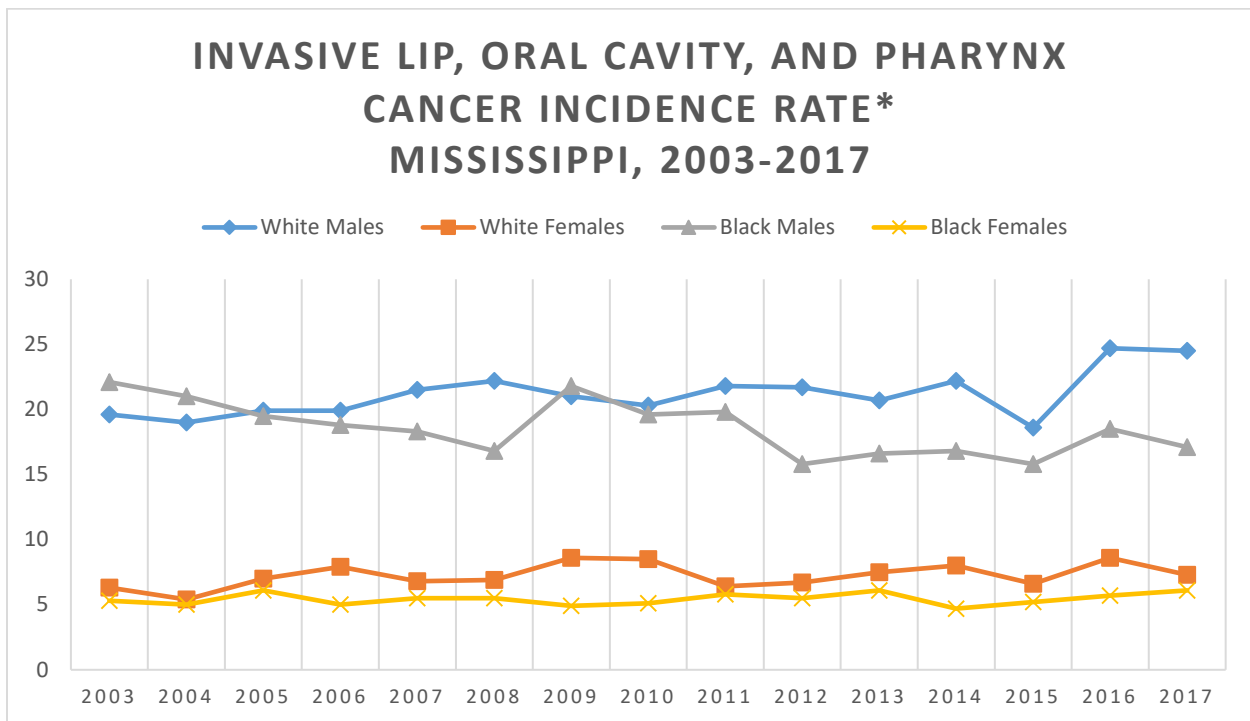


Tobacco-Related Cancers in Mississippi, 2003-2017

Smoking, exposure to second-hand smoke, and use of other tobacco products are a modifiable risk factor associated with the development of certain cancers. According to the Behavioral Risk Factor Surveillance System for 2018, 20.5% of Mississippi adults report being current smokers, 22.2% report being former smokers, and 7.4% of Mississippi adults report using smokeless tobacco. Mississippi's rate of current smoking among adults is tied for the sixth highest in the nation with Louisiana and Ohio.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 2017 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 2013 and 2017. All analysis was done using SEER*Stat software².

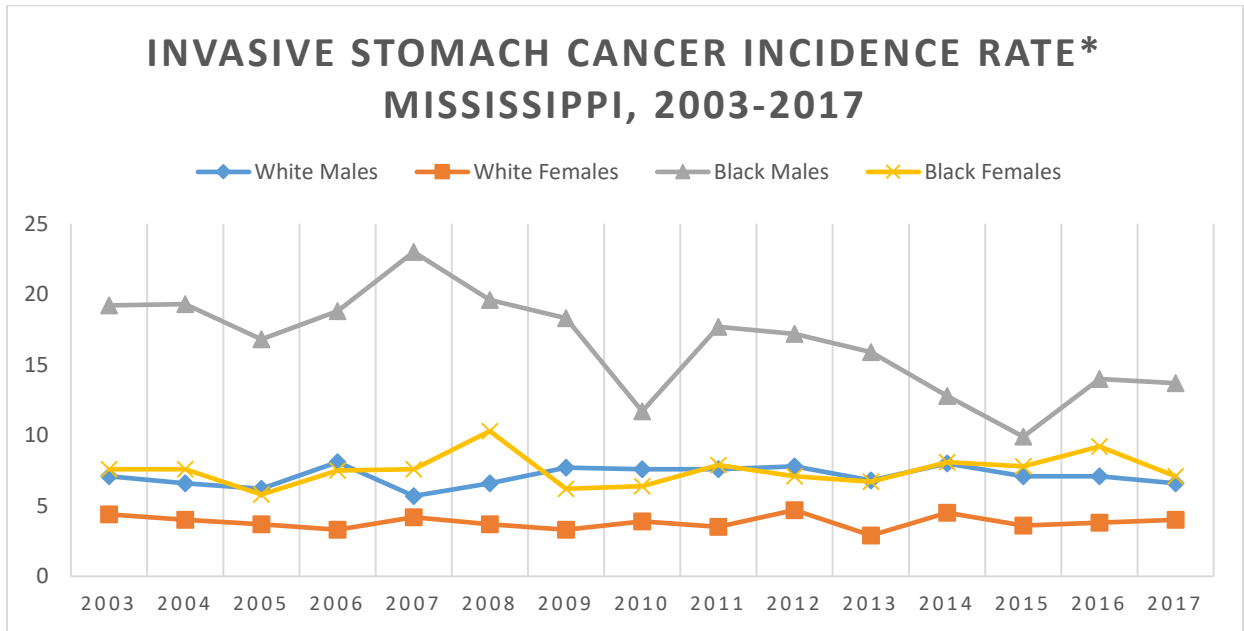


*Rates age-adjusted to the 2000 U.S. standard million population

Males had significantly higher rates of lip, oral cavity, and pharynx cancers than females. Over the period from 2003 to 2017, only black males and white males experienced a significant change in incidence rates. The rate for black males decreased annually by 1.59%, and the rate for white males increased 1.20%. White females saw an annual increase of 1.13%, and black females saw an increase of 0.53%.

For the latest five-year time period of 2013 to 2017, white males and white females had a similar trend to that of the overall time period of 2003 to 2017. Though not statistically

significant, the rate for white males was increasing at a rate of 4.74% annually, and the rate for white females was increasing at a rate of 0.53% annually. Black females also had a similar trend for the time 2013 to 2017 as they had for the full time period of 2003 to 2017. Their annual increase observed for the latest five years was 1.51%. Black males, however, showed a significant decrease for the overall time period but had an observed increase for the latest five year period of 1.67% annually.

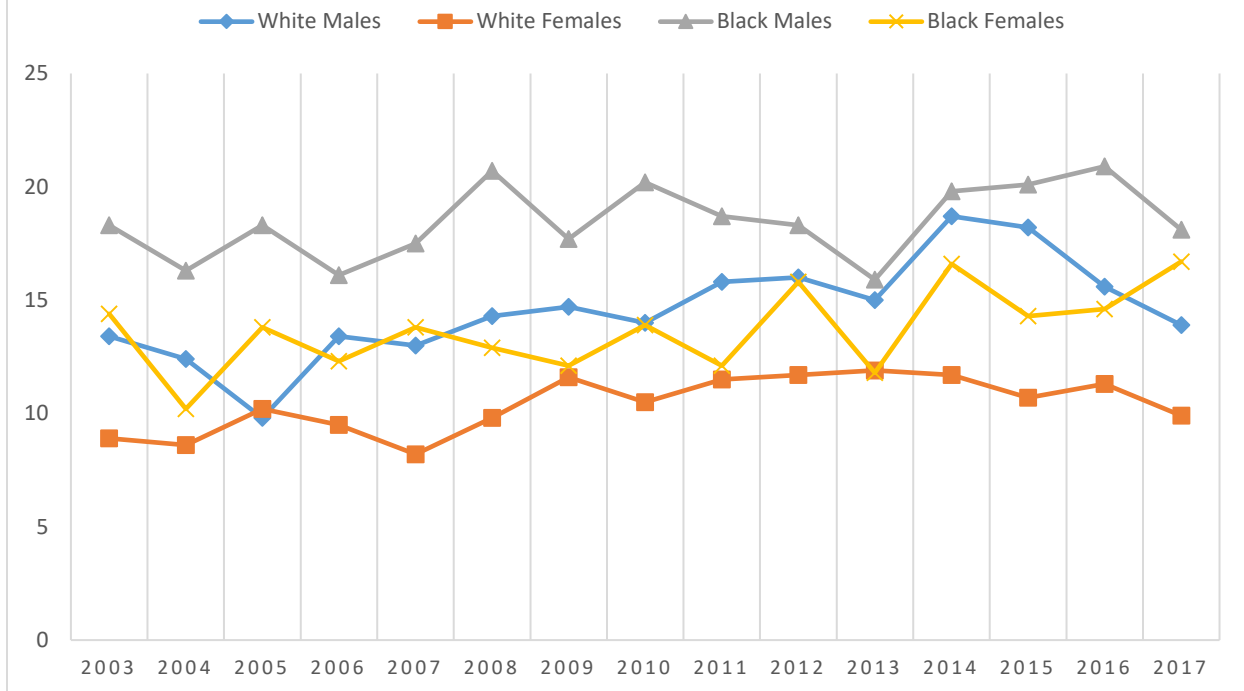


*Rates age-adjusted to the 2000 U.S. standard million population

Between 2003 and 2017, black males had significantly higher incidence rates for stomach cancer than all other groups except in 2015. The rate for stomach cancer in black males decreased significantly between 2003 and 2017 at an annual percent change of 3.4%. No other group had any significant change over time. Black females experienced a 0.51% increase annually between 2003 and 2017. The observed change for white males was an annual increase of 0.41%, and for white females, the observed change was a 0.05% annual decrease.

For the latest five-year period from 2013 to 2017, the observed trends for black males and black females were similar to the overall trend for 2003 to 2017, though not statistically significant. The annual decrease for black males from 2013 to 2017 was 2.11%. The annual increase for black females was 2.46%. In contrast, white males had an observed annual decrease of 1.81% compared to the slight increase observed over the full time period. White females had an observed annual increase of 3.29% from 2013 to 2017 in contrast to the observed, almost flat to slightly decreasing, trend observed over the full time period.

INVASIVE PANCREAS CANCER INCIDENCE RATE* MISSISSIPPI, 2003-2017

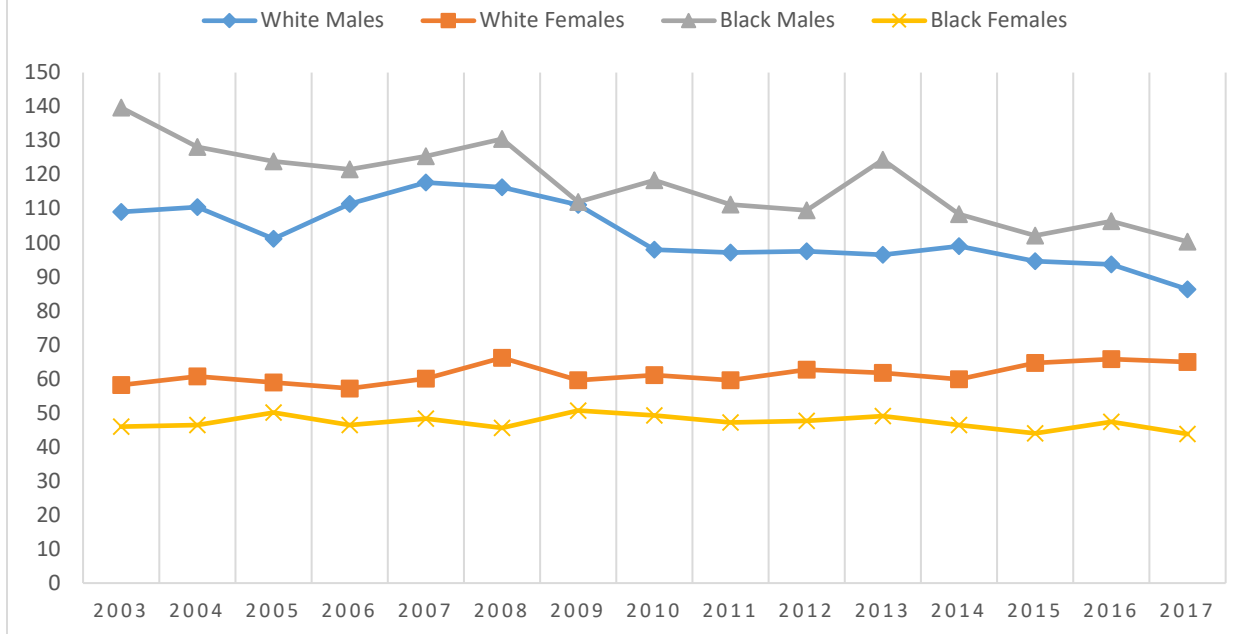


*Rates age-adjusted to the 2000 U.S. standard million population

Pancreatic cancer rates increased significantly between 2003 and 2017 for females. White females experienced annual increase of 1.67%, while the rate for black females increased 1.65% annually. Black males had an observed increase of 0.83% annually, though this change was not statistically significant. White males experienced a significant increase between 2003 and 2015 of 3.56% annually then experienced an observed decrease annually between 2015 and 2017 of 12.0%.

For the latest five-year period of 2013-2017, white males, black males and black females had similar observed trends to those for the full time period from 2003-2017. For white males, the trend for the last five year period is a decrease of 3.63% annually. For black males, the most recent trend observed is an increase of 2.73% annually, and for black females the observed trend for the most recent five years was a 5.17% increase annually. Though white females had a significant increase annually for the full time period from 2003-2017, the trend for the most recent five years was an observed 3.78% annual decrease.

INVASIVE TRACHEA, LUNG, AND BRONCHUS INCIDENCE RATE* MISSISSIPPI, 2003-2017

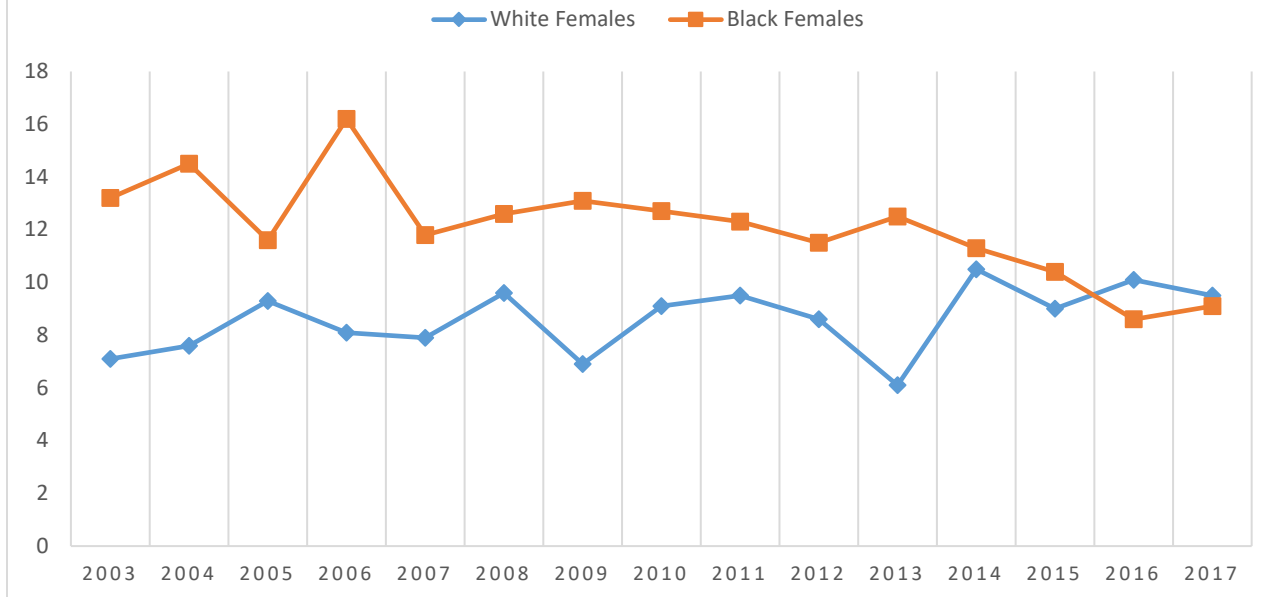


*Rates age-adjusted to the 2000 U.S. standard million population

Males had significantly higher rates of trachea, lung, and bronchus cancer than females. For most years, black males had significantly higher rates than white males. White females had significantly higher incidence rates than black females. The rates for both white males and black males decreased at a significant annual rate between 2003 and 2017. For white males, the annual percent decrease was 1.63%, and for black males, the annual percent decrease was 1.86%. Black females had no significant change in their rates with an annual decrease of 0.32%. In contrast to the decreasing rates of other groups, white females experienced a significant 0.68% annual increase.

Compared to the trends for the full time period from 2003 to 2017, all race/sex groups had similar trends for the most recent five-year time period of 2013 to 2017, though none of the trends for this shorter time period were statistically significant. From 2013 to 2017, white males had an observed annual decrease of 2.74%. Black males had an observed annual decrease of 4.48%, and black females had an observed annual decrease of 2.04%. Similar to the full time period, white females had an increasing observed trend of 1.95% annually.

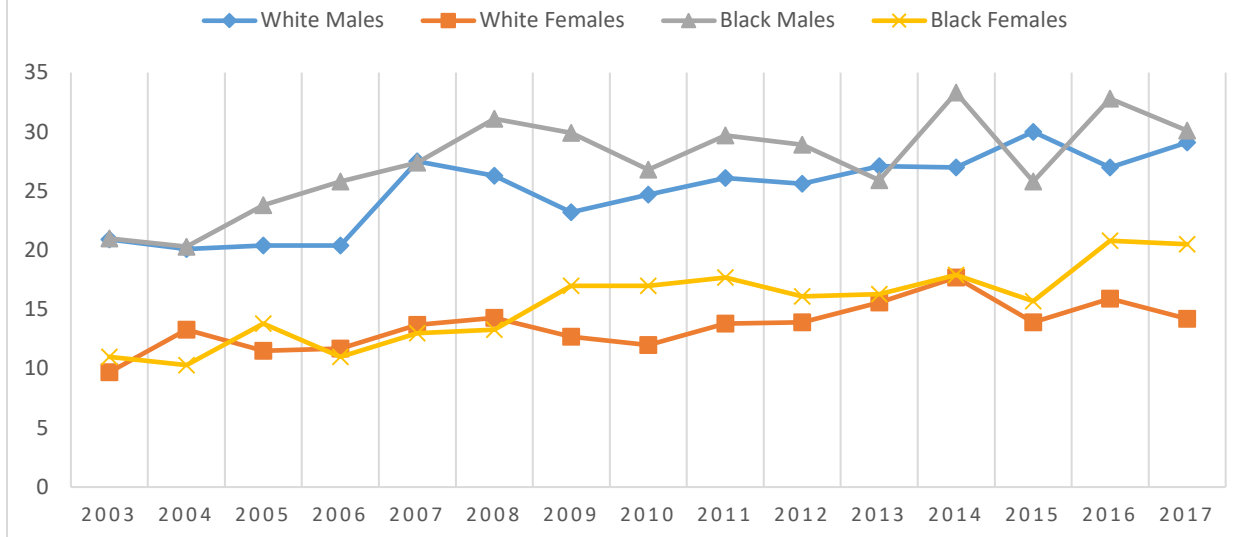
INVASIVE CERVIX UTERI CANCER RATE* MISSISSIPPI, 2003-2017



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

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 females did have higher observed rates until 2016. During the period between 2003 and 2017, the incidence rate for black females decreased at a significant rate of 2.75% annually. In contrast, the observed change in the incidence rate for white females was a 1.21% increase annually, though this change was not statistically significant. The incidence gap between black females and white females has been closed in the most recent years as a result of the significant decrease in rates for black females and the observed increase in rates for white females. Between 2013 and 2017, black females had a significant decrease of 8.80% annually. The rate for white females increased 7.14% annually between 2013 and 2017, though this change was not significant.

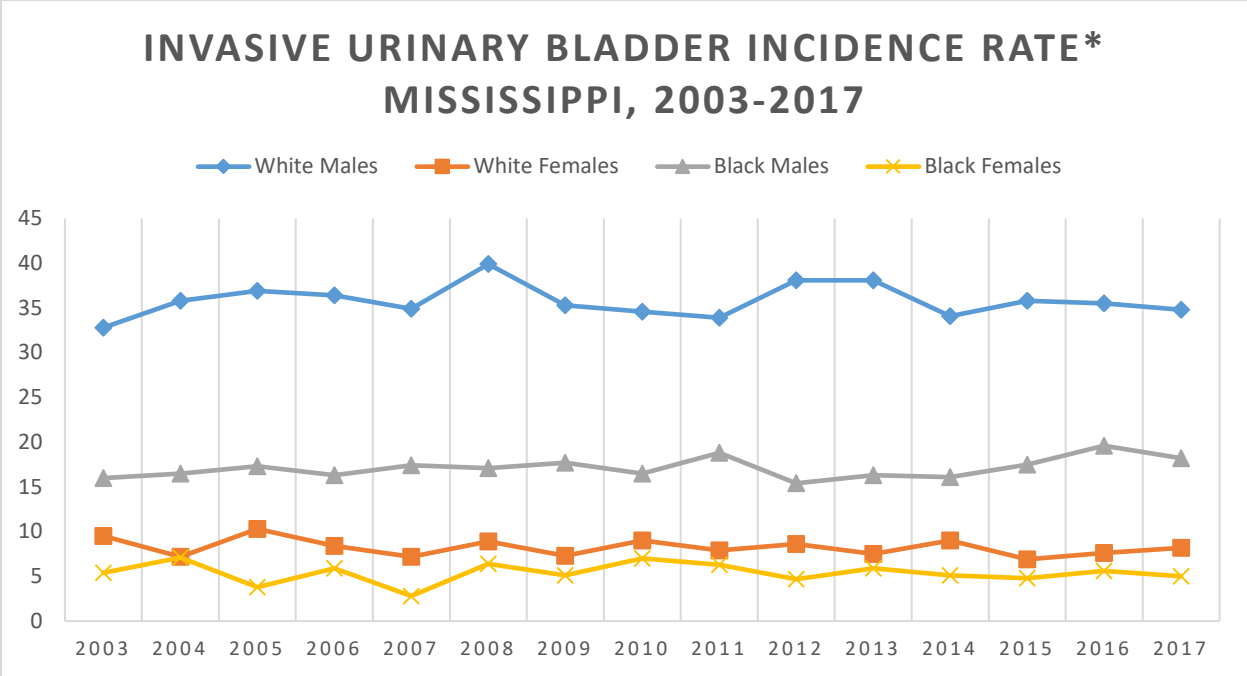
INVASIVE KIDNEY AND RENAL PELVIS INCIDENCE RATE* MISSISSIPPI, 2003-2017



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

Males had significantly higher rates of kidney and renal pelvis cancer than females. Within each sex group, there was little difference in rates by race. Over the period from 2003 to 2017, rates for white males increased annually at 2.45%. Similarly, the rates for white females increased at a rate of 2.35% annually. For black females, the incidence rate increased at a rate of 4.27% annually. Black males had an increase of 2.12% annually. All of these increases were statistically significant.

For the latest five-year period of 2013 to 2017, white males, black males and black females had similar observed trends to those for the full time period from 2003 to 2017. For white males, the trend for the last five year period was an increase of 1.44% annually. For black males, the most recent trend observed was an increase of 2.47% annually, and for black females the observed trend for the most recent five years was a 6.45% increase annually. Though white females had a significant increase annually for the full time period from 2003 to 2017, the trend for the most recent five years was an observed 2.98% annual decrease.

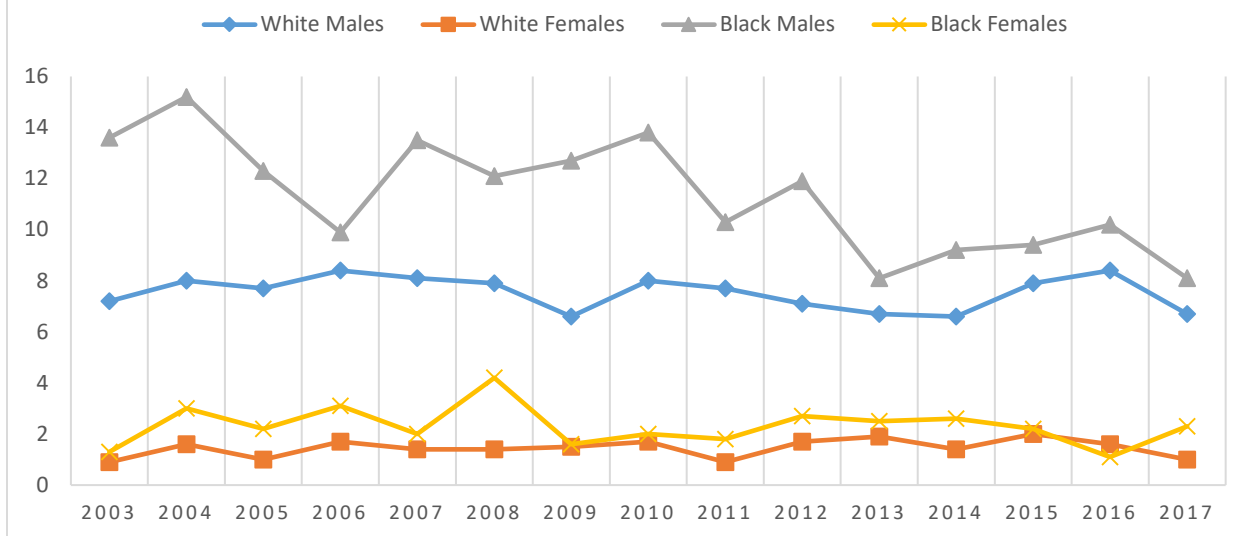


*Rates age-adjusted to the 2000 U.S. standard million population

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 2017 for all groups was small. Black males had a 0.62% increase 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 0.02%. For white females, the annual decrease was 0.98%. For black females, the annual decrease was 0.50%.

Compared to the trends for the full time period from 2003 to 2017, all race/sex groups had similar trends for the most recent five-year time period of 2013 to 2017, though none of the trends for this shorter time period were statistically significant. From 2013 to 2017, white males had an observed annual decrease of 1.40%. White females had an observed annual decrease of 0.39%, and black females had an observed annual decrease of 2.35%. Similar to the full time period, black males had an increasing observed trend of 4.21% annually.

INVASIVE ESOPHAGEAL CANCER INCIDENCE RATE*, MISSISSIPPI, 2003-2017

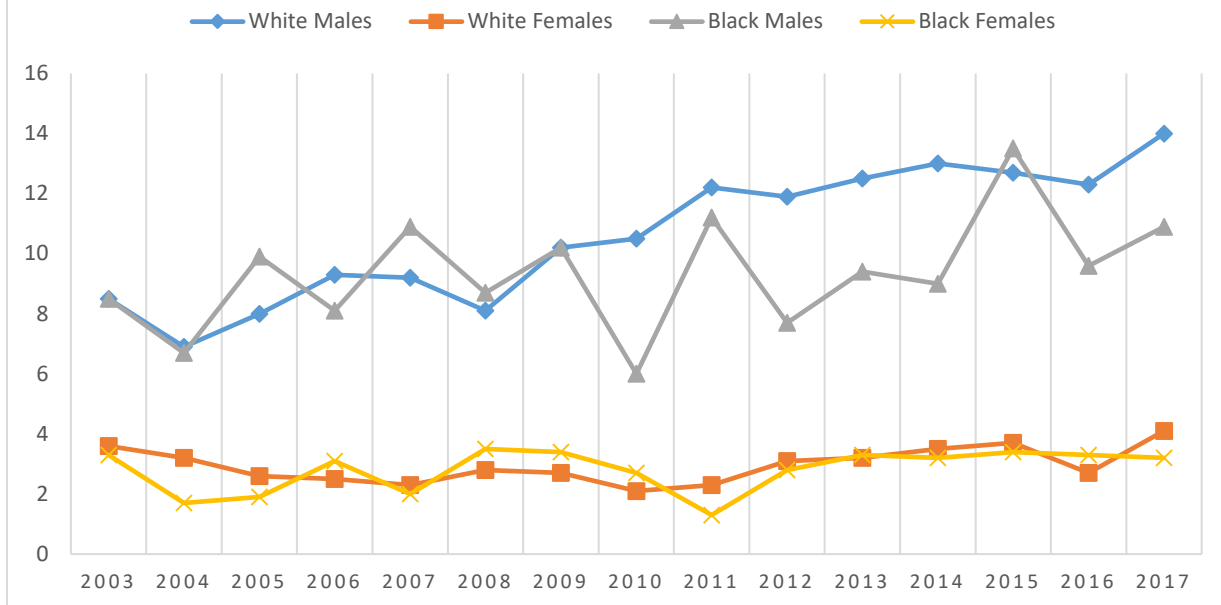


*Rates age-adjusted to the 2000 U.S. standard million population

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 2017 for white males, white females, and black females was not statistically significant. For white males, the annual percent decrease was 0.51% and for black females was 1.70%. White females had an annual increase of 1.58%. Black males had a statistically significant annual decrease of 2.99%.

For the latest five-year time period of 2013 to 2017, only black females had a similar trend to what was observed for the full time period of 2003 to 2017. Their trend for 2013 to 2017 was an annual decrease of 7.01% which was not statistically significant. For all other race/sex groups, the trend for the most recent time period was opposite of the full time period from 2003 to 2017, though none of the trends for 2013 to 2017 were statistically significant. White males had an increasing trend for 2013 to 2017 of 2.70% annually, and white females had a decreasing trend of 7.94% annually. For black males, the trend was an annual increase of 1.23%.

INVASIVE LIVER CANCER INCIDENCE RATE* MISSISSIPPI, 2003-2017

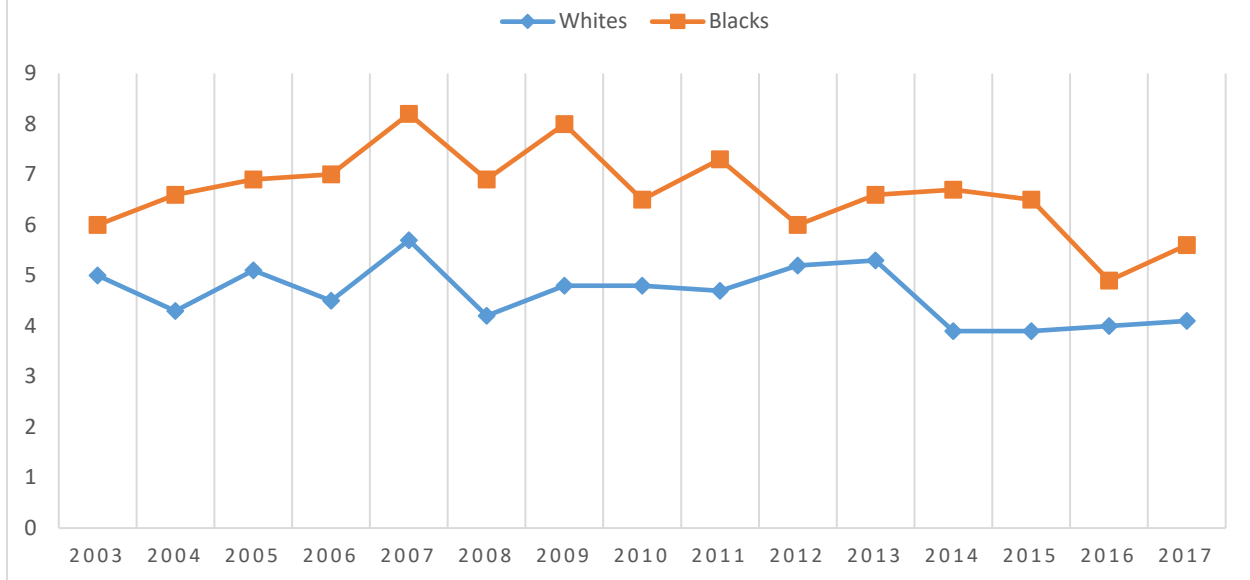


*Rates age-adjusted to the 2000 U.S. standard million population

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 a statistically significant increasing trend. The annual percent change for white males was 4.37%. The annual percent increase for black males was 2.02% and for black females was 2.01%. The rate for white females showed an annual decrease of 10.54% from 2003 to 2007, but then showed a significant increasing trend from 2007-2017 with an annual increase of 5.36%.

For the latest five-year period of 2013 to 2017, white males, white females, and black males had similar observed trends to those for the full time period from 2003 to 2017. For white males, the trend for the last five year period was an increase of 2.17% annually. For white females, the most recent trend observed was an increase of 3.45% annually, and for black males the observed trend for the most recent five years was a 3.46% increase annually. Though black females had a significant increase annually for the full time period from 2003 to 2017, the trend for the most recent five years was an observed 0.37% annual decrease.

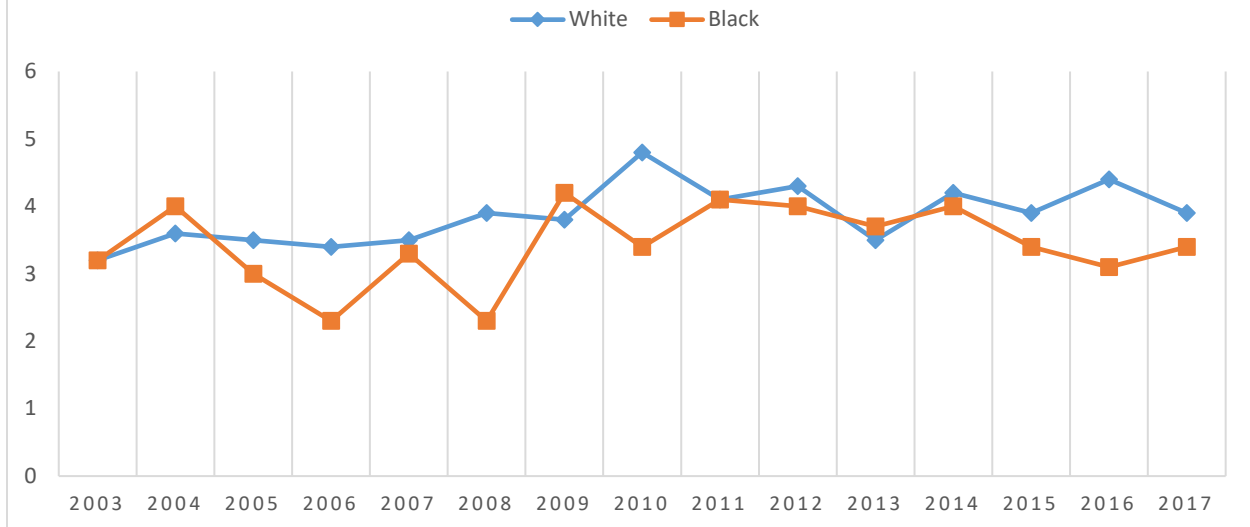
INVASIVE LARYNX CANCER INCIDENCE RATE* MISSISSIPPI, 2003-2017



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

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 2017, the observed annual decrease for the white population was 1.37%, though this change was not statistically significant. For the black population, the annual percent change from 2003 to 2007 was an increase of 6.87%. Conversely, for the period from 2007 to 2017 the black population saw a significant annual decrease of 3.35%. For the latest five-year time period of 2013 to 2017, both the white and black populations saw decreasing trends. These trends were not statistically significant. For the white population, the trend was an annual decrease of 5.04%, and for the black population, the trend was an annual decrease of 5.87%.

ACUTE MYELOID LEUKEMIA INCIDENCE RATE* MISSISSIPPI, 2003-2017

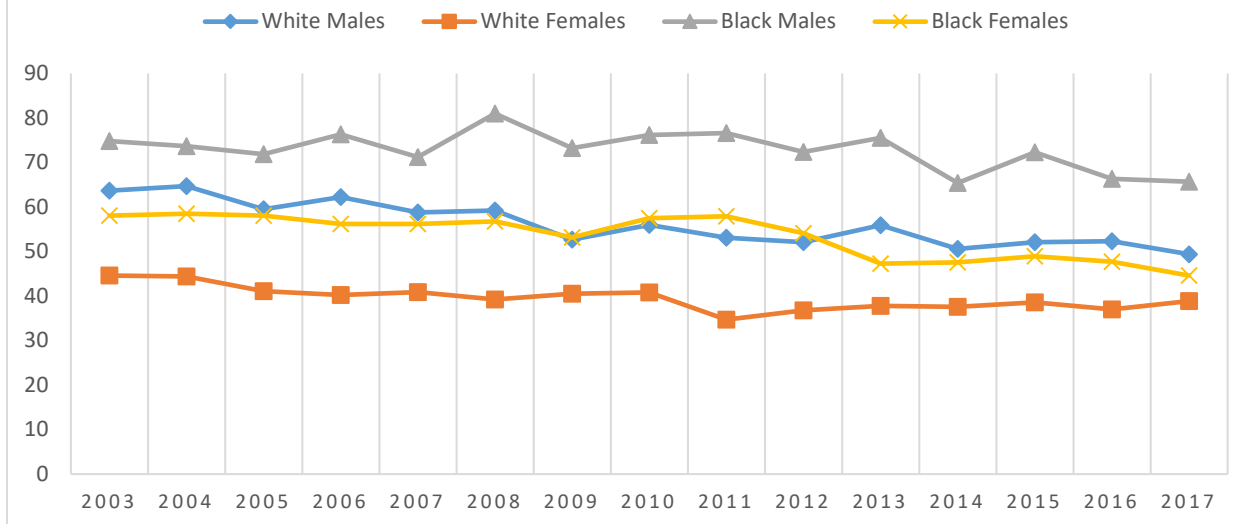


*Rates age-adjusted to the 2000 U.S. standard million population

Acute myeloid leukemia is a relatively rare type of cancer. Rates over the period from 2003 to 2017 remained relatively stable for the black population with an observed annual increase of 0.87%. The white population saw a significant increase over this time period of 1.42% annually. The rates were similar between groups for most years.

For the latest five-year time period from 2013 to 2017, the trend for the white population was similar to the trend for the full time period from 2003 to 2017 but was not statistically significant. The white rate increased between 2013 and 2017 annually 2.04%. The rate for the black population decreased between 2013 and 2017 at an annual rate of 3.93%. This is in contrast to the slight increase observed over the full time period from 2003 to 2017. One of the main reasons for this decreasing rate in the black population during the period from 2013 to 2017 was that black males saw a significant decrease in acute myeloid leukemia of 13.58% annually.

INVASIVE COLORECTAL CANCER INCIDENCE RATE*, MISSISSIPPI, 2003-2017



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

Colorectal cancer rates decreased in all of the race/sex groups between 2003 and 2017. Black females and white males experienced the highest levels of annual decrease in colorectal cancer at significant rates of 1.80% and 1.76%, respectively. Black males had significantly higher rates of colorectal cancer incidence compared to all other groups and experienced the smallest change over time with a significant decrease of 0.8% annually. Conversely, white females had lower rates of colorectal cancer than any other group except for black females in 2017, and experienced a significant annual decrease of 1.13%.

For the latest five-year period of 2013 to 2017, white males, black males, and black females had similar observed trends to those for the full time period from 2003 to 2017. For white males, the trend for the last five year period was a decrease of 2.18% annually. For black males, the most recent trend observed was a decrease of 2.68% annually, and for black females the observed trend for the most recent five years was a 1.14% decrease annually. Though white females had a significant decrease annually for the full time period from 2003 to 2017, the trend for the most recent five years was an observed 0.44% annual increase.

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

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/>.

²Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version 8.3.6.

Acknowledgement

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