

# Gender and racial disparities in the incidence and mortality of pancreatic cancer in Mississippi State from 2003 to 2019

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**Background:** In the United States, the incidence and prevalence of pancreatic cancer are well-established relative to the factors of gender and race. These rates can be seen to be dictated by biological, behavioral, socio-environmental, socioeconomic, and structural factors. This paper focused on the context of Mississippi, with a particular emphasis on racial and gender-linked mortality and incidence from 2003 to 2019.

**Methods:** Data were obtained from the Mississippi Cancer Registry. Specific parameters that were focused upon included the data source in the form of all cancer incidents and cancer mortality, geography in terms of cancer coalition regions, cancer sites in the form of the digestive system as a category to which pancreatic cancer belongs, and the year, ranging from 2003 to 2019.

**Results:** From the findings, the rates were more dominant in blacks than their white counterparts, suggesting racial disparity. Additionally, regardless of race, females exhibited lower rates compared to males. In the state, there were also marked geographical variations in disease incidence and mortality rates, with the Delta cancer coalition region faring the worst in terms of incidence rates for both races and genders.

**Conclusions:** It was concluded that in Mississippi, being a black male poses the highest risk. In the future, certain additional factors that will need to be investigated as per their probable moderating role to inform the coining of health care interventions at the state level. They include lifestyle and behavioral factors, comorbidities, stage of disease, and geographical variations or remoteness.

Keywords: Pancreatic cancer; cancer coalition region; incidence; mortality rate; racial disparity; gender disparity

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# Introduction

In the United States (U.S.), one of the few cancers whose incidence is increasing is pancreatic cancer, yet little is known relative to racial disparities arising as per the condition's associated mortality and incidence (1). For investigations that have focused on the years ranging from 2001 to 2015, for instance, with a specific emphasis on how race shapes the incidence and mortality aspects, findings have demonstrated that there have been 5-year time period declines in disparities in black versus white patients, but the incidence and mortality among blacks have remained

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higher (1). Despite the insightful nature of these outcomes, however, which point to the inference that pancreatic cancer mortality and incidence vary with cancer stage, patient age, and location but disparities between black and white patients are persistent, the specific factors responsible for the observed racial disparities are not highlighted vividly, a flaw that complicates efforts by healthcare authorities seeking to intervene.

In additional scholarly investigations, the focus has been on pancreatic cancer health disparities spanning more than 10 years, including variations in patient outcome, treatment, and epidemiology (2). The motivation of such investigations has been to give insight into the impact of these disparities on interventions that aim to promote equity, having unearthed health disparities in pancreatic cancer treatment based on determinants such as socioeconomic status,

#### Highlight box

#### Key findings

 Our findings demonstrated the rates of pancreatic cancer were more dominant in blacks than their white counterparts, suggesting racial disparity. Additionally, regardless of race, females exhibited lower rates compared to males. In the state, there were also marked geographical variations in disease incidence and mortality rates, with the Delta cancer coalition region faring the worst in terms of incidence rates for both races and genders.

#### What is known and what is new?

- Poor prognosis of pancreatic cancer in the United States. Previous studies have also shown longitudinal differences in the rates of mortality and incidence of pancreatic cancer based on ethnic or racial background have been documented. Similar to earlier studies, the findings suggest specifically that African-Americans exhibit a higher mortality rate and also incidence compared to their counterparts in the non-Hispanic White community
- Paucity of data that demonstrates the racial disparity of pancreatic cancer rates in the state of Mississippi. This study focuses on Mississippi State as the research context, and the target years span from 2003 to 2019. The year 2006 saw Mississippi report the highest pancreatic cancer-related death rate in the nation of 12.7 out of every 100,000 persons.

#### What is the implication, and what should change now?

 The studies increase the awareness of racial disparity in the state of Mississippi and forecast similar implications in other states across the United States. This sets the stage for future studies on how to curtail these differences by recognition of the modifiable risk factors for pancreatic cancer. Also, the creation of comprehensive strategies specifically relevant and tailored to the needs of the affected populations would be recommended for implementation in Mississippi and other states. ethnicity, and racial background (1,2). The results of such narrative reviews have indicated that most African Americans and Hispanics report higher rates and receive treatment at low-volume hospitals, as well as have lower surgical resection rates. Pancreatic cancer treatment delivery is also seen to be dictated by the factors of socioeconomic status and insurance concurrently (2). Hence, such studies can be seen to give insight into the existence of disparities based on socioeconomic status and race relative to pancreatic cancer treatment, but the underlying causes of those differences especially in socioeconomic statuses are not outlined vividly, yet they ought to be understood to inform interventions.

Poor prognosis has been evidenced further in studies that have focused on the steadiness of pancreatic cancer incidence and prevalence across the U.S. Particularly, the condition has been affirmed to maintain lower survival rates, at nine percent (3). Factors documented to account for lower survival rates include delayed detection, as well as limitations in treatment options whereby only 20 percent of patients tend to be eligible for "curative" surgical resection (3). Since the 1970s, also, incompletely explained and longstanding differences in the rates of mortality and incidence of pancreatic cancer based on ethnic or racial background have been documented (4). Similar to earlier studies, the findings suggest specifically that African-Americans exhibit a higher mortality rate and also incidence compared to their counterparts in the non-Hispanic White community (5). Some of the factors that explain the disparities include lifestyle and behavioral factors such as alcohol consumption, obesity, diabetes, and smoking (6). Among African-Americans and Latinos, pancreatic cancer risk has been asserted to increase with an increase in the rate of suddenonset diabetes (7). However, the recruitment of minorities in research studies centering on pancreatic cancer has been historically low (8). making the understanding of these disparities and the quest to guide intervention efforts unclear.

This study focuses on Mississippi State as the research context, and the target years span from 2003 to 2019. The year 2006 saw Mississippi report the highest pancreatic cancer-related death rate in the nation, standing at 12.7 out of every 100,000 persons (9). Further statistical outcomes for the respective counties on an age-adjusted basis yielded the rate of incidence standing as high as 26.91 in every 100,000 persons, with 51 percent of mortalities arising from treatment at the American College of Surgeons Commission on Cancer (ACS CoC) hospitals while the fate of the

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remaining 49 percent remained unclear (10). Also, among the patients tracked at the state's CoC facilities, compared to the National Cancer Data Base (NCDB) nationwide CoC data, there were no significant changes relative to factors of first treatment modalities, stage at diagnosis, and age distribution. Also, compared to national figures, fewer patients have survived 2 years with locally advanced disease in the state (9,10). Concerning, particularly, has been the larger number of individuals with unknown pancreatic cancer treatment. Hence, in the wake of these complexities, the extent of disparities is worth uncovering. Through such efforts, it is projected that the results might sensitize health care providers in Mississippi regarding the need to establish a system of pancreatic cancer care that is deemed comprehensive, inclusive, and accessible. We present this article in accordance with the STROBE reporting checklist (available at https://jgo.amegroups.com/article/ view/10.21037/jgo-22-913/rc).

# Methods

This study used Mississippi Cancer Registry as a data source. The registry contains population-based linked datasets combining data gained from health administrative datasets and long-form census questionnaire respondents. This study conformed to the provisions of the Declaration of Helsinki (as revised in 2013). Whereas the longform census questionnaire respondents are similar to the case of respondents in national household surveys, the health administrative datasets include information on annual mailing-address postal codes, ambulatory care, hospitalizations, cancer, and mortality. Indeed, the study concentrated on the successful linkage of cancer records to incidence and mortality records between 2003 and 2019, with the moderating factors on the focus being gender characteristics and racial origins. Hence, information was obtained via the linkage to the state cancer registry. Within the registry, specific parameters included the data source in the form of all cancer incidents and cancer mortality, geography in terms of cancer coalition regions, cancer sites in the form of the digestive system as a category to which pancreatic cancer belongs, and the year, ranging from 2003 to 2019. Regarding the study population, insights were gained from the registry in terms of sex and ethnicity, with the latter achieved by centering on the black race and the white race. Important to note is that race refers to distinct groups into which human species are divided based on inherited behavioral and physical differences (11). With

gender referring to the range of features pertaining to masculinity and femininity and differentiating between them, including gender identity and sex-based social structures (12).

Concerning the aspect of cancer definition, there was the estimation of cancer mortality rates and cancer incidence at the population level by gender and race in Mississippi, as demonstrated by the registry. Hence, the two indicators served as a baseline for the health status of various races relative to pancreatic cancer cases. New cancer cases, therefore, were defined as those that had occurred from 2003 to 2019. On the other hand, cancer deaths were deemed as those arising from a cancer form (pancreatic) that a physician had certified as the death's primary underlying cause. Hence, mortality data gained from the registry were those covering the period from 2003 to 2019.

Lastly, there was the statistical analysis aspect. As noted earlier, data were drawn from the Mississippi Cancer Registry. Thus, inferential and descriptive statistical approaches were used to present the results. From the descriptive statistical approach, data from the registry was collected, organized, analyzed, and presented meaningfully via graphical techniques, tabulation, and charts. On the other hand, the inferential statistical approach complemented the descriptive statistical technique through comprehensive discussions regarding the subject under investigation, eventually drawing conclusions considering the central subject under investigation.

# Statistical analysis

The cancer registry allows an end-user to select and download open-source data for didactics. In this study, the specific options select from the open-source cancer registry include all mortality cancer rates. With this study's focal area being pancreatic cancer epidemiology, the option chosen entailed all cancer incidence. In terms of geography, the Mississippi open-source cancer registry offers options such as data analysis by public health district, county, Delta or non-Delta regions, cancer coalition regions, rural or urban areas, and the Appalachian region. In addition, the geographical factor was then narrowed down to involve pancreatic cancer by cancer. The opensource cancer registry also allows an end user to select the cancer site to focus upon. In this case, pancreatic cancer was selected as the cancer. Additional navigation of the registry paves the way for the user to select the starting year and the ending year to ensure the timeframe being



**Figure 1** Age-adjusted pancreatic cancer incidence rates in Mississippi 2003–2019 by cancer coalition regions. Age-adjusted to the 2000 U.S. standard million population.

focused upon is specified. With age-adjusted rates on the focus, the starting year that was chosen was 2003 while the ending year was 2019. The registry provides additional room for the user to select the sex being focused upon and, in this case, all sexes were selected, implying both male and female populations had their pancreatic cancer used in the context of Mississippi. Relative to the factor of race or ethnicity, options include Black, White, or all, and the choice that was arrived upon was all races or ethnic groups, implying Mississippi's general population formed the focal demographic area.

# Results

From *Figure 1*, Delta Regional Coalition rates the worst, followed by the Central Regional Coalition, the Southern Regional Coalition, the Northeast Regional Coalition, and the Costal Regional Coalition, respectively. The specific indepth statistical data for the respective coalition regions are presented in tabular forms in *Figure 2*.

*Figure 2* illustrates the statistical outcomes concerning the incidence rate of cancer in the Delta, Central, Southern, Coastal and Northeast regional cancer coalition regions respectively. Specific findings demonstrate that in Mississippi, the highest incidence between 2003 and 2019 has been in Delta, rating the worst. On the other hand, the lowest incidence in the selected period is in the northeast.

*Figure 3* shows five (Delta, Central, Southern, Coastal and Northeast) regional cancer coalition regions, the graphical representation suggests that the rate in black males is consistently higher than the rate in white males.

It can also be observed from *Figure 4* that across the five cancer coalition regions in Mississippi, the incidence rate

in black females is consistently higher than the rate in their counterparts of the white race. At this point, it becomes imperative to gain additional insight into the subject of gender, offering a comparative analysis in males and females across these regions, pitting males versus females in the respective zones.

Between 2003 and 2019 in *Figure 5*, the incidence rate of pancreatic cancer can be seen to be consistently higher in black males than black females across all five regions. When the individual cancer coalition regions are compared, the coastal region favors the worst on the part of incidence in black males while the northeast zone favors the worst relative to pancreatic cancer incidence in black females. In both groups, however, the lowest incidence rate occurs in the southern cancer coalition region. Whether these statistical outcomes were similar to the case of white males versus white females in the same period and regions remains at stake.

Similar to the case of blacks, a comparison between males and females of the white race relative to the incidence of pancreatic cancer between 2003 and 2019 in *Figure 6* suggests that the rate is higher in males than females. Additionally, the northeast cancer coalition rate rates better in both genders while the incidence rate is worst in Delta for both male whites and female whites.

The statistical results concerning pancreatic cancerrelated mortality rate in Mississippi in *Figures* 7,8 suggest similar trend outcomes compared to the incidence rate. With cancer coalition regions on the focus, it is evident that Delta rates the worst implying it reported the highest mortality rate, with the northeast reporting the lowest mortality rate.

As indicated earlier, in both white and black males, the incidence rate between 2003 and 2019 was highest in Delta. *Figure 9* suggests that similar outcomes are found relative to the mortality rate, with Delta reporting the highest mortality rate arising from pancreatic cancer in Mississippi. Conversely, the lowest incidence rate in white and black males was in the southern cancer coalition region, and the mortality rate assumes a similar trend.

When it comes to a comparative analysis of white females versus black females in *Figure 10*, mixed outcomes accrue. In white females, the highest mortality rate was in Delta while the lowest was in the northeast regional coalition. In black females, however, it was in the northeast coalition region that the mortality rate was highest, with the lowest rate reported in the costal regional coalition.

Similar disease incidence analysis between white males

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Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	521002	523789	525922	532160	535021	537635	536805	536571	535158	533930	533718	533017	531487	529569	528375	526928	524042	9025129
Total Cases	65	61	56	62	67	72	74	92	75	83	85	89	106	84	90	88	79	1328
Crude-Rate	12.48	11.65	10.65	11.65	12.52	13.39	13.79	17.15	14.01	15.55	15.93	16.7	19.94	15.86	17.03	16.7	15.08	14.71
Age-Adjusted Rate	12.94	12.15	11.14	12.51	12.85	13.65	13.74	16.85	13.19	14.45	14.65	15.07	18.13	14.14	14.76	13.91	13.07	14
95% Confidence Interval Lower	9.98	9.28	8.4	9.58	9.93	10.65	10.75	13.54	10.33	11.46	11.65	12.05	14.79	11.22	11.81	11.11	10.29	13.24
95% Confidence Interval Upper	16.5	15.62	14.48	16.05	16.35	17.23	17.3	20.72	16.61	17.99	18.2	18.65	22.02	17.6	18.24	17.24	16.4	14.78
Statewide Age-Adjusted Rate	12.1	10.67	11.47	12.07	11.94	13.08	13.3	13.29	14.05	14.43	13.51	15.76	14.93	14.55	13.93	13.32	13.38	13.36
Statewide 95% Confidence	10.94	0.40	10.26	10.92	10.72	11.97	12.02	12.02	12 77	12.14	12.29	14.42	12.64	12 20	12 72	12.15	12.2	12.05
Statewide 95% Confidence	10.84	3.43	10.20	10.85	10.75	11.02	12.03	12.05	12.77	15.14	12.20	14.45	13.04	13.25	12.72	12.15	12.2	13.05
Interval Upper	13.45	11.94	12.79	13.4	13.25	14.44	14.66	14.65	15.43	15.81	14.85	17.18	16.32	15.89	15.22	14.59	14.65	13.67
Note: All rates are per 100,000. F	ates are age-a	djusted to th	he 2000 U.S.	Standard Mil	lion Populati	on.												
В																		
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	843994	850711	850816	865901	868051	870797	873976	878071	882583	883416	883575	883635	881886	882072	880278	875773	871586	14827121
Total Cases	94	88	100	103	120	123	130	102	123	143	135	159	138	167	162	147	165	2199
Crude-Rate	11.14	10.34	11.75	11.9	13.82	14.12	14.87	11.62	13.94	16.19	15.28	17.99	15.65	18.93	18.4	16.79	18.93	14.83
Age-Adjusted Rate	11.62	11.04	12.02	12.3	13.85	14.01	14.69	11.36	13.58	15.27	13.93	16.3	14.13	16.8	15.63	13.82	15.49	13.95
95% Confidence Interval Lower	9.38	8.85	9.77	10.03	11.46	11.62	12.24	9.24	11.26	12.83	11.64	13.81	11.83	14.3	13.27	11.63	13.17	13.36
95% Confidence Interval Upper	14.22	13.59	14.63	14.93	16.58	16.74	17.47	13.82	16.24	18.04	16.55	19.11	16.75	19.62	18.31	16.33	18.12	14.55
Statewide Age-Adjusted Rate	12.1	10.67	11.47	12.07	11.94	13.08	13.3	13.29	14.05	14.43	13.51	15.76	14.93	14.55	13.93	13.32	13.38	13.36
Statewide 95% Confidence Interval Lower	10.84	9.49	10.26	10.83	10.73	11.82	12.03	12.03	12.77	13.14	12.28	14.43	13.64	13.29	12.72	12.15	12.2	13.05
Statewide 95% Confidence	13.45	11 94	12 79	13.4	13 25	14 44	14.66	14.65	15.43	15.81	14.85	17 18	16.32	15.89	15.22	14 59	14.65	13.67
Note: All rates are per 100.000.	Rates are age-a	diusted to the	he 2000 U.S.	Standard Mil	lion Populati	on.					2							
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Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	459687	460362	459513	470117	473794	476685	478161	480374	480719	480733	480789	479431	477988	476923	475677	474564	473356	8058873
Total Cases	40	56	56	58	59	69	62	75	82	87	68	92	77	77	88	76	71	1193
Crude Rate	8.7	12.16	12.19	12.34	12.45	14.4/	12.97	15.61	17.06	18.1	14.14	19.19	16.11	16.15	18.5	16.01	15	14.8
Age-Adjusted Rate	8.30	0.75	11.29	9.74	11.25	10.49	11.54	14.20	14.99	13.61	12.43	10.55	14.34	12.75	14.5	12.37	11.49	12.91
95% Confidence Interval Linner	11.41	15.07	14.69	14 93	14.56	17.14	14.85	17.03	18.69	19.59	9.01	20.12	18.03	16.05	17.98	15.61	14.63	13.67
Statewide Age-Adjusted Bate	12.1	10.67	11.47	12.07	11 94	13.08	13.3	13 29	14.05	14.43	13.55	15.76	14.93	14.55	13.93	13.32	13.38	13.36
Statewide 95% Confidence		10.07	11.47	12.07	11.54	15.00	10.0	13.23	14.05	14.45	10.01	10.70	14.55	14.55	13.55	10.02	15.50	15.50
Interval Lower	10.84	9.49	10.26	10.83	10.73	11.82	12.03	12.03	12.77	13.14	12.28	14.43	13.64	13.29	12.72	12.15	12.2	13.05
Statewide 95% Confidence	13.45	11.94	12.79	13.4	13.25	14.44	14.66	14.65	15.43	15.81	14.85	17.18	16.32	15.89	15.22	14.59	14.65	13.67
Note: All rates are per 100.000. F	ates are age-a	diusted to th	he 2000 U.S.	Standard Mil	lion Populati	on.			20110									
D	Ū																	
Voor	2002	2004	2005	2005	2007	2000	2000	2010	2011	2012	2012	2014	2015	2010	2017	2010	2010	2002 2010
Tear Deputation at Rick	2003	2004	2005	420756	450970	450105	462250	467602	472156	474001	479247	2014	2015	2016	2017	404391	407305	2003-2019
Total Cases	400009	404637	440440	433/30	4506/0	433105	405550	407032	472150	4/4501	4/024/	402023	403335	4000/8	432345	434261	43/335	1122
Crude-Bate	7 46	8.6	13.16	8.87	9.98	13 94	13 16	11 97	12.5	17.69	15.47	16 78	18 34	18.85	16.05	16 59	16.89	14
Age-Adjusted Bate	7.40	8.92	13.62	9.25	9.83	13.15	12.46	11.83	11.85	15.97	13.82	14 74	16.13	15.42	12.61	13.07	13 73	12 78
95% Confidence Interval Lower	5.25	6.32	10.3	6.52	7.12	10.08	9.47	8.88	8.98	12.68	10.79	11.65	12.89	12.36	9.92	10.33	10.88	12.03
95% Confidence Interval Upper	10.73	12.22	17.64	12.72	13.23	16.88	16.1	15.44	15.37	19.87	17.46	18.43	19.95	19.05	15.84	16.37	17.13	13.57
Statewide Age-Adjusted Rate	12.1	10.67	11.47	12.07	11.94	13.08	13.3	13.29	14.05	14.43	13.51	15.76	14.93	14.55	13.93	13.32	13.38	13.36
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Statewide 95% Confidence																		
Interval Opper	13.45	11.94	12.79	13.4	13.25	14.44	14.66	14.65	15.43	15.81	14.85	17.18	16.32	15.89	15.22	14.59	14.65	13.67
Note: All rates are per 100,000. F	tates are age-a	ajustea to tr	ne 2000 0.3.	standard iviii	lion Populati	on.												
E																		
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	587760	589251	591532	597044	600614	603584	606482	607907	608531	611619	613510	613186	613535	613953	613999	611333	611848	10295688
Total Cases	62	58	59	91	69	72	87	89	113	77	90	114	97	97	87	99	92	1453
Crude-Rate	10.55	9.84	9.97	15.24	11.49	11.93	14.35	14.64	18.57	12.59	14.67	18.59	15.81	15.8	14.17	16.19	15.04	14.11
Age-Adjusted Rate	10.33	9.61	9.59	14.1	10.67	10.89	13.3	13.45	16.47	11.2	12.59	15.77	13.18	12.6	11.23	12.99	11.99	12.43
95% Confidence Interval Lower	7.91	7.29	7.29	11.34	8.29	8.5	10.62	10.77	13.55	8.81	10.09	12.98	10.66	10.18	8.97	10.51	9.63	11.79
95% Confidence Interval Upper	13.26	12.44	12.38	17.34	13.54	13.75	16.46	16.6	19.87	14.06	15.55	19.01	16.15	15.47	13.92	15.9	14.8	13.09
Statewide Age-Adjusted Rate	12.1	10.67	11.47	12.07	11.94	13.08	13.3	13.29	14.05	14.43	13.51	15.76	14.93	14.55	13.93	13.32	13.38	13.36
Statewide 95% Confidence	10.84	9,49	10.26	10.83	10.73	11.82	12.03	12.03	12.77	13.14	12.28	14.43	13.64	13.29	12.72	12.15	12.2	13.05
Statewide 95% Confidence	10.04	5.15	10.120	20.00	2011.0	JL	12.00	12.00		20124	12.20	215	10104	20120				20100
Interval Upper	13.45	11.94	12.79	13.4	13.25	14.44	14.66	14.65	15.43	15.81	14.85	17.18	16.32	15.89	15.22	14.59	14.65	13.67
Note: All rates are per 100.000. R	ates are age-a	diusted to th	ne 2000 U.S.	Standard Mil	lion Populati	on.												

Figure 2 Pancreatic cancer incidence rates in Delta (A), Central (B), Southern (C), Coastal (D) and Northeast (E) Regional Coalition Mississippi 2003–2019.

and white females, aimed at unearthing gender disparities, it can be seen that the mortality rate is consistently lower in females than males belonging to the same race across all the cancer coalition regions.

A dominant theme or trend relative to the comparison of the mortality rate in black males and females is that it is higher in males than females, with the largest gap occurring in Delta while the lowest gap is reported in the northeast coalition region between 2003 and 2019. *Figure 11* outlines the mortality rate of white males versus white females. This helps demonstrates the gender disparity in the mortality rate. While *Figure 12* shows the mortality rate in black males versus black females.

# **Discussion**

This investigation sought to discern pancreatic cancer disparities in gender and race in Mississippi. The target

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**Figure 3** Incidence rate of pancreatic cancer between white males and black males by cancer coalition regions in Mississippi between 2003 to 2019.



**Figure 4** Incidence rate of pancreatic cancer between white females and black females by cancer coalition regions in Mississippi between 2003 to 2019.



**Figure 5** Incidence rate of pancreatic cancer between black males and black females by cancer coalition regions in Mississippi between 2003 to 2019.



Figure 6 Incidence rate of pancreatic cancer between white males and white females by cancer coalition regions in Mississippi between 2003 to 2019.



**Figure 7** Age-adjusted pancreatic cancer mortality rates in Mississippi 2003–2019 by cancer coalition regions. Age-adjusted to the 2000 U.S. standard million population.

period spanned from 2003 to 2019. As per the data from the Mississippi Cancer Registry, specifically concerning pancreatic cancer, the state is divided into five regional cancer coalitions. The coalitions include Delta, Central, Northeast, Southern, and Costal coalitions. To present the results, two main sets were focused upon. The first set touched on incidence rates while the second set revolved around mortality rates. From the findings, some degree of consistency was evident. For instance, between 2003 and 2019, the rate was consistently higher in black males than in white males. Still, with this population category on the focus, a look at the mortality rates depicted black males rating consistently worsen than their white male counterparts, findings that were found to hold in all the five regional cancer coalitions. It is also worth highlighting

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Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	521002	523789	525922	532160	535021	537635	536805	536571	535158	533930	533718	533017	531487	529569	528375	526928	524042	9025129
Total Deaths	72	68	64	70	49	79	66	81	72	83	86	73	87	96	87	83	69	1285
Crude-Rate	13.82	12.98	12.17	13.15	9.16	14.69	12.29	15.1	13.45	15.55	16.11	13.7	16.37	18.13	16.47	15.75	13.17	14.24
Age-Adjusted Rate	14.59	13.41	12.7	14.29	9.17	15.08	12.24	15.05	13.27	14.91	15.11	12.43	14.6	15.95	14.75	13.5	10.87	13.64
95% Confidence Interval Lower	11.41	10.4	9.76	11.12	6.76	11.91	9.43	11.91	10.34	11.83	12.03	9.68	11.64	12.87	11.76	10.7	8.41	12.89
95% Confidence Interval Upper	18.38	17.01	16.23	18.05	12.15	18.84	15.62	18.76	16.77	18.56	18.74	15.73	18.1	19.58	18.29	16.84	13.87	14.41
Statewide Age-Adjusted Rate	11.84	10.81	10.62	12.79	10.42	11.65	11.9	12.03	11.87	14.14	12.42	12.36	13.83	12.9	13.23	12.16	11.85	12.2
Statewide 95% Confidence	40.50		0.45		0.00	40.45	40.74		40.7	40.00	44.00		12.50		40.05	44.05	10.71	
Interval Lower	10.59	9.63	9.45	11.51	9.29	10.46	10.71	10.84	10.7	12.86	11.23	11.19	12.59	11./1	12.05	11.05	10.74	11.91
Interval Upper	13.18	12.09	11.89	14.17	11.65	12.94	13.2	13.33	13.15	15.52	13.7	13.62	15.18	14.18	14.5	13.37	13.04	12.5
Note: All rates are per 100.000. Ra	ates are age-a	diusted to th	e 2000 U.S.	Standard Mill	ion Populati	on.												
B																		
5																		
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	843994	850711	850816	865901	868051	870797	873976	878071	882583	883416	883575	883635	881886	882072	880278	875773	871586	14827121
Total Deaths	100	98	80	102	109	103	120	96	102	152	110	114	130	120	145	121	130	1932
Crude-Rate	11.85	11.52	9.4	11.78	12.56	11.83	13.73	10.93	11.56	17.21	12.45	12.9	14.74	13.6	16.47	13.82	14.92	13.03
Age-Adjusted Rate	12.54	12.12	9.79	12.16	12.83	11.71	13.74	10.9	11.25	16.43	11.72	11.66	13.44	12.02	13.89	11.53	12.23	12.35
95% Confidence Interval Lower	10.2	9.83	7.76	9.91	10.52	9.54	11.37	8.81	9.15	13.88	9.6	9.59	11.18	9.93	11.69	9.53	10.18	11.8
55% Confidence Interval Upper	15.25	14.77	12.19	14.78	15.5	14.23	16.45	13.34	13.69	19.31	14.17	14.07	16.01	14.44	16.41	13.84	14.59	12.92
Statewide Age-Adjusted Kate	11.84	10.81	10.62	12.79	10.42	11.65	11.9	12.03	11.8/	14.14	12.42	12.36	13.83	12.9	13.23	12.16	11.85	12.2
Interval Lower	10.59	9.63	9,45	11.51	9,29	10.46	10.71	10.84	10.7	12.86	11.23	11.19	12.59	11.71	12.05	11.05	10.74	11.91
Statewide 95% Confidence	20.00	5.55	5.45		5.25	20.70				12.00							20.74	
Interval Upper	13.18	12.09	11.89	14.17	11.65	12.94	13.2	13.33	13.15	15.52	13.7	13.62	15.18	14.18	14.5	13.37	13.04	12.5
Note: All rates are per 100,000. Ra	ates are age-a	djusted to th	e 2000 U.S.	Standard Mill	ion Populati	on.												
~																		
C																		
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Population at Risk	459687	460362	459513	470117	473794	476685	478161	480374	480719	480733	480789	479431	477988	476923	475677	474564	473356	8058873
Total Deaths	455007	400502	57	69	51	61	59	64	67	79	71	74	71	63	82	77	475556	1104
Crude-Rate	10.22	10.21	12.4	14.68	10.76	12.8	12.34	13.32	13.94	16.43	14.77	15.43	14.85	13.21	17.24	16.23	13.73	13.7
Age-Adjusted Rate	9,94	9.83	11.74	13.86	9.78	11.72	11.06	12.04	11.92	14.76	12.64	12.39	13.68	11.02	13.8	12.58	10.1	11.98
95% Confidence Interval Lower	7.3	7.22	8.89	10.77	7.27	8.94	8.4	9.25	9.2	11.65	9.85	9.7	10.63	8.42	10.93	9.89	7.76	11.28
95% Confidence Interval Upper	13.23	13.09	15.23	17.57	12.9	15.1	14.31	15.44	15.21	18.48	16.02	15.64	17.33	14.21	17.23	15.83	12.99	12.72
Statewide Age-Adjusted Rate	11.84	10.81	10.62	12.79	10.42	11.65	11.9	12.03	11.87	14.14	12.42	12.36	13.83	12.9	13.23	12.16	11.85	12.2
Statewide 95% Confidence																		
Interval Lower	10.59	9.63	9.45	11.51	9.29	10.46	10.71	10.84	10.7	12.86	11.23	11.19	12.59	11.71	12.05	11.05	10.74	11.91
Statewide 95% Confidence	42.40	42.00	11.00		44.65			42.22	43.45	45.53		42.62	45.40			42.27	12.04	43.5
Interval Opper	13.18	12.09	11.89	14.17	11.65	12.94	13.2	13.33	13.15	15.52	13.7	13.62	15.18	14.18	14.5	13.37	13.04	12.5
Note: All rates are per 100,000. Rates a	ire age-adjuste	a to the 2000 U	J.S. Standard I	fillion Populatio	on.													
D																		
Year	2003	2004																
Population at Risk	587760	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2003-2019
Total Deaths		589251	<b>2005</b> 591532	<b>2006</b> 597044	<b>2007</b> 600614	<b>2008</b> 603584	<b>2009</b> 606482	<b>2010</b> 607907	<b>2011</b> 608531	<b>2012</b> 611619	<b>2013</b> 613510	<b>2014</b> 613186	<b>2015</b> 613535	<b>2016</b> 613953	<b>2017</b> 613999	<b>2018</b> 611333	<b>2019</b> 611848	<b>2003-2019</b> 10295688
	64	589251 58	<b>2005</b> 591532 54	<b>2006</b> 597044 81	<b>2007</b> 600614 72	<b>2008</b> 603584 63	<b>2009</b> 606482 60	2010 607907 81	<b>2011</b> 608531 86	<b>2012</b> 611619 78	<b>2013</b> 613510 80	<b>2014</b> 613186 96	<b>2015</b> 613535 100	<b>2016</b> 613953 88	<b>2017</b> 613999 96	<b>2018</b> 611333 91	<b>2019</b> 611848 91	2003-2019 10295688 1339
Crude Rate	64 10.89	589251 58 9.84	2005 591532 54 9.13	2006 597044 81 13.57	2007 600614 72 11.99	2008 603584 63 10.44	2009 606482 60 9.89	2010 607907 81 13.32	<b>2011</b> 608531 86 14.13	<b>2012</b> 611619 78 12.75	<b>2013</b> 613510 80 13.04	<b>2014</b> 613186 96 15.66	2015 613535 100 16.3	<b>2016</b> 613953 88 14.33	<b>2017</b> 613999 96 15.64	<b>2018</b> 611333 91 14.89	<b>2019</b> 611848 91 14.87	2003-2019 10295688 1339 13.01
Crude Rate Age-Adjusted Rate	64 10.89 10.65	589251 58 9.84 9.43	2005 591532 54 9.13 8.87	2006 597044 81 13.57 12.61	2007 600614 72 11.99 11.03	2008 603584 63 10.44 9.62	2009 606482 60 9.89 9.05	2010 607907 81 13.32 12.01	2011 608531 86 14.13 12.41	<b>2012</b> 611619 78 12.75 11.33	2013 613510 80 13.04 11.45	2014 613186 96 15.66 13.4	2015 613535 100 16.3 13.73	2016 613953 88 14.33 12.26	<b>2017</b> 613999 96 15.64 12.47	<b>2018</b> 611333 91 14.89 11.47	2019 611848 91 14.87 12.25	<b>2003-2019</b> 10295688 1339 13.01 11.47
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower	64 10.89 10.65 8.2	589251 58 9.84 9.43 7.15	2005 591532 54 9.13 8.87 6.66	2006 597044 81 13.57 12.61 10	2007 600614 72 11.99 11.03 8.62	2008 603584 63 10.44 9.62 7.38	2009 606482 60 9.89 9.05 6.89	2010 607907 81 13.32 12.01 9.51	<b>2011</b> 608531 86 14.13 12.41 9.9	2012 611619 78 12.75 11.33 8.93	2013 613510 80 13.04 11.45 9.05	2014 613186 96 15.66 13.4 10.83	2015 613535 100 16.3 13.73 11.14	2016 613953 88 14.33 12.26 9.8	<b>2017</b> 613999 96 15.64 12.47 10.07	<b>2018</b> 611333 91 14.89 11.47 9.21	2019 611848 91 14.87 12.25 9.82	<b>2003-2019</b> 10295688 1339 13.01 11.47 10.86
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper	64 10.89 10.65 8.2 13.61	589251 58 9.84 9.43 7.15 12.21	2005 591532 54 9.13 8.87 6.66 11.59	2006 597044 81 13.57 12.61 10 15.7	2007 600614 72 11.99 11.03 8.62 13.93	2008 603584 63 10.44 9.62 7.38 12.35	2009 606482 60 9.89 9.05 6.89 11.69	2010 607907 81 13.32 12.01 9.51 14.98	2011 608531 86 14.13 12.41 9.9 15.39	2012 611619 78 12.75 11.33 8.93 14.19	2013 613510 80 13.04 11.45 9.05 14.32	2014 613186 96 15.66 13.4 10.83 16.43	2015 613535 100 16.3 13.73 11.14 16.76	2016 613953 88 14.33 12.26 9.8 15.17	<b>2017</b> 613999 96 15.64 12.47 10.07 15.31	<b>2018</b> 611333 91 14.89 11.47 9.21 14.15	2019 611848 91 14.87 12.25 9.82 15.14	2003-2019 10295688 1339 13.01 11.47 10.86 12.11
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate	64 10.89 10.65 8.2 13.61 11.84	589251 58 9.84 9.43 7.15 12.21 10.81	2005 591532 54 9.13 8.87 6.66 11.59 10.62	2006 597044 81 13.57 12.61 10 15.7 12.79	2007 600614 72 11.99 11.03 8.62 13.93 10.42	2008 603584 63 10.44 9.62 7.38 12.35 11.65	2009 606482 60 9.89 9.05 6.89 11.69 11.9	2010 607907 81 13.32 12.01 9.51 14.98 12.03	2011 608531 86 14.13 12.41 9.9 15.39 11.87	2012 611619 78 12.75 11.33 8.93 14.19 14.14	2013 613510 80 13.04 11.45 9.05 14.32 12.42	2014 613186 96 15.66 13.4 10.83 16.43 12.36	2015 613535 100 16.3 13.73 11.14 16.76 13.83	2016 613953 88 14.33 12.26 9.8 15.17 12.9	2017 613999 96 15.64 12.47 10.07 15.31 13.23	<b>2018</b> 611333 91 14.89 11.47 9.21 14.15 12.16	<b>2019</b> 611848 91 14.87 12.25 9.82 15.14 11.85	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval I over	64 10.89 10.65 8.2 13.61 11.84	589251 58 9.84 9.43 7.15 12.21 10.81	2005 591532 54 9.13 8.87 6.66 11.59 10.62	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51	2007 600614 72 11.99 11.03 8.62 13.93 10.42	2008 603584 63 10.44 9.62 7.38 12.35 11.65	2009 606482 60 9.89 9.05 6.89 11.69 11.9	2010 607907 81 13.32 12.01 9.51 14.98 12.03	2011 608531 86 14.13 12.41 9.9 15.39 11.87	2012 611619 78 12.75 11.33 8.93 14.19 14.14	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59	2016 613953 88 14.33 12.26 9.8 15.17 12.9	2017 613999 96 15.64 12.47 10.07 15.31 13.23	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05	2019 611848 91 14.87 12.25 9.82 15.14 11.85	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval Lower Statewide 95% Confidence	64 10.89 10.65 8.2 13.61 11.84 10.59	589251 589251 9.84 9.43 7.15 12.21 10.81 9.63	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7	<b>2012</b> 611619 78 12.75 11.33 8.93 14.19 14.14 12.86	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74	<b>2003-2019</b> 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval Lower Statewide 95% Confidence Interval Upper	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18	589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19 13.62	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval Lower Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. R.	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a	589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S.	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on.	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19 13.62	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. R	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a	589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S.	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on.	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19 13.62	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide 95% Confidence Interval Lower Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. Ri E	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a	589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 me 2000 U.S.	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on.	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7	2014 613186 96 15.66 13.4 10.83 16.43 12.36 11.19 13.62	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37	<b>2019</b> 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide Age-Adjusted Rate Statewide Age-Adjusted Rate Interval Lower Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. R E Year	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a	2004 589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S. 2005	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006	2007 600614 712 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on.	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33	2011 608531 866 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011	2012 611619 78 12.75 11.33 8.93 14.14 12.86 15.52 2012	2013 613510 80 13.04 11.45 9.05 12.42 12.42 11.23 13.7 2013	2014 613186 96 13.66 13.4 10.83 16.43 12.36 11.19 13.62 2014	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5 2017	2018 611333 91 14.489 11.47 9.21 14.15 12.16 11.05 13.37 2018	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 2003-2019
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 95% Confidence Interval Jower Statewide 95% Confidence Interval Joper Note: Ali rates are per 100,000. R E Year Population at Risk	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 2003 455869	2004 589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th 2004 464897	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S. 2005 448446	2006 597044 81 13.57 12.61 100 15.7 12.79 11.51 14.17 Standard Mill 2006 439756	2007 600614 722 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on.	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2 2009 463350	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472156	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7 2013 478247	2014 613186 996 15.66 13.4 10.83 16.43 12.36 11.19 13.62 2014 482623	2015 613535 1000 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5 14.5 2017 492345	2018 611333 91 14.89 92.1 14.15 12.16 11.05 13.37 2018 494281	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 2003-2019 8015346
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper 95% Confidence Interval Upper Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. Ri E Year Population at Risk Total Deaths	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 2003 455869 49	2004 589251 58 9.84 9.84 9.83 12.21 10.81 9.63 12.09 djusted to th 2004 464897 37	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S. 2005 448446 47	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006 439755 48	2007 600614 722 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on. 2008 459105 49	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2 2009 463350 633	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472156 53	2012 611619 78 12,75 11.33 8,93 14,19 14,14 12,86 15,52 2012 474901 64	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7 2013 478247 63	2014 613186 956 15.66 13.4 10.83 16.43 12.36 11.19 13.62 2014 482623 65	2015 613535 10,100 16,3 13,73 11,14 16,76 13,83 12,59 15,18 2015 485335 78	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5 14.5 2017 492345 66	2018 611333 91 14.89 11.147 9.21 14.15 12.16 11.05 13.37 2018 494281 78	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395 82	2003-2019 10295688 1339 13.01 11.47 10.866 12.11 12.2 11.91 12.5 2003-2019 8015346 1010
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 35% Confidence Interval Lower Statewide 35% Confidence Interval Upper Note: All rates are per 100,000. R E Year Population at Risk Total Deaths Crude-Rate	64 10.89 10.65 8.22 13.61 11.84 10.59 13.18 ates are age-a 2003 455869 49 10.75	2004 589251 58 9.84 9.83 7.15 12.21 10.81 9.63 12.09 djusted to th 2004 464897 37 7.96	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 re 2000 U.S. 2005 448446 47 10.48	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006 439756 439756 48 10.92	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33 7.32	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 on. 2008 459105 459105 49 10.67	2009 606482 60 9.05 6.89 11.69 11.9 10.71 13.2 2009 463350 63 13.6	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472156 53 11.23	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901 64 13.48	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7 2013 478247 63 13.17	2014 613186 996 15.66 13.4 10.83 16.43 12.36 11.19 13.62 2014 482623 65 13.47	2015 613535 1000 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 16.07	2016 613953 88 14.33 12.26 9.88 15.17 12.9 11.71 14.18 2016 488078 81 16.6	2017 613999 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5 2017 492345 66 13.41	2018 611333 91 14,89 91.1.47 9,21 14,15 12,16 11.05 13,37 2018 494281 78 15,78	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395 82 16.49	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 2003-2019 8015346 1010 12.6
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 95% Confidence Interval Lower Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. Ri E Year Population at Risk Total Deaths Crude-Rate Age-Adjusted Rate	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-ad 455869 49 10.75 11.59	2004 589251 58 9,84 9,83 7,15 12,21 10,81 9,63 12,09 djusted to th 2004 464897 37 7,96 8,73	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S. 2005 448446 47 10.48 11.02	2006 597044 81 13.57 12.61 10 15.7 11.51 14.17 Standard Mill 439756 439756 439756 48 10.92 11.44	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33 7.32 7.14	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 00. 459105 459105 49 10.67 10.44	2009 606482 60 9.05 6.89 11.69 10.71 13.2 2009 463350 63 13.6	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55 11.04	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472156 53 11.23 10.83	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901 64 13.48 12.59	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7 2013 478247 63 13.17 11.68	2014 613186 96 15.66 13.44 10.83 16.43 12.36 11.19 13.62 2014 482623 65 13.47 11.81	2015 613535 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 16.07 14.27	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81 16.6 13.94	2017 613999 96 15.64 12.47 15.31 13.23 12.05 14.5 2017 492345 66 13.41 10.86	2018 611333 91 14.89 9211 14.15 12.16 11.05 13.37 2018 494281 78 15.78 12.1	2019 611848 91 14.87 9.82 15.14 11.85 10.74 13.04 497395 82 16.49 13.28	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 <b>2003-2019</b> 8015346 1010 12.6 11.63
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 35% Confidence Interval Lower Statewide 35% Confidence Interval Upper Note: All rates are per 100,000. R E Year Population at Risk Total Deaths Crude-Rate Age-Adjusted Rate 95% Confidence Interval Lower	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 45869 49 10.75 11.59 8.51	2004 589251 58 9,84 9,84 9,84 9,83 7,15 12,21 10,81 9,63 12,09 djusted to th 2004 464897 37 7,96 8,73 6,13	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 at 2000 U.S. 2005 448446 47 10.48 11.02 8.05	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006 433756 48 8 48 8.36	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33 7.32 7.14 4.87	2008 603584 603584 9.62 7.38 12.35 11.65 10.46 12.94 on. 2008 459105 49 10.67 10.44 7.67	2009 606482 60 9.05 6.89 11.69 11.71 13.2 2009 463350 63 13.6 13.06 9.97	2010 607907 81 13.322 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55 11.04 8.24	2011 608531 86 14.13 12.44 9.9 15.39 11.87 10.7 13.15 2011 472156 53 11.23 10.83 8.07	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901 64 13.48 12.59 9.65	2013 613510 80 13.04 11.45 9.05 12.42 11.23 13.7 2013 478247 63 13.17 11.68 8.92	2014 613186 96 15.66 13.34 10.83 16.43 11.19 13.62 2014 482623 65 13.47 11.81 9.06	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 485335 78 16.07 14.27 11.21	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81 16.6 13.94 11.01	2017 613999 956 15.64 12.47 10.07 15.31 13.23 12.05 14.5 2017 492345 66 13.41 10.86 8.35	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37 2018 494281 78 494281 15.78 15.78 12.1 9.551	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395 82 22 216.49 13.28 10.48	2003-2019 10255688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 2003-2019 8015346 1010 12.6 11.63 10.91
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 95% Confidence Interval Upper Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. R E Year Population at Risk Total Deaths Crude-Rate Age-Adjusted Rate 95% Confidence Interval Upper	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 455869 49 10.75 11.59 8.51 15.4	2004 589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th 2004 464897 37 7.966 8.73 6.1 12.08	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 e 2000 U.S. 2005 448446 47 10.48 11.02 8.05 14.73	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006 439756 439756 48 10.92 11.44 8.36 15.25	2007 600614 72 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33 7.32 7.14 4.87 10.1	2008 603584 63 10.44 9.62 7.38 11.65 10.46 12.94 00. 459105 49 10.67 10.44 7.67 13.88	2009 606482 60 9.89 9.05 6.89 11.69 11.71 13.2 2009 463350 63 13.6 13.06 13.06 9.97 16.8	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55 51 11.04 8.24 14.49	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472156 53 11.23 10.83 8.07 14.23	2012 611619 78 12.75 11.33 8.93 14.14 12.86 15.52 2012 474901 64 13.48 12.59 9.65 16.17	2013 613510 80 13.04 11.43 9.05 14.32 12.42 11.23 13.17 63 13.17 13.68 8.892 15.04	2014 613186 95 15.66 13.34 10.83 16.43 12.36 11.19 13.62 2014 482623 65 13.47 11.81 9.06 15.16	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 16.07 14.27 11.21 17.92	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81 16.6 6 13.94 11.01 17.45	2017 613999 956 15.64 12.47 10.07 15.31 13.23 12.05 14.5 7 492345 66 13.41 10.86 8.85 13.93	2018 611333 91 14.89 9.21 14.15 12.16 11.05 13.37 2018 494281 78 15.78 12.1 9.51 15.23	2019 611848 91 14.87 9.82 15.14 11.85 10.74 13.04 2019 497395 82 497395 82 16.49 13.28 10.48 16.64	2003-2019 10255688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 2003-2019 8015346 1010 12.6 11.63 10.91 12.39
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 95% Confidence Interval Lower Statewide 95% Confidence Interval Upper Note: All rates are per 100,000. Ri E Year Population at Risk Total Deaths Crude-Rate Age-Adjusted Rate 95% Confidence Interval Upper 95% Confidence Interval Upper Statewide Age-Adjusted Rate	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 455869 49 10.75 11.59 8.51 11.54 11.84	2004 589251 58 9.84 9.43 7.15 12.21 10.81 9.63 12.09 djusted to th 2004 464897 7.96 8.73 6.1 12.08 10.81	2005 591532 544 9.13 8.87 6.66 11.59 10.62 9.45 11.89 te 2000 U.S. 2005 448446 47 10.48 11.02 8.05 14.73 10.62	2006 597044 81 13.57 12.61 10 15.7 12.79 11.51 14.17 Standard Mill 2006 43975 43975 43975 8 8 10.92 11.44 8.36 15.25 12.79	2007 600614 72 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 450870 33 7.14 450870 33 7.32 7.14 4.87 10.1	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 00. 459105 49 10.67 10.44 7.67 13.88 11.65	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2 2009 463350 63 3 13.6 13.06 13.06 9.97 16.8	2010 607907 81 13.322 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55 11.04 8.24 14.49 12.03	2011 608531 86 14.13 12.41 9.9 11.87 10.7 13.15 2011 472156 53 3 11.23 10.83 8.07 14.23 11.87	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901 64 13.48 12.59 9.65 16.17 14.14	2013 613510 80 13.04 11.45 9.05 14.32 12.42 11.23 13.7 478247 63 3 13.17 11.68 8.92 15.04 12.42	2014 613186 96 13.66 13.4 10.83 16.43 12.36 11.19 13.62 2014 482623 65 5 13.47 11.81 9.06 15.16 12.36	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 16.07 14.27 11.21 17.92 13.83	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81 16.6 13.94 11.01 17.45 12.9	2017 613999 15.64 12.47 10.07 15.31 13.23 12.05 14.5 2017 492345 66 6 6 6 6 6 6 8.33 13.41 10.85 8.83 13.23	2018 611333 91 14.89 11.47 9.21 14.15 12.16 11.05 13.37 2018 494281 78 8 15.78 12.78 15.78 12.11 9.51 15.23 12.16	2019 611848 9 9 1 1 1 4.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395 822 16.49 13.28 10.44 11.85	2003-2019 1025568 1139 11.07 10.86 12.11 12.2 11.91 12.5 2003-2019 8015346 1010 12.6 11.63 10.91 12.39 12.2
Crude Rate Age-Adjusted Rate 95% Confidence Interval Lower 95% Confidence Interval Upper Statewide 35% Confidence Interval Lower Statewide 35% Confidence Interval Upper Note: All rates are per 100,000. R E Year Population at Risk Total Deaths Crude-Rate Age-Adjusted Rate 95% Confidence Interval Upper Statewide 35% Confidence	64 10.89 10.65 8.2 13.61 11.84 10.59 13.18 ates are age-a 455869 49 10.75 11.59 8.51 15.4	2004 2004 2004 2004 2004 2004 2004 2004	2005 591532 54 9.13 8.87 6.66 11.59 10.62 9.45 11.89 at 2000 U.S. 2005 448446 47 10.48 11.02 8.05 14.73 10.62	2006 597044 81 13.57 12.61 100 15.7 11.51 14.17 <b>Standard Mill</b> <b>2006</b> 439756 48 10.92 11.44 8.36 (5.25 12.79	2007 600614 72 11.99 11.03 8.62 13.93 10.42 9.29 11.65 ion Populati 2007 450870 33 7.32 7.14 4.87 10.1	2008 603584 63 10.44 9.62 7.38 12.35 11.65 10.46 12.94 00. 459105 459105 49 10.67 10.44 7.67 13.88 11.65	2009 606482 60 9.89 9.05 6.89 11.69 11.9 10.71 13.2 2009 463350 63 13.6 13.06 9.97 16.8 11.9	2010 607907 81 13.32 12.01 9.51 14.98 12.03 10.84 13.33 2010 467692 54 11.55 51 11.04 84 84 91 2.03	2011 608531 86 14.13 12.41 9.9 15.39 11.87 10.7 13.15 2011 472155 53 11.23 10.83 807 807 14.23 11.87	2012 611619 78 12.75 11.33 8.93 14.19 14.14 12.86 15.52 2012 474901 64 13.48 12.59 9.65 16.17 14.14	2013 613510 80 13.04 11.45 14.32 12.42 11.23 13.7 2013 478247 63 13.17 11.68 8.92 15.04 12.42	2014 613186 96 15.66 13.4 10.83 12.36 11.19 13.62 2014 482623 65 13.47 11.81 9.06 55 13.47 11.81	2015 613535 100 16.3 13.73 11.14 16.76 13.83 12.59 15.18 2015 485335 78 16.07 14.27 11.21 17.92	2016 613953 88 14.33 12.26 9.8 15.17 12.9 11.71 14.18 2016 488078 81 16.6 6 13.94 11.04 17.45 12.9	2017 61399 96 15.64 12.47 10.07 15.31 13.23 12.05 14.5 2017 492345 66 8.35 13.94 13.84 13.83 13.93 13.23	2018 611333 91 14.489 11.47 9.21 12.16 11.05 13.37 2018 494281 78 15.78 12.1 9.51 15.21	2019 611848 91 14.87 12.25 9.82 15.14 11.85 10.74 13.04 2019 497395 82 16.49 13.28 10.48 16.64	2003-2019 10295688 1339 13.01 11.47 10.86 12.11 12.2 11.91 12.5 8015346 1010 12.6 11.63 10.91 12.3
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Figure 8 Pancreatic cancer mortality rates in Delta (A), Central (B), Southern (C), Northeast (D) and Coastal (E) Regional Coalition Mississippi 2003–2019.

that Delta's rate was highest for the male population in both races while the Southern coalition's rates were the lowest, but with all the coalitions seeing the number of incidents and mortality cases higher in black males than white males across the board, as highlighted earlier. At this point, it can be seen that the results concurred with what had been documented previously in the literature, depicting that in the U.S. context, with Mississippi State unexceptional, black males are more likely to report pancreatic cancer or die of the disease than white males (13). In such investigations, it had been established that from data such as that spanning from 2000 to 2011, African-Americans were more likely to display overall significantly greater agestandardized incidence rates than whites or Caucasians. Some factors likely to be playing a role in these rates have been documented. Some of them include the physical environment such as industry and water quality (14). and the role of ultraviolet-B irradiance (15).

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**Figure 9** Mortality rate—white versus black males (racial disparity in mortality rate).



**Figure 10** Mortality rate—white versus black females (racial disparity in mortality rate).

However, the dilemma that emerges entails the remainder of the groups whose incidence and mortality data might not have been captured in the cancer coalition regions due to factors such as access challenges (especially in rural zones) and sociocultural factors, historical injustices, and systemic issues. Whether similar rates would have been achieved or the equation would have tilted after incorporating such data remains unclear, pointing to the criticality of improving population representativeness by widening the level of collaboration among hospital networks to gain such data more comprehensively.

The rates in black females were also higher than in white females in all the five coalition regions, with Delta rating the worst and the Northeastern coalition region yielding the lowest incidence rates of pancreatic cancer. When it comes to mortality rates, however, black females' rates are higher than those for white females, but the trend is similar to the incidence rate only for the case of white females



**Figure 11** Mortality rate—white males versus white females (gender disparity in mortality rate).



**Figure 12** Mortality rate—black males versus black females (gender disparity in mortality rate).

whereby Delate had the highest mortality rate while the Northeastern coalition had the lowest mortality rate. For black females, the lowest mortality rate was in Costal while the highest rate was in the Northeaster coalition region. From additional scholarly studies, factors contributing to this consistency in disparities between black females and white females have been documented. Some of them include attribution to interethnic differences in the effects and distribution of predominant environmental risk factors (16). Specific factors include red meat intake (17), adiposity (18) and (19,20).

To determine gender disparity, the incidence rates of pancreatic cancer were determined by comparing white males with white females, as well as black males with black females. The same approach applied to the mortality rate, aimed to determine gender disparities. From the results, females rated more favorably than males concerning the attribute of incidence, regardless of whether they were

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white or black. This trend held further when it came to the comparative analysis of the mortality rates, with the rates in white males being higher than in white females and also in black males than in black females. At this point, an additional theme that emerged was that being a black male proved the riskiest while being a white female proved the least risky.

Gender disparities have been linked to some factors. They include smoking and associated behaviors (21). and sex-steroid hormones (22). The factor of remoteness has also been found to explain higher mortality rates (23,24). but whether, in this case, the population of blacks residing in remote areas was significantly higher than whites between 2003 and 2019 is worth understanding further. Studies that concur with this position hold that geographical variations affect the survival rate and hence the mortality rate whereby they shape disparities in supportive care needs and the quality of care (25,26).

Indeed, this study established that between 2003 and 2019, there were gender disparities, but certain factors could not be clarified vividly. For instance, the statistical information fails to discern the probable role of the pancreatic cancer stage on the incidence and mortality rates. Another factor involved the age of diagnosis. Indeed, the statistics drawn from the state cancer registry were ageadjusted, implying the probable impact of age of diagnosis on the mortality rates, if any, remained unknown. Lastly, there is the factor of comorbidities. Whereas some scholarly insights hold that the presence of pre-existing conditions could increase the mortality rate by compromising healthrelated quality of life (26), whether this was the case in Mississippi remained unclarified. In the future, such factors are worth considering even further to increase understanding of their probable moderating role and, in turn, inform the recommendation of strategies tailored to the target population's needs with more accuracy and precision.

# Conclusions

In summary, this paper established that between 2003 and 2019, there were persistent racial and gender disparities in disease mortality rates and incidence. Also, Delta fared the worst based on most parameters that were analyzed. In the future, it will be critical to increase the understanding of these values by incorporating the probable role of moderating factors such as lifestyle and behavioral factors, morbidity, stage of disease, and geographical variations or remoteness of the area of residence and their impact on disease incidence and mortality rates. In so doing, better, comprehensive strategies specifically relevant and tailored to the needs of the affected populations would be recommended for implementation in Mississippi and other states.

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# Footnote

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*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study conformed to the provisions of the Declaration of Helsinki (as revised in 2013). Ethical approval was not required for this current study.

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