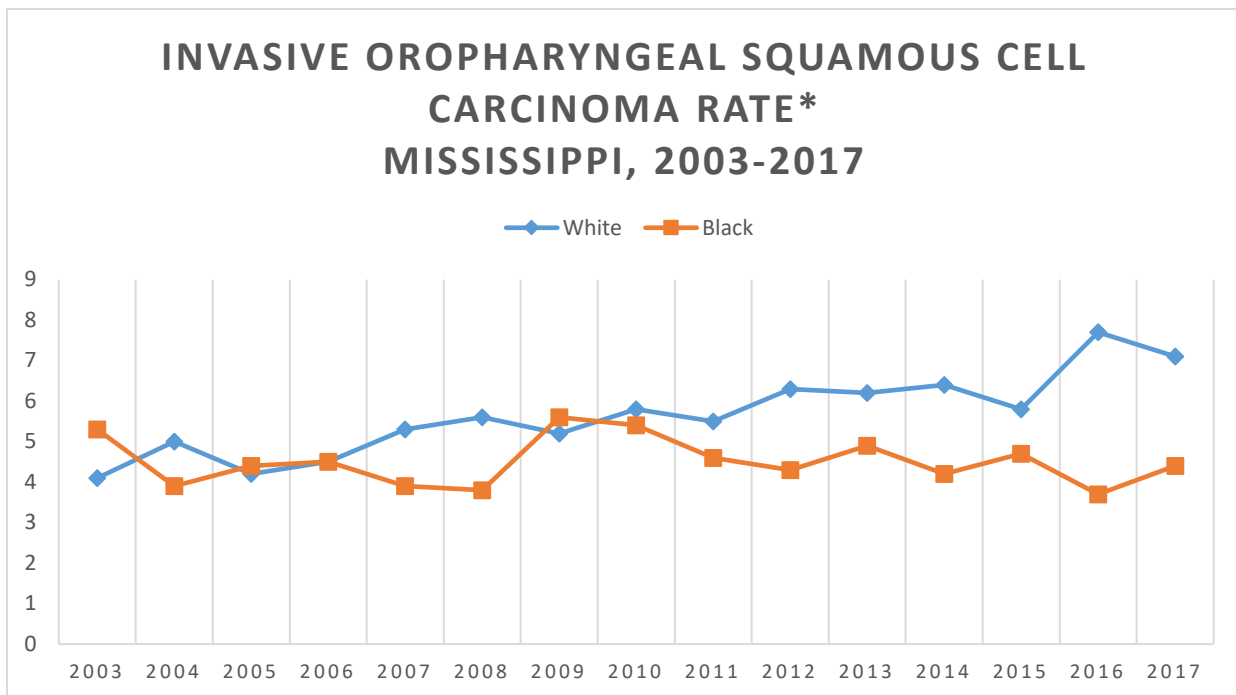


HPV-Related Cancers in Mississippi, 2003-2017

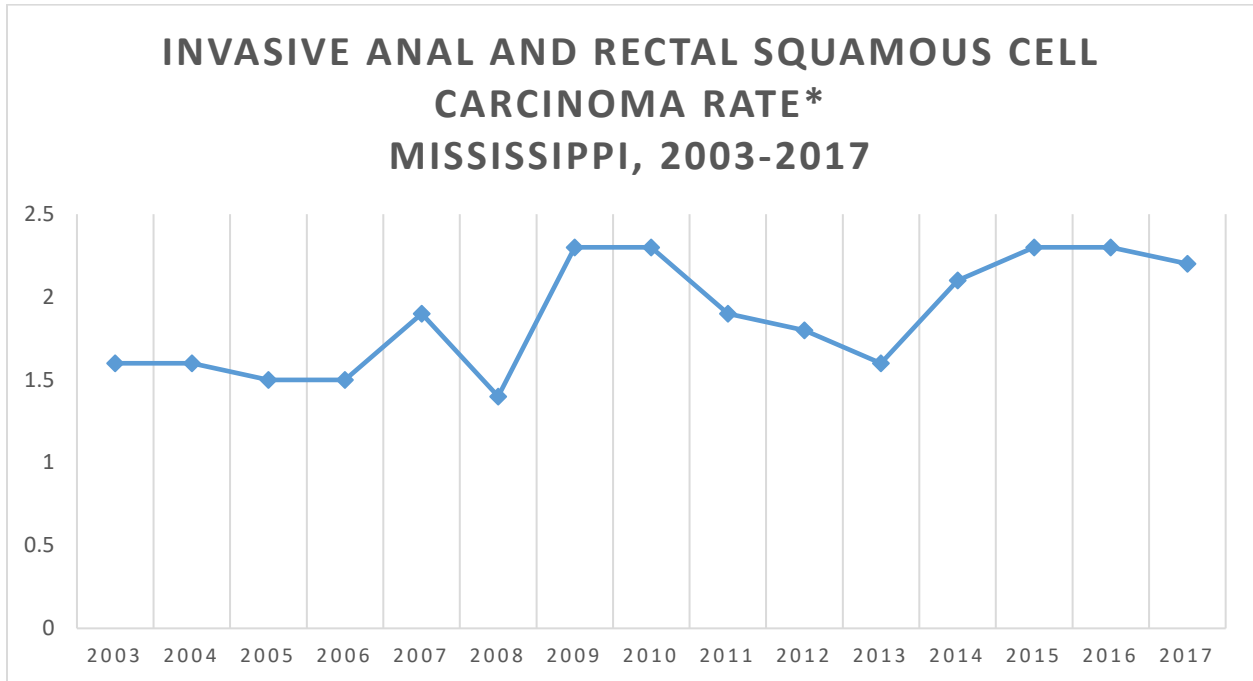
The Human Papilloma Virus (HPV) increases the risk of certain types of cancer. A vaccine is available that can prevent the most common cancer-causing types of HPV. Unfortunately, data from the 2017 National Immunization Survey-Teen reported by the National Cancer Institute's State Cancer Profiles shows that only 35.3% of Mississippi teens between ages 13 and 17 have received two or more doses of the HPV vaccination. Mississippi has the lowest rate of vaccination in the U.S.¹ Cancers associated with HPV infections include squamous cell carcinoma of the oropharynx, rectum, anus, vagina, vulva, and penis, as well as, carcinoma of the cervix. According to the Behavioral Risk Factor Surveillance System for 2018, 82.3% of women ages 21 to 65 in Mississippi report having had a Pap test in the past three years. Mississippi has the fourteenth highest rate among US states and the District of Columbia.² Below are graphs of the trends in HPV-related cancers over the period 2003 to 2017 by race and sex where the counts allow for such breakdown with a description of the trends occurring in each group both for the full time period and for the most recent period between 2013 and 2017. All analysis was done using SEER*Stat software³.



*Rates age-adjusted to the 2000 U.S. standard million population

The rate of oropharyngeal squamous cell carcinoma cannot be broken down by both race and sex due to how rare this cancer is particularly in black females. Over the period from 2003 to 2017, the white population had significantly higher rates of oropharyngeal squamous cell carcinoma than the black population in 2008, 2012, 2014, 2016, and 2017. The white population experienced a statistically significant increase between 2003 and 2017 of 3.61% annually. The rate for the black population remained relatively flat over this period with an annual decrease of 0.43%. For the latest five-year time period between 2013 and 2017, the trend for the white population was an increase of 4.78% annually.

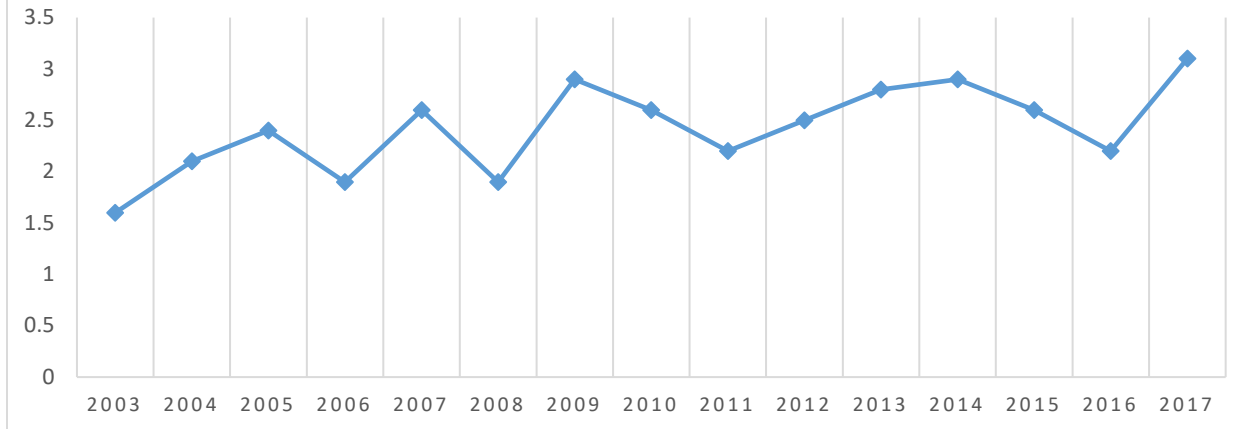
The rate for the black population during this period decreased at a rate of 2.94% annually. The changes for both groups between 2013 and 2017 were not statistically significant.



*Rates age-adjusted to the 2000 U.S. standard million population

Squamous cell carcinoma of the anus and rectum are rare cancers. Thus, the data can only be presented for Mississippi as a whole and not broken down by race and sex. Between 2003 and 2017, the rates for squamous cell carcinoma of the rectum and anus increased significantly at a rate of 2.72% annually. The greatest increases were seen in both white and black females. For the latest five-year time period between 2013 and 2017, anal and rectal squamous cell carcinoma was observed to be increasing at a rate of 8.09% annually, though this change was not statistically significant due to the small number of cases. White females were the only group with a significant increase during the period from 2013 to 2017.

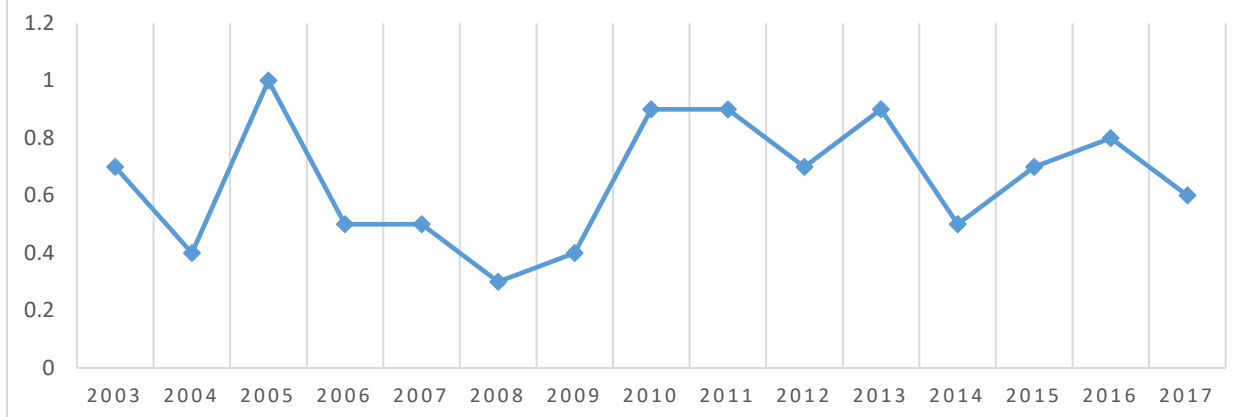
INVASIVE VULVAR SQUAMOUS CELL CARCINOMA RATE* MISSISSIPPI, 2003-2017



*Rates age-adjusted to the 2000 U.S. standard million population

Squamous cell carcinoma of the vulva is a rare cancer. Therefore, the rates cannot be broken out by race. For the time period between 2003 and 2017, the rates of squamous cell carcinoma of the vulva increased significantly at a rate of 2.81% annually. In the most recent five-year time period between 2013 and 2017, the rate of squamous cell carcinoma of the vulva increased at a rate of 0.60% annually, though this increase was not statistically significant.

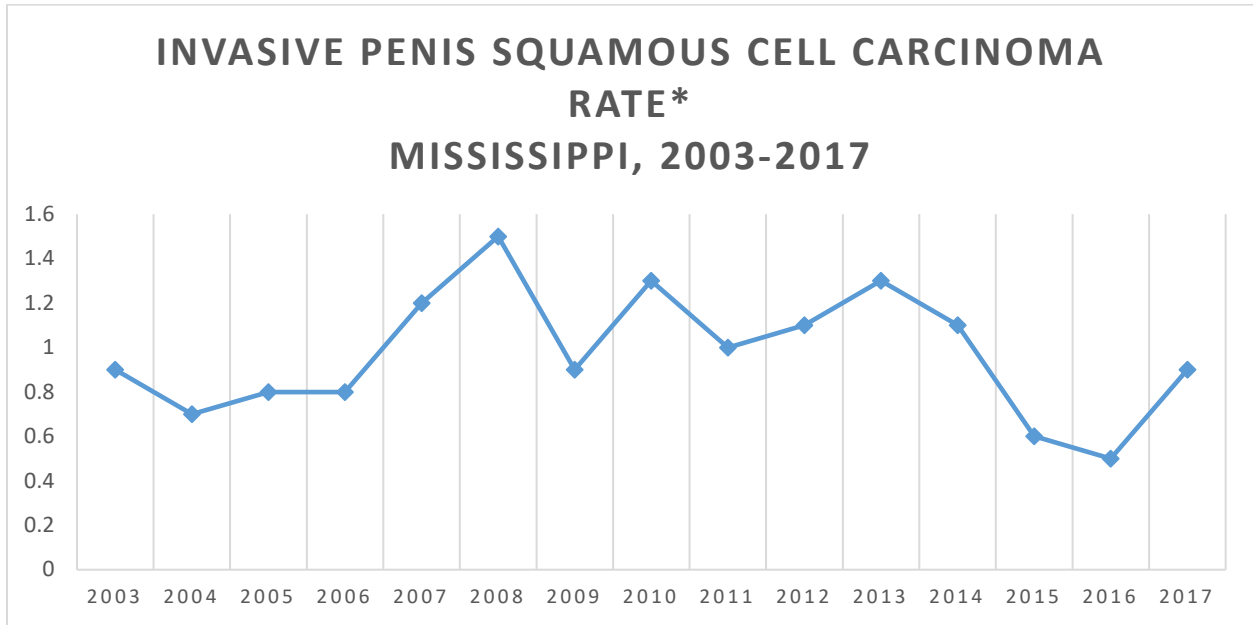
INVASIVE VAGINAL SQUAMOUS CELL CARCINOMA RATE* MISSISSIPPI, 2003-2017



*Rates age-adjusted to the 2000 U.S. standard million population

Squamous cell carcinoma of the vagina is also a rare cancer. Therefore, the rates cannot be broken out by race. For the time period between 2003 and 2017, the rates of squamous cell carcinoma of the vagina remained relatively stable with only a 1.55% increase annually. However, for the latest five-year

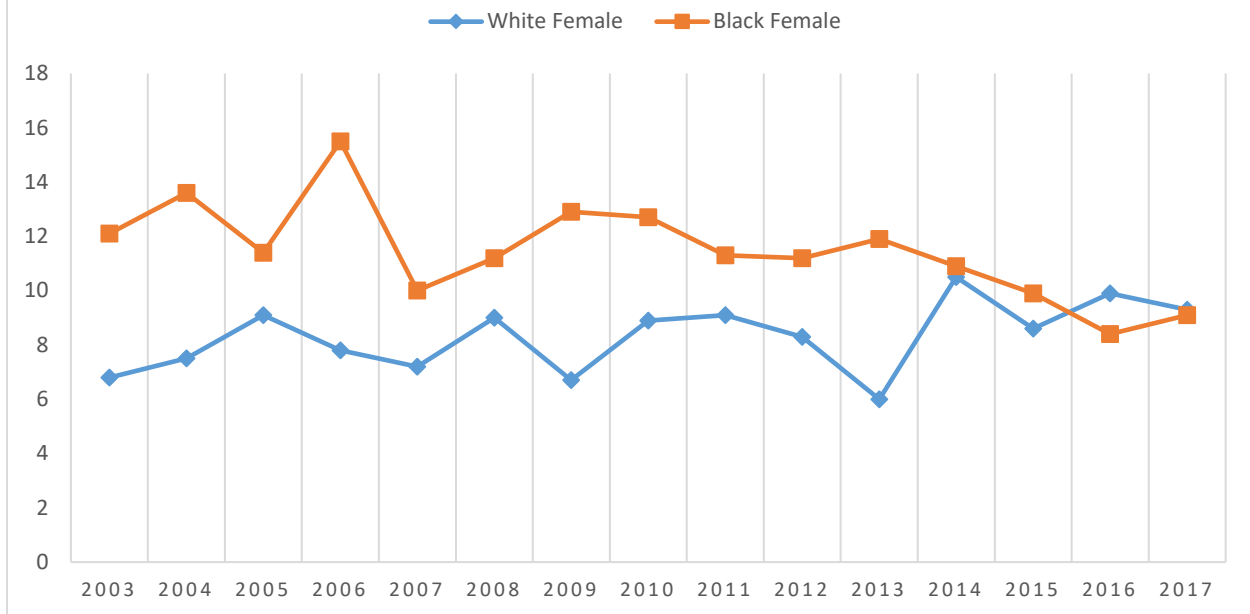
time period between 2013 and 2017, the rate of squamous cell carcinoma of the vagina fell 5.66% annually. This change was not significant due to the low numbers of cases.



*Rates age-adjusted to the 2000 U.S. standard million population

Like most of the other HPV-related cancers, squamous cell carcinoma of the penis is a rare cancer. Therefore, the rates cannot be broken out by race. For the time period between 2003 and 2008, the rates of squamous cell carcinoma of the penis increased 14.98% annually though this increase was not significant due to the small number of cases. Then, from 2008 to 2017, the rate of penile cancer fell 5.61% annually. Again, this change was not statistically significant. For the latest five-year time period between 2013 and 2017, the rate of squamous cell carcinoma of the penis fell 10.79% annually. However, due to the small number of cases, this change was also not statistically significant.

INVASIVE CERVICAL CARCINOMA RATE* MISSISSIPPI, 2003-2017



*Rates age-adjusted to the 2000 U.S. standard million population

The rates of cervical carcinoma were higher for black females than white females, but this difference was only statistically significant for 2003, 2004, 2006, 2009, 2010, and 2013. Over the time period from 2003 to 2017, the rate for black females dropped significantly at a rate of 2.36% annually. The rate for white females increased at a rate of 1.61% annually. This increase was not statistically significant. Over the latest five-year period of 2013 to 2017, the rate for white females rose 6.68% annually, though this change was not statistically significant. The rate for black females decreased significantly 7.76% annually. The falling rate for black females coupled with the observed increasing rate for white females closed the disparity between the two groups to the point that white females had observed rates that were higher than for black females for 2016 and 2017.

Definitions

Age Adjusting: A statistical method that allows comparisons of populations that take into account age-distribution differences between the populations. The 2000 U.S. standard population is used and applied to all of the time periods being considered. This assures that the rates do not reflect differences in the age distribution of the population.

Annual Percent Change (APC): The average annual percent change over several years. It is used to measure the change in rates over time. Calculating the APC involves fitting a straight line to the natural logarithm of the data when it is displayed by calendar year.

Statistical Significance: This is a mathematical measure of the difference between groups. A difference is said to be statistically significant if it is greater than what might be expected to happen by chance alone 95% of the time. Rate ratios were used to assess the statistical significance between groups.

Citations

¹The National Immunization Survey - Teen, Hyattsville, MD: Centers for Disease Control and Prevention. Created by statecancerprofiles.cancer.gov on 06/22/2018 9:27 am.

¹Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. BRFSS Prevalence & Trends Data [online]. 2015. [accessed Jun 5, 2020]. URL: <https://www.cdc.gov/brfss/brfssprevalence/>.

³ Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 8.3.6.

Acknowledgement

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