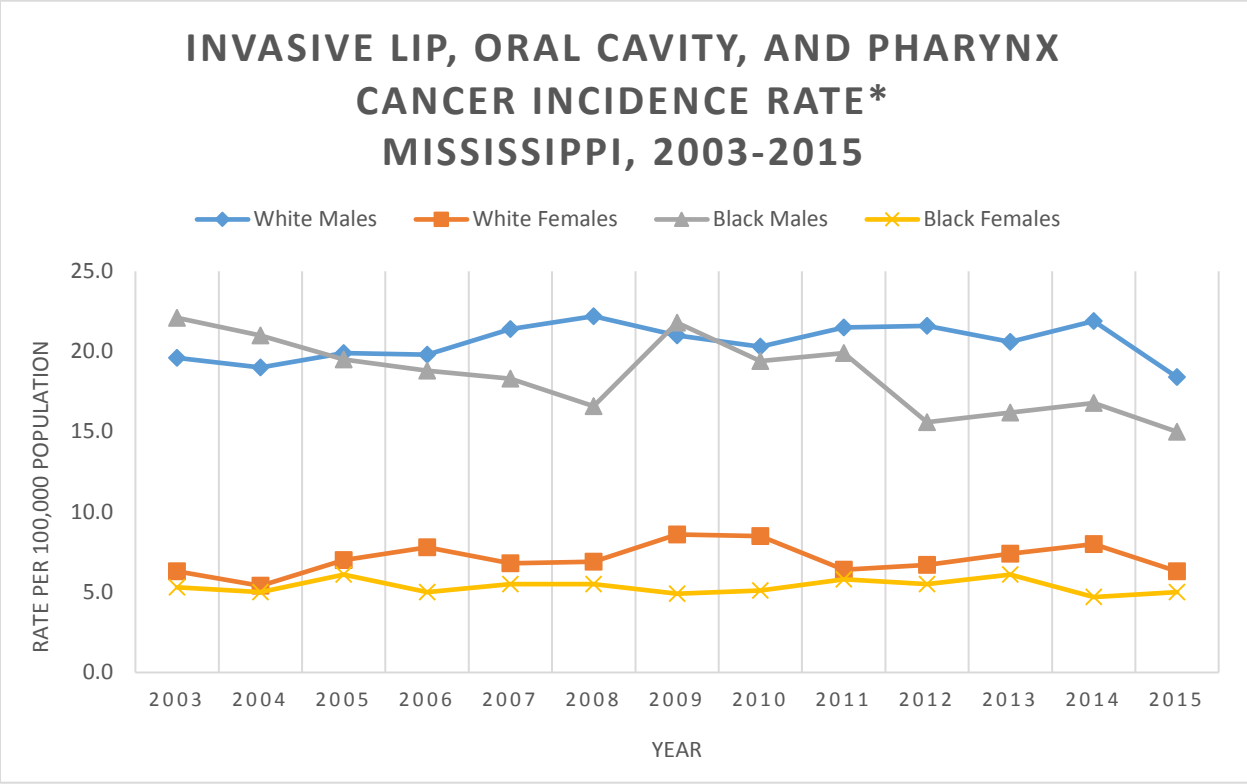
Tobacco-Related Cancers in Mississippi, 2003-2015

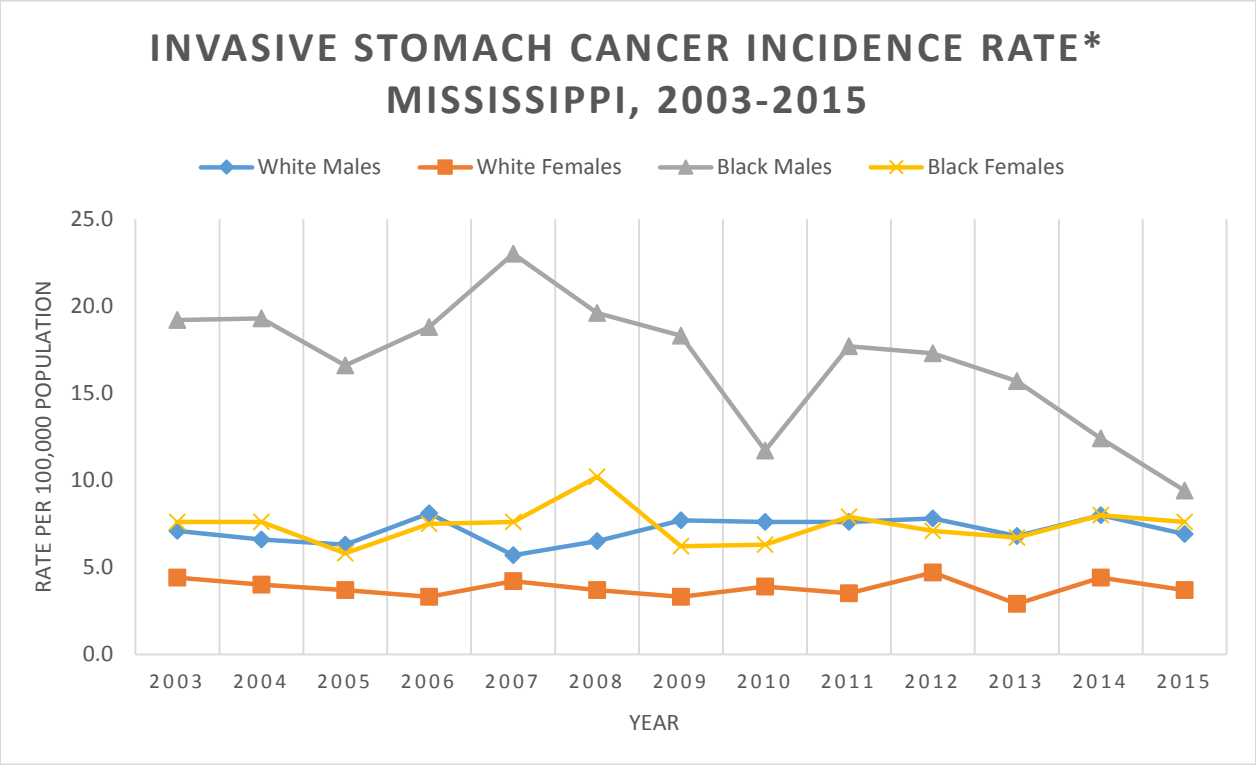
Smoking, exposure to second-hand smoke, and use of other tobacco products is a modifiable risk factor associated with the development of certain cancers. According to the Behavioral Risk Factor Surveillance System for 2016, 22.7% of Mississippi adults report being current smokers, and 4.4% of Mississippi adults report using smokeless tobacco every day. Mississippi's rate of current smoking among adults is the fourth highest in the nation.[1] Tobacco use is associated with cancers of the lip, oral cavity, pharynx, stomach, colon and rectum, pancreas, trachea, lung and bronchus, cervix, kidney and renal pelvis, urinary bladder, esophagus, liver, and larynx. Tobacco use is also associated with the development of acute myeloid leukemia. Below are graphs of the trends in tobacco-related cancers over the period 2003 to 2015 by race and sex 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. All analysis was done using SEER*Stat software[2].



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

Males have significantly higher rates of lip, oral cavity, and pharynx cancers than females. Over the period from 2003 to 2015, only black males experienced a significant change in incidence rates. The rate for black males decreased annually by 2.4%. The other groups experienced very little change. White males and females saw small annual increases of 0.3% for males and 0.9% for females. Black females saw a very small decrease of 0.1% annually.

For the latest five-year time period of 2011 to 2015, none of the groups had any statistically significant changes in their rates. Each group but white females was showing a decreasing trend. The observed decrease for white males was 2.8% annually. For black males, the observed decrease was 4.9%, and for black females, the observed decrease was 4.3%. White females, conversely, were observed to have rates that were increasing 2.0% annually.



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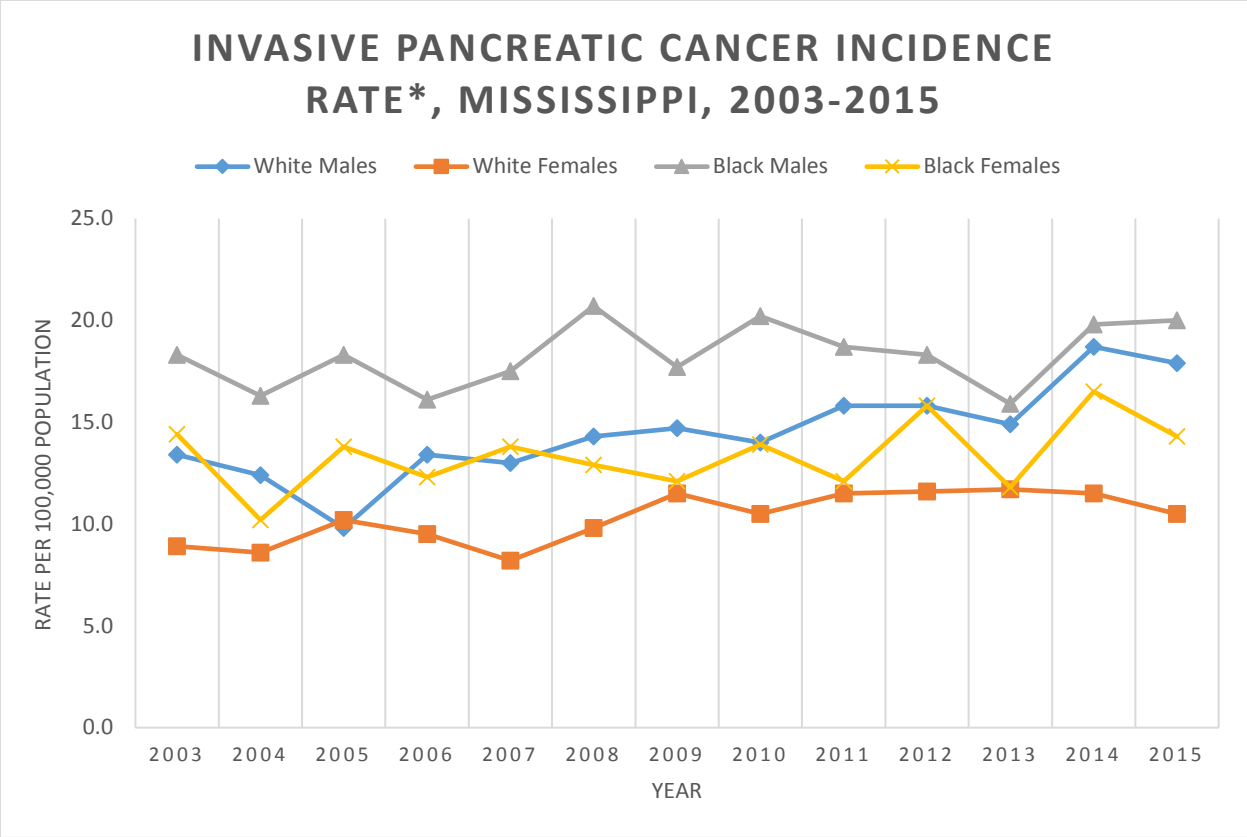
Between 2003 and 2015, black males had significantly higher incidence rates for stomach cancer than all other groups except in 2010. The rate for stomach cancer in black males decreased significantly between 2003 and 2015 at an annual percent change of 4.0%. This decrease together with limited to no change in the rates for other groups eliminated the disparity between black males and the other groups beginning in 2014. Black females experienced no change in the rate of stomach cancer annually between 2003 and 2015. The observed changed for white males was an annual increase of 0.9%, and for white females, the observed change was a 0.4% annual decrease. Neither of these changes was statistically significant.

For the latest five-year period from 2011 to 2015, black males had a significant annual decrease of 14.2%. White females had no annual change in their rate. White males decreased annually by 1.4%, and black females had an annual increase of 0.6% in their rate of stomach cancer. Neither the change for white males nor for black females was statistically significant.



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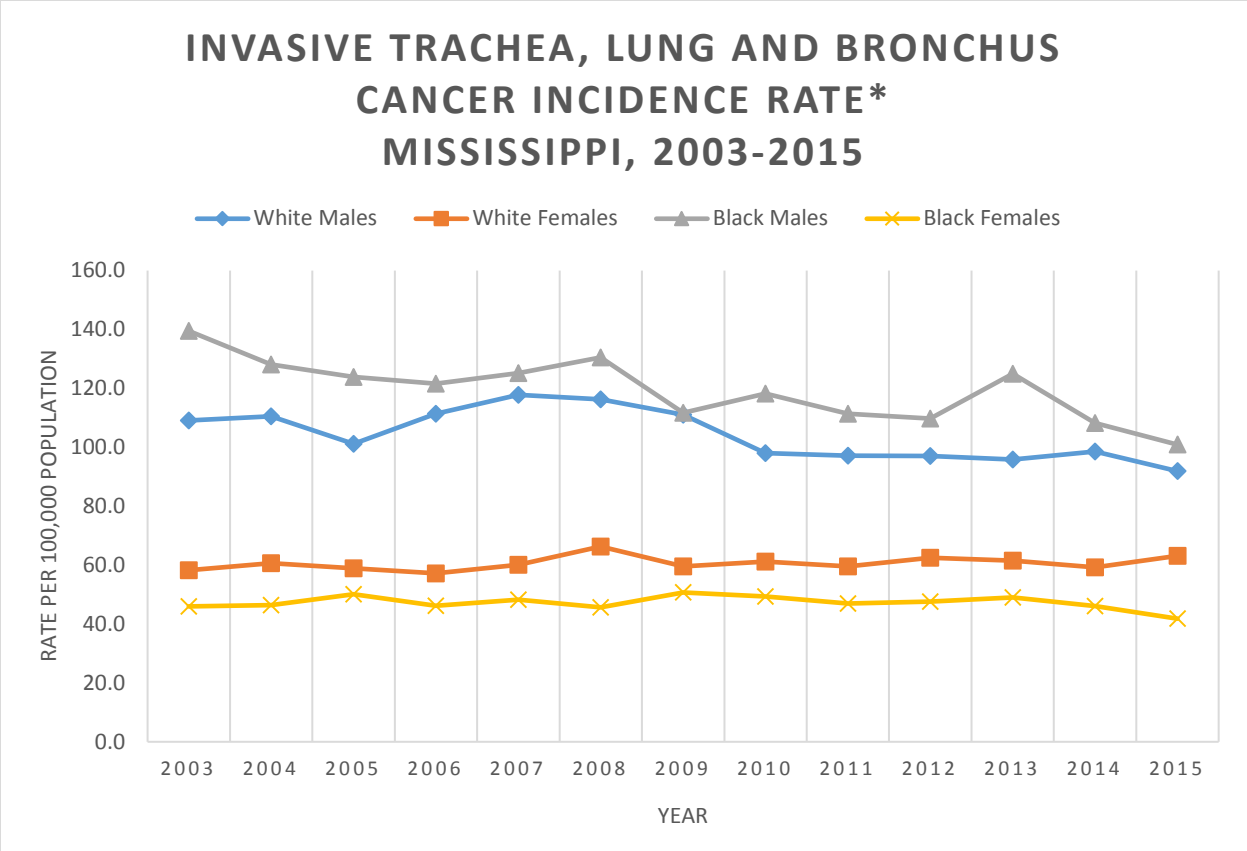
Pancreatic cancer rates increased in all of the race/sex groups between 2003 and 2015. White males experienced the highest level of increase in pancreatic cancer at a significant 3.5% annually. White females also experienced a significant increase over time of 2.3% annually. While the trend for both black males and black females was increasing, neither was statistically significant. The annual percent change for black males was 0.8% and for black females was 1.3%.

For the latest five-year period of 2011-2015, none of the groups had a significant increase or decrease. Like for the overall time period of 2003-2015, white males, black males and black females all demonstrated an increasing trend. For white males, the annual percent change was 1.3%. For black males, the annual percent increase was 2.3%, and for black females the annual percent increase was 3.6%. Only white females showed the desired annual decrease of 2.0%. Again, this decrease was not statistically significant.



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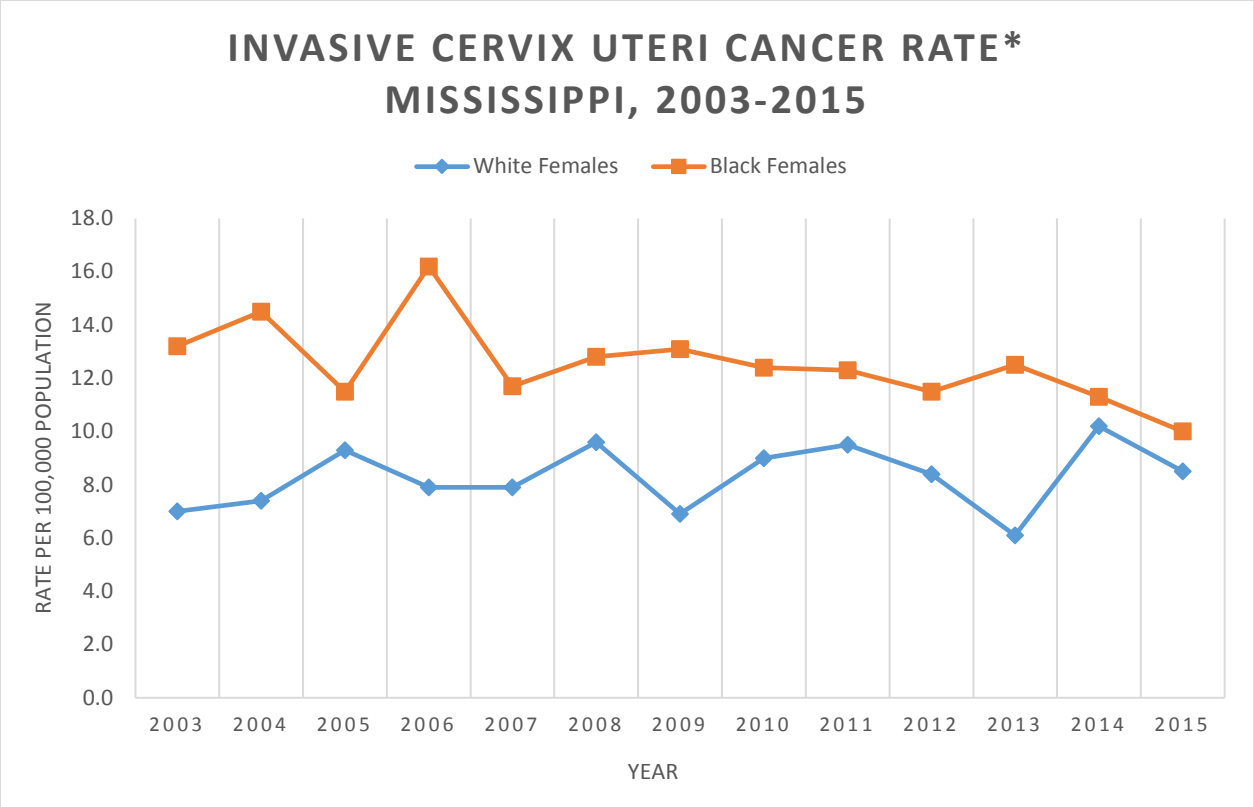
Males had significantly higher rates of trachea, lung, and bronchus cancer than females. For most years, white males and black males had similar rates. White females had significantly higher incidence rates than black females between 2010 and 2015. The rates for both white males and black males decreased at a significant annual rate between 2003 and 2015. For white males, the annual percent decrease was 1.6%, and for black males, the annual percent decrease was 1.8%. In contrast, white females and black females had no significant change in their rates. White females experienced a 0.4% increase, and black females experienced a 0.3% decrease.

For the latest five-year time period of 2011-2015, none of the groups experienced a significant increase or decrease. The observed trend was decreasing for all groups except white females. The observed annual percent decrease for white males was 0.9%, for black males was 2.1%, and for black females was 2.7%. For white females, the observed trend was a small increase of 0.6% annually. The more recent observed trends for black females and white females is contributing to the disparity that has developed between the two groups.



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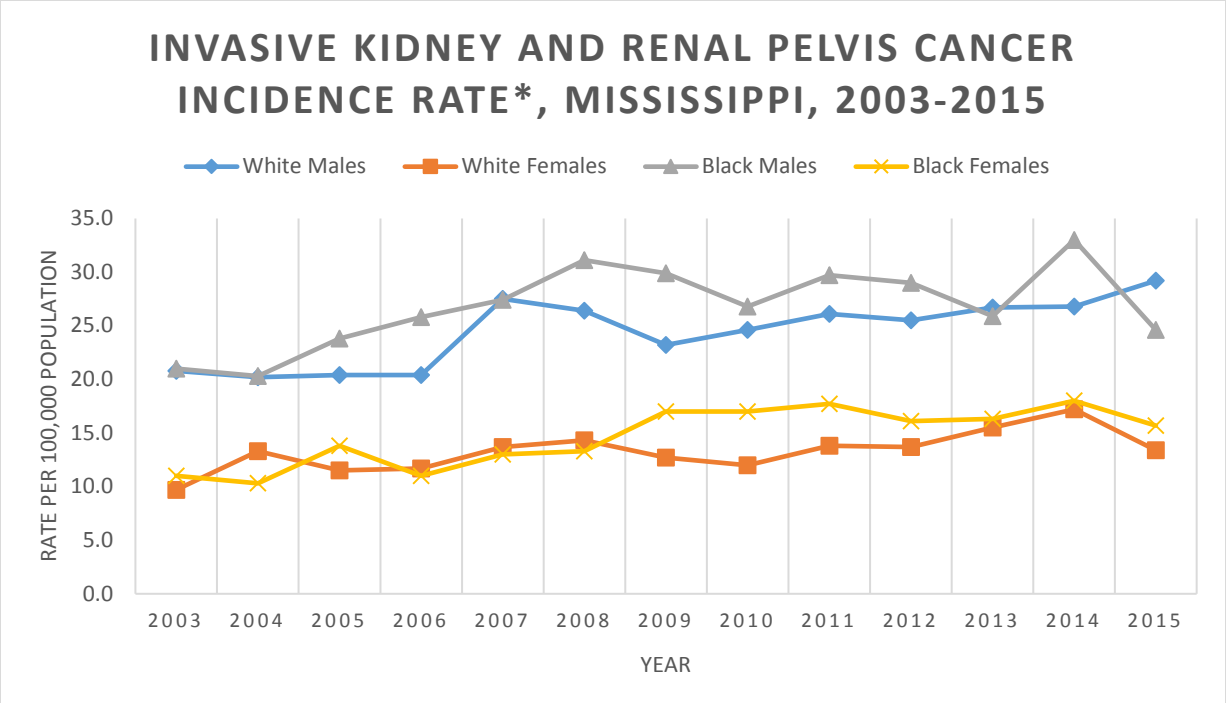
For most years, there was not a statistically significant difference in the incidence rates of cervical cancer between white females and black females, though black women did have higher observed rates. During the period between 2003 and 2015, the incidence rate for black women decreased at a significant rate of 2.0% annually. In contrast, the observed change in the incidence rate for white women was a 1.1% increase annually, though this change was not statistically significant. During the most recent five-year period of 2011 to 2015, neither group had a significant change in their rates, but both were observed to be decreasing. The decrease for black women was 4.0% annually, while the decrease observed for white women was a very small 0.1% annually.



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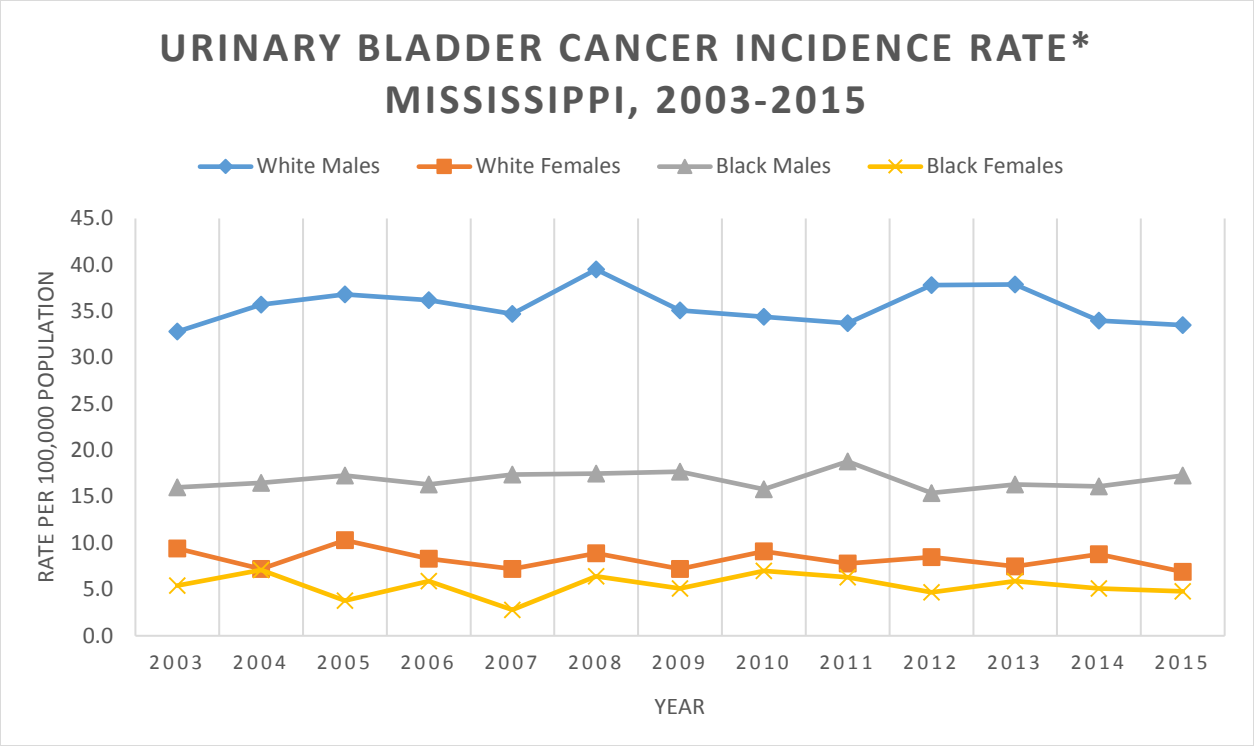
Males have significantly higher rates of kidney and renal pelvis cancer than females. Within each sex group, there is no difference in rates by race. Over the period from 2003 to 2015, rates for white males increased annually at 2.7%. Similarly, the rates for white females increased at 2.6% annually. For black females, the incidence rate increased at a rate of 3.9% annually. All of these increases were statistically significant. Black males had an observed increase of 2.0% annually, though this increase was not statistically significant.

For the most recent five-year period from 2011 to 2015, there were no statistically significant changes in the rates of kidney and renal pelvis cancer. Whites had an observed increase, while blacks had an observed decrease. For white males, the increase was 2.9% annually, and for white females, the increase was 2.1% annually. For black males, the observed decrease was 2.1% annually, and for black females, the decrease was 1.3% annually.



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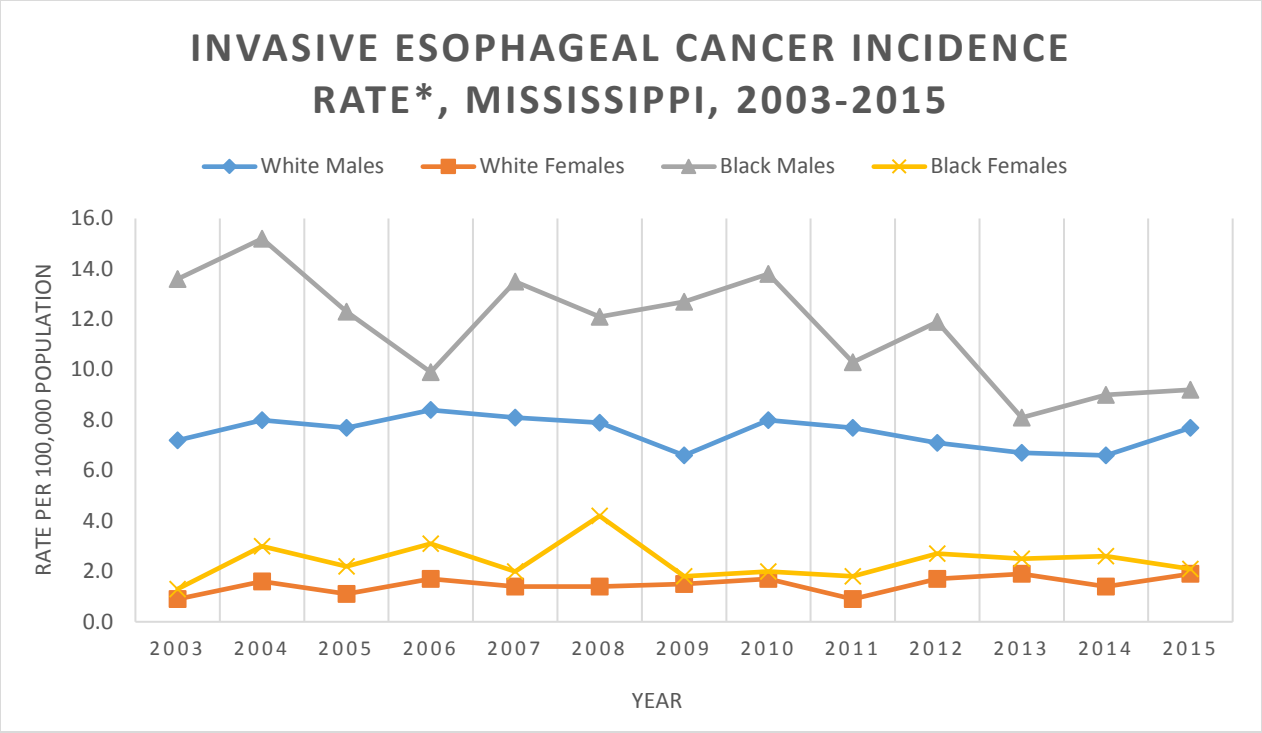
Males had significantly higher rates of urinary bladder cancer than females. Also, white males had significantly higher rates than black males. The observed annual percent change between 2003 and 2015 for all groups was small. Black males had no change annually in their incidence rates. The other groups had observed decreases, though the decreases were small and not statistically significant. For white males, the decrease annually was only 0.1%. For white females, the annual decrease was 1.1%. For black females, the annual decrease was 0.5%.

For the latest five-year period between 2011 and 2015, all groups saw an annual decrease in their urinary bladder cancer incidence rates, though these decreases were not statistically significant. For white males, the decrease was 1.3% annually, and for white females, the decrease was 1.7% annually. For black males, the decrease was 1.5% annually, and for black females, the decrease was 5.1% annually.



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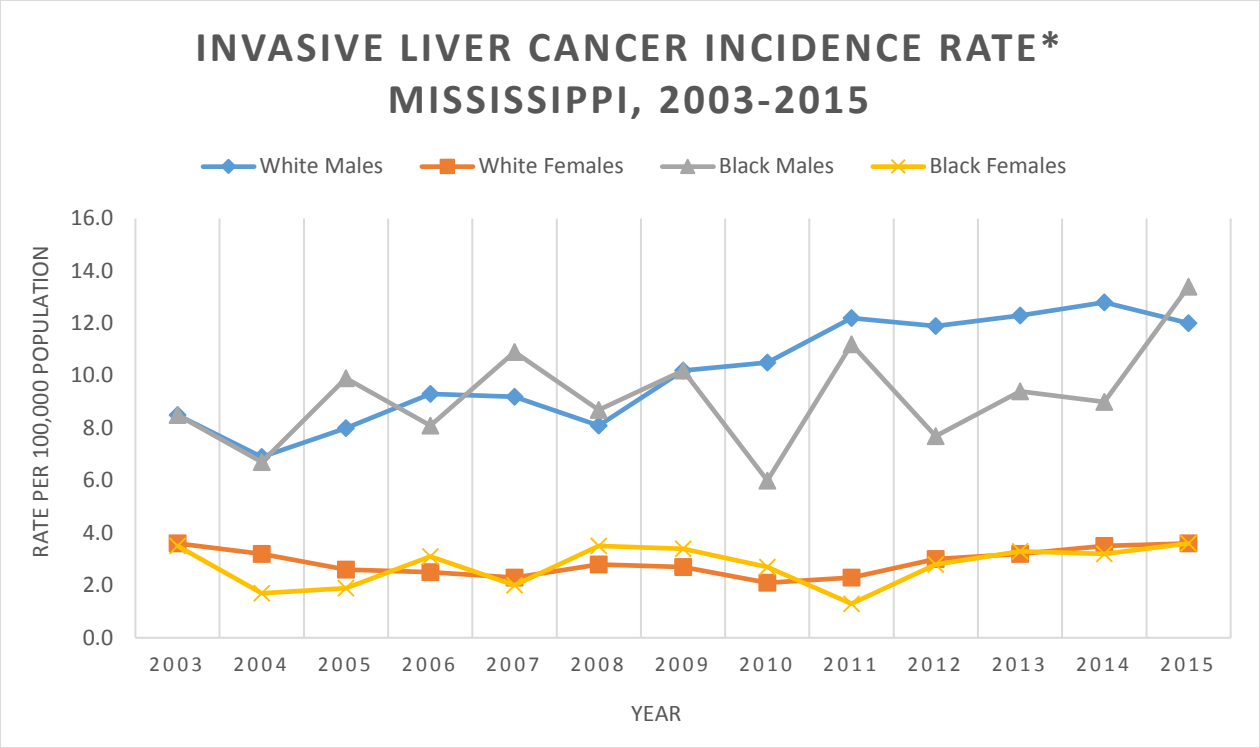
Males had significantly higher rates of esophageal cancer than females. The rates were similar by race for each sex group. The annual percent change over the period from 2003 to 2015 for white males and black females was very small. For white males, the annual percent decrease was 0.9% and for black females was 0.8%. Black males had a statistically significant annual decrease of 3.5%. White females had an observed annual increase of 2.7%, though this increase was not significant.

For the latest five-year period of 2011 to 2015, the groups had no statistically significant changes, in part, due to the small numbers of esophageal cancer. Similar to the trend observed for the overall time period, white males and black males experienced an annual decrease. The annual decrease for white males was 4.8%, and the decrease for black males was a very small 0.5% annually. Similar to the overall time period, white females experienced an observed annual increase of 1.8%. While the overall trend for black females was relatively flat with a slight decrease, the last five years was quite different. During the period from 2011 to 2015, black females experienced an annual increase of 10.4%. The magnitude of the change appears large due to how few cases are seen in black females, but this observed trend was not statistically significant.



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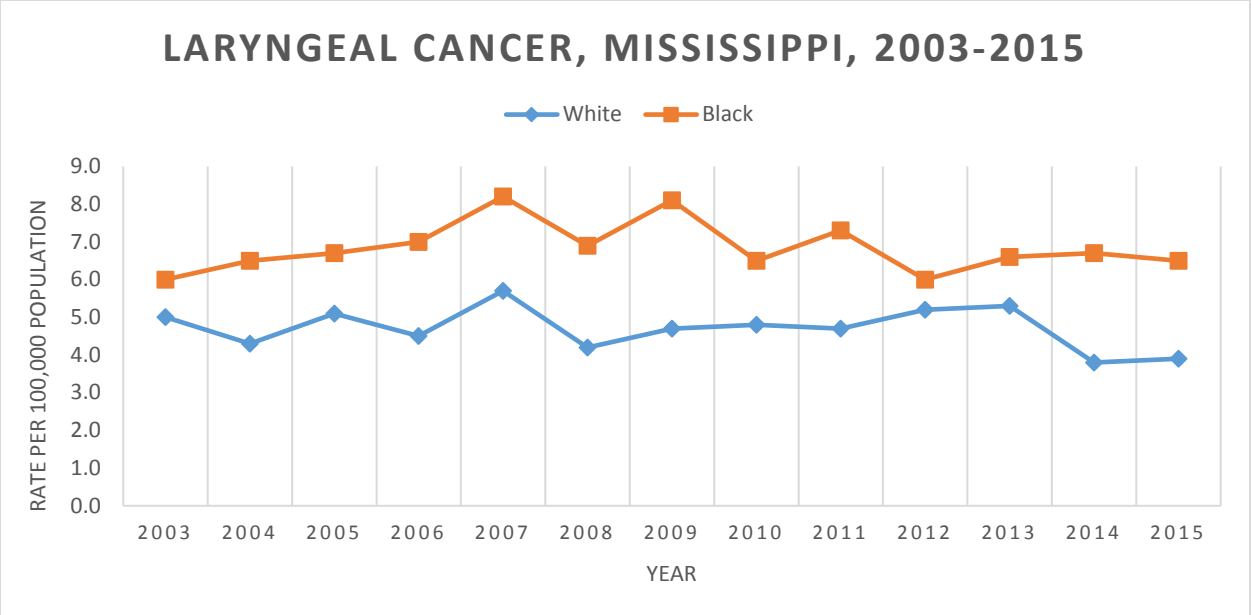
Like many of the other tobacco-related cancers, males had significantly higher rates of liver cancer than females. The rates were similar between the races for each sex group. All groups saw an increasing trend, but that trend was only statistically significant for white males. The annual percent change for white males was 4.6%. The rates for white females changed very little on average over the time period from 2003 to 2015 with an annual percent increase of 0.9%. The annual percent increase for black males was 2.4% and for black females was 1.9%.

For the most recent five-year time period from 2011 to 2015, the trends were also increasing for all groups with only white females having a statistically significant increase. In contrast to the significant increase over the full time period for white males, the period from 2011 to 2015 saw little change for white males with a small 0.4% annual increase. Conversely, white females over the full time period had a very small annual percent change, but they had a significant 10.8% annual percent increase over the period from 2011 to 2015. Though not statistically significant, black males experienced a 6.5% annual increase over the final five years, and black females experienced a 16.4% increase. The increase for black females seems large but is not statistically significant because of the small numbers of cases for black females. The increasing trends in liver cancer may be explained, in part, by advances in imaging that allow for better diagnosis of liver cancer.



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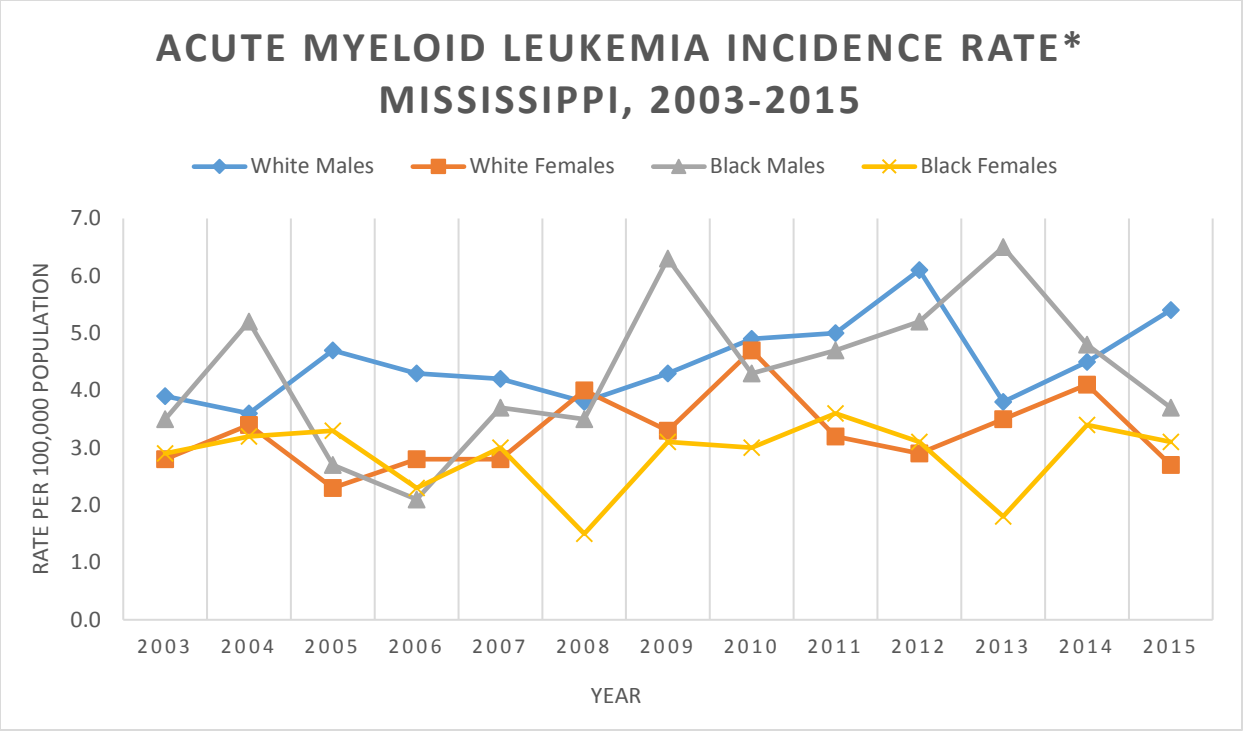
Laryngeal cancer is a relatively rare cancer. Thus, the rates could not be broken down by both race and sex. This graph only displays the rates by race. Over the period from 2003 to 2015, the rates for both whites and blacks remained relatively constant. There was a slight annual decrease for whites of 0.9% and for blacks of 0.3%. For the latest five-year time period of 2011 to 2015, both groups also saw a decrease. For whites, there was an annual decrease of 6.1%, and for blacks, there was an annual decrease of 1.5%. None of these changes were statistically significant.



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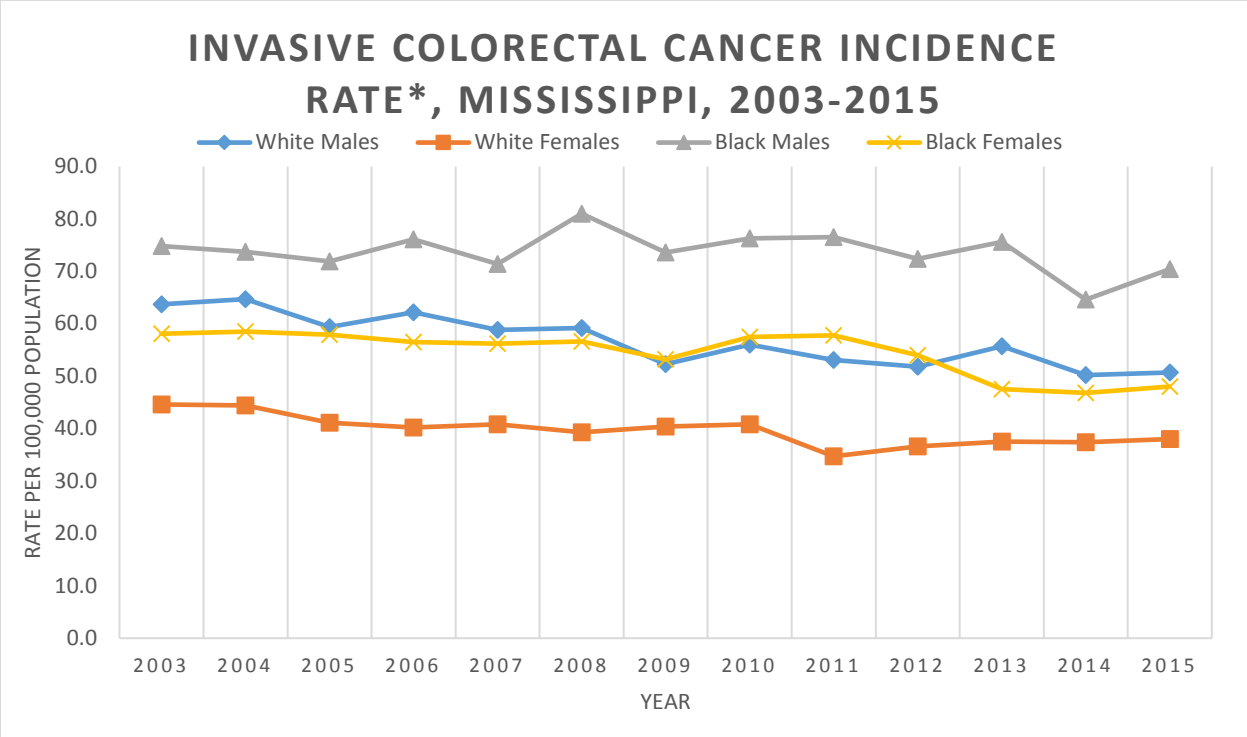
Acute myeloid leukemia is a relatively rare type of cancer. Rates over the period from 2003 to 2015 remained relatively stable for white males, white females and black females. White males had a small annual increase of 0.3%. Likewise, white females had a small annual increase of 0.9%. Black females had a small annual decrease of 0.1%. Black males experienced the only statistically significant change over time between 2003 and 2015. The annual decrease for black males was 2.4%.

For the latest five-year time period, the trend was decreasing for every group but white females. The annual decrease for white males was 2.8%, for black males was 4.9%, and for black females was 4.3%. White females experienced a 2.0% increase over the period from 2011 to 2015. None of these changes were statistically significant.



Colorectal cancer rates decreased in all of the race/sex groups between 2003 and 2015. White males experienced the highest level of decrease in colorectal cancer at a significant rate of 2.0% annually. Black males had significantly higher rates of colorectal cancer incidence compared to all other groups and experienced the smallest change over time with a decrease of only 0.5% annually. Conversely, white females had lower rates of colorectal cancer than any other group, and experienced a significant annual decrease of 1.5%. Black females had the second highest annual decrease in colorectal cancer rates at a significant 1.7%. Their rates were similar to that of white males.

For the latest five-year period of 2011-2015, black females experienced a significant decrease annually of 5.0% in colorectal cancer rates. Conversely, white females experienced a significant increase of 2.0% annually. While white females had the lowest colorectal cancer incidence rates, the increasing trend is cause for concern. The annual percent decreases for white males of 1.2% and for black males of 2.7% were not statistically significant.

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

[1]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/.

[2]Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 8.3.5.

Acknowledgement

We acknowledge the Centers for Disease Control and Prevention for their financial support under a cooperative agreement awarded to the Mississippi Cancer Registry.