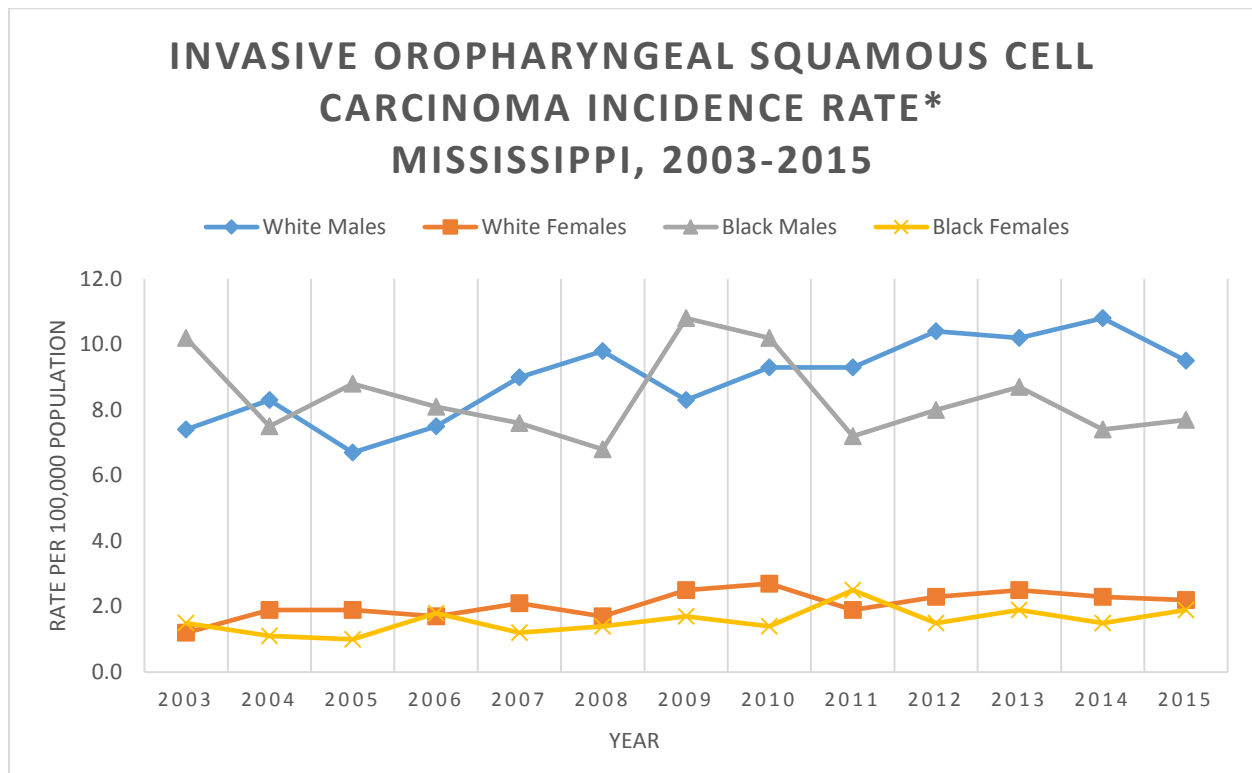


## HPV-Related Cancers in Mississippi, 2003-2015

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 National Immunization Survey-Teen reported by the National Cancer Institute's State Cancer Profiles shows that only 35.4% of Mississippi teens between ages 13 and 15 have received two or more doses of the HPV vaccination. Mississippi has the fourth lowest rate of vaccination in the U.S.<sup>1</sup> 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 2016, 83.0% of women ages 21 to 65 in Mississippi report having had a Pap test in the past three years. Mississippi has the sixth highest rate among US states and the District of Columbia.<sup>2</sup> Below are graphs of the trends in HPV-related cancers over the period 2003 to 2015 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 2011 and 2015. Though squamous cell carcinoma of the rectum is associated with HPV, the number of these cancers that are diagnosed in Mississippi is too small to report out by year. All analysis was done using SEER\*Stat software<sup>3</sup>.

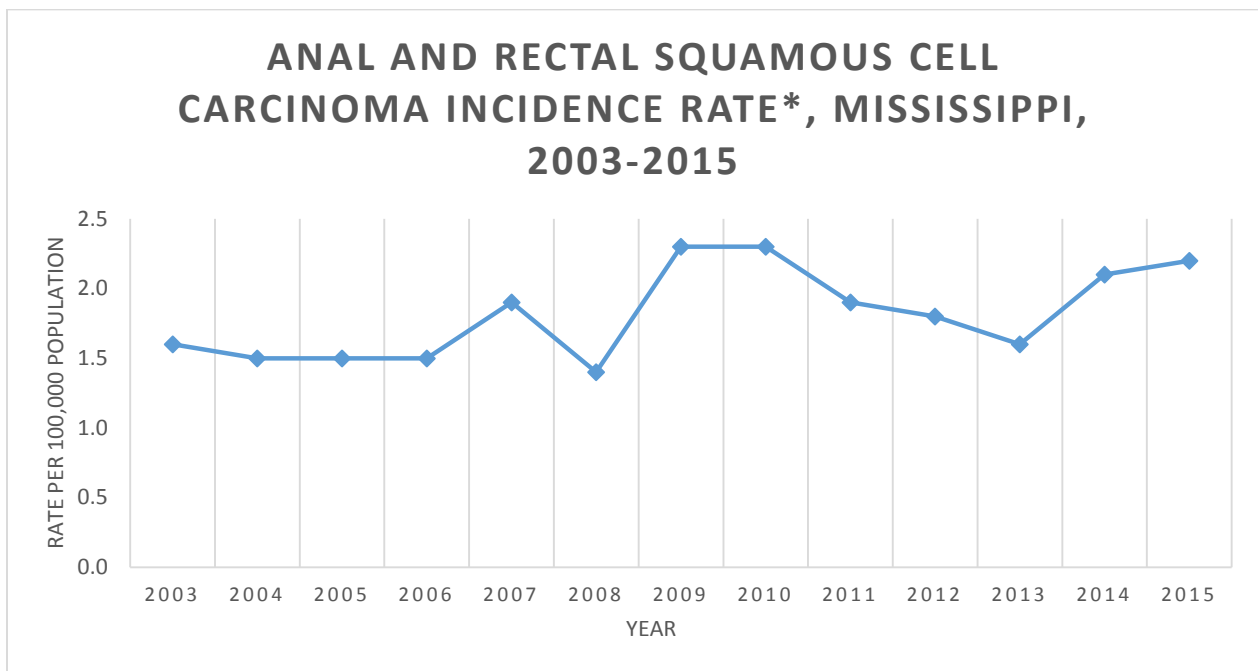


\*Rates age-adjusted to the 2000 U.S. standard million population

Females had significantly lower rates of squamous cell carcinoma of the oropharynx than males. Over the period from 2003 to 2015, white males and white females experienced significant increases in

incidence rates. White males had a 3.0% annual percent increase, and white females had a 3.4% annual increase. Rates for black females also showed an increasing trend at 3.5% annually, but this increase was not statistically significant. The trend for black males was decreasing at 1.0% annually, but this change was not statistically significant.

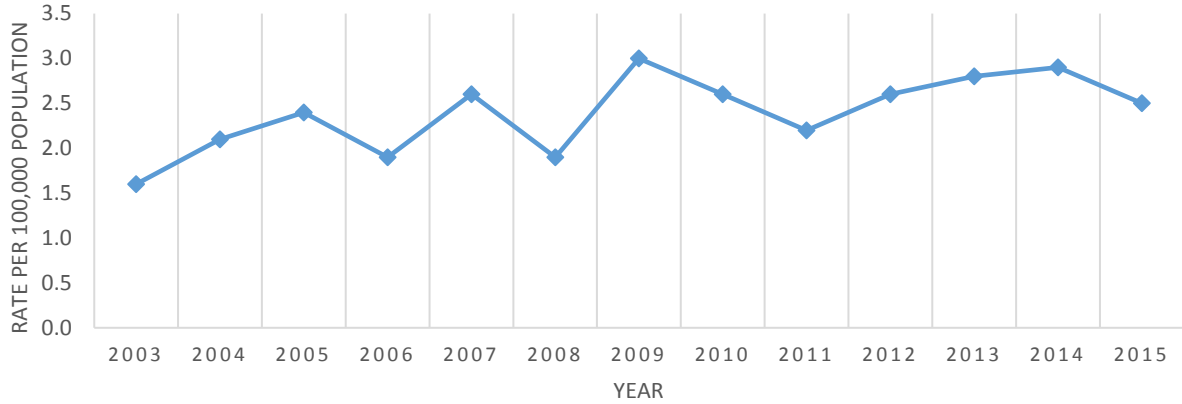
For the latest five-year time period between 2011 and 2015, the trend for white males and white females was increasing but was not statistically significant. White males saw a 0.8% increase annually, while white females saw a 2.1% increase annually. Though the rates for black males decreased annually over the full period from 2003 to 2015, the most recent period from 2011 to 2015 demonstrated a relative constant trend with only a slight 0.2% increase annually. The trend for black females over the full period from 2003 to 2015 was increasing, but for just the last five years, the trend was decreasing at a rate of 6.2% annually. This trend is not significant, which is likely a result of the slight spike in the rate for 2011.



\*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 2015, the rates for squamous cell carcinoma of the anus increased significantly at a rate of 2.7% annually. For the latest five-year time period between 2011 and 2015 the rates were still observed to be increasing at a rate of 5.1% annually, though this change was not statistically significant due to the small number of cases.

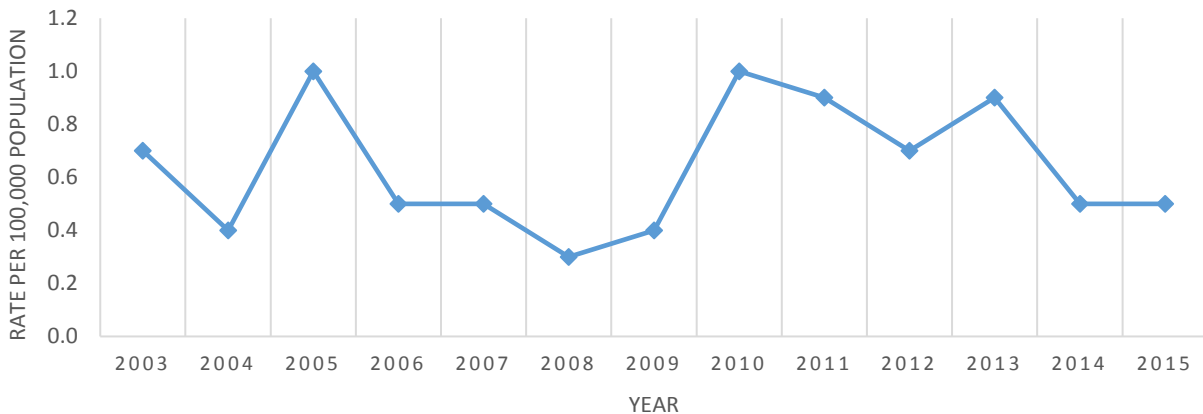
## INVASIVE VULVAR SQUAMOUS CELL CARCINOMA INCIDENCE RATE\* MISSISSIPPI, 2003-2015



\*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 2015, the rates of squamous cell carcinoma of the vulva increased significantly at a rate 3.0% annually. In the most recent five-year time period between 2011 and 2015, the rate of squamous cell carcinoma of the vulva increased at a rate of 4.5% annually, though this increase was not statistically significant due to the small number of cancers.

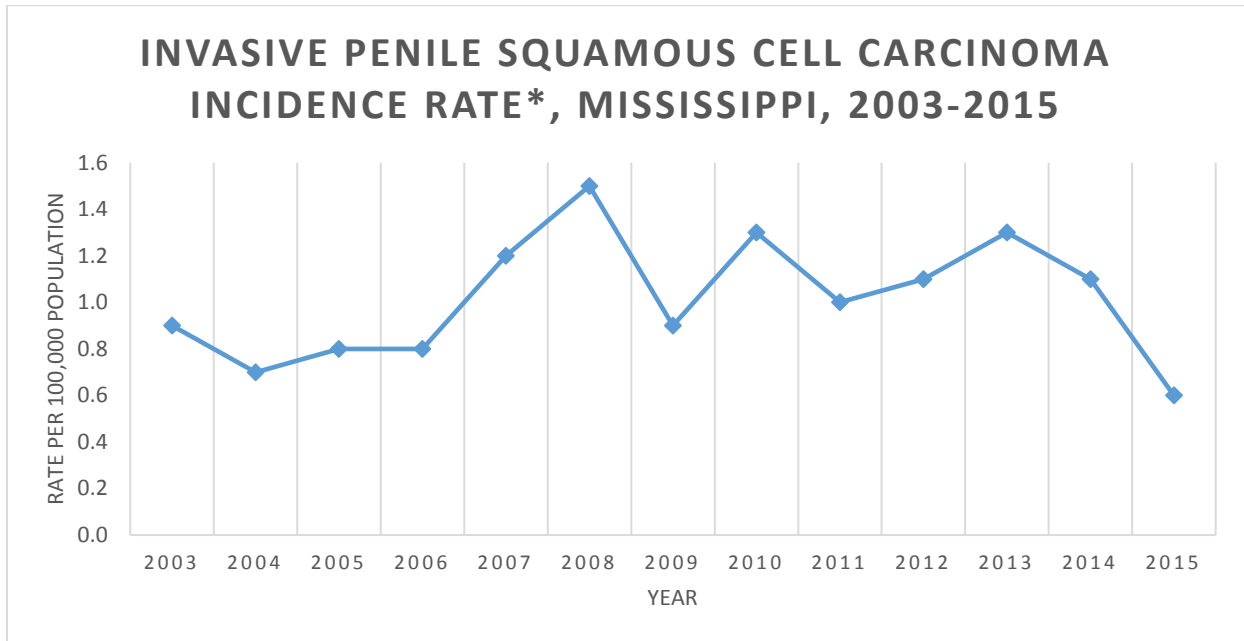
## INVASIVE VAGINAL SQUAMOUS CELL CARCINOMA INCIDENCE RATE\* MISSISSIPPI, 2003-2015



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

Squamous cell carcinoma of the vagina is a rare cancer. Therefore, the rates cannot be broken out by race. For the time period between 2003 and 2015, the rates of squamous cell carcinoma of the vagina

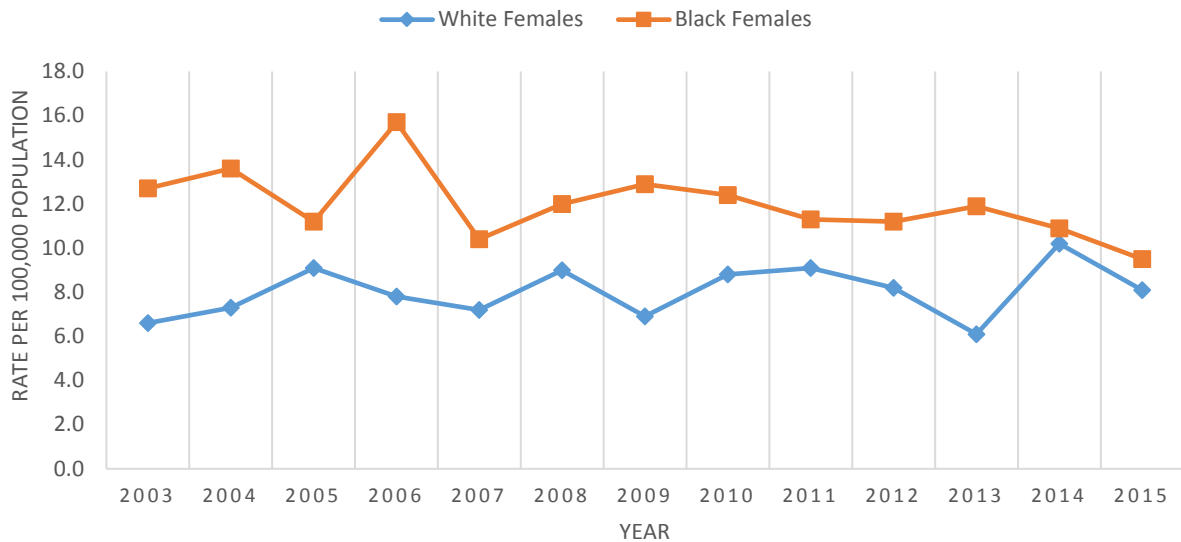
remained relatively stable with only a 0.9% increase annually. However, for the latest five-year time period between 2011 and 2015, the rate of squamous cell carcinoma of the vagina fell 13.3% annually. This change was not significant due to the low numbers of cases.



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

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 2015, the rates of squamous cell carcinoma of the penis increased 1.4% annually though this increase was not significant. However, for the latest five-year time period between 2011 and 2015, the rate of squamous cell carcinoma of the penis fell 7.8% annually. This change was not significant due to the low numbers of cases.

## INVASIVE CERVICAL CARCINOMA INCIDENCE RATE\*, MISSISSIPPI, 2003-2015



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

The rates of cervical carcinoma are higher for black females than white females, but this difference is only statistically significant for the time periods 2003, 2004, 2006, 2009, and 2013. Over the time period from 2003 to 2015, the rate for black females dropped significantly at a rate of 2.0% annually. The rate for white females increased at a rate of 1.2% annually. This increase was not statistically significant. Over the latest five-year period of 2011 to 2015, the rate for white females remained relatively constant with only a small 0.1% increase annually. The rate for black females decreased 3.5% annually. Neither of these changes was statistically significant. However, the falling rate for black females coupled with the constant rate of white females closed the observed disparity between the two groups.

## Definitions

**Age Adjusting:** A statistical method that allows comparisons of populations that take into account age-distributions 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 changes 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.

## Citations

<sup>1</sup>The National Immunization Survey - Teen, Hyattsville, MD: Centers for Disease Control and Prevention. Created by [statecancerprofiles.cancer.gov](http://statecancerprofiles.cancer.gov) on 06/22/2018 9:27 am.

<sup>2</sup>Centers 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 20, 2018]. URL: <https://www.cdc.gov/brfss/brfssprevalence/>.

<sup>3</sup>Surveillance Research Program, National Cancer Institute SEER\*Stat software ([seer.cancer.gov/seerstat](http://seer.cancer.gov/seerstat)) version 8.3.5.

## Acknowledgement

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