



CANCER

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PREFACE

HEALTH DISPARITIES AND CANCER

By Cancer Contributing Editors
Sanya Springfield, Ph.D.
& Peter Ogunbiyi, D.V.M., Ph. D.

The 2009 Annual Report to the Nation on the Status of Cancer, 1975-2006, depicts a decline in overall rates of cancer incidence and rates of cancer mortality for most racial and ethnic populations in the United States. The overall decrease was driven largely by declines in incidence of and mortality from the three most common cancers in men (lung, prostate, and colorectal cancer) and two of the three leading cancers in women (breast and colorectal cancer).

National Cancer Institute (NCI) Director Dr. John Niederhuber frames the nation's condition best in *The Nation's Investment in Cancer Research: Connecting the Cancer Community, An Annual Plan and Budget Proposal for FY2009*:

"We have made progress, but much work remains. The rate of cancer mortality continues to drop; however, **cancer still remains a leading cause of death, second only to heart disease. The number of new cancer diagnoses continues to rise**, with more than 1.4 million people hearing the dreaded words "you have cancer" (in 2007) in the United States alone. And **we know this burden is disproportionately shouldered by the poor, the elderly, and minority populations**" (U.S. Department of Health and Human Services (DHHS), 2009, p. 4).

Evidence suggests that disparities in cancer care are associated with high death rates among minorities.

Minority women have lower rates of breast cancer than white women, but black women are more likely to die from the disease. Nationally, blacks have both higher incidence of and mortality from colorectal cancer than all other racial/ethnic groups. Black men are 50% more likely to have prostate cancer than whites and are more than twice as likely to die from it. Hispanic women are twice as likely to have cervical cancer as whites, while black women are twice as likely to die from the disease. Hispanics are more likely to suffer from infection-related cancers than non-Hispanics.

Of course, access to care alone does not completely account for these disparities. Because cancer initiation and progression are determined by complex interactions among genetic, behavioral, cultural, social, and environmental factors, some level of health disparity — e.g., higher than average incidence, more rapid disease progression, poorer outcome or survival — can affect anyone. However, **several assessments conducted in recent years point to the unequal burden of disease in our society as not just a scientific and medical challenge but also a moral and ethical dilemma for our nation. Minorities and other underserved populations variously distinguished by race, ethnicity, gender, age, socioeconomic status, geographic location, occupation, and education bear a far greater cancer burden than the general population.**

The NCI's Center to Reduce Cancer Health Disparities (CRCHD) is at the forefront of the efforts to reduce cancer health disparities by employing the following strategies:

1. Understand the factors that cause cancer health disparities.
2. Work with communities to develop interventions targeted to the specific needs of underserved populations.
3. Provide the knowledge base for and develop interventions to enhance the integration of cancer services for underserved populations.
4. Work with others to develop a cadre of researchers and clinicians prepared to effectively address cancer health disparities.
5. Develop and work with others to implement innovative, educationally and culturally appropriate approaches for disseminating information on research results to underserved populations.
6. Examine the role of health policy in reducing and eliminating cancer health disparities.

We cannot afford to ignore cancer health disparities for doing so will be at our own peril. According to the Census Bureau, U.S. minority populations will be the majority by 2042. By 2050, minorities collectively (those who identify as Hispanic, black, Asian, American Indian, Native Hawaiian, Pacific Islanders or mixed race) will account for 54% of the U.S. population which is projected to total 439 million that year.

Not only will the nation be more racially and ethnically diverse at midcentury, it also will be older, according to the Census Bureau. Meanwhile, **the percentage of the population in the “working ages” of 18 to 64 is projected to fall from 63% to 57% between 2008 and 2050; over half of this crucial population will be minorities.** Since ethnic diversity is recognized as one of the greatest assets held by the United States, it is in our own interest to diversify the workforce and address issues of health disparities and cancer health disparities.

This book, *What if We Were Equal? A Mississippi Health Assessment*, could not have come at a better time. We are of the opinion that it will be a tremendous asset to health care providers, policy makers, and students alike.

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About the Contributing Editors

Sanya A. Springfield, Ph.D., is the Director of the Center to Reduce Cancer Health Disparities (CRCHD) at the National Cancer Institute (NCI). Dr. Springfield oversees CRCHD's mission to coordinate and strengthen the NCI's portfolio in basic, clinical, translational, and population-based cancer research to address cancer health disparities. Previously, Dr. Springfield was Chief of the current NCI Diversity Training Branch, a Program Director in the National Science Foundation's Division of Integrative Biology and Neurosciences, and a faculty member at City College of the City University of New York. Dr. Springfield's Ph.D. is in Physiology and Biophysics from Howard University in Washington, D.C., and she was awarded a National Research Service Award for postdoctoral studies in Pharmacology at the Robert Wood Johnson School of Medicine in Piscataway, N.J.

Peter O. Ogunbiyi, D.V.M., Ph.D., is a Program Director in the Diversity Training Branch of the Center to Reduce Cancer Health Disparities, National Cancer Institute. Dr. Ogunbiyi manages research supplements; co-manages the Minority Institution/Cancer Center Partnership program; and manages and administers the co-funding of the Minority Biomedical Research Support efforts. Prior to his appointment at the NCI, Dr. Ogunbiyi was in academia for over 20 years. He has held faculty positions at Ahmadu Bello University, Nigeria; Tuskegee University, Tuskegee, Alabama; Clayton College and State University; and Southern Polytechnic State University, Atlanta, Georgia. Dr. Ogunbiyi holds a Ph.D. and M.S. in Pharmacology/ Toxicology from the University of Guelph, Ontario, Canada, and a D.V.M. and a B.S. in Biochemistry from Ahmadu Bello University, Nigeria. He completed his post-doctoral training in biochemical pharmacology and toxicology at the Department of Biomedical Sciences, Virginia Polytechnic and State University, Blacksburg, VA.

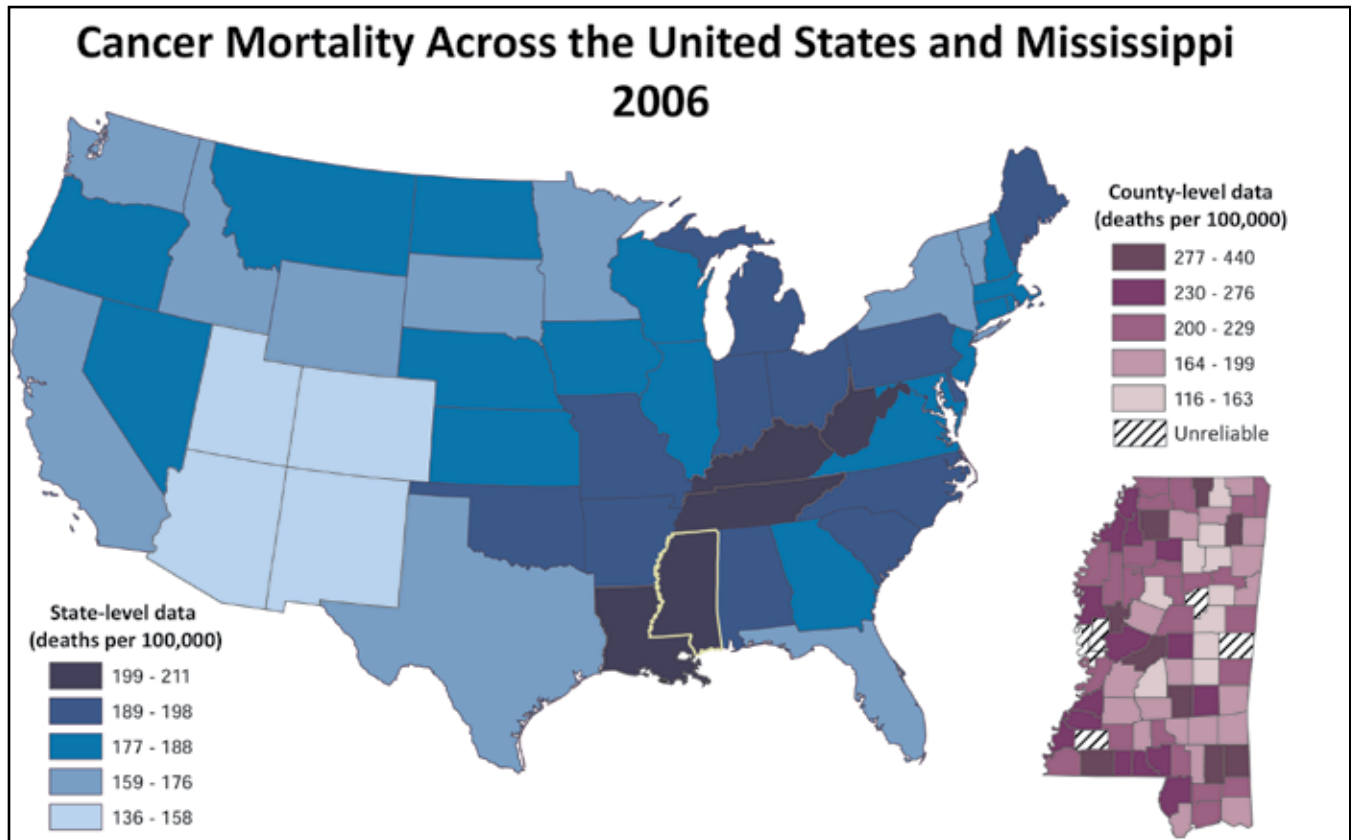
CANCER

OVERALL CANCER MORTALITY

Cancer is the second leading cause of death in the United States. Throughout the 1980s, cancer mortality increased, finally peaking for men in 1990 and for women in 1991. Since then, **overall cancer incidence and mortality have declined steadily**, a pattern typically attributed to improvements in methods of prevention and in methods of early detection and treatment (National Cancer Institute, 2007; Ward, Thun, Hannan, & Jemal, 2006). Similar to mortality trends, cancer diagnosis rates peaked and fell in the early 1990s. This correlation strongly emphasizes the role of prevention in the decline of mortality (Ward et al., 2006).

In 2007, cancer cost the United States **\$219 billion** in direct medical expenses and loss of productivity due to illness and death costs. (American Cancer Society, 2008)

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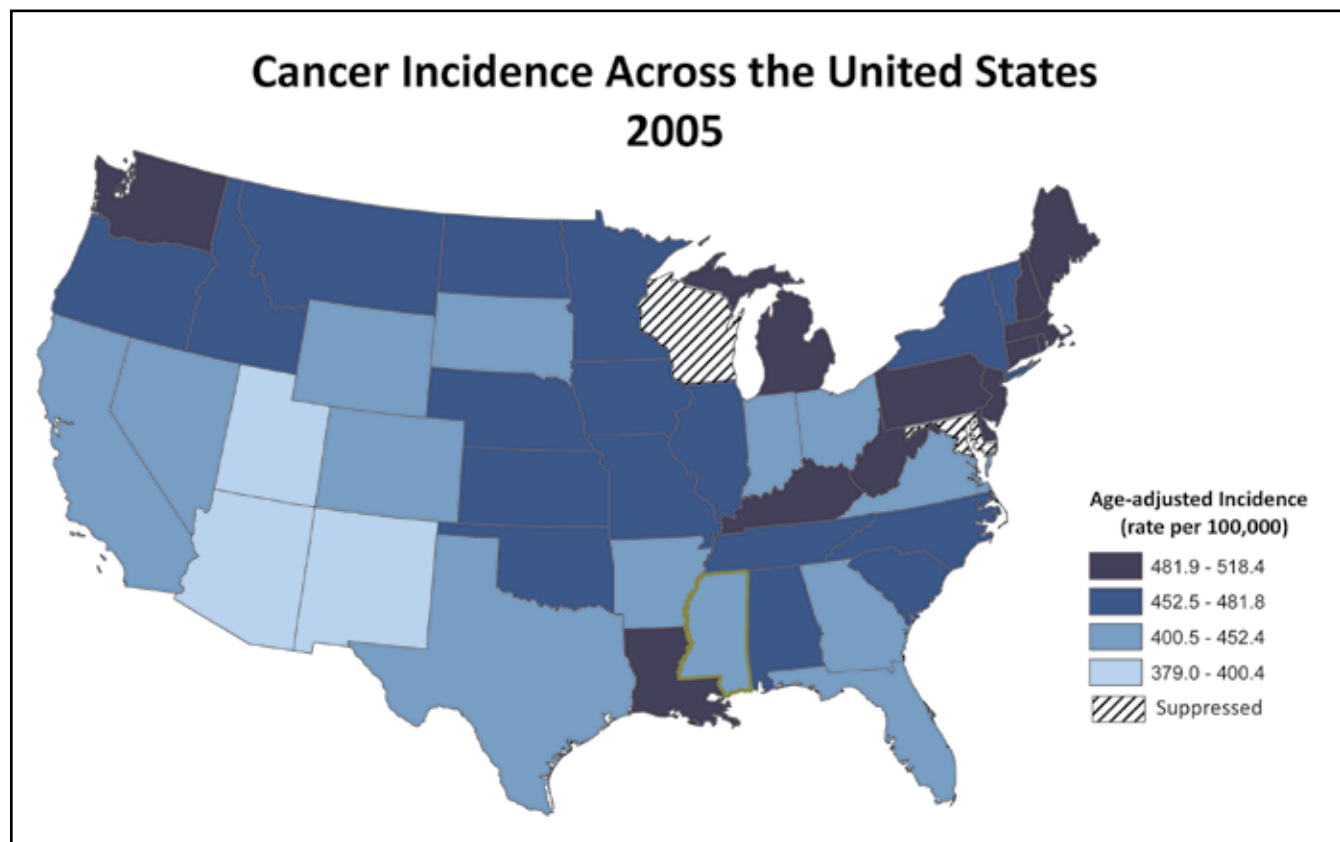
Mississippi, the Nation, and Healthy People 2010

Using the 1998 US rate of 202.4 deaths per 100,000 as a baseline, Healthy People calls for a decrease of overall cancer mortality to 159.9 per 100,000 by 2010 (U.S. Department of Health and Human Services (DHHS), n.d.). As of 2005, the nation had not reached this goal (the rate of overall cancer deaths at 186.9 per 100,000). However, if rates continue to follow the current downward trend, **the overall US cancer rate will near the Healthy People goal by 2010.**

NOTE: All rates and resulting measures are age-adjusted.

The lack of correlation between states with the highest levels of cancer mortality and states with the highest levels of cancer diagnosis indicates failures in tracking cancer incidence and/or disparities in access to care.

**Cancer Incidence Across the United States
2005**



Source: U.S. Cancer Statistics Working Group, 2009

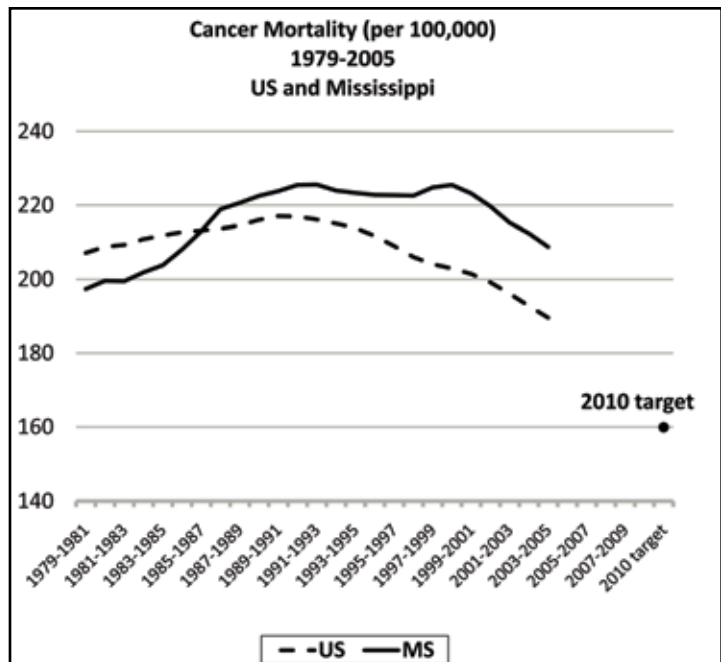
Since 1987, rates of overall cancer mortality in Mississippi exceeded national rates, and the disparity between Mississippi and the nation, for the most part, rose continuously.

While cancer mortality in Mississippi began to decline very slightly at the same time as national rates began a major decline (in the early 1990s), Mississippi rates rose again in the late 90s and only began a sustained decline at the turn of this century. As a result, in 2005, overall cancer mortality in Mississippi (206.9 deaths per 100,000) was 20 deaths per 100,000 higher than the nation. Hence, Mississippi is unlikely to meet the Healthy People goal by 2010.

**Mississippians:
How Have We Compared?**

Advantages Mississippians held over the rest of the country in cancer mortality in the late 1970s and early 80s have disappeared among all groups with the exception of white females.

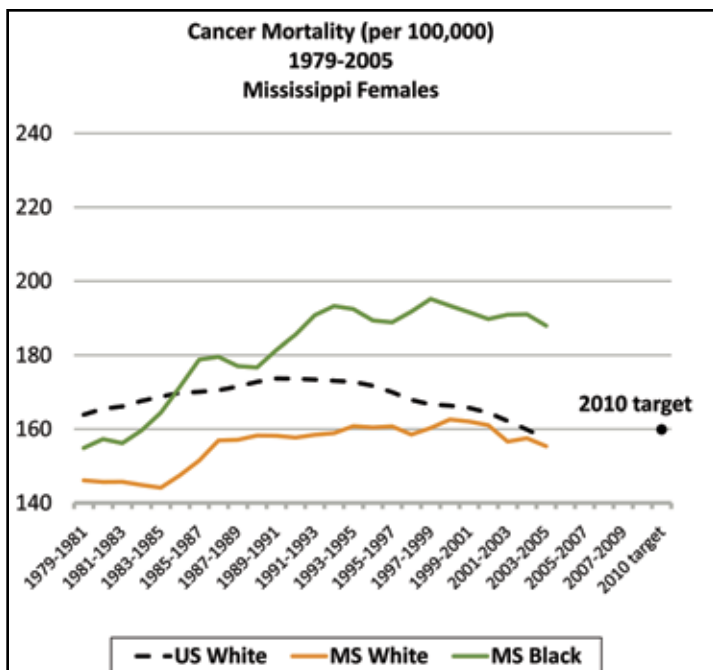
In 1979, both black and white Mississippi females died at significantly lower rates (148.1 and 146.7 per 100,000 respectively) than white females across the United States (who died at a rate of 161.6 per 100,000).



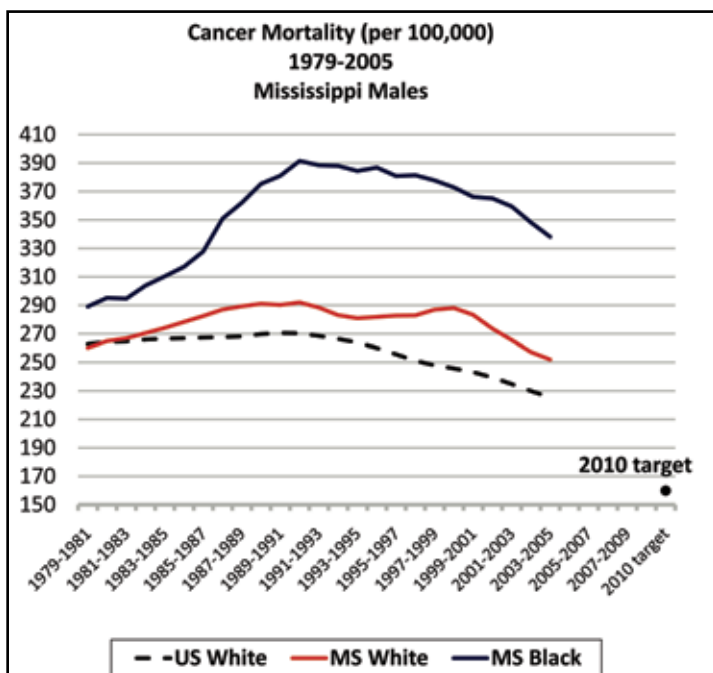
Source: CDC, Compressed Mortality Data, n.d.a; n.d.b.

If Mississippi had achieved like the nation in 2005, **1 of every 10** cancer deaths in Mississippi would have been averted.

Among black Mississippi females **1 in 6 deaths** could have been averted.



Source: CDC, Compressed Mortality Data, n.d.a; n.d.b



Source: CDC, Compressed Mortality Data, n.d.a; n.d.a

However, this advantage has decreased consistently, and, in 1986, black female cancer mortality in Mississippi overtook national rates. Compared to 13.5 fewer deaths per 100,000 in 1979, black females in Mississippi in 2005 experienced 29.7 more deaths per 100,000 than their white US counterparts. **Meanwhile, the advantage white females in Mississippi held over their US counterparts, 14.9 per 100,000 in 1979, diminished to a mere 0.4 per 100,000 by 2005.**

Disturbingly, black and white females in Mississippi have not displayed the sustained downward trend in overall cancer mortality observed for all other groups.

Disparities are even greater amongst Mississippi males. Cancer mortality threatened white males in Mississippi at a rate almost equal to that of the nation in 1979. However, since 1981, **rates for white MS males have floundered, and disparity between Mississippi and the United States has increased steadily.** By 2005, white MS males died at a rate (248.3 per 100,000) that was 26 per 100,000 higher than the white US male rate (222.3 per 100,000).

Meanwhile, overall cancer mortality rates for black MS males have always exceeded the rates for white US males, with the disparity between these groups growing larger and larger over time. In 1979, black males in Mississippi died of cancer at a rate (275 per 100,000) that was 13.8 per 100,000 worse than the national white rate. By 2005, the black MS male rate had rocketed (to 337 per 100,000) while the white US male rate had fallen (to 222.3 per 100,000). 114.7 per 100,000 more black males in Mississippi would have survived in 2005 if we achieved at white national levels.

Cancer Mortality (per 100,000)	1979	2005
US white female	161.6	155.2
MS white female	146.7	154.8
MS black female	148.1	184.9
US white male	261.2	222.3
MS white male	255.2	248.3
MS black male	275.0	337.0

Because we were not equal...
169 more black females in Mississippi
229 more white males in Mississippi
582 more black males in Mississippi
...died of cancer in 2005.

NOTE: In tables, red data represent a worsening in rate or percentage over the observed time period. Green data represent an improvement in rate or percentage.

NOTE: Measurements of equality employ national white data as the standard for comparison.

Almost **1 in 3** cancer deaths among black Mississippi males would have been averted in 2005 if we had achieved at white national levels.

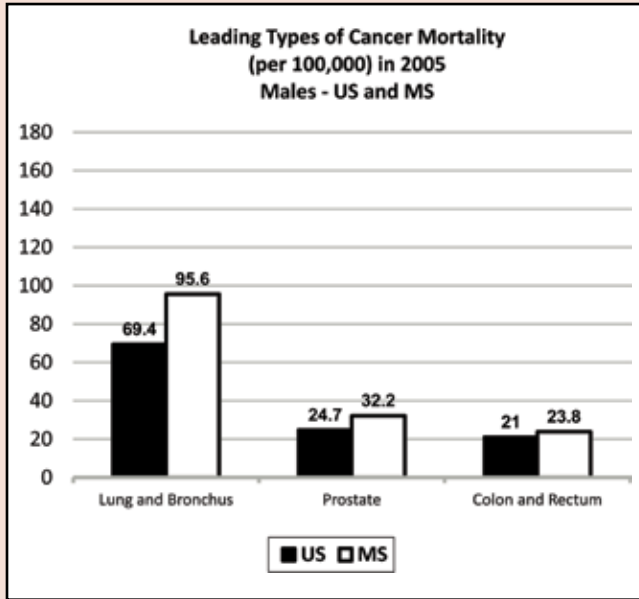
Nearly **1 in 10** deaths among white males could have been averted.



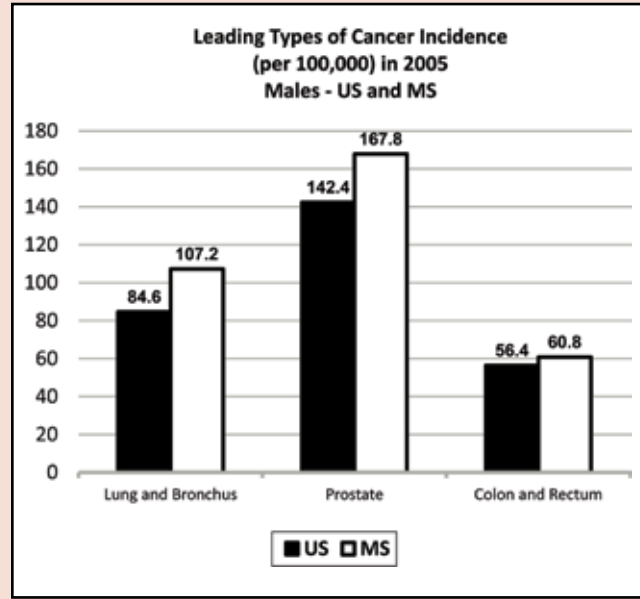


MAJOR TYPES OF CANCER

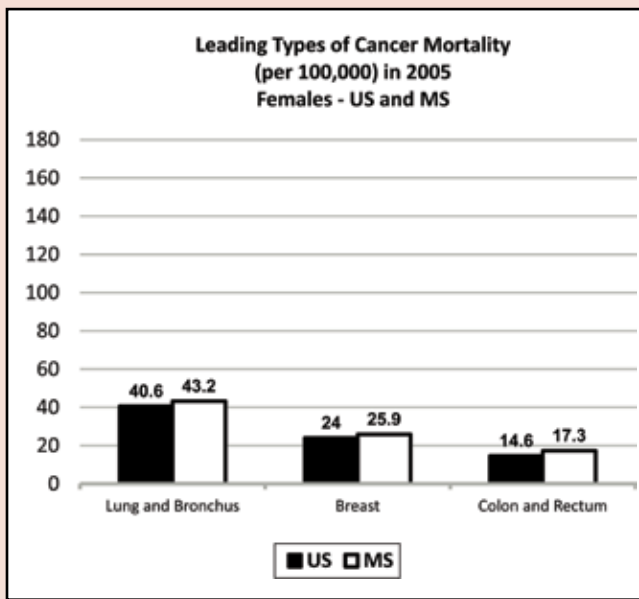
BY MORTALITY AND INCIDENCE



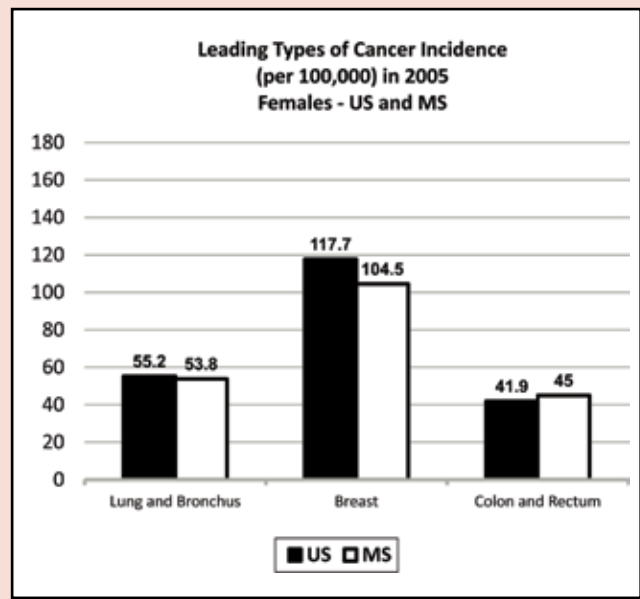
Source: U.S. Cancer Statistics Working Group, 2009



Source: U.S. Cancer Statistics Working Group, 2009



Source: U.S. Cancer Statistics Working Group, 2009



Source: U.S. Cancer Statistics Working Group, 2009

Cancer registries allow states to monitor cancer incidence and mortality as well as stage of identification and progression of diseases. In 1993, the state of Mississippi set aside funding for a state-wide cancer registry. Through this registry, disparities can be identified and programs developed to address differences in cancer incidence, identification, and mortality

(The Partnership for a Healthy Mississippi, n.d.)

FORREST GENERAL HOSPITAL

Forrest General Hospital, located in Hattiesburg, MS, serves a 17-county area in South Mississippi. Since opening in 1952, Forrest General has grown tremendously, from a 90-bed facility to a facility that includes 512 in-patient beds and a level II trauma center. Forrest General Hospital operates the only Comprehensive Community Cancer Center in the 17-county service area. The Center provides detection, diagnosis, education, prevention, screening, rehabilitative, and treatment services. (Images provided by Byron Malone, 2010.)



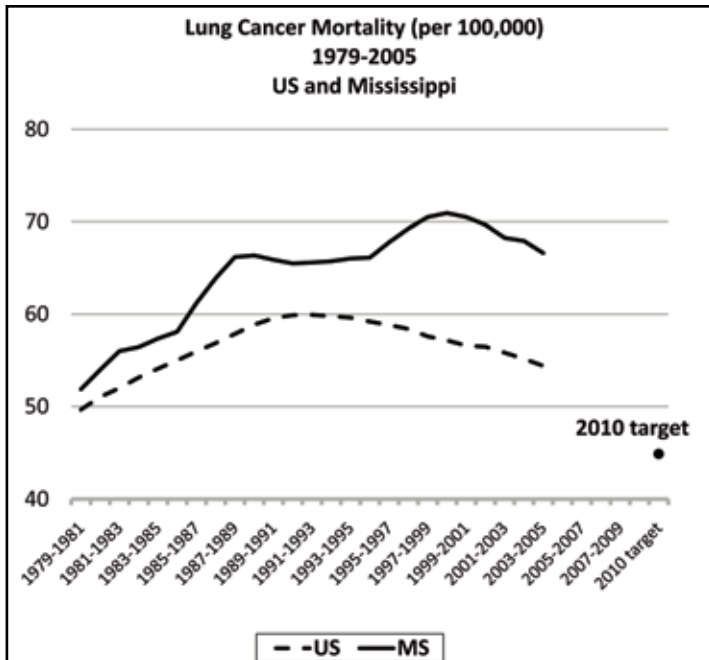
LUNG & OROPHARYNGEAL CANCER

LUNG CANCER MORTALITY

Lung cancer is the leading cause of cancer mortality in the United States. **Lung cancer mortality rose across the United States throughout the 1980s, but rates have gradually declined since 1993. This decline is typically attributed to reducing smoking rates over the last 30 years.** Unfortunately, only 16% of lung cancer cases are diagnosed early, when the cancer is still localized and thus more successfully treated. Early detection strategies such as chest x-rays, sputum cell analyses, and fiber-optic examination of bronchial passages, have not been shown effective in preventing mortality (American Cancer Society, 2008).



Photograph by Tomasz Sienicki, 2005.



Source: CDC, Compressed Mortality Data, n.d.a; n.d.b.

If Mississippi had achieved like the nation in 2005, **1 of every 6 lung cancer deaths** in Mississippi would have been averted.

New early screening strategies, such as low-dose spiral computed tomography scans and tests for certain molecular markers in sputum, may increase effectiveness in identifying lung cancer at initial, operable stages

(American Cancer Society, 2008).

Mississippi, the Nation, and Healthy People 2010

Using the 1998 US baseline of 57.6 deaths per 100,000, Healthy People calls for a drop in lung cancer mortality to 44.9 per 100,000 by 2010 (DHHS, n.d.). By 2005, lung cancer deaths had only declined to 53.7 per 100,000; at this rate, **the nation is unlikely to meet the Healthy People target by 2010.**

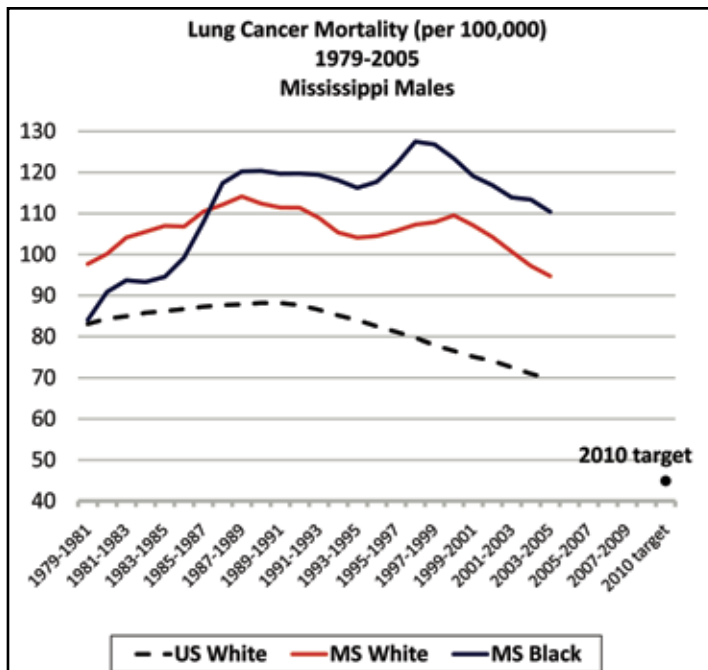
In 1979, only 0.7 more lung cancer deaths per 100,000 occurred in Mississippi in comparison to the nation. However, lung cancer mortality in Mississippi quickly rose above US rates, and **the disparity between Mississippi and the US has increased steadily.** Mississippi lung cancer mortality rates did not begin a steady decline until after a peak (of 71.3 deaths per 100,000) in 2000—seven years later than national rates began to decline. In 2005, Mississippians died from lung cancer at a rate (64.3 per 100,000) that was 10.6 per 100,000 higher than the national rate. Hence, **Mississippi is even less likely than the nation to attain the Healthy People target by 2010.**

Mississippians: How Have We Compared?

After a minor increase in the 1980s, lung cancer mortality rates for white US males have declined consistently (from 81.6 deaths per 100,000 in 1979 to 68.7 per 100,000 in 2005). In comparison, white males in Mississippi have experienced consistently higher lung cancer mortality and have also seen multiple increases in mortality between 1979 and 2005. As a result, the overall decline in mortality from 1979 to 2005 for white MS males was minor (from 96.9 to 90.8 per 100,000). If white MS males achieved at national rates, 22.1 fewer white males per 100,000 would have died of lung cancer in 2005.

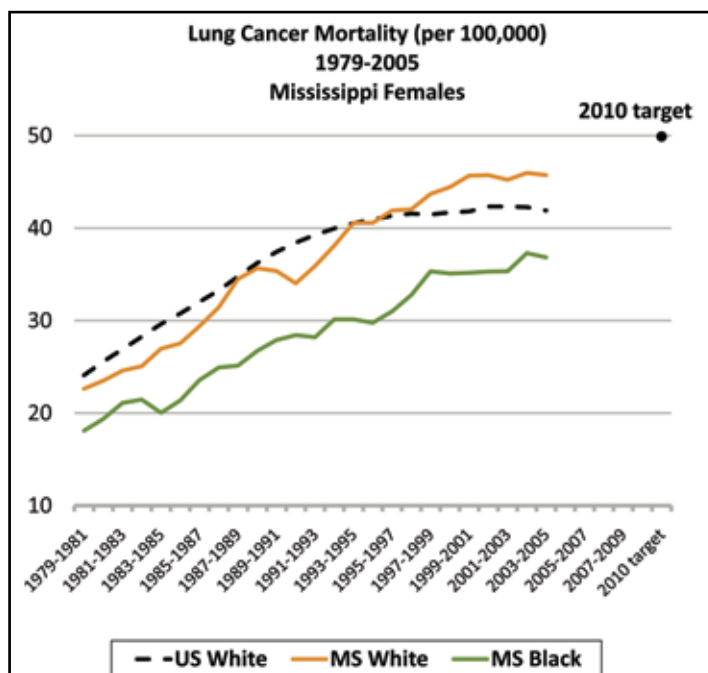
Unlike white MS males, in 1979 black MS males died less frequently (at a rate of 72.7 per 100,000) from lung cancer compared to their national counterparts. This advantage of 8.9 fewer deaths per 100,000 was lost the following year, when the black MS rate overtook national lung cancer mortality, and the rate has continued to increase rapidly. If black MS males (with a rate of 104.4 per 100,000) had achieved at the national white rate in 2005, 35.7 per 100,000 more black males would have survived lung cancer.

Interestingly, when diagnosed with lung cancer in early stages, African American men are not as likely to receive surgery, the most effective treatment. This disparity, which disappears under the



Source: CDC, Compressed Mortality Data, n.d.a; n.d.b

Roughly **1 in 3** lung cancer deaths among black Mississippi males would have been averted in 2005 if we had achieved at white national levels. Among white Mississippi males, **1 in 4** deaths would have been averted.



Source: CDC, Compressed Mortality Data, n.d.a; n.d.b

Lung cancer mortality is on the rise among females across the nation and within Mississippi.

White females in Mississippi have seen the sharpest increases.

Lung Cancer Mortality (per 100,000)	1979	2005
US white male	81.6	68.7
MS white male	96.9	90.8
MS black male	72.7	104.4
US white female	22.5	41.5
MS white female	20.2	45.3
MS black female	17.5	36.4

Because we were not equal...
35 more white females in Mississippi
181 more black males in Mississippi
195 more white males in Mississippi
...died of lung cancer in 2005.

“Continued higher incidence and death rates among some racial and ethnic groups may be an indication that some populations have not benefited equally from cancer prevention and control efforts. Such disparities may be due to multiple factors, such as late stage of disease at diagnosis, barriers to health care access, a history of other diseases, biologic and genetic differences in tumors, health behaviors, and the presence of risk factors. A commitment to reducing morbidity and mortality from cancer in the United States will require concomitant dedication to bridging racial and ethnic disparities related to cancer incidence and mortality”

(Wingo et al., 1999, p. 683).

universal access to medical care found through the military health care system, could contribute to higher lung cancer mortality rates experienced by black Mississippi males (American Cancer Society, 2009).

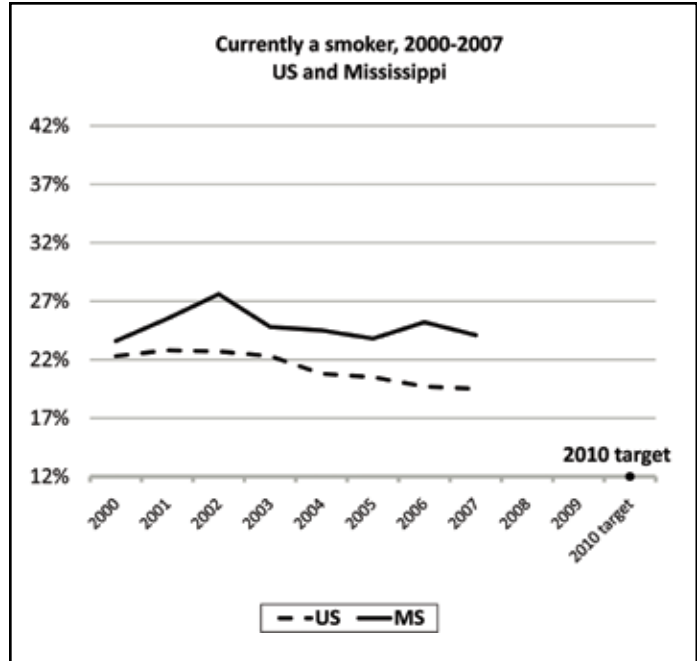
Historically, female Mississippians have performed better than national females in lung cancer mortality; however, lung cancer mortality is on the rise for all females, nationally and locally. In 1979, white females in Mississippi (with a rate of 20.2 per 100,000) bettered their national counterparts (with a rate of 22.5 per 100,000) by 2.3 per 100,000. Unfortunately, in the mid-1990s, lung cancer mortality among white MS females surpassed mortality among their national counterparts. By 2005, the white MS female rate (45.3 per 100,000) exceeded the white US rate (41.5 per 100,000) by 3.8 per 100,000.

While also increasing over the 1979 to 2005 period (from 17.5 to 36.4 per 100,000), rates of lung cancer mortality among black females in Mississippi remain consistently lower than rates for white females across the US – a 5.0 per 100,000 advantage in 1979 holding to a 5.1 per 100,000 advantage in 2005.

LUNG CANCER RISK FACTOR: SMOKING

Mississippi, the Nation, and Healthy People 2010

From 2000 to 2007, the nation saw a steady decrease (from 22.3% to 19.5%) in the number of current smokers (persons who have smoked at least 5 packs in their entire life and currently smoke every day or some days). However, this rate of decrease is not nearly sufficient to meet the Healthy People goal of 12% by 2010. With rates of smoking even higher than the nation, Mississippi will also fail to meet the Healthy People goal in 2010. Moreover, Mississippi has not experienced an overall decrease in smoking (from 23.6% in 2000, rates rose to 27.6% in 2002, returning to 24.1% by 2007). In 2007, 4.6% more people smoked in Mississippi, compared to the nation.



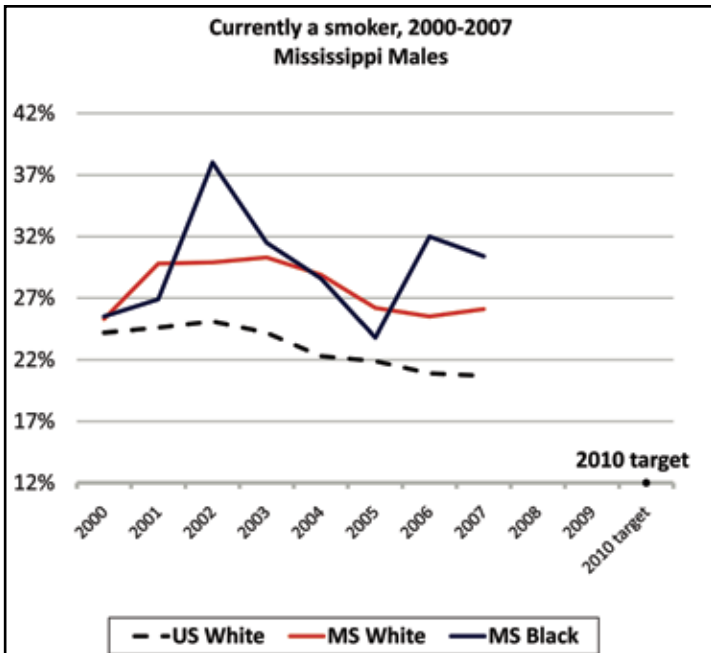
Source: CDC, Behavioral Risk Factor Surveillance System Survey (BRFSS), n.d.c.

4.6% more people smoked in Mississippi in 2007 compared to the nation.

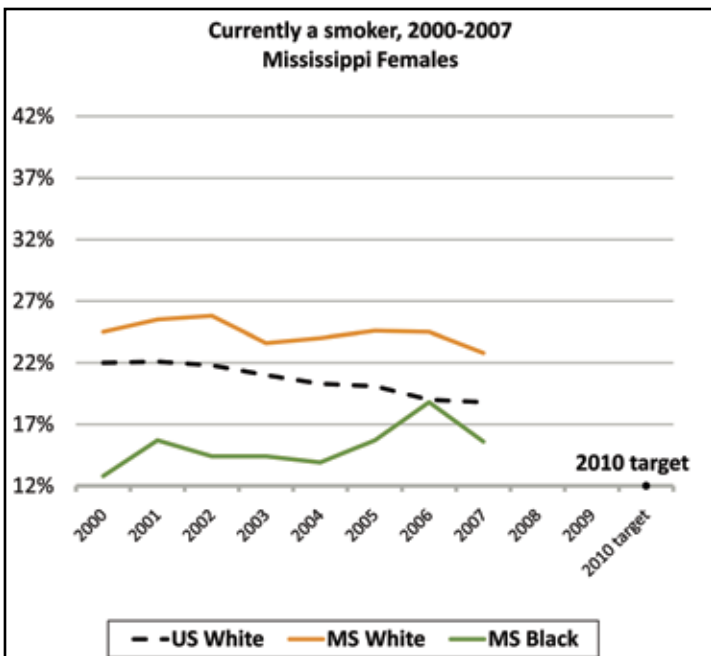
Current Smoker	2000	2007
US white male	24.2%	20.7%
MS white male	25.3%	26.1%
MS black male	25.5%	30.4%
US white female	22.0%	18.8%
MS white female	24.5%	22.8%
MS black female	12.8%	15.6%

Lung cancer is the leading cause of cancer mortality and the third leader in incidence. Because of the import of lung cancer, “the largest impact [on overall cancer incidence and death rates] can be made through programs and policies that deter smoking initiation, promote cessation, and protect nonsmokers from environmental tobacco smoke”

(Wingo et al., 1999, p. 687).



Source: CDC, BRFSS, n.d.c



Source: CDC, BRFSS, n.d.c

Mississippians: How Have We Compared?

Unlike for white US males, among whom smoking decreased from 2000 to 2007 (from 24.2 to 20.7%), **rates for white MS males increased slightly** (from 25.3 to 26.1%.) These disparate trends created a **widening disparity between MS and US white males** that reached 5.4% in 2007. Meanwhile, **rates for black MS males, initially very close to white MS males, have increased much more sharply** (from 25.5% in 2000 to 30.4% in 2007), creating a 9.7% disparity between black MS males and white US males in 2007. Disturbingly, black MS males actually showed downward trends that approached white US rates in the early and middle parts of the decade, before rates spiked upwards once more.

Similar to US male patterns but at lower magnitudes, white US females show a slight decrease in smoking from 2000 to 2007, from 22% to 18.8%. However, **white MS females, unlike their male MS counterparts, also show a decrease in rates**, from 24.5 to 22.8%. In an even greater departure, **black MS females actually consistently smoke at lower rates than their white US counterparts.** However, as white US females slowly decrease in smoking, black MS females are slowly increasing, from 12.8% to 15.6% between 2000 and 2007. As a result, **while currently performing better than any other group, black MS female rates are actually worsening.**

Because we were not equal...
4% more white females in Mississippi
5.4% more white males in Mississippi
9.7% more black males in Mississippi
...smoked in 2007.