	(8.2-29.2)
Decatur County	24	16.1	(10.0-24.7)	^	^	^	^	^	^
Dyer County	53	12.7	(9.5-16.8)	22	4.8	(3.0-7.4)	17	9.1	(5.2-14.7)
Fayette County	69	13.1	(10.1-16.9)	34	5.6	(3.8-8.1)	17	7.3	(4.1-12.1)
Gibson County	78	13.3	(10.4-16.7)	21	3.3	(2.0-5.2)	26	9.4	(6.0-13.9)
Hardeman County	46	15.3	(11.1-20.6)	14	4.2	(2.2-7.2)	13	11.9	(6.2-20.6)
Hardin County	50	15.5	(11.3-20.8)	21	5.0	(3.1-8.0)	12	10.7	(5.5-18.7)

^ Data not shown due to fewer than 11 cases.

Appendix B - Detailed Counts and Rates by Health Department Region and County

State/Region/County	All Sites			Oral			Cervix		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
Haywood County	28	13.0	(8.5-19.2)	^	^	^	^	^	^
Henderson County	42	13.4	(9.6-18.4)	22	6.1	(3.8-9.5)	^	^	^
Henry County	52	12.8	(9.4-17.2)	13	2.3	(1.2-4.3)	21	12.3	(7.4-19.3)
Lake County	15	17.5	(9.8-29.5)	^	^	^	^	^	^
Lauderdale County	54	18.3	(13.7-24.1)	13	4.0	(2.1-7.0)	27	21.7	(14.1-31.8)
McNairy County	53	16.6	(12.2-22.0)	22	6.5	(4.0-10.0)	13	9.2	(4.7-16.1)
Obion County	59	14.9	(11.2-19.4)	24	5.5	(3.5-8.4)	18	10.3	(5.9-16.6)
Tipton County	98	14.5	(11.7-17.8)	44	6.2	(4.5-8.4)	25	7.6	(4.9-11.3)
Weakley County	39	10.4	(7.3-14.4)	14	3.3	(1.7-5.7)	12	7.9	(3.9-14.1)
Metro Regions									
Davidson County	869	13.0	(12.2-14.0)	359	5.2	(4.7-5.8)	230	6.6	(5.8-7.6)
Hamilton County	529	12.6	(11.5-13.8)	221	5.0	(4.3-5.7)	136	7.1	(6.0-8.5)
Knox County	682	13.5	(12.5-14.6)	305	5.7	(5.1-6.4)	158	6.6	(5.6-7.7)
Madison County	153	13.8	(11.7-16.3)	60	5.0	(3.8-6.5)	47	8.8	(6.4-11.9)
Shelby County	1,267	13.0	(12.3-13.8)	433	4.2	(3.8-4.6)	504	10.0	(9.1-10.9)
Sullivan County	259	12.5	(11.0-14.3)	102	4.4	(3.6-5.4)	69	8.2	(6.3-10.6)

^ Data not shown due to fewer than 11 cases.

Appendix C - Detailed Counts and Rates by Cancer Type and Demographic Group

	All Sites			Oral			Cervix		
	Count	Rate	95%CI	Count	Rate	95%CI	Count	Rate	95%CI
Tennessee	10,180	13.6	(13.4-13.9)	4,079	5.1	(4.9-5.2)	2,875	8.3	(8.0-8.6)
Sex									
Female	5,913	15.7	(15.3-16.1)	689	1.7	(1.5-1.8)	2,875	8.3	(8.0-8.6)
Male	4,267	11.5	(11.1-11.8)	3,390	8.9	(8.6-9.3)	n/a	n/a	n/a
Race									
Black	1,246	11.8	(11.2-12.5)	359	3.2	(2.9-3.6)	560	9.7	(8.9-10.6)
White	8,814	14.1	(13.8-14.4)	3,692	5.4	(5.3-5.6)	2,255	8.1	(7.8-8.5)
Ethnicity									
Hispanic	117	6.7	(5.4-8.3)	29	1.9	(1.2-2.8)	69	7.0	(5.2-9.1)
Non-Hispanic	9,457	13.0	(12.7-13.3)	3,861	4.9	(4.8-5.1)	2,629	7.8	(7.5-8.1)
Age (years)									
<30	172	0.6	(0.5-0.7)	^	^	^	150	1.0	(0.9-1.2)
30-39	742	9.0	(8.4-9.7)	42	0.5	(0.4-0.7)	590	14.1	(13.0-15.3)
40-49	1,585	17.9	(17.0-18.8)	438	4.8	(4.4-5.3)	701	15.8	(14.7-17.1)
50-59	2,853	31.5	(30.3-32.7)	1,383	15.3	(14.5-16.1)	647	13.9	(12.9-15.1)
60-69	2,729	37.8	(36.4-39.2)	1,429	19.8	(18.8-20.8)	418	11.0	(10.0-12.1)
70+	2,099	32.7	(31.3-34.1)	779	12.0	(11.2-12.9)	369	10.0	(9.0-11.1)
Region									
Davidson County	869	13.0	(12.2-14.0)	359	5.2	(4.7-5.8)	230	6.6	(5.8-7.6)
East Region	1,336	14.2	(13.4-15.1)	551	5.3	(4.8-5.7)	321	8.3	(7.4-9.3)
Hamilton County	529	12.6	(11.5-13.8)	221	5.0	(4.3-5.7)	136	7.1	(6.0-8.5)
Knox County	682	13.5	(12.5-14.6)	305	5.7	(5.1-6.4)	158	6.6	(5.6-7.7)
Madison County	153	13.8	(11.7-16.3)	60	5.0	(3.8-6.5)	47	8.8	(6.4-11.9)
Mid-Cumberland Region	1,693	13.6	(12.9-14.3)	732	5.6	(5.2-6.0)	463	7.6	(7.0-8.4)
Northeast Region	624	14.5	(13.4-15.7)	240	5.2	(4.5-5.9)	163	8.8	(7.5-10.4)
Shelby County	1,267	13.0	(12.3-13.8)	433	4.2	(3.8-4.6)	504	10.0	(9.1-10.9)
South Central Region	685	14.9	(13.8-16.1)	260	5.2	(4.5-5.8)	206	10.0	(8.6-11.5)
Southeast Region	574	14.5	(13.3-15.7)	227	5.2	(4.6-6.0)	150	9.0	(7.6-10.6)
Sullivan County	259	12.5	(11.0-14.3)	102	4.4	(3.6-5.4)	69	8.2	(6.3-10.6)
Upper-Cumberland Region	602	13.8	(12.7-15.0)	245	5.1	(4.5-5.8)	159	8.3	(7.0-9.8)
West Region	907	14.4	(13.5-15.4)	344	4.9	(4.4-5.5)	269	9.9	(8.7-11.2)

^ Data not shown due to fewer than 11 cases.

Appendix C - Detailed Counts and Rates by Cancer Type and Demographic Group

	Vagina			Vulva			Penis		
	Count	Rate	95%CI	Count	Rate	95%CI	Count	Rate	95%CI
Tennessee	192	0.5	(0.4-0.5)	1,024	2.6	(2.4-2.8)	312	0.9	(0.8-1.0)
Sex									
Female	192	0.5	(0.4-0.5)	1,024	2.6	(2.4-2.8)	n/a	n/a	n/a
Male	n/a	n/a	n/a	n/a	n/a	n/a	312	0.9	(0.8-1.0)
Race									
Black	13	0.2	(0.1-0.4)	118	2.1	(1.7-2.5)	39	0.9	(0.6-1.2)
White	174	0.5	(0.4-0.6)	899	2.7	(2.5-2.9)	270	0.9	(0.8-1.0)
Ethnicity									
Hispanic	^	^	^	^	^	^	^	^	^
Non-Hispanic	172	0.4	(0.4-0.5)	961	2.5	(2.3-2.6)	277	0.8	(0.7-0.9)
Age (years)									
<30	^	^	^	^	^	^	^	^	^
30-39	^	^	^	53	1.3	(1.0-1.7)	^	^	^
40-49	16	0.3	(0.2-0.6)	155	3.4	(2.9-4.0)	22	0.5	(0.3-0.7)
50-59	34	0.7	(0.5-1.0)	230	5.0	(4.3-5.7)	63	1.4	(1.1-1.8)
60-69	60	1.6	(1.2-2.0)	240	6.3	(5.5-7.2)	90	2.7	(2.1-3.3)
70+	79	2.2	(1.7-2.7)	341	9.1	(8.1-10.1)	130	5.0	(4.1-5.9)
Region									
Davidson County	17	0.5	(0.3-0.8)	84	2.4	(1.9-3.0)	16	0.6	(0.3-1.0)
East Region	33	0.6	(0.4-0.9)	148	3.0	(2.5-3.5)	44	0.9	(0.7-1.3)
Hamilton County	^	^	^	53	2.2	(1.6-2.9)	14	0.7	(0.4-1.2)
Knox County	11	0.4	(0.2-0.8)	71	2.6	(2.0-3.4)	16	0.7	(0.4-1.2)
Madison County	^	^	^	16	2.9	(1.6-4.8)	^	^	^
Mid-Cumberland Region	28	0.4	(0.3-0.6)	150	2.3	(2.0-2.7)	49	1.0	(0.7-1.3)
Northeast Region	14	0.5	(0.3-0.9)	72	3.0	(2.3-3.9)	22	1.0	(0.6-1.6)
Shelby County	21	0.4	(0.2-0.6)	103	2.0	(1.6-2.4)	31	0.7	(0.5-1.0)
South Central Region	15	0.6	(0.3-1.0)	73	3.1	(2.4-4.0)	19	0.8	(0.5-1.3)
Southeast Region	13	0.6	(0.3-1.0)	64	3.0	(2.3-3.9)	30	1.5	(1.0-2.1)
Sullivan County	^	^	^	24	2.0	(1.3-3.1)	9	0.8	(0.4-1.7)
Upper-Cumberland Region	^	^	^	64	2.8	(2.2-3.7)	22	1.0	(0.6-1.6)
West Region	15	0.4	(0.2-0.7)	102	2.9	(2.4-3.6)	36	1.1	(0.8-1.6)

^ Data not shown due to fewer than 11 cases.

Appendix C - Detailed Counts and Rates by Cancer Type and Demographic Group

	Anus		
	Count	Rate	95%CI
Tennessee	1,698	2.2	(2.1-2.3)
Sex			
Female	1,133	2.7	(2.6-2.9)
Male	1,698	2.2	(2.1-2.3)
Race			
Black	157	1.5	(1.3-1.8)
White	1,524	2.3	(2.2-2.5)
Ethnicity			
Hispanic	^	^	^
Non-Hispanic	1,557	2.1	(2.0-2.2)
Age (years)			
<30	^	^	^
30-39	49	0.6	(0.4-0.8)
40-49	253	2.8	(2.5-3.2)
50-59	496	5.4	(4.9-5.9)
60-69	492	6.8	(6.2-7.4)
70+	401	6.3	(5.7-6.9)
Region			
Davidson County	163	2.5	(2.1-2.9)
East Region	239	2.4	(2.1-2.8)
Hamilton County	97	2.3	(1.9-2.8)
Knox County	121	2.4	(1.9-2.8)
Madison County	24	2.0	(1.3-3.1)
Mid-Cumberland Region	271	2.2	(1.9-2.4)
Northeast Region	113	2.5	(2.0-3.0)
Shelby County	175	1.8	(1.5-2.1)
South Central Region	112	2.2	(1.8-2.7)
Southeast Region	90	2.1	(1.7-2.6)
Sullivan County	49	2.2	(1.6-3.0)
Upper-Cumberland Region	103	2.3	(1.8-2.8)
West Region	141	2.2	(1.8-2.6)

^ Data not shown due to fewer than 11 cases.