



Wisconsin Cancer Health Disparities Surveillance Reports:

Trends in Cancer Disparities Among African Americans and Whites in Wisconsin



Authors:

Nathan R. Jones, PhD ^{1,2}
Amy A. Williamson, MPP ^{1,2}
Paul D. Creswell, BA ^{1,2}
Rick Strickland, MA ^{1,2}
Patrick L. Remington, MD, MPH ^{2,4}

Acknowledgements:

Mary Foote, MS ³
Alexandra Adams, MD, PhD ^{1,2,5}
Mary Baliker, BS ^{1,2}

Cancer Health Disparities Initiative Principal Investigators:

Patrick L. Remington, MD, MPH ^{2,4}
James Cleary, MB, BS ^{1,2}

¹ Cancer Health Disparities Initiative

<http://chdi.bcg.wisc.edu/>

² University of Wisconsin Paul P. Carbone Comprehensive Cancer Center

www.cancer.wisc.edu

³ Wisconsin Cancer Reporting System

<http://dhs.wisconsin.gov/wcrs/>

⁴ University of Wisconsin Population Health Institute

<http://www.pophealth.wisc.edu/UWPHI/>

⁵ Collaborative Center for Health Equity

<http://ictr.wisc.edu/node/298>

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Corresponding author:

Nathan Jones, PhD
UW Carbone Cancer Center
610 Walnut Street
WARF 330A
Madison, WI 53726
nrjones@uwcarbone.wisc.edu



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EXECUTIVE SUMMARY

Introduction

Cancer incidence and mortality have decreased over the last few decades, yet nationally and in Wisconsin, not all people have benefited equally from these successes. This has exacerbated disparities in cancer burden among various population groups, including those defined by race.

The purpose of this report is to provide information about trends in cancer incidence and mortality among African Americans and whites in Wisconsin between 1994 and 2004/5 and to highlight disparities in cancer burden. Incidence data were obtained from the Wisconsin Cancer Reporting System. Mortality data were accessed from the Surveillance, Epidemiology, and End Results registry of the National Cancer Institute. Trends in rates between 1995 and 2004/2005 for African Americans and whites were calculated, and changes in relative disparity were measured.

Major Findings

Overall Cancer

- All site cancer incidence decreased 7.0% and mortality decreased 8.3% among all Wisconsin residents between 1995 and 2004/5.
- The relative disparity in all site cancer incidence between African Americans and whites **increased**, as incidence among African Americans increased while rates decreased among whites.
- The relative disparity in all site cancer mortality between African Americans and whites **persisted** while rates for both races declined over the period.

Lung Cancer

- Lung cancer incidence decreased 3.7% and mortality increased 0.5% among all Wisconsin residents between 1995 and 2004/5.
- The relative disparity between African Americans and whites in lung cancer incidence and mortality **persisted** while rates for both races declined over the period.
- The relative disparity in lung cancer mortality among *males* **declined** as the rate of decline among African Americans was faster than the decline observed among whites.
- The relative disparity in lung cancer incidence and mortality between African American and white *females* **increased**.

Colorectal Cancer

- Colorectal cancer incidence decreased 20.7% and mortality 26.0% among all Wisconsin residents between 1995 and 2004/5.

- The relative disparity in colorectal cancer incidence between African Americans and whites **increased dramatically** as African American rates increased and white rates decreased. This result was striking among both men and women.
- The relative disparity in colorectal cancer mortality between African Americans and whites also **increased**, as the rate of decline among whites was faster than the decline observed among African Americans. This result was particularly dramatic among men.

Breast Cancer

- Breast cancer incidence decreased 11.6% and mortality 23.3% among all Wisconsin women between 1995 and 2004/5.
- The relative disparity in breast cancer incidence between African American and white women **increased** as white rates decreased and African American rates increased.
- The relative disparity in breast cancer mortality between the two groups **decreased** slightly over the period.

Prostate Cancer

- Prostate cancer incidence decreased 9.3% and mortality 29.9% among all Wisconsin men between 1995 and 2004/5.
- For both groups, incidence and mortality trended downwards over the period. However, the rate of decline was greater among whites than African Americans, which led to an **increase** in relative disparity.

Implications

Race, per se, is not a biological variable, but racial differences are meaningful proxies for other factors that act on individuals and their risk for developing and dying of cancer over the life course. The results indicate that disparities in cancer incidence and mortality between African Americans and whites in Wisconsin are large and have persisted in most cases, if not worsened, over the period 1995 to 2004/5. Elimination of these disparities will require further research into their causes, as well as into effective interventions to remove them. Any solution will require that policy makers, health systems, and healthcare providers carefully balance resources and set appropriate priorities to target these inequities.

INTRODUCTION

Cancer health disparities are a primary concern both nationally and in Wisconsin. Although treatments for cancer are improving and cancer mortality is decreasing^{1,2}, not all Americans benefit equally from these successes.^{3,4} National organizations such as the National Cancer Institute, U.S. Department of Health and Human Services, and American Cancer Society have targeted the elimination of health disparities. In Wisconsin, elimination of health disparities is one of three overarching goals embodied in *Healthiest Wisconsin 2010*⁵ and is the motivation for the Wisconsin Minority Health Program.⁶ Cancer health disparities are also a prominent, cross cutting issue in the Wisconsin Comprehensive Cancer Control Plan.⁷

Monitoring trends in cancer incidence and mortality is an important part of any coordinated state plan to reduce disparities. This information is useful to cancer prevention programs, clinicians, and policy makers who seek to reduce the burden of cancer. To that end, the Cancer Health Disparities Initiative of the University of Wisconsin Paul P. Carbone Comprehensive Cancer Center plans a series of reports which explore cancer health disparities in Wisconsin. These reports will examine disparities defined by race, ethnicity, urbanicity, and socioeconomic status.

The purpose of this report is to provide information about trends over time in cancer incidence and mortality among African Americans and whites in Wisconsin. To focus on disparities between African Americans and whites may seem limited, however the decision was deliberate. Considering the relatively small population of the state of Wisconsin, the small size and geographically clustered locations of minority populations (see next section), and the rarity of cancer events, analysis of trends in cancer disparities among other racial and ethnic groups in Wisconsin requires dedicated reports that carefully identify methodological limitations.^{8,9} Future reports in this series will address these issues.

One strategy for producing stable estimates for rates of rare events within small populations is to pool several years of data. This methodology has been used in previously published reports on cancer health disparities in Wisconsin.^{2,8-10} For example, *The Health of Racial and Ethnic Populations in Wisconsin* reported overall cancer mortality rates for African Americans, American Indians, Asians, Hispanic/Latinos, whites, and other races according to standard racial group definitions.^{6,8} But in order to produce stable rates, it was necessary to pool four years of data together (*i.e.*, 1996-2000 and 2001-2003).⁹ While limited to a comparison between African Americans and whites, the present report is unique in providing annual rates over a 10-year period for incidence and an 11-year period for mortality, as well as calculating trends.

This report focuses on incidence and mortality due to the four most commonly diagnosed cancers in Wisconsin: lung, colon, breast, and prostate. Together, these cancers accounted for 56% of all newly diagnosed cancer cases during the period 1995-2004.¹⁰

Racial diversity in Wisconsin

Compared to other states, Wisconsin does not have large minority populations. Taken together, racial and ethnic minority populations comprise 13% of Wisconsin's total population. (See Table A below.) African Americans are the largest minority group, comprising 6% of the total population. Over 90% of African Americans live in five counties (Milwaukee, Racine, Dane, Kenosha, and Rock), and almost three-quarters (73%) reside in the City of Milwaukee.⁶

Table A. Wisconsin demographic estimates, by race and ethnicity, 2006

	Estimate	Percent of Total
Total	5,556,506	
One race		
White	4,859,689	87%
Black or African American	328,376	6%
American Indian and Alaska Native	47,727	1%
Asian	110,778	2%
Native Hawaiian and Other Pacific Islander	1,622	0%
Some other race	136,736	2%
Two or more races	71,578	1%
Hispanic or Latino ethnicity (of any race)	256,304	5%

Source: U.S. Census Bureau, 2006 American Community Survey, Wisconsin, Data Profile Highlights, <http://factfinder.census.gov>

Table B (below) shows a variety of demographic and socioeconomic indicators for African Americans and whites in Wisconsin. According to the U.S. Census Bureau, there were 4,734,357 whites and 307,950 African Americans in Wisconsin in 2005. African Americans had a lower male to female sex ratio, were more likely to be under 18, and were less likely to be over 65 than whites. African Americans and whites were about equally likely to be living in a married-couple family household. However, African Americans were more likely than whites to be a female householder with no husband present. African Americans over the age of 15 were about twice as likely as whites to have never been married.

Among people 25 years and older, African Americans were less likely to have a high school diploma and less likely to have a bachelor's degree. Among people 16 years and older, African Americans were somewhat less likely than whites to have management/professional jobs, more likely to have service and sales jobs, and less likely to have construction and production jobs. The median household income among African Americans was about half the income of whites. The percentage of the African Americans living below the poverty level was about four times the percentage of whites.

Table B: Selected demographic characteristics of African Americans and whites in Wisconsin, 2005

	African American	White
Population	307,950	4,734,357
Male : female ratio	0.86	0.98
Age distribution		
18 and under	36.6%	22.2%
65 and over	5.8%	13.6%
Household type		
Married-couple families	19.9%	21.4%
Female householder, no husband present	38.6%	7.9%
Average household size	2.6	2.4
Never married, 15 years and older		
Male	50.5%	26.3%
Female	52.4%	23.1%
Educational attainment (25 years and older)		
Less than high school diploma	20.1%	9.9%
Bachelor's degree	9.8%	17.4%
Same residence as one year ago	75.4%	86.3%
Not in labor force	35.6%	29.8%
Occupation (16 years and older)		
Management, professional	28.5%	32.7%
Service	29.4%	14.7%
Sales, office	31.5%	25.1%
Farming, fishing, and forestry	0.0%	0.9%
Construction, extraction, maintenance, repair	0.7%	9.2%
Production, transportation, material moving	9.9%	17.4%
Median household income	\$26,318	\$49,244
Poverty rate (all people)	34.3%	7.8%

Source: U.S. Census Bureau, 2005 American Community Survey, <http://factfinder.census.gov>

What is cancer?

Cancer is a term generically used to describe a collection of more than one hundred diseases that manifest as uncontrolled cell growth. There are many types of cancer and the growth of cancerous cells affects body systems in many different ways. Yet all cancer begins at the cellular level when cells with damaged DNA begin to replicate abnormally. The resulting proliferation typically happens in a localized area called a tumor. Given time, cancer is likely to spread beyond the original tumor site and invade other tissues and organs. This is known as metastasis and is the hallmark of most fatal cancers. Detecting and treating cancer early increases the odds of survival. Cancer treatment includes surgery, chemotherapy, radiation, hormonal therapy, and biological therapy. Individuals can also reduce their risk of developing cancer by changing how they live – for example, by quitting smoking, eating a healthy diet, and being physically active.

DATA SOURCES AND METHODS

Incidence data

This report includes all cancer cases newly diagnosed among Wisconsin residents in 1995-2004. These cases were reported to the Wisconsin Cancer Reporting System (WCRS) by Wisconsin hospitals, clinics, and physician offices. Since 1976, the WCRS has collected cancer incidence data on Wisconsin residents as mandated by section 255.04, Wisconsin Statutes, and HFS 124.05(3)(h), Wisconsin Administrative Code. All invasive and noninvasive malignant tumors, except basal and squamous cell carcinomas of the skin and *in situ* cancers of the cervix uteri, are reportable to WCRS. Beginning in 1994, WCRS entered into a cooperative agreement with the U.S. Centers for Disease Control and Prevention (CDC) and became part of the National Program of Cancer Registries (NPCR).¹¹ WCRS collects data on patient demographics (race, ethnicity, age, and county), primary tumor site, stage at diagnosis, and tumor morphology. The SEER*Stat software package, from the National Cancer Institute (NCI), was used to calculate incidence rates.¹²

Mortality data

Mortality data used in this report reflect Wisconsin resident death records from the Vital Records Section, Wisconsin Department of Health Services. Mortality data were accessed directly from the National Center for Health Statistics (NCHS) public use data file of Wisconsin death and cover the period from 1995 to 2005. Population data used in calculating cancer rates is obtained periodically by NCHS from the Census Bureau.¹³ The SEER*Stat software package, from NCI, was used to calculate mortality rates.¹²

Race definition

The methodology for defining race developed by NCHS and the U.S. Census Bureau was modified in 2007. NCHS recoded detailed historical race information into four major categories in order to make them compatible with available annual population estimates used as denominators for the rates. These categories are “White”, “Black or African American”, “American Indian/Alaska Native”, and “Asian or Pacific Islander.”¹⁴ For a more detailed description of race variables, please refer to NCHS documentation.¹⁵

Age standardization

All rates presented in this report are age-adjusted using the 2000 U.S. standard population. See Appendix A for calculations showing an example of age-adjustment and comparison of crude and age-adjusted rates.

Measure of relative disparity

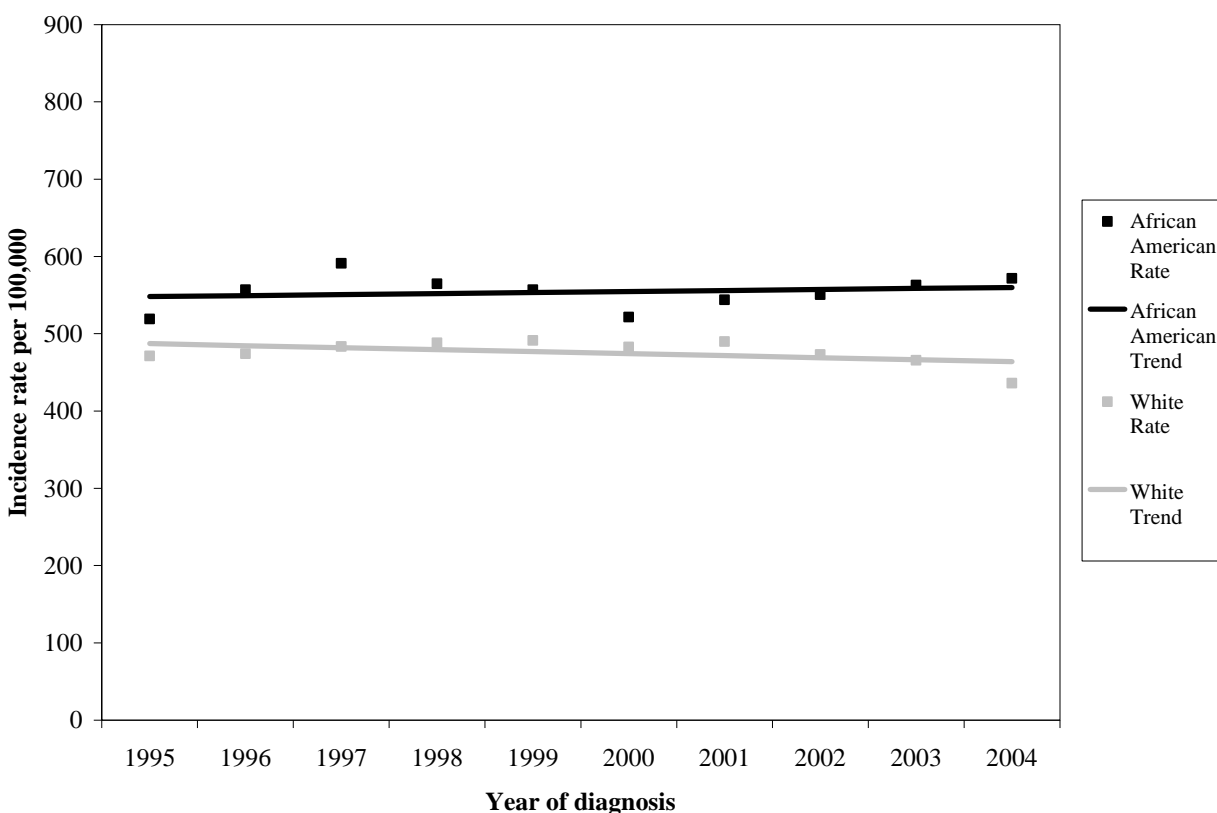
We used the rate ratio as our measure of relative disparity. For both incidence and mortality, the rate ratio is defined as the ratio of the African American rate to the white rate in a given year. To measure change in relative disparity, we compared the ratio for the first and last year in the period of analysis.

Calculation of excess mortality

One way to express the scope of racial cancer disparities is to pose a hypothetical situation in which African Americans experience the cancer mortality rates observed among whites. Using this method, simulated deaths are calculated by multiplying the age-specific mortality rates observed among whites by the African American population in each age group. The ratio of the modeled to the observed deaths among African Americans is an estimate of excess mortality, or deaths that would have been averted if African Americans had experienced the lower age-specific death rates of whites. Excess deaths were calculated for overall cancer only, as the number of cases for specific sites was too small to permit meaningful analysis. See Appendix B for more detailed explanation of the methodology.

RESULTS

Figure 1: Trends in age-adjusted overall cancer **incidence** rates by race, Wisconsin, 1995-2004



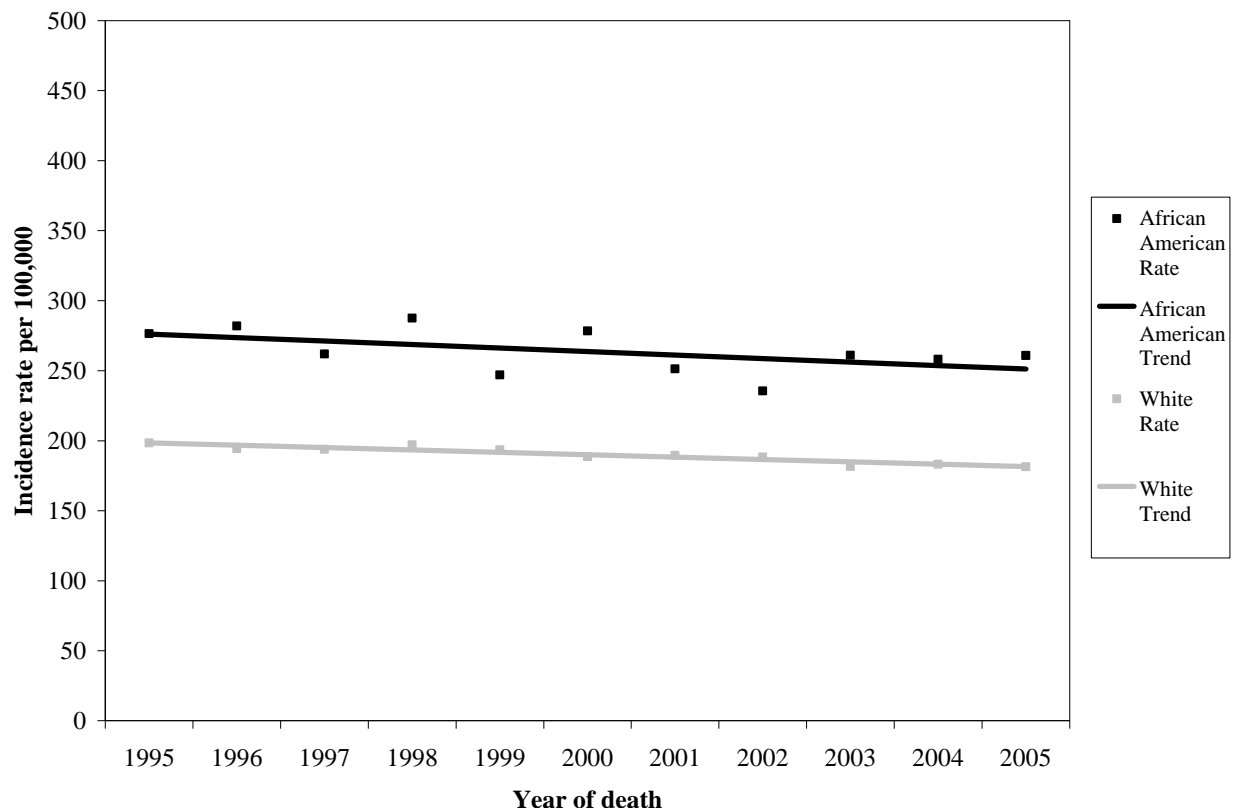
From 1995 through 2004, cancer was diagnosed in 262,970 Wisconsin residents (including 249,332 whites and 9,267 African Americans). During this period, overall age-adjusted cancer incidence decreased 7.0% from 476.2 per 100,000 in 1995 to 443.0 per 100,000 in 2004. The four most frequently occurring cancers in 1995-2004 were lung and bronchus; colon and rectum; breast; and prostate.

Between 1995 and 2004, the relative disparity in overall cancer incidence rates between African Americans and whites increased. The rate ratio between African American and whites (that is, the ratio of the African American incidence rate to the white incidence rate) increased from 1.1 in 1995 to 1.3 in 2004.

Table 1: African American and white overall cancer incidence rates and rate ratio

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	519.5	471.2	1.1
2004	571.8	436.1	1.3

Figure 2: Trends in age-adjusted overall cancer mortality rates by race, Wisconsin, 1995-2005



From 1995 through 2005, there were 117,995 deaths due to cancer among Wisconsin residents (including 112,540 whites and 4,425 African Americans). Over this period, the overall age-adjusted cancer mortality rate declined 8.2% from 200.5 per 100,000 in 1995 to 184.0 per 100,000 in 2005.

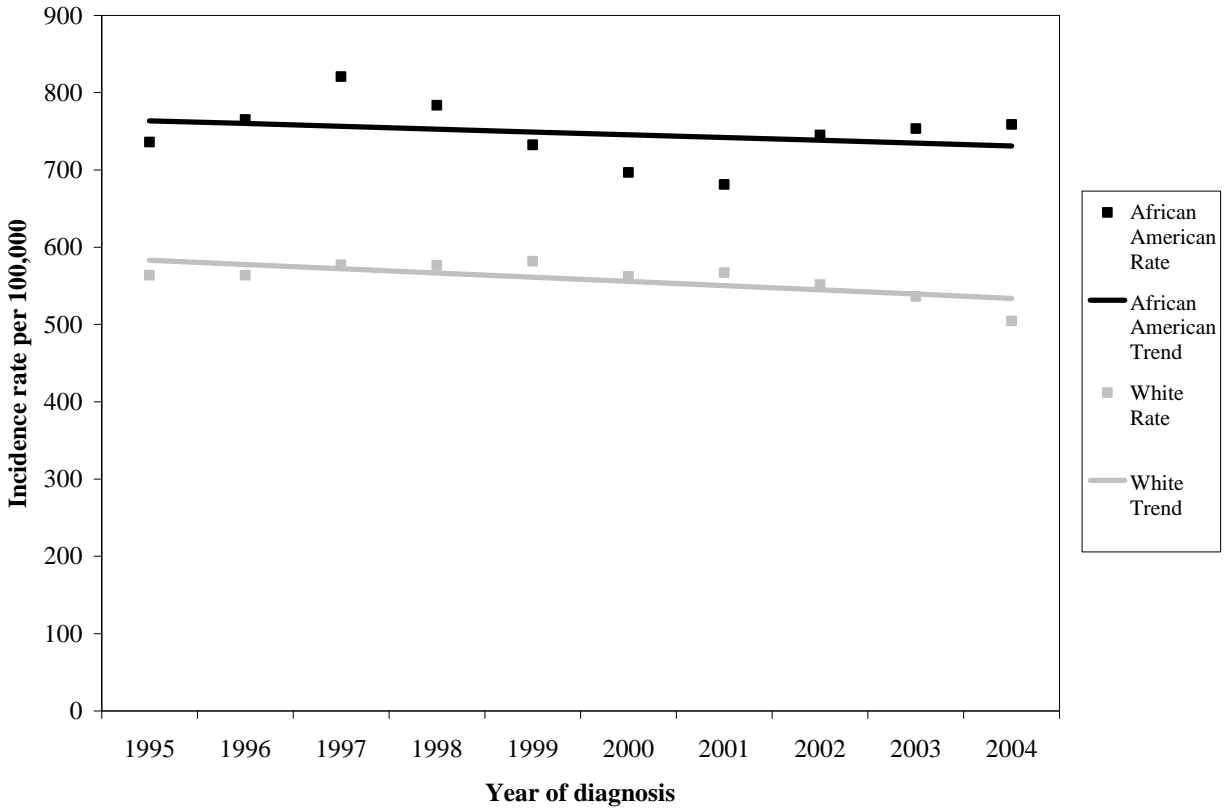
Between 1995 and 2005, the disparity in overall cancer mortality rates between African Americans and whites remained constant. The ratio between African American and white cancer mortality rates was 1.4 in 1995 and in 2005. However, if African Americans experienced the lower age-specific mortality rates of whites, about one third of African American cancer deaths in 1995 and 2005 would have been averted.

Table 2: African American and white overall cancer mortality rates; rate ratio; African American excess mortality and proportion of total deaths attributed to excess*

Year	African American Mortality Rate	White Mortality Rate	African American : White Rate Ratio	Actual African American Deaths	Excess* African American Deaths	Excess/Actual African American Deaths
1995	276.5	198.4	1.4	351	112	31.8%
2005	260.9	181.4	1.4	382	135	35.2%

* Excess deaths = the number of deaths averted if the African American cancer death rate were lowered to the white cancer mortality rate. See Appendix B for complete methodology.

Figure 3: Trends in age-adjusted overall cancer **incidence** rates among **males** by race, Wisconsin, 1995-2004



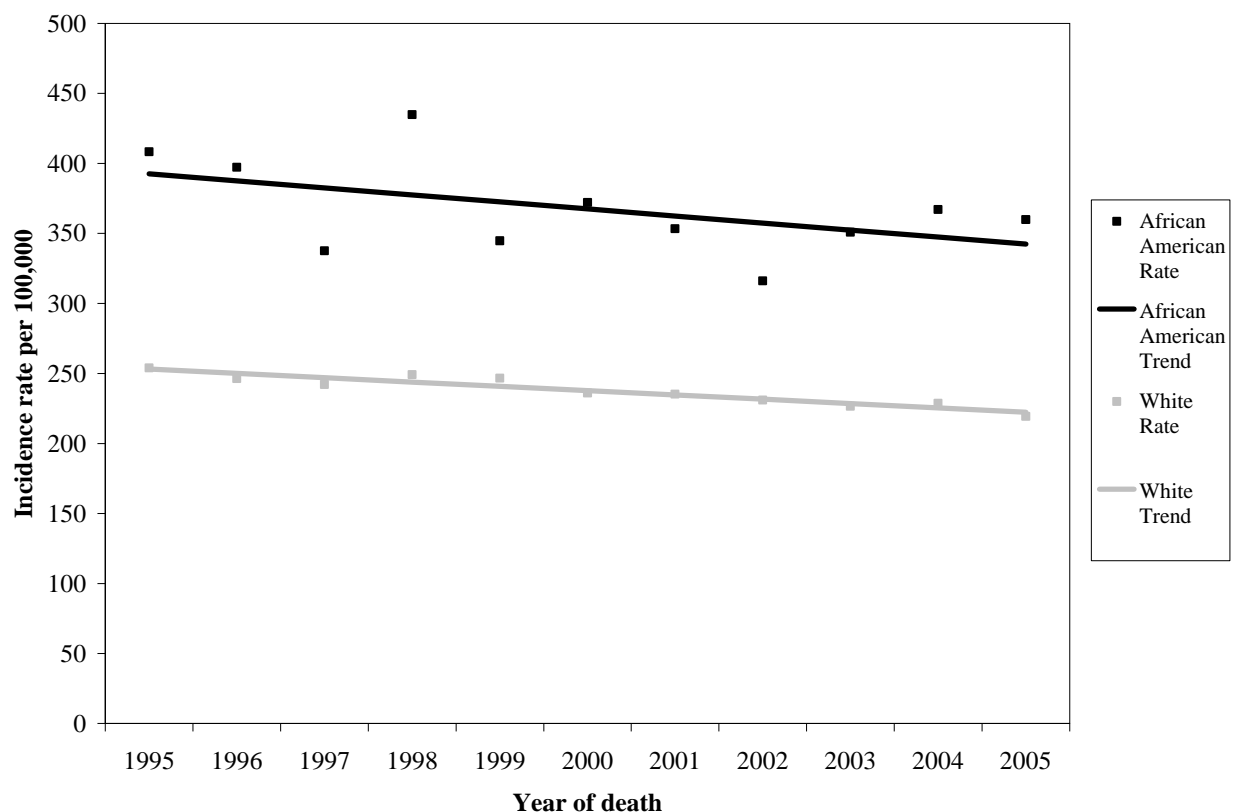
From 1995 through 2004, cancer was diagnosed in 136,164 Wisconsin men (including 128,839 whites and 5,070 African Americans). Over this period, overall age-adjusted cancer incidence among men decreased 9.8% from 571.9 per 100,000 in 1995 to 515.7 per 100,000 in 2004.

Between 1995 and 2004, the disparity in overall cancer incidence rates between African American and white males increased. The ratio between African American and white rates was 1.3 in 1995 and 1.5 in 2004.

Table 3: African American and white overall cancer incidence rates and rate ratio, males

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	736.1	563.9	1.3
2004	758.8	504.6	1.5

Figure 4: Trends in age-adjusted overall cancer mortality rates among males by race, Wisconsin, 1995-2005



From 1995 through 2005, there were 61,469 deaths due to cancer among Wisconsin men (including 58,520 whites and 2,435 African Americans). Over this period, the overall age-adjusted cancer mortality rate among men declined 13.3% from 257.7 per 100,000 in 1995 to 223.3 per 100,000 in 2005.

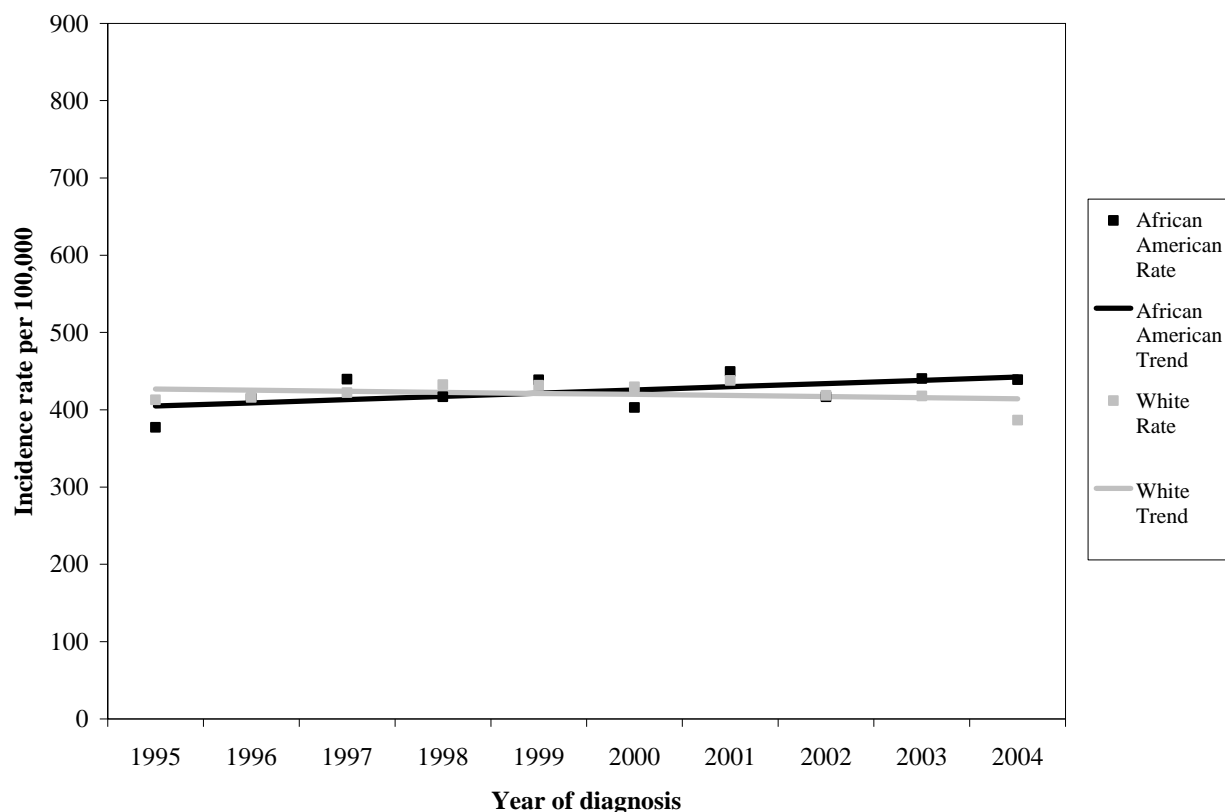
Between 1995 and 2005, the disparity in overall male cancer mortality rates between African Americans and whites remained constant. The ratio between African American and white male cancer mortality rates was 1.6 in 1995 and in 2005. However, if African American men experienced the lower age-specific death rates of whites, more than 40% of African American male cancer deaths in 1995 and 2005 would have been averted.

Table 4: African American and white overall cancer mortality rates; rate ratio; African American excess mortality and proportion of total deaths attributed to excess* (males)

Year	African American Mortality Rate	White Mortality Rate	African American : White Rate Ratio	Actual African American Deaths	Excess* African American Deaths	Excess/Actual African American Deaths
1995	408.3	254.0	1.6	204	85	41.7%
2005	359.9	219.3	1.6	217	96	44.2%

* Excess deaths = the number of deaths averted if the African American cancer death rate were lowered to the white cancer mortality rate. See Appendix B for complete methodology.

Figure 5: Trends in age-adjusted overall cancer **incidence** rates among **females** by race, Wisconsin, 1995-2004



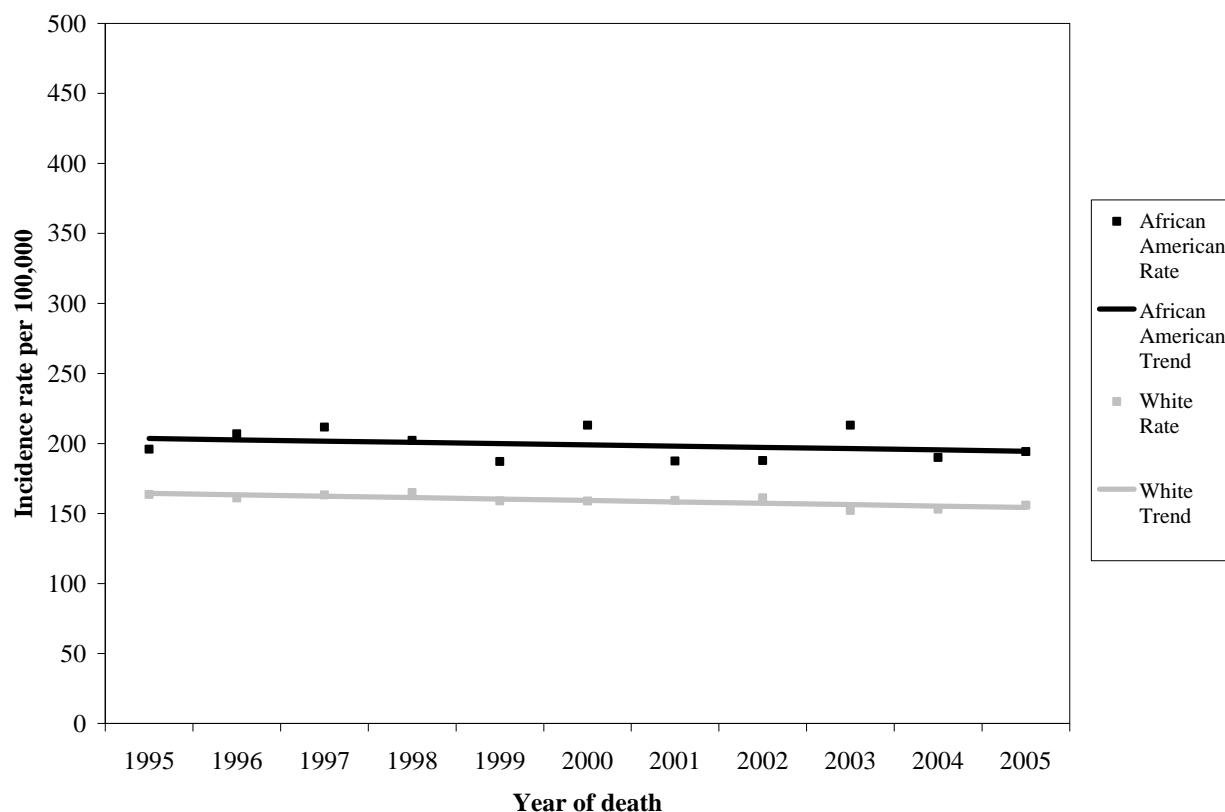
From 1995 through 2004, cancer was diagnosed in 136,164 Wisconsin women (including 126,806 whites and 4,197 African Americans). Over this period, overall age-adjusted cancer incidence among women decreased 6.2% from 415.6 per 100,000 in 1995 to 390.0 per 100,000 in 2004.

Between 1995 and 2004, the disparity in overall cancer incidence rates between African American and white females increased. The incidence rate among African American females was lower than among white females in 1995 (the rate ratio was 0.9). However, African American incidence rates increased over the period to surpass the white rate by 2004 (rate ratio 1.1).

Table 5: African American and white overall cancer incidence rates and rate ratio, females

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	377.2	412.8	0.9
2004	438.9	386.6	1.1

Figure 6: Trends in age-adjusted overall cancer mortality rates among females by race, Wisconsin, 1995-2005



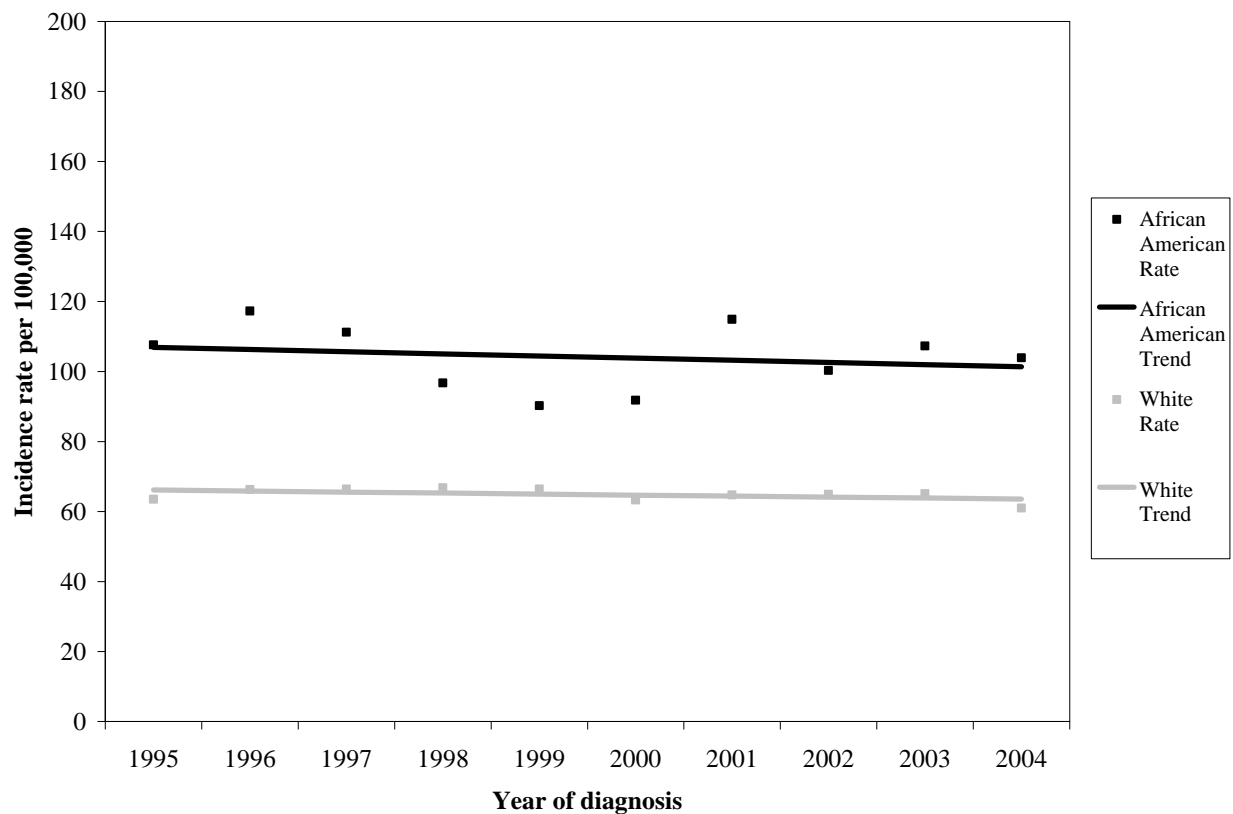
From 1995 through 2005, there were 56,526 deaths due to cancer among Wisconsin women (including 54,020 whites and 1,990 African Americans). Over this period, the overall age-adjusted cancer mortality rate among women declined 4.4% from 164.5 per 100,000 in 1995 to 157.3 per 100,000 in 2005.

Between 1995 and 2005, the disparity in the overall female cancer mortality rates between African Americans and whites remained unchanged. The ratio between African American and white female cancer mortality rates was 1.2 in 1995 and 2005. If African American women experienced the lower age-specific death rates of whites, about 20% of African American female cancer deaths in 1995 and 2005 would have been averted.

Table 6: African American and white overall cancer mortality rates; rate ratio; African American excess mortality and proportion of total deaths attributed to excess* (females)

Year	African American Mortality Rate	White Mortality Rate	African American : White Rate Ratio	Actual African American Deaths	Excess* African American Deaths	Excess/Actual African American Deaths
1995	195.8	163.6	1.2	147	29	19.5%
2005	194.1	155.9	1.2	165	41	25.0%

* Excess deaths = the number of deaths averted if the African American cancer death rate were lowered to the white cancer mortality rate. See Appendix B for complete methodology.

Figure 7: Trends in age-adjusted lung cancer **incidence** rates by race, Wisconsin, 1995-2004

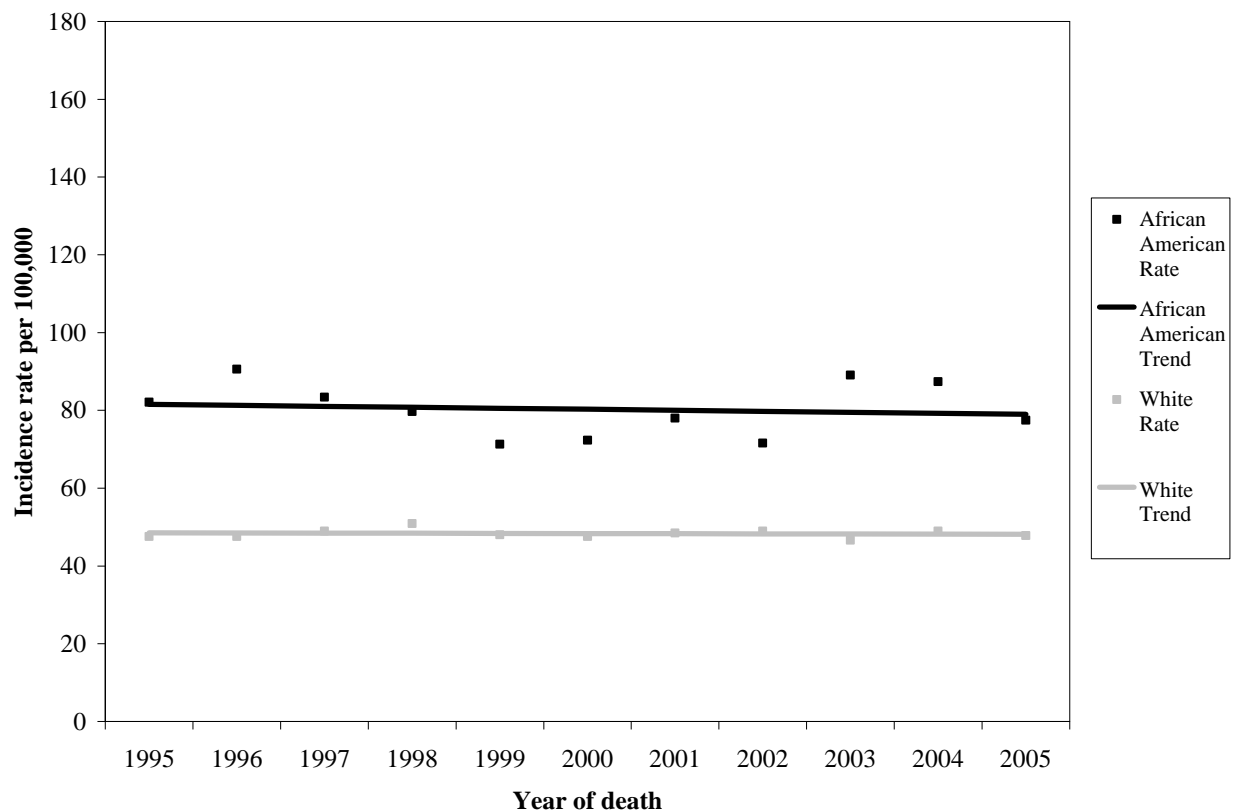
From 1995 through 2004, lung cancer was diagnosed in 36,207 Wisconsin residents (including 34,116 whites and 1,652 African Americans). Over this period, age-adjusted lung cancer incidence decreased 3.7% from 65.1 per 100,000 in 1995 to 62.7 per 100,000 in 2004.

Between 1995 and 2004, the disparity in lung cancer incidence rates between African Americans and whites did not change. The ratio between African American and white rates was 1.7 in 1995 and 2004.

Table 7: African American and white lung cancer incidence rates and rate ratio

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	107.6	63.5	1.7
2004	103.9	61.0	1.7

Figure 8: Trends in age-adjusted lung cancer **mortality** rates by race, Wisconsin, 1995-2005



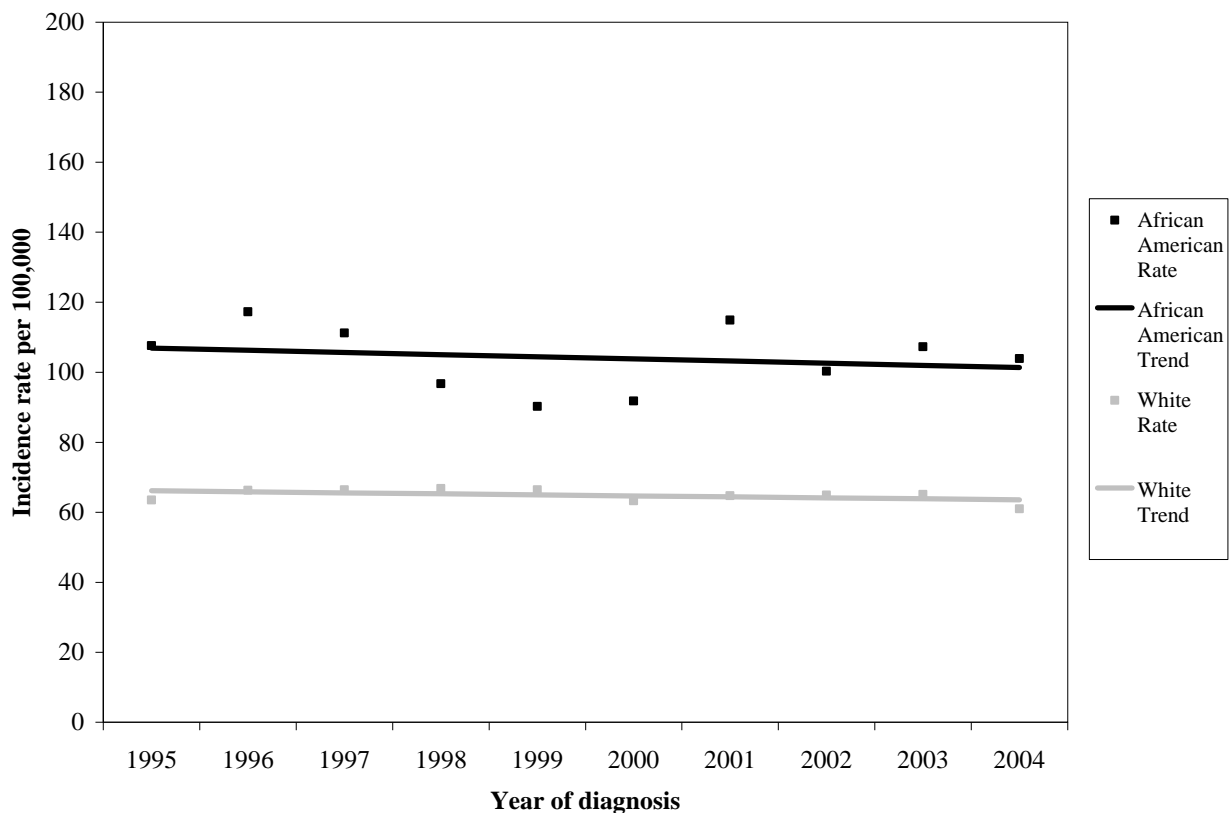
From 1995 through 2005, there were 29,708 deaths due to cancer of the lung and bronchus among Wisconsin residents (including 28,351 whites and 1,357 African Americans). Over this period, age-adjusted lung cancer mortality increased 0.5% from 48.5 per 100,000 in 1995 to 48.7 per 100,000 in 2005.

While among all Wisconsin residents the lung cancer mortality rate increased slightly between 1995 and 2005, among African Americans there was a 4.6% decline while among whites there was a 0.2% increase. The ratio between African American and white lung cancer mortality rates declined from 1.7 in 1995 to 1.6 in 2005.

Table 8: African American and white lung cancer mortality rates and rate ratio

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	82.1	47.6	1.7
2005	77.5	47.8	1.6

Figure 9: Trends in age-adjusted lung cancer **incidence** rates among **males** by race, Wisconsin, 1995-2004



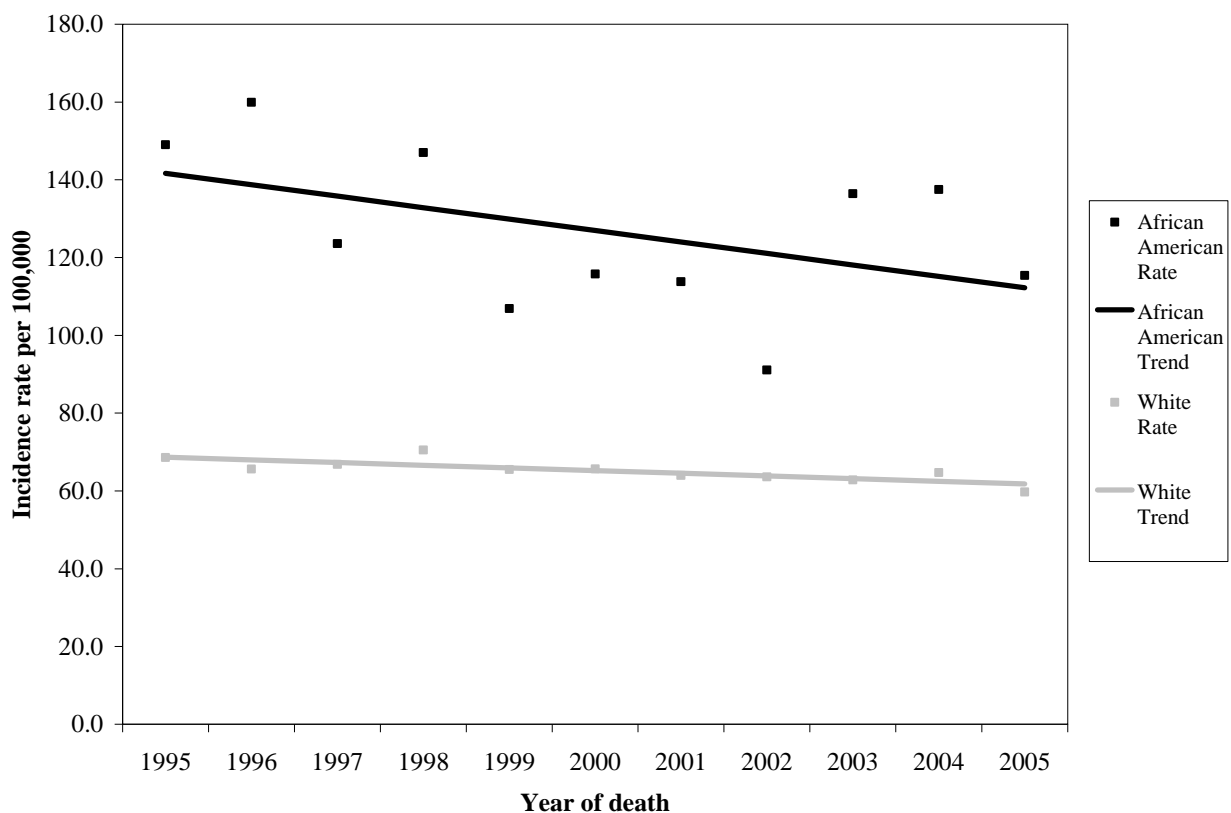
From 1995 through 2004, lung cancer was diagnosed in 20,694 Wisconsin men (including 19,449 whites and 1,006 African Americans). Age-adjusted lung cancer incidence among men decreased 11.3% from 89.9 per 100,000 in 1995 to 79.7 per 100,000 in 2004.

Between 1995 and 2004, the disparity in lung cancer incidence rates between African American and white males did not change. The ratio between African American and white rates was 2.0 in 1995 and 2004.

Table 9: African American and white lung cancer incidence rates and rate ratio, males

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	176.2	87.4	2.0
2004	155.6	76.9	2.0

Figure 10: Trends in age-adjusted lung cancer **mortality** rates among **males** by race, Wisconsin, 1995-2005



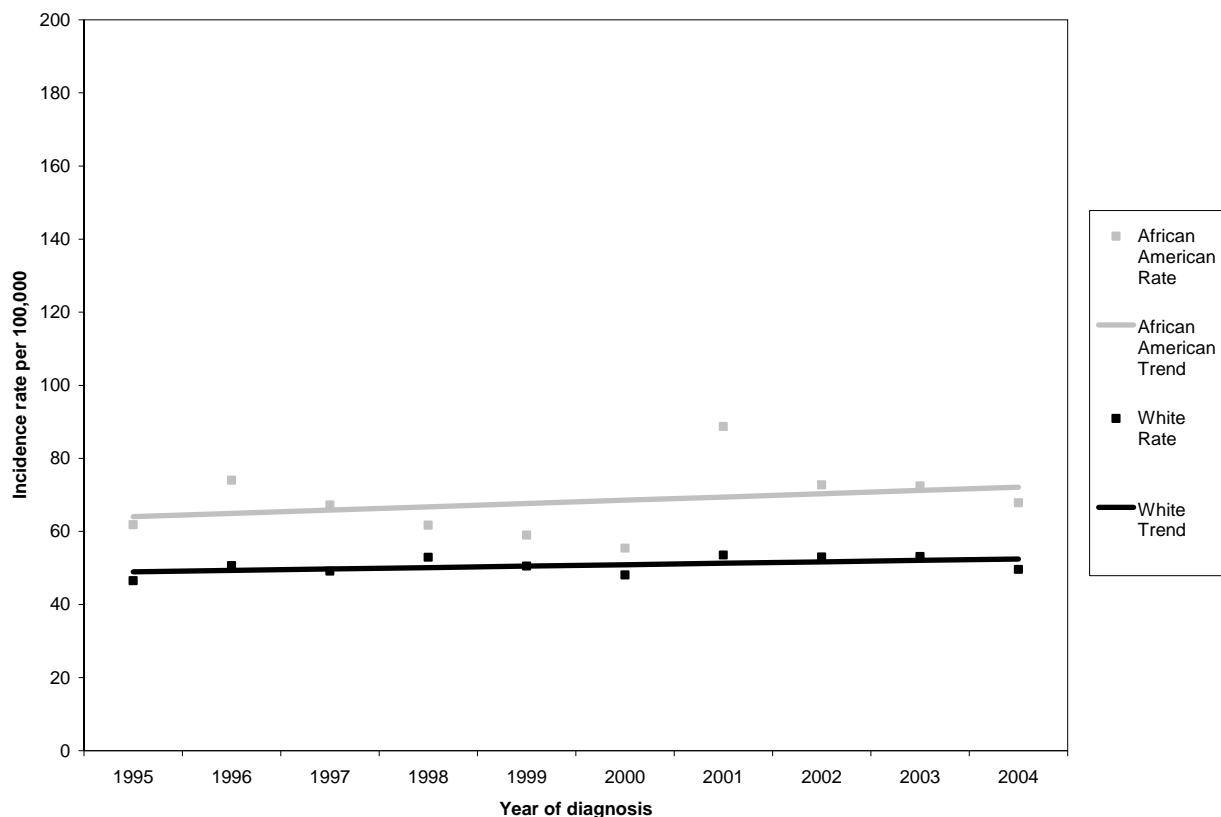
From 1995 through 2005, there were 17,233 deaths due to cancer of the lung and bronchus among Wisconsin men (including 16,384 whites and 849 African Americans). During this period, age-adjusted male lung cancer mortality declined 13.0% from 70.5 per 100,000 in 1995 to 61.3 per 100,000 in 2005.

Although the male lung cancer mortality rate in Wisconsin declined over the period, the rate of decline among African Americans was faster than the decline observed among whites. The ratio between African American and white male lung cancer mortality rates declined from 2.2 in 1995 to 1.9 in 2005.

Table 10: African American and white lung cancer mortality rates and rate ratio, males

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	149.0	68.6	2.2
2005	115.4	59.7	1.9

Figure 11: Trends in age-adjusted lung cancer **incidence** rates among **females** by race, Wisconsin, 1995-2004



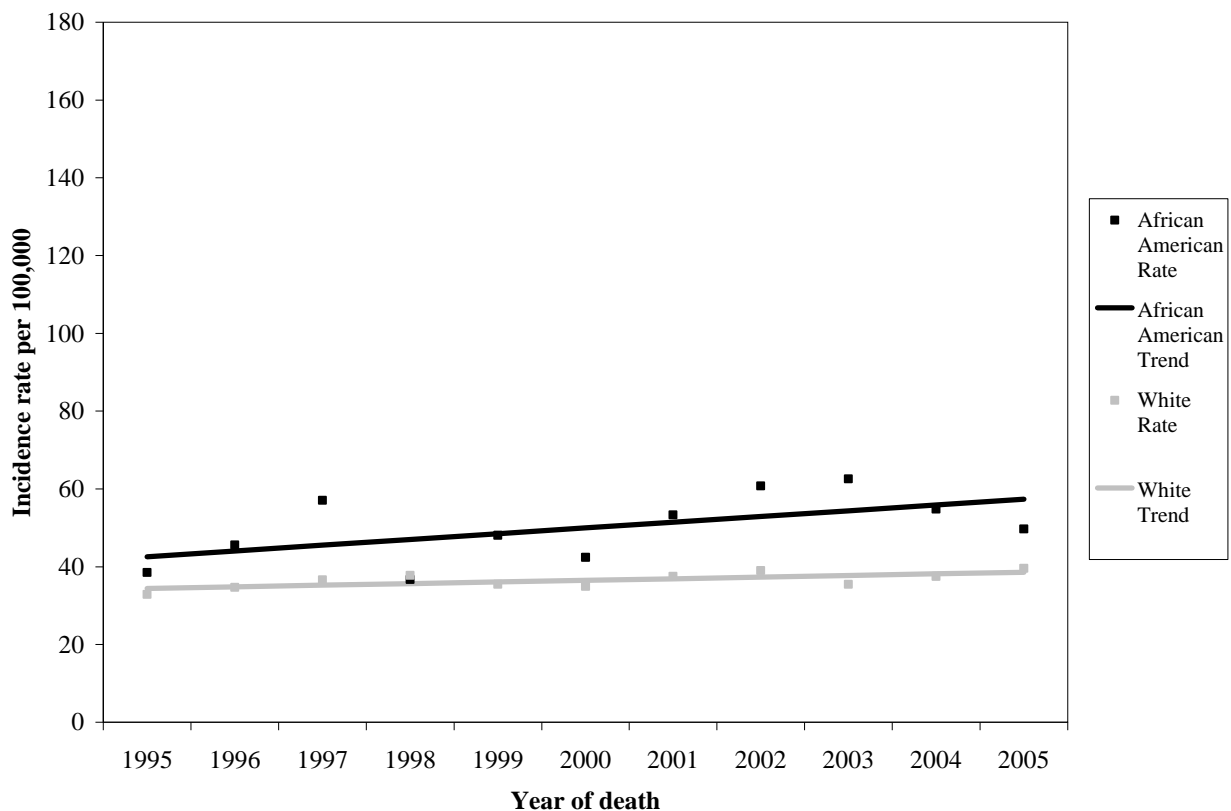
From 1995 through 2004, lung cancer was diagnosed in 15,513 Wisconsin women (including 14,665 whites and 646 African Americans). During this period, age-adjusted lung cancer incidence among women increased 6.7% from 44.8 per 100,000 in 1995 to 47.8 per 100,000 in 2004.

Between 1995 and 2004, the disparity in lung cancer incidence rates between African American and white females increased slightly. The ratio between African American and white rates was 1.3 in 1995 and 1.4 in 2004.

Table 11: African American and white lung cancer incidence rates and rate ratio, females

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	61.8	46.5	1.3
2004	67.8	49.6	1.4

Figure 12: Trends in age-adjusted lung cancer **mortality** rates among **females** by race, Wisconsin, 1995-2005



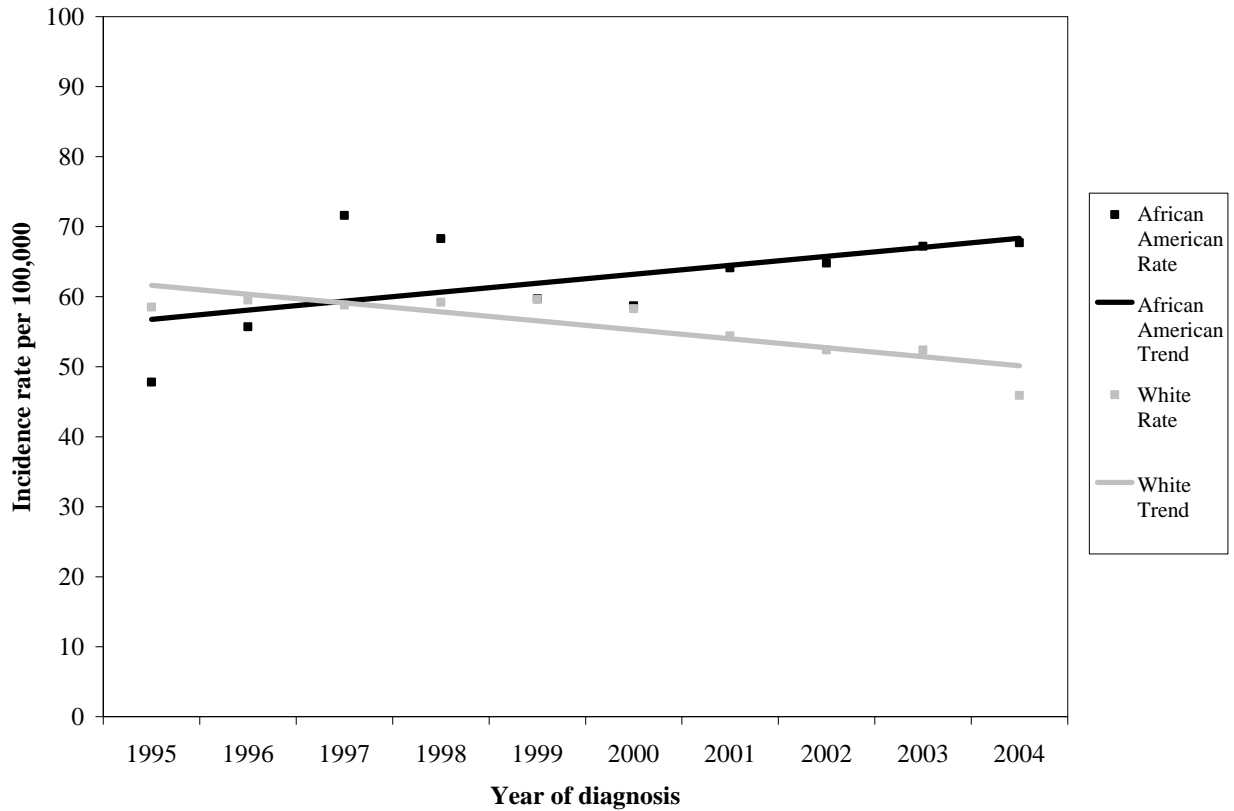
From 1995 through 2005, there were 12,475 deaths due to cancer of the lung and bronchus among Wisconsin women (including 11,967 whites and 508 African Americans). Over this period, age-adjusted female lung cancer mortality increased 20.2% from 33.1 per 100,000 in 1995 to 39.8 per 100,000 in 2005.

Between 1995 and 2005, the disparity in female lung cancer rates between African Americans and whites increased slightly. The ratio between African American and white female lung cancer mortality rates was 1.2 in 1995 and 1.3 in 2005.

Table 12: African American and white lung cancer mortality rates and rate ratio, females

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	38.5	32.9	1.2
2005	49.7	39.6	1.3

Figure 13: Trends in age-adjusted colorectal cancer **incidence** rates by race, Wisconsin, 1995-2004



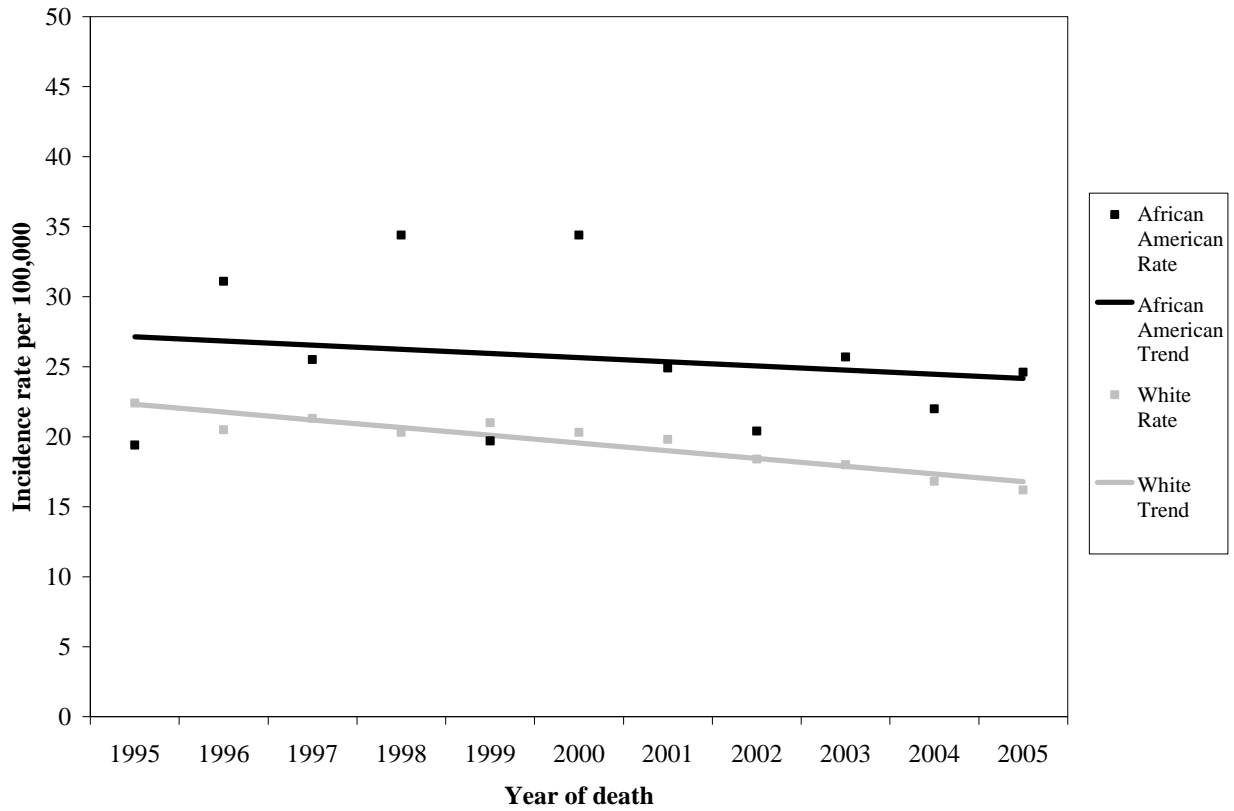
From 1995 through 2004, colorectal cancer was diagnosed in 31,243 Wisconsin residents (including 29,800 whites and 976 African Americans). Over this period, age-adjusted colorectal cancer incidence decreased 20.7% from 59.0 per 100,000 in 1995 to 46.8 per 100,000 in 2004.

Between 1995 and 2004, the disparity in colorectal cancer incidence rates between African Americans and whites increased dramatically as African American rates increased and white rates decreased. The ratio between African American and white rates was 0.8 in 1995 and 1.5 in 2004.

Table 13: African American and white colorectal cancer incidence rates and rate ratio

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	47.8	58.5	0.8
2004	67.7	45.9	1.5

Figure 14: Trends in age-adjusted colorectal cancer **mortality** rates by race, Wisconsin, 1995-2005



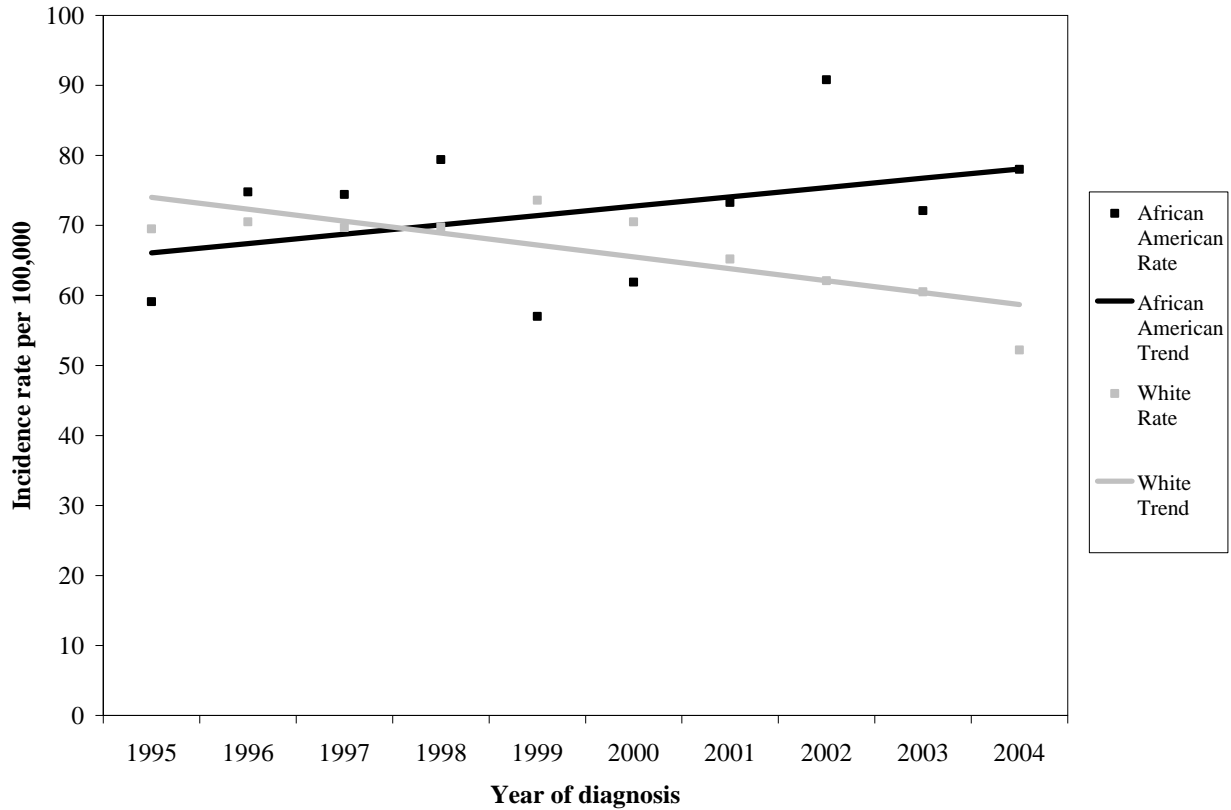
From 1995 through 2005, there were 12,132 deaths due to cancer of the colon and rectum among Wisconsin residents (including 11,732 whites and 400 African Americans). Over this period, age-adjusted colorectal cancer mortality decreased 26.0% from 22.3 per 100,000 in 1995 to 16.5 per 100,000 in 2005.

Between 1995 and 2005, the disparity in colorectal cancer mortality rates between African Americans and whites increased considerably. The ratio between African American and white colorectal cancer mortality rates rose from 0.9 in 1995 to 1.5 in 2005.

Table 14: African American and white colorectal cancer mortality rates and rate ratio

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	19.4	22.4	0.9
2005	24.6	16.2	1.5

Figure 15: Trends in age-adjusted colorectal cancer **incidence** rates among **males** by race, Wisconsin, 1995-2004



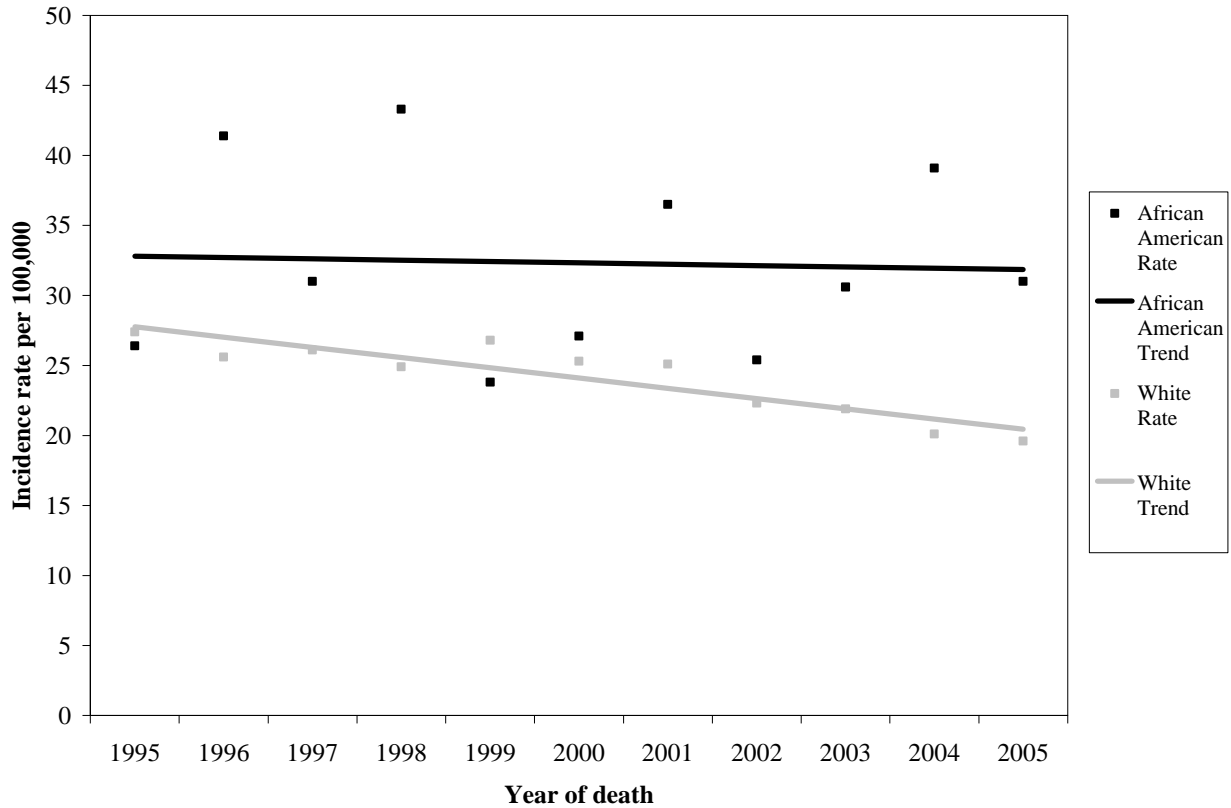
From 1995 through 2004, colorectal cancer was diagnosed in 15,795 Wisconsin men (including 15,070 whites and 475 African Americans). Over this period, age-adjusted colorectal cancer incidence among men decreased 24.4% from 70.1 per 100,000 in 1995 to 53.0 per 100,000 in 2004.

Between 1995 and 2004, the disparity in colorectal cancer incidence rates between African American and white males increased dramatically as African American rates increased and white rates decreased. The ratio between African American and white rates rose from 0.9 in 1995 to 1.5 in 2004.

Table 15: African American and white colorectal cancer incidence rates and rate ratio, males

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	59.1	69.5	0.9
2004	78.0	52.2	1.5

Figure 16: Trends in age-adjusted colorectal cancer **mortality** rates among **males** by race, Wisconsin, 1995-2005



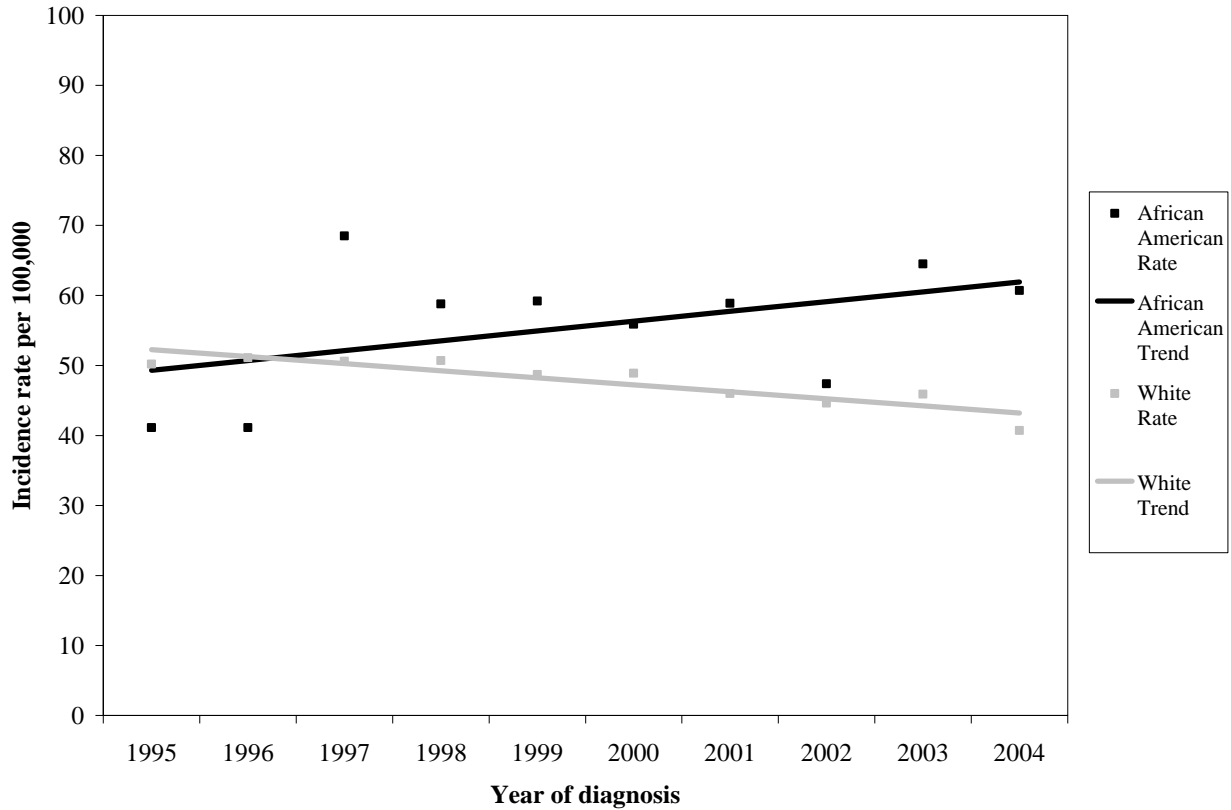
From 1995 through 2005, there were 6,054 deaths due to cancer of the colon and rectum among Wisconsin men (including 5,857 whites and 197 African Americans). Over this period, age-adjusted male colorectal cancer mortality decreased 27.4% from 27.4 per 100,000 in 1995 to 19.9 per 100,000 in 2005.

Between 1995 and 2005, the disparity in colorectal cancer mortality rates between African Americans and whites increased greatly, due to the sharper decline in white male colorectal mortality compared to African American mortality. The ratio between African American and white colorectal cancer mortality rates increased from 1.0 in 1995 to 1.6 in 2005.

Table 16: African American and white colorectal cancer mortality rates and rate ratio, males

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	26.4	27.4	1.0
2005	31.0	19.6	1.6

Figure 17: Trends in age-adjusted colorectal cancer **incidence** rates among **females** by race, Wisconsin, 1995-2004



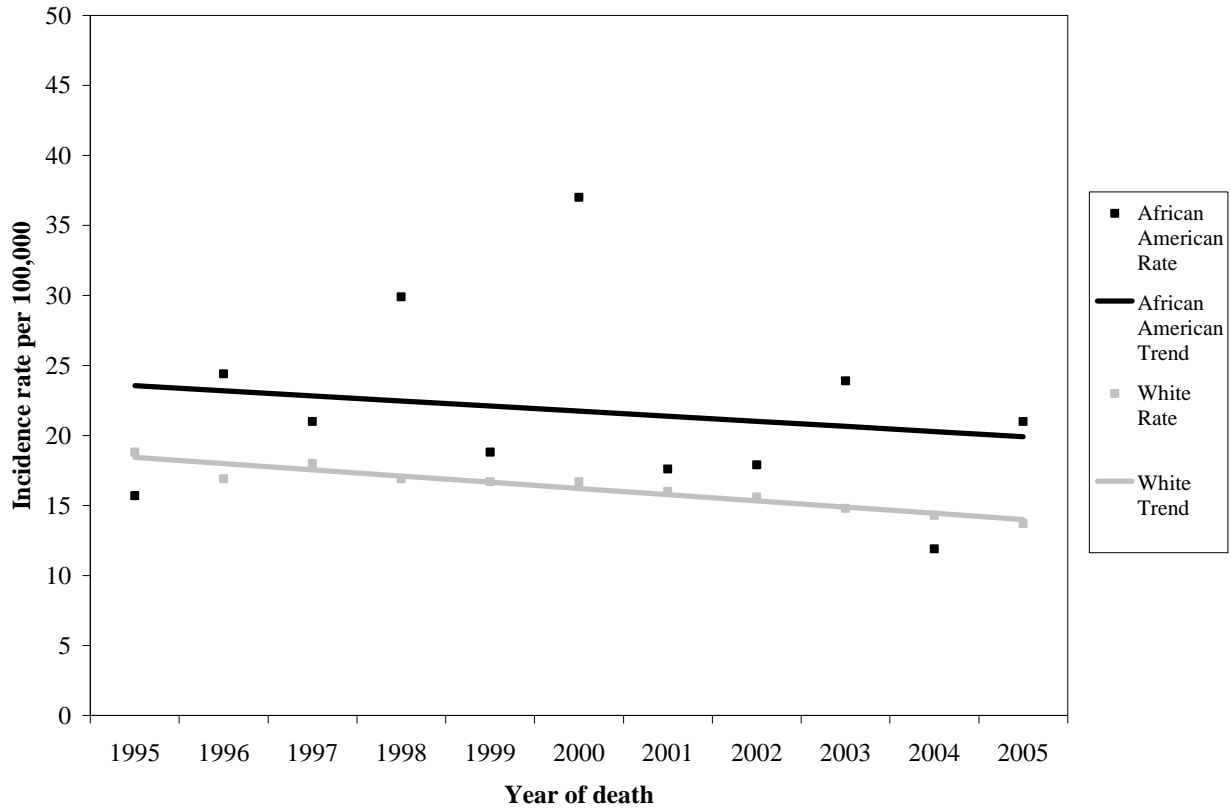
From 1995 through 2004, colorectal cancer was diagnosed in 15,448 Wisconsin women (including 14,727 whites and 501 African Americans). Over this period, age-adjusted colorectal cancer incidence among women decreased 17.6% from 50.7 per 100,000 in 1995 to 41.8 per 100,000 in 2004.

Between 1995 and 2004, the disparity in colorectal cancer incidence rates between African American and white females increased dramatically as African American rates increased and white rates decreased. The ratio between African American and white rates rose from 0.8 in 1995 to 1.5 in 2004.

Table 17: African American and white colorectal cancer incidence rates and rate ratio, females

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	41.1	50.2	0.8
2004	60.7	40.7	1.5

Figure 18: Trends in age-adjusted colorectal cancer **mortality** rates among **females** by race, Wisconsin, 1995-2005



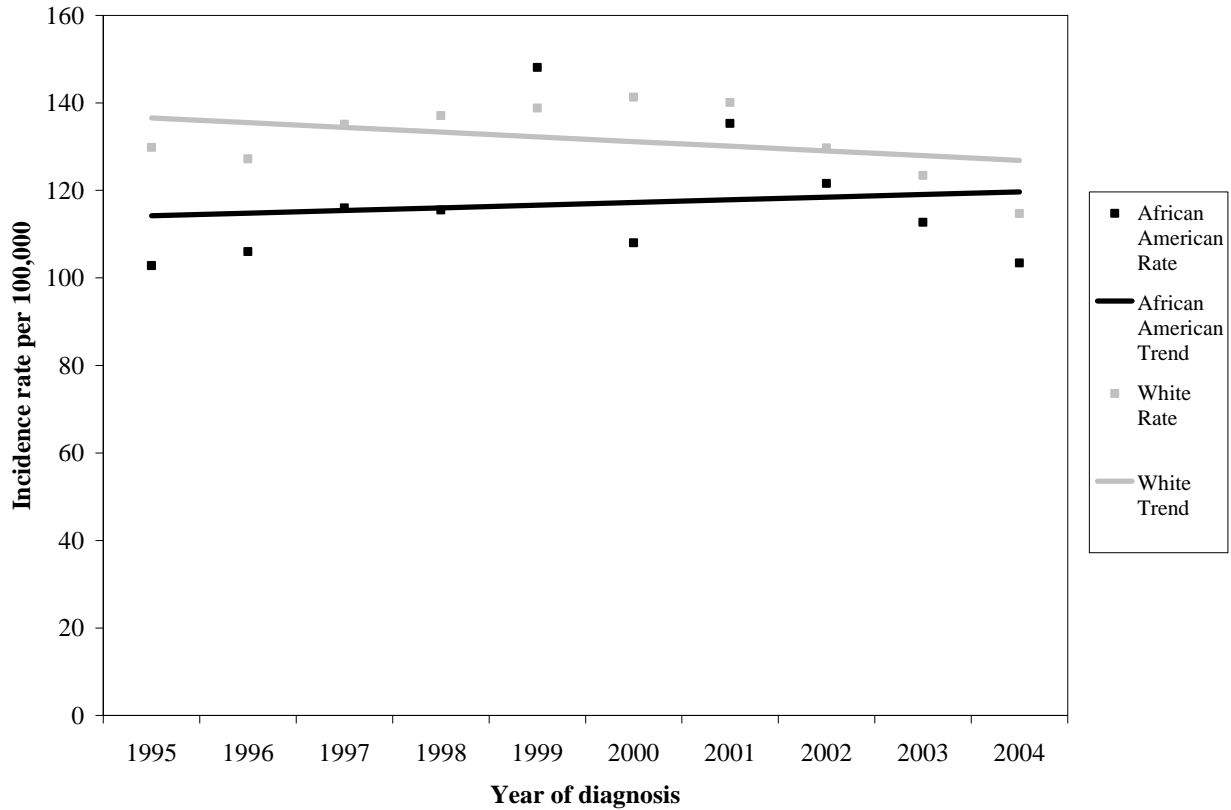
From 1995 through 2005, there were 6,078 deaths due to cancer of the colon and rectum among Wisconsin women (including 5,875 whites and 203 African Americans). During this period, age-adjusted colorectal cancer mortality decreased 25.1% from 18.7 per 100,000 in 1995 to 14.0 per 100,000 in 2005.

Between 1995 and 2005, the disparity in female colorectal cancer mortality rates between African Americans and whites increased considerably. The ratio between African American and white colorectal cancer mortality rates rose from 0.8 in 1995 to 1.5 in 2005.

Table 18: African American and white colorectal cancer mortality rates and rate ratio, females

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	15.7	18.8	0.8
2005	21.0	13.7	1.5

Figure 19: Trends in age-adjusted breast cancer **incidence** rates among **females** by race, Wisconsin, 1995-2004



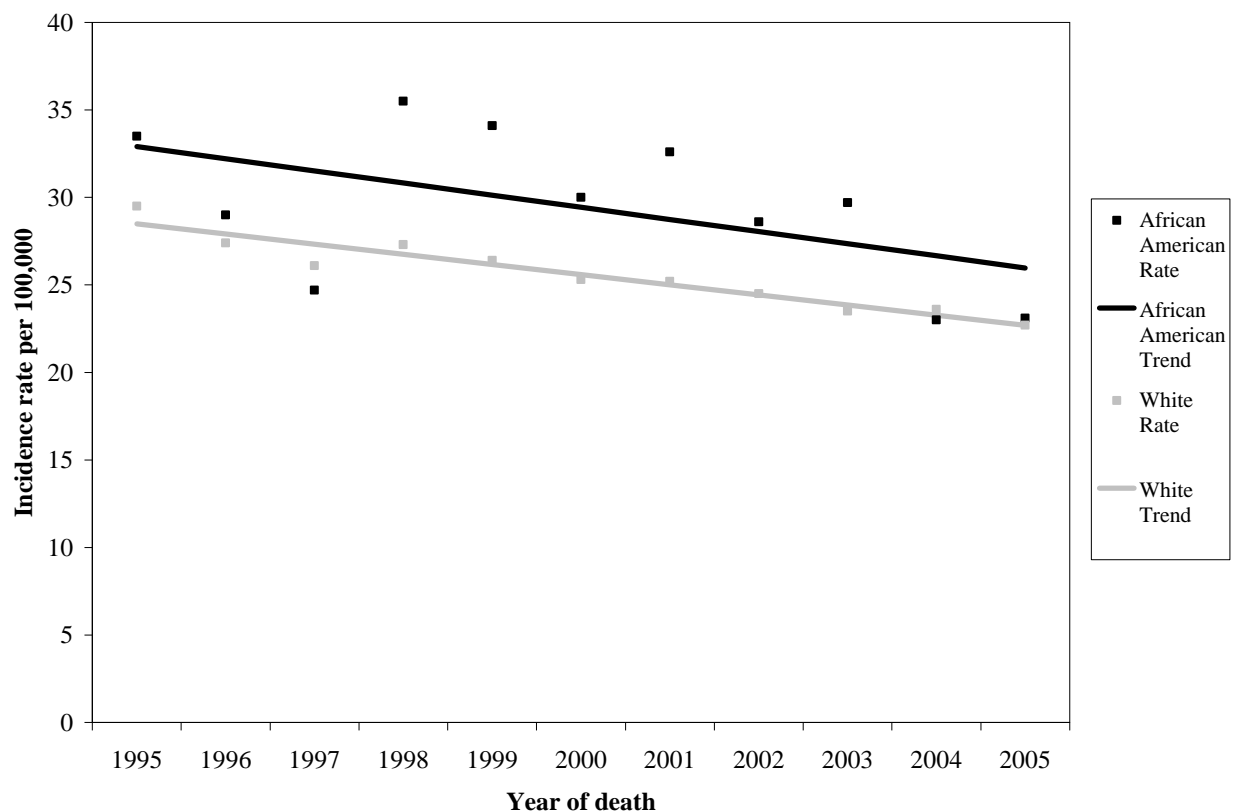
From 1995 through 2004, breast cancer was diagnosed in 38,486 Wisconsin women (including 37,073 whites and 1,227 African Americans). Over this period, age-adjusted breast cancer incidence among women decreased 11.6% from 129.7 per 100,000 in 1995 to 114.7 per 100,000 in 2004.

Between 1995 and 2004, the disparity in breast cancer incidence rates between African American and white females decreased slightly. However, the narrowing in this disparity is the result of a decreasing white incidence rate and increasing African American rate. The ratio between African American and white rates was 0.8 in 1995 and 0.9 in 2004.

Table 19: African American and white breast cancer incidence rates and rate ratio, females

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	102.8	129.8	0.8
2004	103.4	114.7	0.9

Figure 20: Trends in age-adjusted breast cancer **mortality** rates among **females** by race, Wisconsin, 1995-2005



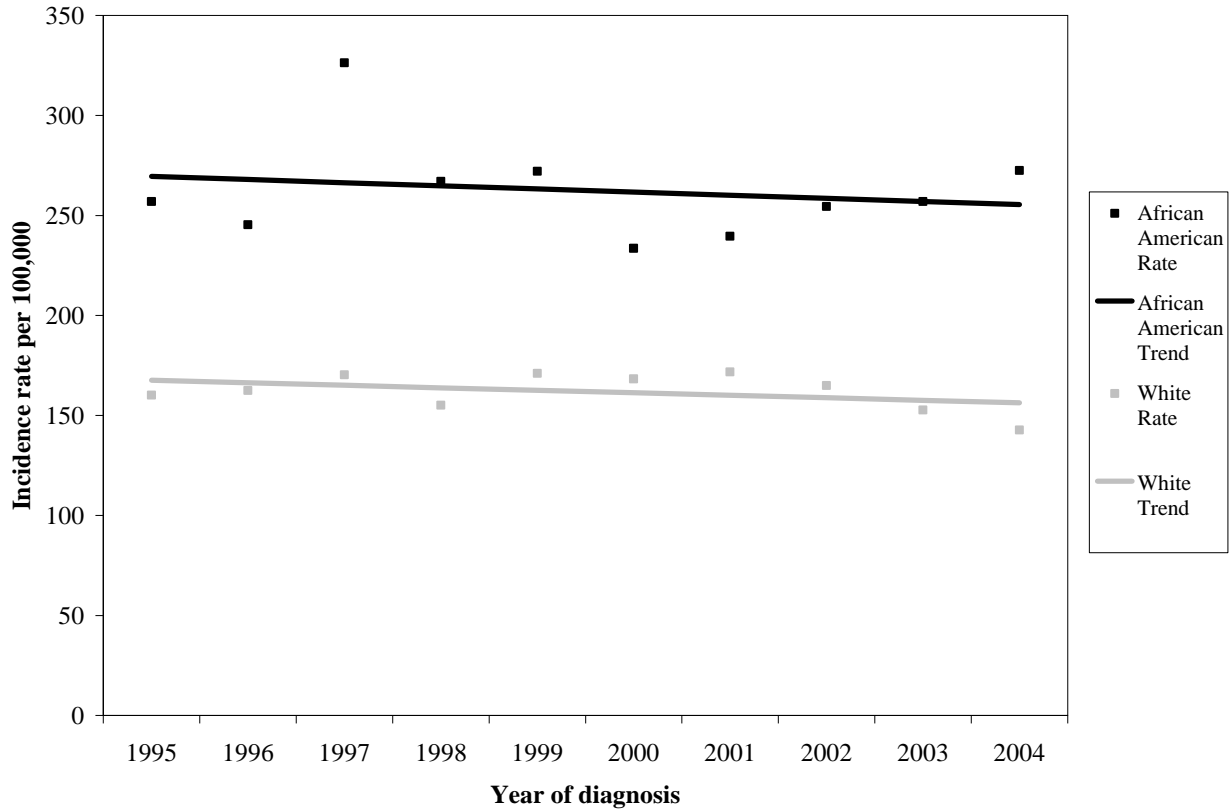
From 1995 through 2005, there were 8,796 deaths due to breast cancer among Wisconsin women (including 8,473 whites and 323 African Americans). Over this period, age-adjusted female breast cancer mortality decreased 23.3% from 29.6 per 100,000 in 1995 to 22.7 per 100,000 in 2005.

Between 1995 and 2005, the disparity in breast cancer mortality rates between African Americans and whites decreased slightly. The ratio between African American and white breast cancer mortality rates decreased from 1.1 in 1995 to 1.0 in 2005.

Table 20: African American and white breast cancer mortality rates and rate ratio, females

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	33.5	29.5	1.1
2005	23.1	22.7	1.0

Figure 21: Trends in age-adjusted prostate cancer **incidence** rates among **males** by race, Wisconsin, 1995-2004



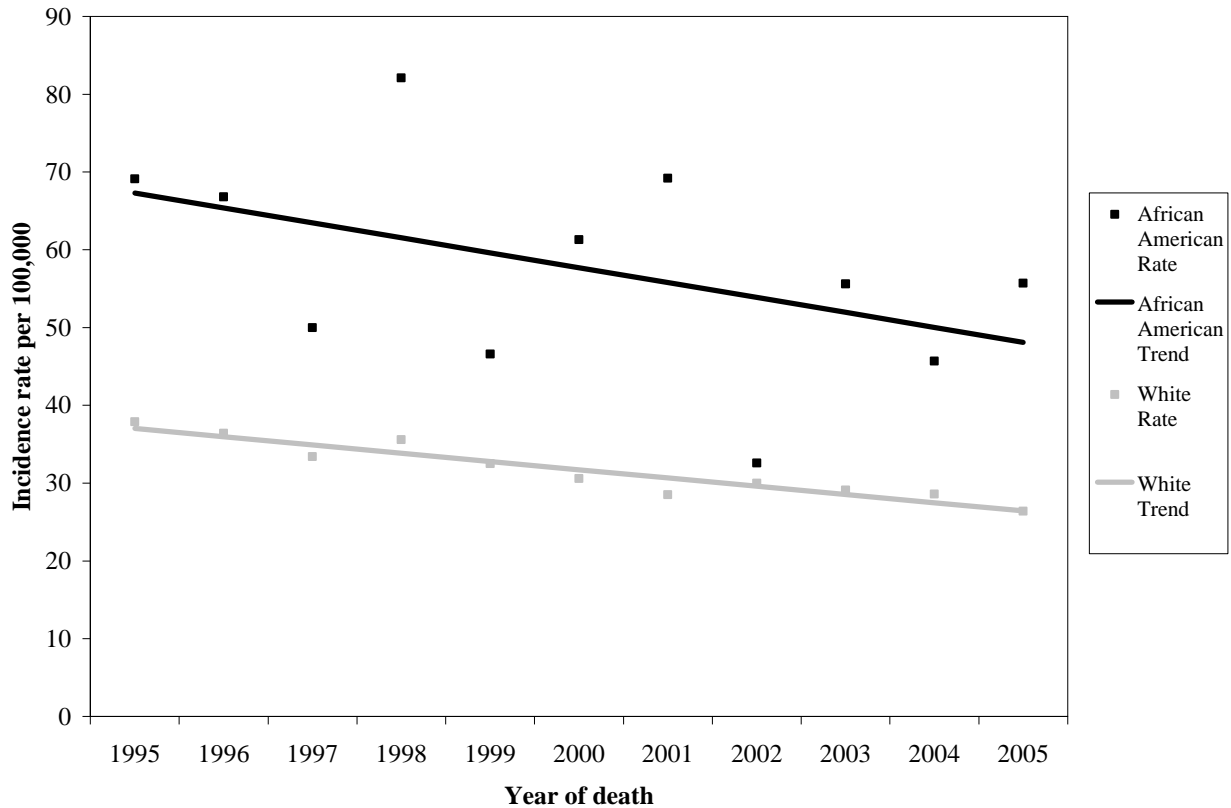
From 1995 through 2004, prostate cancer was diagnosed in 40,011 Wisconsin men (including 37,573 whites and 1,698 African Americans). Over this period, age-adjusted prostate cancer incidence among men decreased 9.3% from 163.9 per 100,000 in 1995 to 148.6 per 100,000 in 2004.

Between 1995 and 2004, the disparity in prostate cancer incidence rates between African American and white males increased. The ratio between African American and white rates was 1.6 in 1995 and 1.9 in 2004.

Table 21: African American and white prostate cancer incidence rates and rate ratio, males

Year	African American Incidence Rate (per 100,000)	White Incidence Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	256.9	160.2	1.6
2004	272.5	142.7	1.9

Figure 22: Trends in age-adjusted prostate cancer **mortality** rates among **males** by race, Wisconsin, 1995-2005



From 1995 through 2005, there were 7,495 deaths due to cancer of the prostate among Wisconsin men (including 7,229 whites and 266 African Americans). Over this period, age-adjusted prostate cancer mortality decreased 29.9% from 38.4 per 100,000 in 1995 to 26.9 per 100,000 in 2005.

Between 1995 and 2005, the disparity in prostate cancer mortality rates between African Americans and whites increased, as the decline among whites was steeper than that among African Americans. The ratio between African American and white prostate cancer mortality rates was 1.8 in 1995 and 2.1 in 2005.

Table 22: African American and white prostate cancer mortality rates and rate ratio, males

Year	African American Mortality Rate (per 100,000)	White Mortality Rate (per 100,000)	African American : White Rate Ratio (per 100,000)
1995	69.1	37.9	1.8
2005	55.7	26.4	2.1

DISCUSSION

Among all Wisconsin residents, cancer incidence and mortality rates in Wisconsin decreased over the period 1995-2004/5. But for all cancers combined and most individual cancer sites, African American residents of Wisconsin experienced higher rates than whites, pointing to an absolute disparity in cancer outcomes. Moreover, while the disease became less common and less deadly for both racial groups over the decade, the relative disparities between them grew.

The findings are remarkable. For over half of the cancer site and sex combinations examined in this report, cancer incidence among African Americans in Wisconsin was consistently higher than that among whites over the period 1995-2004 (for a summary of trends, see Table 23). The absolute disparities were even more striking for mortality: for *all* cancer site/sex combinations, in *all* years, cancer mortality was higher among African Americans than whites. In fact, if African Americans had experienced the lower age-specific mortality rates of whites, on average 31.8% of African American cancer-related deaths in 1995 and 35.2% in 2005 would have been averted. Moreover, the relative disparity (the rate ratio) between African American and white residents increased for nearly all site/sex combinations examined (9 out of 11) in terms of incidence, as well nearly half of the mortality combinations (5 out of 11).

Table 23: Summary of Racial Cancer Disparity Trends in Wisconsin, 1995-2004/5

Site		Total	Male	Female
Overall	Incidence	<i>Increasing</i>	<i>Increasing</i>	<i>Increasing</i>
	Mortality	Persistent	Persistent	Persistent
Lung	Incidence	Persistent	Persistent	<i>Increasing</i>
	Mortality	Decreasing	Decreasing	<i>Increasing</i>
Colorectal	Incidence	<i>Increasing</i>	<i>Increasing</i>	<i>Increasing</i>
	Mortality	<i>Increasing</i>	<i>Increasing</i>	<i>Increasing</i>
Breast	Incidence			<i>Increasing</i>
	Mortality			Decreasing
Prostate	Incidence		<i>Increasing</i>	
	Mortality		<i>Increasing</i>	

Overall cancer

For whites, overall cancer incidence and mortality decreased over the period 1995 to 2004/5. In general, overall cancer incidence and mortality among African Americans also decreased over the period. There were a few exceptions – namely, incidence among both sexes combined and among women – in which the rate among African Americans increased slightly over the period.

In all but one case, African American residents of Wisconsin had higher overall cancer incidence and mortality rates than whites over the period 1995-2004/5. The exception was all cancer incidence for women, where the rate among whites was higher than that among African Americans in 1995, but as African American rates rose and white rates fell over time, by 2004 the difference was reversed. Moreover, the absolute disparities observed, particularly for men, were quite large.

The relative disparity in overall cancer incidence between African Americans and whites increased from 1995 to 2004 – among both sexes combined, men alone, and women alone. It is notable that the relative disparity in mortality rates among both sexes combined and separate remained constant from 1995 to 2005.

Lung cancer

For both sexes, the incidence and mortality of lung cancer among African American residents of Wisconsin was higher than that of whites over the period 1995-2004/5. These absolute disparities were particularly large among men. Considering trends, for whites of both sexes combined and for men, lung cancer incidence and mortality remained constant or dropped slightly over the period. The same was true for African Americans, although the decrease in male rates was notably larger than that among whites. In contrast, lung cancer incidence and mortality rose over the period among women of both races.

Trends in relative disparities in lung cancer rates between African Americans and whites were more variable. Among women, there was an increase in the relative disparity of lung cancer incidence and mortality between the two groups. However, for both sexes combined and for men, there was a decrease in the relative disparity of lung cancer mortality and no change in the relative disparity of lung cancer incidence.

Colorectal cancer

In 1995, the incidence of colorectal cancer among African Americans residents of Wisconsin was lower than among whites. Subsequently, incidence among whites decreased while that of African Americans steadily increased. By 1997 African American rates exceeded white rates, and by 2004 they were 47.5% higher. In comparison, mortality due to colorectal cancer was consistently higher among African Americans compared to whites over the period 1995-2005. Trends in mortality were less striking than those observed for incidence, as the rate declined in both race groups (although the decrease among men was quite small). It is notable that the actual colorectal cancer incidence and mortality rates observed among African Americans were relatively more variable than for other cancer sites.

The relative disparity in colorectal cancer incidence and mortality between African Americans and whites increased dramatically over the period for both sexes.

Breast cancer

The incidence of breast cancer among white women was higher than among African Americans over the period 1995-2004. However, the difference in incidence rates decreased over the period, as white rates trended downwards while African American rates increased slightly. Consequently, the relative disparity between African Americans and whites increased.

African Americans had higher breast cancer mortality rates than whites over the period 1995-2005, except for in 1997. The rates trended downwards over the period for both groups, but at a slightly higher rate for African Americans than whites. This led to a small decrease in relative disparity.

Prostate cancer

Prostate cancer incidence and mortality rates were higher among African American residents of Wisconsin than among whites over the period 1995-2004/5. For both groups, incidence and mortality trended downwards over the period. However, the rate of decline was greater among whites than African Americans, which led to an increase in relative disparity for both incidence and mortality.

Limitations

This study is subject to several limitations. First, the scope of this report is limited to differences in cancer incidence and mortality rates between African American and whites in Wisconsin. The decision to focus on these two groups was determined by the demographic composition of Wisconsin and the rarity of cancer events. Wisconsin has relatively small non-white populations, making comparisons similar to those featured in this report difficult to replicate among other groups. Cancer incidence and mortality rates among many minority populations seem to vary widely from year to year. However, this variation is most likely due to the small size of the population groups rather than real changes in disease burden. Discussion of cancer incidence and mortality trends in Wisconsin's other minority populations is important and will be featured in future reports in this series which identify the statistical issues involved in observing rare events in small populations.

Second, although African Americans form the largest non-white minority population in Wisconsin, there are still relatively few new cases and deaths due to some of the rarer forms of cancer. This situation yields rates for African Americans that vary more from year to year than do rates among whites.

Third, for some cancer sites, the trend lines suggest a different finding regarding cancer disparities than the observed rates. For example, prostate cancer incidence trends among African Americans and whites decreased at a similar rate over the period, giving the appearance of unchanging disparity. The measure of relative disparity used in this report, the rate ratio, uses only the observed incidence rate at the start and end of the period. Due to variability from year to year in prostate incidence rates, the rate ratio gives the impression of an increase in disparity over the period. The same issue exists for some mortality comparisons – such as colorectal cancer among females.

Conclusions

Race, per se, is not a biological variable, but racial differences are meaningful proxies for other factors that act on individuals and their risk for developing and dying of cancer over the life course. The results indicate that disparities in cancer incidence and mortality between African Americans and whites in Wisconsin are large and have persisted in most cases, if not worsened, over the period 1995 to 2004/5. Elimination of these disparities will require further research into their causes, as well as into effective interventions to remove them.¹⁶ Any solution will require that policy makers, health systems, and healthcare providers carefully balance resources and set appropriate priorities to target these inequities.

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APPENDIX A

AGE ADJUSTMENT OF RATES TO THE 2000 U.S. CENSUS STANDARD POPULATION

Age adjustment of mortality rates to a standard population age structure allows comparison of populations by eliminating differences in observed rates that result from age differences in underlying population. Age-adjusted rates are considered relative indexes rather than actual measures of risk and therefore should not be used for projections.

The following is an example of a *direct* method for age standardization. Table A1 (below) shows the application of observed age-specific African American cancer mortality rates in 1995 to a standardized age distribution, the 2000 U.S. Census standard age distribution. To calculate age-specific death rates, we divide deaths (column 1) by the population in each age group. To calculate the crude death rate, we can divide total deaths by total population ($351/288,815 = 121.5$ per 100,000). To calculate the age-adjusted African American cancer death rate using the 2000 U.S. standard population, we multiply the observed African American death rate by the standard population and sum the result across all ages. Dividing the sum by the standard population yields an age-adjusted mortality rate of 276.5 per 100,000. The age-adjusted rate is higher than the crude rate because the African American population in Wisconsin is younger than the general U.S. population on average and cancer typically affects older people.

Table A1: Example showing calculation of excess African American cancer deaths

Age	Observed Deaths (1)	Population (2)	Age-Specific Mortality Rate (per 100,000) (3)	2000 U.S. Standard Population (4)	Age-Adjusted Deaths (5)
Under 1	0	5,949	0	13,818	0
1-4	1	27,723	3.6	55,317	2
5-9	1	34,291	2.9	72,533	2
10-14	0	30,656	0	73,032	0
15-19	0	27,313	0	72,169	0
20-24	1	24,234	4.1	66,478	3
25-29	1	22,873	4.4	64,529	3
30-34	1	23,220	4.3	71,044	3
35-39	7	22,841	30.6	80,762	25
40-44	24	18,371	130.6	81,851	107
45-49	23	14,049	163.7	72,118	118
50-54	35	9,655	362.5	62,716	227
55-59	36	7,737	465.3	48,454	225
60-64	43	6,269	685.9	38,793	266
65-69	52	5,462	952	34,264	326
70-74	44	3,447	1,276.50	31,773	406
75-79	37	2,282	1,621.40	26,999	438
80-84	24	1,291	1,859.00	17,842	332
85+	21	1,152	1,822.90	15,508	283
Total	351	288,815		1,000,000	2,765

APPENDIX B

CALCULATION OF EXCESS AFRICAN AMERICAN MORTALITY

Excess mortality was calculated by simulating the exposure of the African American population to age-specific cancer death rates experienced by whites. See Table B1 (next page) for example calculations. Column 1 shows the age-specific cancer death rates among whites in 1995. Column 2 shows the African American population in each 5-year age group. Column 3 shows the number of deaths caused by cancer in this population. Column 4 shows the age-specific death rate calculated by dividing column 3 by column 2. There were 351 African American deaths caused by cancer in Wisconsin in 1995. Column 5 shows the number of deaths that would have occurred if African Americans had experienced the same age-specific death rates as whites in 1995. These modeled deaths are calculated by multiplying the white age-specific mortality by the African American population in each age group. Summing across the age groups, 239 African Americans would have died from cancer in 1995 if the population had experienced the white cancer death rates. The difference between the observed and modeled deaths among African Americans was 112 deaths, thus 31.9% ($112 / 351$) of African American deaths would have been averted if African Americans had experienced the lower age-specific death rates of whites.

Table B1: Example showing calculation of excess African American cancer deaths

Age	White	African American			Modeled Deaths (if exposed to White Rate) (1)*(3) (5)
	Observed Death Rate (per 100,000) (1)	Observed Deaths (2)	Population (3)	Observed Death Rate (per 100,000) (2)/(3) (4)	
Under 1	0.0	0	5,949	0.0	0
1-4	4.2	1	27,723	3.6	1
5-9	1.2	1	34,291	2.9	0
10-14	2.8	0	30,656	0.0	1
15-19	2.4	0	27,313	0.0	1
20-24	5.5	1	24,234	4.1	1
25-29	7.6	1	22,873	4.4	2
30-34	11.5	1	23,220	4.3	3
35-39	21.1	7	22,841	30.6	5
40-44	41.6	24	18,371	130.6	8
45-49	83.1	23	14,049	163.7	12
50-54	156.7	35	9,655	362.5	15
55-59	292.7	36	7,737	465.3	23
60-64	447.7	43	6,269	685.9	28
65-69	700.9	52	5,462	952.0	38
70-74	956.7	44	3,447	1276.5	33
75-79	1240.7	37	2,282	1621.4	28
80-84	1485.2	24	1,291	1859.0	19
85+	1880.3	21	1,152	1822.9	22
Total		351	288,815		239