

Racial Disparities in Cancer Incidence and Mortality: Wisconsin and United States, 1996-2000

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ABSTRACT

These findings focus on African American-white disparities in cancer incidence and mortality between 1996 and 2000 in Wisconsin and the United States. Cancer incidence data were obtained from the Wisconsin Cancer Reporting System (WCRS), the National Cancer Institute's (NCI) Surveillance, Epidemiology and End Results (SEER) Program, and mortality data from the National Center for Health Statistics. Results of this study highlight site-specific differences in cancer incidence and mortality rates age adjusted to the 2000 US standard population. Incidence and mortality rate ratios (RR) were calculated comparing African American and white populations. Supplemental variables of cancer-related risk behaviors from the Wisconsin Behavioral Risk Factor Surveillance System (BRFSS) and stage of disease at diagnosis information from WCRS were also examined for differences between African American and white populations. Results showed Wisconsin had an overall greater disparity than the United States for all cancers combined and for cancers of the lung, cervix, and gastrointestinal sites. During the 5-year period, Wisconsin's overall cancer mortality rate was 196 per 100,000, but among African Americans in Wisconsin, the overall mortality rate was 272 per 100,000.

INTRODUCTION

With few exceptions, African Americans have the highest mortality rates and the worst survival of any racial population in the United States. African Americans have a 10% higher incidence rate and a 30% higher mortality rate from all cancers combined than whites in the United States.¹ While Asian Americans, American

Indians, and Hispanics generally have lower incidence and mortality rates than whites (with few site-specific exceptions) the lower rates may be attributable in part to incomplete case ascertainment and under-reporting of racial/ethnic data to the state and ultimately national registries.^{2,3} There is a pressing need for the careful examination of racial data for statewide cancer prevention and control programs. Disparities in cancer incidence and mortality between African Americans and whites at the national level have been well documented.¹ This report examines African American-white disparities in Wisconsin and answers the following questions: Are there African American-white disparities in cancer incidence and mortality in Wisconsin? Are Wisconsin disparities larger or smaller than national disparities? What are the rate ratios for African American-white differences, and how do they vary by cancer site? Do the state and national disparities parallel each other across different cancer sites? What behavioral, social, and medical factors have been identified as relevant to disparities in cancer rates?

METHODS

Data for newly diagnosed cancer cases between 1996 and 2000 were drawn from the Wisconsin Cancer Reporting System (WCRS), and from the National Cancer Institute's (NCI) Surveillance, Epidemiology and End Results (SEER) public-use database in the United States. Mortality data (the underlying cause of death) for both Wisconsin and the United States were obtained from public-use data files published by the National Center for Health Statistics. Using NCI's SEER Stat analysis software, average annual incidence and mortality rates were calculated per 100,000 and age-adjusted to the 2000 US standard population. Tables 1-4 show Wisconsin and US rate ratios for age-adjusted incidence and mortality rates comparing African Americans to whites. African

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Table 1. African American to White Cancer Incidence Rate Ratios, Wisconsin, 1996-2000

| Primary Cancer Site | Males | | | Females | | | Total | | |
|----------------------------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|
| | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio |
| All Cancers | 707.2 | 523.9 | 1.3 | 398.5 | 402.0 | 1.0 | 523.5 | 450.0 | 1.2 |
| Oral Cavity and Pharynx | 28.4 | 16.3 | 1.7 | 5.5 | 6.6 | 0.8 | 15.1 | 11.0 | 1.4 |
| Esophagus | 17.0 | 9.6 | 1.8 | 4.9 | 2.0 | 2.4 | 9.9 | 5.4 | 1.8 |
| Stomach | 20.1 | 9.8 | 2.0 | 7.9 | 3.6 | 2.2 | 12.8 | 6.3 | 2.0 |
| Colon and Rectum | 72.3 | 69.9 | 1.0 | 58.0 | 49.2 | 1.2 | 64.5 | 58.3 | 1.1 |
| Liver and Intrahepatic Bile Duct | 10.1 | 5.8 | 1.7 | 3.3 | 2.3 | 1.4 | 6.2 | 3.9 | 1.6 |
| Pancreas | 18.7 | 11.1 | 1.7 | 17.2 | 8.6 | 2.0 | 18.0 | 9.7 | 1.9 |
| Larynx | 18.1 | 7.6 | 2.4 | 3.8 | 1.6 | 2.4 | 9.6 | 4.3 | 2.2 |
| Lung and Bronchus | 143.6 | 80.9 | 1.8 | 60.2 | 46.5 | 1.3 | 93.5 | 60.9 | 1.5 |
| Melanoma of the Skin | 0.5 | 14.3 | 0.0 | 0.2 | 10.0 | 0.0 | 0.3 | 11.8 | 0.0 |
| Breast | 1.7 | 1.5 | 1.1 | 114.0 | 131.3 | 0.9 | 65.9 | 71.1 | 0.9 |
| Cervix Uteri | - | - | - | 17.1 | 9.0 | 1.9 | - | - | - |
| Corpus and Uterus, NOS | - | - | - | 18.2 | 27.4 | 0.7 | - | - | - |
| Ovary | - | - | - | 9.0 | 16.4 | 0.5 | - | - | - |
| Prostate | 258.7 | 157.4 | 1.6 | - | - | - | - | - | - |
| Testes | 1.8 | 7.2 | 0.2 | - | - | - | - | - | - |
| Urinary Bladder | 10.7 | 28.1 | 0.4 | 6.8 | 7.6 | 0.9 | 8.4 | 16.2 | 0.5 |
| Kidney and Renal Pelvis | 18.5 | 15.9 | 1.2 | 6.8 | 8.5 | 0.8 | 11.5 | 11.9 | 1.0 |
| Brain and Other Nervous System | 2.8 | 8.0 | 0.3 | 3.4 | 6.2 | 0.5 | 3.2 | 7.1 | 0.4 |
| Thyroid | 3.1 | 3.2 | 0.9 | 3.8 | 8.9 | 0.4 | 3.3 | 6.1 | 0.5 |
| Hodgkin Lymphoma | 3.7 | 3.6 | 1.1 | 1.5 | 2.9 | 0.5 | 2.5 | 3.2 | 0.8 |
| Non-Hodgkin Lymphoma | 17.3 | 22.1 | 0.8 | 13.4 | 15.6 | 0.8 | 15.4 | 18.4 | 0.8 |
| Myeloma | 10.6 | 5.8 | 1.8 | 7.5 | 3.8 | 2.0 | 8.8 | 4.6 | 1.9 |
| Leukemia | 14.2 | 16.6 | 0.8 | 9.5 | 10.1 | 0.9 | 11.6 | 12.8 | 0.9 |

Source: Wisconsin Cancer Reporting System, Bureau of Health Information, Department of Health and Family Services. Rates are averaged per 100,000 population and age-adjusted to the 2000 US standard population.

Table 2. African American to White Cancer Mortality Rate Ratios, Wisconsin, 1996-2000

| Primary Cancer Site | Males | | | Females | | | Total | | |
|----------------------------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|
| | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio |
| All Cancers | 378.1 | 244.3 | 1.5 | 204.1 | 161.5 | 1.3 | 271.6 | 193.5 | 1.4 |
| Oral Cavity and Pharynx | 9.0 | 4.0 | 2.2 | 2.3 | 1.7 | 1.3 | 5.2 | 2.7 | 1.9 |
| Esophagus | 15.2 | 8.6 | 1.8 | 4.7 | 1.8 | 2.6 | 9.3 | 4.7 | 2.0 |
| Stomach | 17.4 | 5.8 | 3.0 | 6.5 | 2.3 | 2.8 | 10.7 | 3.7 | 2.9 |
| Colon and Rectum | 33.2 | 25.8 | 1.3 | 26.4 | 17.0 | 1.5 | 29.1 | 20.7 | 1.4 |
| Liver and Intrahepatic Bile Duct | 10.4 | 5.4 | 1.9 | 3.5 | 2.7 | 1.3 | 6.7 | 3.9 | 1.7 |
| Pancreas | 20.6 | 11.8 | 1.7 | 16.5 | 8.8 | 1.9 | 18.3 | 10.2 | 1.8 |
| Larynx | 6.0 | 2.2 | 2.7 | 0.8 | 0.5 | 1.6 | 2.8 | 1.2 | 2.3 |
| Lung and Bronchus | 130.2 | 66.9 | 1.9 | 45.8 | 35.9 | 1.3 | 79.2 | 48.7 | 1.6 |
| Melanoma of the Skin | 0.6 | 3.8 | 0.2 | 0.6 | 1.8 | 0.3 | 0.6 | 2.7 | 0.2 |
| Breast | 0.3 | 0.4 | 0.7 | 30.7 | 26.5 | 1.2 | 18.3 | 15.1 | 1.2 |
| Cervix Uteri | - | - | - | 6.3 | 2.1 | 3.0 | - | - | - |
| Corpus and Uterus, NOS | - | - | - | 7.1 | 4.0 | 1.8 | - | - | - |
| Ovary | - | - | - | 5.3 | 9.8 | 0.5 | - | - | - |
| Prostate | 61.3 | 33.7 | 1.8 | - | - | - | - | - | - |
| Testes | 0.0 | 0.3 | 0.0 | - | - | - | - | - | - |
| Urinary Bladder | 6.3 | 7.9 | 0.8 | 3.2 | 2.3 | 1.4 | 4.1 | 4.4 | 0.9 |
| Kidney and Renal Pelvis | 7.0 | 6.6 | 1.1 | 1.4 | 3.1 | 0.4 | 3.4 | 4.6 | 0.7 |
| Brain and Other Nervous System | 1.6 | 6.1 | 0.3 | 2.2 | 4.5 | 0.5 | 2.0 | 5.2 | 0.4 |
| Thyroid | 0.2 | 0.4 | 0.5 | 0.0 | 0.5 | 0.0 | 0.1 | 0.5 | 0.2 |
| Hodgkin Lymphoma | 0.6 | 0.6 | 1.0 | 0.6 | 0.5 | 1.2 | 0.6 | 0.5 | 1.2 |
| Non-Hodgkin Lymphoma | 7.4 | 12.0 | 0.6 | 6.8 | 7.4 | 0.9 | 7.2 | 9.4 | 0.8 |
| Myeloma | 9.0 | 4.9 | 1.8 | 5.3 | 2.8 | 1.9 | 6.9 | 3.7 | 1.9 |
| Leukemia | 7.7 | 11.2 | 0.7 | 7.1 | 6.7 | 1.1 | 7.6 | 8.5 | 0.9 |

Sources: National Center for Health Statistics, and the Surveillance, Epidemiology and End Results (SEER) Program, Division of Cancer Control and Population Sciences, National Cancer Institute. Rates are averaged per 100,000 population and age-adjusted to the 2000 US standard population.

Table 3. African American to White Cancer Incidence Rate Ratios, United States, 1996-2000

| Primary Cancer Site | Males | | | Females | | | Total | | |
|----------------------------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|
| | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio |
| All Cancers | 705.9 | 566.1 | 1.2 | 406.4 | 435.7 | 0.9 | 525.1 | 486.4 | 1.1 |
| Oral Cavity and Pharynx | 21.3 | 16.3 | 1.3 | 6.1 | 6.6 | 0.9 | 12.6 | 11.0 | 1.1 |
| Esophagus | 12.3 | 7.9 | 1.5 | 4.4 | 2.0 | 2.2 | 7.7 | 4.6 | 1.7 |
| Stomach | 20.5 | 10.5 | 1.9 | 9.8 | 4.6 | 2.1 | 14.1 | 7.1 | 2.0 |
| Colon and Rectum | 71.5 | 65.3 | 1.1 | 55.3 | 47.0 | 1.2 | 61.7 | 54.8 | 1.1 |
| Liver and Intrahepatic Bile Duct | 11.0 | 6.8 | 1.6 | 3.9 | 2.6 | 1.5 | 7.0 | 4.5 | 1.5 |
| Pancreas | 18.4 | 12.5 | 1.5 | 14.5 | 9.5 | 1.5 | 16.3 | 10.8 | 1.5 |
| Larynx | 12.1 | 7.1 | 1.7 | 2.8 | 1.6 | 1.7 | 6.7 | 4.0 | 1.7 |
| Lung and Bronchus | 123.6 | 83.5 | 1.5 | 55.4 | 53.6 | 1.0 | 82.9 | 65.9 | 1.3 |
| Melanoma of the Skin | 1.6 | 25.3 | 0.1 | 0.8 | 17.3 | 0.0 | 1.1 | 20.6 | 0.0 |
| Breast | 2.0 | 1.2 | 1.7 | 120.8 | 143.0 | 0.8 | 69.8 | 77.1 | 0.9 |
| Cervix Uteri | - | - | - | 12.7 | 8.0 | 1.6 | - | - | - |
| Corpus and Uterus, NOS | - | - | - | 17.8 | 26.5 | 0.7 | - | - | - |
| Ovary | - | - | - | 11.9 | 18.0 | 0.7 | - | - | - |
| Prostate | 276.8 | 167.5 | 1.6 | - | - | - | - | - | - |
| Testes | 1.4 | 6.4 | 0.2 | - | - | - | - | - | - |
| Urinary Bladder | 20.4 | 40.7 | 0.5 | 7.8 | 10.2 | 0.8 | 12.7 | 23.0 | 0.5 |
| Kidney and Renal Pelvis | 18.1 | 16.2 | 1.1 | 10.1 | 8.0 | 1.3 | 13.5 | 11.6 | 1.2 |
| Brain and Other Nervous System | 4.9 | 8.8 | 0.6 | 3.2 | 6.0 | 0.5 | 3.9 | 7.3 | 0.5 |
| Thyroid | 1.9 | 3.9 | 0.5 | 5.9 | 10.5 | 0.6 | 4.1 | 7.2 | 0.6 |
| Hodgkin Lymphoma | 2.7 | 3.4 | 0.8 | 2.1 | 2.8 | 0.7 | 2.4 | 3.0 | 0.8 |
| Non-Hodgkin Lymphoma | 18.7 | 24.5 | 0.8 | 10.9 | 16.7 | 0.6 | 14.3 | 20.2 | 0.7 |
| Myeloma | 12.9 | 6.7 | 1.9 | 10.4 | 4.2 | 2.5 | 11.4 | 5.3 | 2.1 |
| Leukemia | 13.2 | 16.7 | 0.8 | 7.8 | 9.9 | 0.8 | 9.9 | 12.8 | 0.8 |

Source: Surveillance, Epidemiology, and End Results Program (SEER), Division of Cancer Control and Population Sciences, National Cancer Institute. Rates are averaged per 100,000 population and age-adjusted to the 2000 US standard population.

Table 4. African American to White Cancer Mortality Rate Ratios, United States, 1996-2000

| Primary Cancer Site | Males | | | Females | | | Total | | |
|----------------------------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|
| | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio | Af. Am. Rate | White Rate | AA/Wh Ratio |
| All Cancers | 356.2 | 249.5 | 1.4 | 198.6 | 166.9 | 1.2 | 257.1 | 199.1 | 1.3 |
| Oral Cavity and Pharynx | 7.9 | 4.0 | 2.0 | 2.0 | 1.6 | 1.2 | 4.5 | 2.7 | 1.7 |
| Esophagus | 12.2 | 7.3 | 1.7 | 3.4 | 1.7 | 2.0 | 7.0 | 4.1 | 1.7 |
| Stomach | 14.0 | 6.1 | 2.3 | 6.5 | 2.9 | 2.2 | 9.4 | 4.2 | 2.2 |
| Colon and Rectum | 34.6 | 25.3 | 1.4 | 24.6 | 17.5 | 1.4 | 28.5 | 20.7 | 1.4 |
| Liver and Intrahepatic Bile Duct | 9.3 | 6.0 | 1.5 | 3.7 | 2.7 | 1.4 | 6.1 | 4.2 | 1.4 |
| Pancreas | 16.4 | 12.0 | 1.4 | 12.9 | 8.9 | 1.4 | 14.4 | 10.3 | 1.4 |
| Larynx | 5.7 | 2.4 | 2.4 | 0.9 | 0.5 | 1.8 | 2.9 | 1.3 | 2.2 |
| Lung and Bronchus | 107.0 | 78.1 | 1.4 | 40.0 | 41.5 | 1.0 | 66.4 | 56.7 | 1.2 |
| Melanoma of the Skin | 0.5 | 4.4 | 0.1 | 0.5 | 2.0 | 0.2 | 0.5 | 3.1 | 0.2 |
| Breast | 0.6 | 0.3 | 2.0 | 35.9 | 27.2 | 1.3 | 21.4 | 15.4 | 1.4 |
| Cervix Uteri | - | - | - | 5.9 | 2.7 | 2.2 | - | - | - |
| Corpus and Uterus, NOS | - | - | - | 7.0 | 3.8 | 1.8 | - | - | - |
| Ovary | - | - | - | 7.4 | 9.1 | 0.8 | - | - | - |
| Prostate | 73.0 | 30.2 | 2.4 | - | - | - | - | - | - |
| Testes | 0.2 | 0.3 | 0.7 | - | - | - | - | - | - |
| Urinary Bladder | 5.8 | 8.0 | 0.7 | 3.0 | 2.3 | 1.3 | 4.0 | 4.5 | 0.9 |
| Kidney and Renal Pelvis | 6.2 | 6.2 | 1.0 | 2.8 | 2.8 | 1.0 | 4.2 | 4.3 | 1.0 |
| Brain and Other Nervous System | 3.3 | 6.0 | 0.5 | 2.3 | 4.1 | 0.6 | 2.7 | 5.0 | 0.5 |
| Thyroid | 0.3 | 0.4 | 0.7 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 0.1 |
| Hodgkin Lymphoma | 0.6 | 0.6 | 1.0 | 0.3 | 0.4 | 0.7 | 0.5 | 0.5 | 0.1 |
| Non-Hodgkin Lymphoma | 7.6 | 11.1 | 0.7 | 4.6 | 7.3 | 0.6 | 5.9 | 8.9 | 0.7 |
| Myeloma | 9.2 | 4.5 | 2.0 | 6.6 | 2.9 | 2.3 | 7.6 | 3.5 | 2.2 |
| Leukemia | 9.3 | 10.6 | 0.9 | 5.5 | 6.0 | 0.9 | 7.0 | 7.9 | 0.9 |

Sources: SEER Public-use Database: Mortality - All COD (1969-2000), National Cancer Institute, Surveillance Research Program, released April, 2003. Underlying mortality data provided by National Centers for Health Statistics. Rates are averaged per 100,000 population and age-adjusted to the 2000 US standard population.

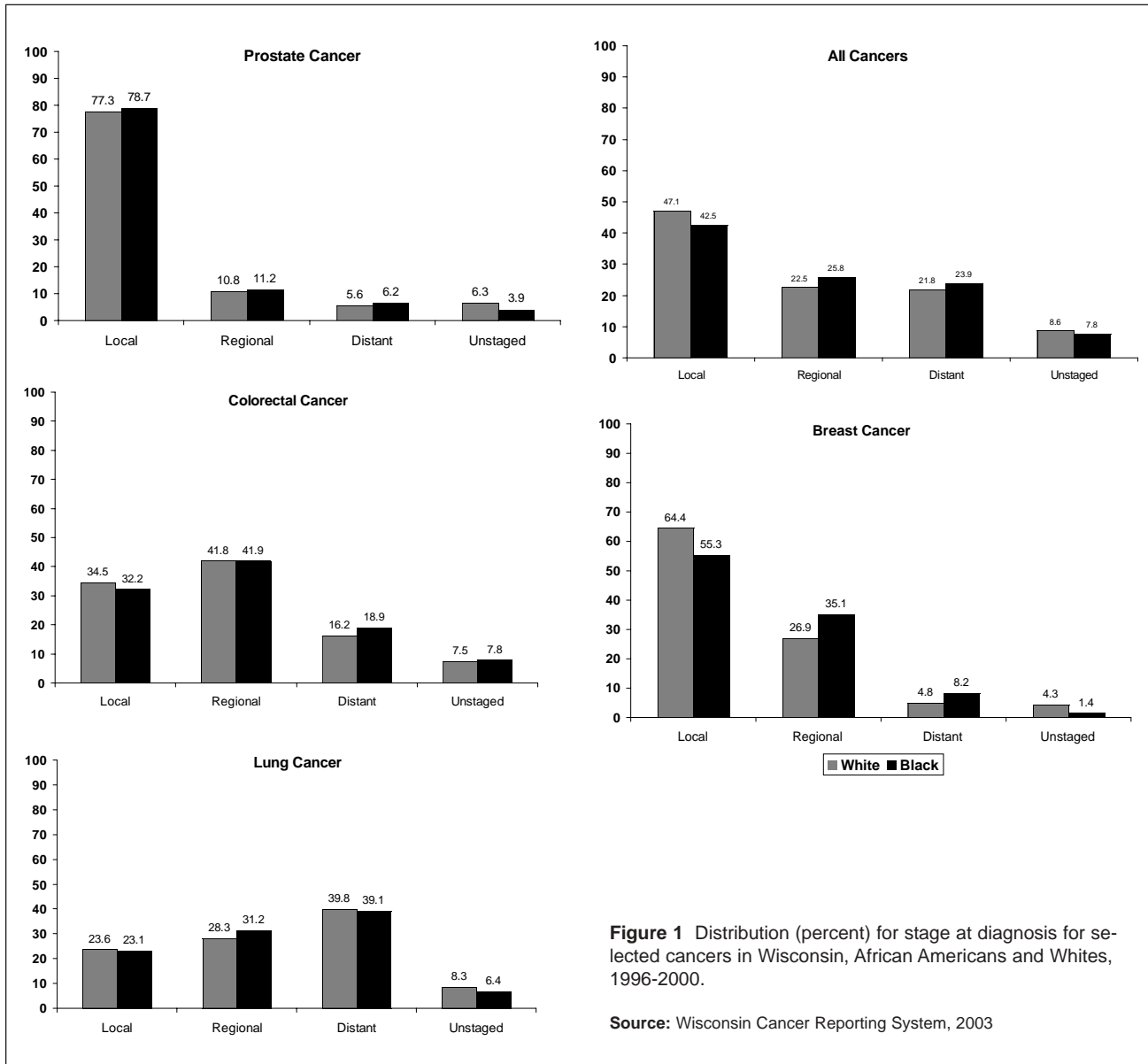


Figure 1 Distribution (percent) for stage at diagnosis for selected cancers in Wisconsin, African Americans and Whites, 1996-2000.

Source: Wisconsin Cancer Reporting System, 2003

American-white rate ratios were calculated for selected cancer sites and by gender. An RR above 1 indicates a higher incidence or mortality rate for the black population. Data for the stage of disease at diagnosis were categorized according to SEER summary stage definitions for invasive cancers: local, regional, distant and unstaged (Figure 1). This report also provides data about the prevalence of cancer-related behaviors from the BRFSS and the National Health Interview Survey, administered annually to adults by telephone and in-person, respectively (Table 5).

Analyses for this report were restricted to white and African American populations. According to the 2000 census, African Americans comprise 5.7% of Wisconsin's population and 12.4% of the US population.

Information on race compiled by WCRS and SEER registries is routinely obtained from patient medical records or death certificates, and often reflects a subjective judgment by hospital staff and a coroner, medical examiner or funeral director.⁴ Recent evidence suggests the reporting of race for the African American and white populations are generally reliable, but more biases are found for smaller racial populations, particularly for American Indians.^{2,3} Additionally, rates for less common cancers can be unreliable for small racial and ethnic populations.

RESULTS

African American-white disparities for all cancer sites combined for both incidence and mortality were greater for Wisconsin than the United States. RRs indicated

Table 5. Wisconsin Behavioral Risk Factor Surveillance System Results

| Lifestyle Practices by Race, 2000, 2001 | | |
|--|-------|---------|
| | White | Af. Am. |
| Prevalence of obesity (% with BMI => 30 kg/m ²) among adults aged 18 and over, 2001 | 22% | 35% |
| Fruit and vegetable consumption (consuming <5 servings /day) for adults age 18 and over, 2001 | 79% | 79% |
| Sedentary lifestyle (no leisure time physical activity during the past month) among adults age 18 and over, 2001 | 20% | 34% |
| Currently smoking cigarettes, 2000 | 23% | 28% |
| Cancer Screening Examinations, 2001 | | |
| | White | Af. Am. |
| Ever had a mammogram, 2001 | 65% | 57% |
| Females age 40 and over who ever had a mammogram, 2001 | 92% | 92% |
| Females age 50 and over who had a mammogram within the past two years, 2001 | 81% | 92% |
| Ever had a clinical breast exam, 2001 | 93% | 82% |
| Ever had a Pap smear, 2001 | 97% | 94% |
| Pap smear with past two years, 2001 | 84% | 92% |
| Ever had a sigmoidoscopy or colonoscopy, 2001 | 57% | 38% |

Source: Behavioral Risk Factor Surveillance System, 2000, 2001, National Centers for Disease Control and Prevention, 2003.

that the magnitude of this disparity varied by both cancer site and gender. Results were examined by site categories of potential interest to cancer prevention and control programs, such as screening-detectable cancers and smoking-related cancers.

Gender based disparities

For cancer incidence, two patterns of gender variations are shown in Tables 1 and 3. In Wisconsin, African American males had a 30% higher overall incidence (RR=1.3, Table 1) than white males, but among females, African Americans and whites experienced equivalent incidence rates (RR=1, Table 1). Wisconsin males also experienced larger racial disparities than were found for the nation (RR=1.2, Table 3). This difference was largely due to a lower white incidence rate, but a similar African American rate, compared to the US rates. The overall incidence rate for whites was 450 per 100,000 in Wisconsin compared to 486 per 100,000 in the United States; the overall rate for African Americans was 523 per 100,000 in Wisconsin compared to 525 per 100,000 in the United States.

Racial disparities were more pronounced for cancer mortality than for cancer incidence. African American males in Wisconsin experienced a 50% higher overall mortality (RR=1.5, Table 2) than white males. Despite the same incidence rate, African American females had a 30% higher mortality rate than white females (RR=1.3, Table 2). African American-white disparities were greater in Wisconsin for both males and females (RR=1.5 and 1.3, respectively, Table 2) than in the United States (RR=1.4 and 1.2, respectively, Table 4).

Cancers detectable by screening

During the 1996-2000 period, cervical cancer incidence rates were higher in Wisconsin than in the United States, but by a larger margin for African Americans. In Wisconsin, the African American incidence rate for invasive cervical cancer was almost twice the rate for whites (RR=1.9, Table 1). The national magnitude of this disparity was less (RR=1.6, Table 3). The African American-white disparity in cervical cancer mortality rates was also larger in Wisconsin, with an African American rate 3 times higher than the white rate (Table 2), compared to the national rate, which was twice as high (Table 4).

Female breast cancer incidence rates were lower in Wisconsin than nationally, regardless of race. In contrast to other major cancers, the disparity was that African American females had lower rates in both Wisconsin and the United States (Wisconsin RR=0.9 and United States RR=0.8, Tables 1 and 3). However, the disparity was reversed for mortality; African American women had higher mortality rates than white women in Wisconsin and the nation. Among African American women in Wisconsin, the breast cancer mortality rate was lower than the national rate, (31 and 36 per 100,000, respectively) resulting in a smaller disparity (RR=1.2 in Wisconsin, RR=1.3 in United States, Tables 2 and 4). Among white women in Wisconsin, the breast cancer mortality rate was close to the national rate (26 and 27 per 100,000, respectively).

Prostate cancer incidence rates were lower in Wisconsin than in the United States for both African American and white males. The Wisconsin incidence rates were 259 per 100,000 for African Americans and 157 per 100,000 for whites compared to US rates of 277 per 100,000 for African Americans and 167 per 100,000 for whites. The African American-white disparities in incidence for state and national rates were equivalent with a rate ratio of 1.6 (Tables 1 and 3). The Wisconsin mortality rate among African Americans for prostate cancer was lower than the US rate (61 per 100,000 in Wisconsin, 73 per 100,000 in the United States) but the

mortality rate for whites in Wisconsin exceeded the national rate (34 per 100,000 in Wisconsin, 30 per 100,000 in United States). Thus the disparity between African American and white rates was larger at the national level (RR=2.4, Table 4) than in Wisconsin (RR=1.8, Table 2).

Colorectal cancer incidence rates were similar between African American and white populations (RR=1.1) in both Wisconsin and the United States. Mortality rates showed a larger disparity (RR=1.4) at both state and national levels. Tables 2 and 4 show the disparity in colorectal cancer mortality was greatest for females in Wisconsin; the rate was higher than both the Wisconsin male rate (RR=1.5, compared to 1.3), and the US female rate. (RR=1.4).

Tobacco-related cancers

In general, the incidence and mortality rates for many tobacco-related cancers (lung and bronchus, oral cavity and pharynx, larynx, esophagus, stomach, liver, and pancreas)² were higher for African Americans than whites. African American-white incidence disparities were found for lung cancer at both state and national levels, but were of greater magnitude in Wisconsin (RR=1.5, Table 1) than the United States (RR=1.3, Table 3). The disparity in mortality rates for lung cancer was also higher for Wisconsin (RR=1.6, Table 2) than nationally (RR=1.2, Table 4).

African American-white disparities for both incidence and mortality were found for most cancers of the gastrointestinal system, many of which are smoking-related. For example, esophageal and laryngeal cancer rates (incidence and mortality) were approximately twice as high for African Americans as for whites in Wisconsin. The disparities in the United States were generally less than in Wisconsin. The esophageal cancer mortality RR was 1.7 nationally, compared to Wisconsin's RR of 2.0. For cancer of the larynx, the US mortality RR was 2.2, and the Wisconsin RR was 2.3. Among cancers of the gastrointestinal system, stomach cancer rates were the most disparate. In Wisconsin, the stomach cancer incidence rate among African Americans was double, and the mortality rate triple the corresponding rates for whites. In the United States, both incidence and mortality rates for stomach cancer were twice as high for African Americans as for whites.

Lifestyle and Behavioral Risk Factors

According to the American Cancer Society, dietary choices and physical activity are the most important modifiable cancer risk factors, next to not smoking. Table 5 summarizes cancer-related behavior practices

based on data from the BRFSS. In Wisconsin, African Americans had a higher prevalence of cigarette smoking than whites. There were also higher proportions of obesity and sedentary lifestyles among African Americans in Wisconsin. The prevalence for recommended fruit and vegetable consumption (5 servings a day) was 21% for both white and African American Wisconsin respondents.

Currently screening is available for cancers of the breast, colon, rectum, cervix, prostate, testes, oral cavity, and skin.⁶ Early detection screening in asymptomatic people is a current objective of state and national cancer prevention programs, and differences in screening access and utilization contribute to racial disparities. The 2001 Wisconsin BRFSS results indicate that fewer African Americans than whites reported "ever" having been screened for major cancers, but a similar or higher proportion of African Americans than whites reported having been screened in the "past two years."

Stage at Diagnosis

Figure 1 shows the stage of disease at diagnosis during 1996-2000 for all cancers combined and leading cancers for African Americans and whites in Wisconsin. A higher percent of all cancer was detected at the early (local) stage for whites than for African Americans (47% compared to 42%). Breast cancer was also detected earlier, at the local stage, for whites than African American women (64% compared to 55%). Prostate cancer was diagnosed early for the majority of men regardless of race (77% for whites, 78% for African Americans). In Wisconsin, the distributions for stage of disease at diagnosis generally paralleled the national patterns, with the exceptions of a higher percent of early lung cancer detection (23% compared to the 16% national rate) and a lower percent of early prostate cancer detection for both races (approximately 77% compared to the national rates of 86% for whites and 82% for African Americans).¹

DISCUSSION

With few exceptions, African Americans have mortality rates far in excess of white populations in Wisconsin and the United States. Incidence rates are also higher among African Americans than whites for all major cancers with the exception of breast cancer. At least four areas of research suggest potential contributing factors to the disparity between African American and white cancer rates: health care or screening and treatment disparities; biologic or hormonal patterns; potentially modifiable behavioral risk factors (obesity, physical activity, and lifestyle behaviors); and socioeconomic

status. The caveats of the available cancer data in Wisconsin and SEER's national cancer dataset are first briefly discussed.

Data limitations

National rates were based on SEER registry data, and while many felt that the current data were sufficient to estimate national rates for cancer control purposes,⁷ SEER recently expanded the number of registries to better represent minority populations.¹ Because only white and African American data were used in this report, the traditional SEER program was considered adequate and provided the most complete published national data. To the extent that SEER may not completely and accurately represent the United States racial populations, the national estimates are subject to challenge.

The North American Association of Central Cancer Registries⁸ is currently studying the reliability of reporting race and ethnicity in all population-based registries in the National Program of Cancer Registries (NPCR). At present, the coding of race and ethnicity is not standardized among cancer registries (not all registries use surnames or place of birth, some facilities do not ask for patient self-identification of race or ethnicity). Although incidence rates for African Americans and whites are considered more reliable than for the other minority racial and ethnic populations, the magnitude of errors or under-reporting is difficult to determine, particularly if long-term in nature. Recent studies have found an underestimation of mortality for American Indians and Hispanics may contribute to an overestimation of mortality for whites and African Americans.^{9,10}

Socioeconomic Status

All cancer registries in the NPCR use the US 2000 Census Bureau's racial and ethnic classification categories.⁴ Racial population categories are sometimes criticized as not being biological categorizations as much as sociopolitical categorizations.¹¹ Socioeconomic status is another categorization that has been associated with cancer risk, incidence, and mortality. Lower income populations have higher incidence and mortality from a number of cancers regardless of race.^{12,13} In spite of recent progress in raising income levels as shown in the 2000 census, African Americans still constitute a disproportionate number of the poor in the United States and Wisconsin. The total national poverty rate in 2001 was 12%, but the African American rate was 23%.¹⁴ Although Wisconsin had one of the nation's lowest poverty rates (8.7%), the poverty rate among African Americans (31.8%) was

well above the national rate.¹⁵ In Wisconsin, only 3% of whites reported having no health insurance over the past year for 2001, compared to 11% of African Americans reporting no coverage.¹⁶ Census data for the United States showed that 10% of whites were uninsured compared with 19% of African Americans.¹⁷ Education level also varied by race in Wisconsin, with college degrees being held by 23% of whites compared with 10.5% of African Americans. Nationally, in 2002, the proportion of whites with at least a bachelor's degree was 29%, compared with 17% of African Americans.¹⁴ Economically Wisconsin had greater disparities in poverty, education, and health insurance coverage than the United States.

Screening and Treatment Utilization

Wisconsin's screening data suggest breast and cervical cancer screening programs like the National and Wisconsin's Breast and Cervical Early Detection Programs have made progress in reducing disparities.¹⁸ Two major reviews of national screening trends for the National Health Interview Survey^{19,20} reported the racial disparity in breast cancer screening between African American and white women that was found a decade earlier had all but disappeared by 1998. However, women with no usual source of medical care and those uninsured were still behind in screening utilization. The Behavioral Risk Factor national data also reflected commensurate mammography utilization for African American and white women, and in 1997 the youngest group studied, age 40-49, reported a higher screening prevalence for African American women than white women.²¹ In contrast, colorectal screening utilization remained low for both races, although the Wisconsin prevalence in 2001 (for adults 50 and older reporting a sigmoidoscopy or colonoscopy in the preceding 5 years) was above the national prevalence (46% and 37%, respectively). The prevalence for prostate-specific antigen testing (during the past year) was 55% in Wisconsin and 57% in the United States, and African American and white males generally reported similar rates.^{6,22}

As the provision of equitable screening is a contributing factor to reducing disparities in cancer incidence and stage at diagnosis, the receipt of equitable treatment would address the African American-white disparities in cancer mortality. Racial disparities in cancer treatments have been well documented in at least two studies. Shavers and Brown²³ reported racial disparities in definitive therapy, conservative therapy, and adjuvant therapy. This comprehensive review also found that lung and colorectal surgical treatments were

consistently disparate between races. Breast and prostate cancer surgical treatments were also found to vary by race, but less conclusively. Bach et al, in a study of clinical trials, also found that equal access to treatment resulted in similar survival outcomes between racial minorities and whites with similar disease.²⁴ Some researchers have estimated that a potential 70% reduction in the African American-white disparity for breast cancer mortality could be realized from the provision of equal treatment.²⁵

Biological factors

Many cancers are known to have biologic prognostic factors. Breast cancer risk factors are related to reproductive and hormonal histories (parity, age at first pregnancy, oral contraceptives, and hormone replacement therapy). Racial/ethnic differences may be related to certain biologic differences. Breast cancer occurs at a higher rate among African American women under 40, but at a lower rate after age 40.^{26,27} Also, breast cancer in younger women is often more aggressive. Studies have also looked at molecular racial/ethnic differences for prostate cancer^{28,29} with mixed results. Research continues to determine the role, if any, biologic and genetic factors play in racial cancer disparities.

CONCLUSIONS

The data presented in this article re-justify the minority health cancer control programs focused on African Americans. Wisconsin African American-white disparities for all cancers combined and for the leading cancers, based on both incidence and mortality rate ratios, were larger than the national disparities. Disparities in Wisconsin were more pronounced for mortality than incidence, and were greatest for male mortality; African American males in Wisconsin are twice as likely to die from lung and prostate cancer and three times as likely to die from stomach cancer as their white counterparts. While African American women in Wisconsin are less likely to be diagnosed with breast cancer, they are more likely to die from the disease. The cervical cancer incidence for African American women in Wisconsin is double the rate for white women, and mortality is triple the white rate.

Potential contributing factors to cancer incidence disparities were found in lifestyle behaviors (smoking, obesity, and lack of exercise) reported by major risk factor surveillance programs. Although breast, cervical, and prostate screening during the 1990s became relatively equitable between African Americans and whites, in Wisconsin whites are still diagnosed with cancer at an earlier stage for most major cancers. At

least two large national studies have presented results documenting disparate cancer treatment that could contribute to racial/ethnic differences in mortality rates.

Compared to the United States, Wisconsin provides an economically resourceful environment (lower poverty and unemployment rates and higher levels of insurance coverage). Despite these resources, African Americans in Wisconsin still assume an unequal burden of cancer, with diagnosis at a later stage and poor survival compared to whites, and the disparity is greater in Wisconsin than in the United States. The level of disparity reported by cancer registry programs (NPCR and SEER) suggests that cancer control programs need not only to improve the quality of cancer prevention and care for all citizens, but also to address racial disparities and strive toward eliminating them.

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