FLORIDA CANCER DATA SYSTEM
SYLVESTER COMPREHENSIVE CANCER CENTER

Cancer in Florida Persons of African Descent 1988 – 2007

2010

Monique Hernandez
Lora Fleming
Jill MacKinnon
David Lee

UNIVERSITY OF MIAMI MILLER SCHOOL OF MEDICINE

CANCER IN FLORIDA PERSONS OF AFRICAN DESCENT
1988-2007

Monique N Hernandez, PhD
Lora E Fleming, MD PhD MPH MSc
Jill A MacKinnon, PhD CTR
David J Lee, PhD

Florida Cancer Data System
University of Miami Miller School of Medicine
Miami, Florida

2010

ACKNOWLEDGEMENTS

The authors would like to thank the staff of the FCDS and the Cancer Registrars of the State of Florida for their contributions to this Monograph. The Florida cancer incidence data used in this report were collected by the Florida Cancer Data System. FCDS is funded under contract with the Florida Department of Health (DOH) and the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC) and the Sylvester Comprehensive Cancer Center at the University of Miami Miller School of Medicine. The views expressed herein are solely those of the authors and do not necessarily reflect those of the CDC or the Florida DOH.

Telephone (305) 243-4600
Florida Cancer Data System website www.fcds.med.miami.edu

Suggested citation:

Hernandez MN, Fleming LE, MacKinnon JA, Lee DJ. Cancer in Florida Persons of African Descent 1988-2007. Miami: Florida Cancer Data System, 2010.

This work was supported by the Florida Department of Health (Contract COANF) and the Centers for Disease Control and Prevention through the National Program of Cancer Registries (U58/DP000844-01).

Table of Contents

A. INTRODUCTION

In the United States, persons of African Descent account for 13.5% of the US population with 41 million people in 2008 (Census 2008).[1] In 2008, there were 3.1 million (16%) persons of African Descent among Florida's rapidly growing population (EDR 2010).[2] Although traditionally the majority of Persons of African Descent population growth in both the US and Florida has been due to persons of African Descent births in the US, more recently persons of African Descent immigrating from the Caribbean, South America and even Africa are a rapidly growing population in the US.[3,4]

Recent studies have demonstrated significant cancer health disparities among persons of African Descent compared to White persons with cancer in the US. The issues of health disparities (ranging from decreased access to medical care, decreased cancer screening, diagnosis at later stage, differences in treatment, and higher cancer mortality) for persons of African Descent has significant implications for the future cancer burden as well as cancer prevention and control in the US, given the projected rapid and continuing growth of both the immigrant and US-born persons of African Descent populations. This Monograph focuses on the cancer experience of Florida persons of African Descent from 1988 through 2007, including identifying potential health disparities.

B. BACKGROUND

In the US there are over 40 million persons of African Descent representing over 13% of the US population with the preponderance (55%) living in the Southern parts of the US. With 25% of all US persons of African Descent living in New York, Georgia and Florida, persons of African Descent comprise 16% of the Florida population.[1] Persons of African Descent populations throughout the US, including Florida, are very diverse, composed of persons from the Caribbean, Latin America, and Africa as well as US born persons of African Descent .[5] Nevertheless, in general, persons of African Descent are more likely to have lower socio-economic class, less education and income, under/unemployment, and live in poorer neighborhoods compared to US White populations.[3,4]

B.1. Persons of African Descent and Health Disparities

Health disparities have been defined as "population-specific differences in the presence of disease, health outcomes, or access to health care." [6,7] Health disparities are a major issue for persons of African Descent. In general, persons of African Descent are significantly less healthy compared to US White populations, more likely to have multiple comorbidities, and more likely to die early from a range of health issues.[8-13] These health disparities can be caused by the confluence of complex issues ranging from lower socio-economic class, educational levels and job attainment to access to healthcare (due to lack of insurance or lack of neighborhood health facilities leading to lack of primary and preventive care as well as late diagnosis and treatment) to racial discrimination, health illiteracy and lack of access to nutritious food sources and healthy residential and work environments.[4,6,7,9,14-22]

B.2. Persons of African Descent and Cancer

Although persons of African Descent are not necessarily at greater risk than White Americans for developing many types of cancer, in general men and women of African Descent are at greater risk for being diagnosed at later stage and of dying from these cancers.[15,12,23-25] Thus, although there have been some improvements over the past few decades, still in general, persons of African Descent diagnosed with cancer have significantly decreased survival and life expectancy compared to the White subpopulation.[13,15,18] Of interest, these differences in cancer survival and mortality are not eliminated when socio-economic class was taken into account.[15] In addition, although not well studied, the cancer survivor quality of life is reportedly lower among persons of African Descent relative to Whites.[11,24]

Cancer in persons of African Descent must be seen against the backdrop of these health disparities and related issues.[4,9] A number of specific cancers have been particularly associated with increased risk for health disparities in Persons of African Descent. Persons of African Descent are at increased risk for lung cancer, as well as increased risk of lung cancer mortality; persons of African Descent also continue to be at increased risk for squamous cell carcinoma of the esophagus while Whites are at increasing risk for adenocarcinoma of the esophagus.[26-28] Although persons of African Descent have been shown repeatedly to be at risk of diagnosis at an advanced stage of disease for colorectal cancer, several studies have demonstrated that persons of African Descent have an increased risk of CRC mortality even after controlling for tumor stage at diagnosis, socioeconomic factors, and comorbidity.[25,29,30] Although melanoma is not considered to be a high risk cancer for persons of African Descent (who have lower age-adjusted incidence rates compared with Whites),

research has shown that melanomas in this race group are more likely to metastasize and have poorer outcomes.[31] Men of African Descent have the highest reported incidence rates of prostate cancer in the US with an increased mortality compared to White men, only partially explained by later stage at diagnosis.[32,33] Women of African Descent have higher mortality rates with endometrial cancer compared with White women; again the health disparities appears to be multi-factorial including later diagnosis, treatment disparities, comorbid conditions, and genetic differences in tumors.[34] Women of African Descent are also at risk for increased mortality with breast cancer, as well as an increased risk of aggressive disease at younger ages, compared to White women.[22,35,36] Overall, the conclusion of the cancer health disparities research for persons of African Descent is that more research is needed to understand the multi-factorial clinical, social, biological, and environmental factors that underlie these health disparities.[25]

B.3. Persons of African Descent Cancers in Florida

Compared to the data on US persons of African Descent in the SEER Registries, Florida Persons of African Descent had significantly lower incidence rates of the tobacco-related cancers of lung, bladder, pancreas, and kidney.[37] Nevertheless, as with the entire US, health disparities has also been a major issue for persons of African Descent and cancer in Florida to the extent that this issue has been explored. Head and neck tumors had poorer prognosis in persons of African Descent in Florida not explained completely by demographics, co-morbid conditions, or under-treatment.[38] Although not common, melanoma was more likely to be diagnosed at later stage in Florida persons of African Descent.[39] Florida persons of African Descent had an increased mortality for bladder cancer; of interest, early surgery was associated with significantly increased survival but women of African Descent were less likely to receive endoscopic surgery.[40] Of note, Cheung et al. [41] found that since 2000, Florida persons of African Descent have experienced higher survival rates from gastrointestinal surgery associated with increased surgical resection rates and decreased perioperative mortality. For Florida women of African Descent with invasive cervical cancer, studies correlated late stage at diagnosis and inadequate surgical treatment with increased risk for mortality.[42,43] Of interest, Kobetz et al. (2010)[44] reported that among women of African Descent, Florida Haitian women were much less likely to know about the risks of human papilloma virus (HPV), a major risk factor for cervical cancer, compared to the entire US population and to other women of African Descent. Finally, Florida women of African Descent were more likely to present at a younger age and at a later stage of diagnosis with breast cancer.[45]

C. METHODS

The data in this Monograph were derived from all cancer cases diagnosed in Florida, between 1988-2007, and reported to the Florida Cancer Data System (FCDS). The FCDS is a statewide, population-based cancer incidence registry created by the State of Florida Department of Health in 1978, and operated by the Sylvester Comprehensive Cancer Center at the University of Miami Leonard M. Miller School of Medicine with support from the Florida Department of Health and from the Centers for Disease Control and Prevention (CDC) and National Program for Cancer Registries (NPCR).

C.1. Assignment of race

Of note, the rates presented in the monograph were focused on persons of African Descent and the comparison group of Whites. "Persons of African Descent" include both African Americans born in the US and elsewhere (particularly the Caribbean). Race data are extracted from the medical and pathology records by trained Certified Cancer Registrars using nationally recognized standards and coded as "Black race."

C.2. Persons of African Descent Cancers

For incidence analyses, all records of invasive cancers among Florida persons of African Descent diagnosed during the 18 year period from 1988-2007 were used in the analysis. Primary cancer site and histology data were coded according to the International Classification of Diseases for Oncology edition in use at the time of diagnosis, converted to the third edition,[46] and categorized according to SEER site groups.[47] The top 10 cancers among all Florida residents in the FCDS database for 2007 were selected, as well as additional cancers demonstrated to be elevated in persons of African Descent populations, as described above in the Background section (Appendix 1).

C.3. Cancer Rates

Age and gender-specific population data for the state of Florida for each racial group for the study years were obtained from the Florida Consensus Estimating Conference for the underlying denominator of all persons at risk. As noted above, for the incidence analysis, all records of invasive cancers among Florida persons of African Descent diagnosed during the 18 year period were used in the analysis.

Cancer incidence rates for years (1988–2007) per 100,000 persons were age-adjusted by 18 age groups (0–4, 5–9, . . . , 80–84, 85 and above) to the 2000 U.S. standard population. Age-adjustment is a process to correct for the differences in cancer cases and death counts caused by differing age composition among different populations and counties. The direct method of age-adjustment was used to calculate age-adjusted incidence and mortality rates in this report.[48] Standard errors and 95% confidence intervals (95% CI) were generated using equations published by SEER*Stat.[49] These values were produced to enable long-term cancer incidence trends (1989-2007) through Joinpoint analysis for all persons of African Descent and Whites.[50] To protect confidentiality, data were suppressed when cell counts were less than 10 cancer cases (following FCDS rules).

C.4. Joinpoint Analyses

The analyses of cancer incidence trends between the years 1988-2007 were conducted using the Joinpoint regression model, where statistically significant rate changes (increase or decrease) determine the best fitting points, or "joinpoints." The analysis begins with a minimum number of joinpoints (e.g. zero or a straight line), and tests whether one or more points are significant and whether they should be added to the model by means of the Monte Carlo Permutation method.[50] The final model represents a statistically significant change in a trend at each joinpoint. The Annual Percent Change (APC), or the average rate of change in a cancer rate, was generated for each joinpoint segment and was tested at the $\rho < 0.05$ to determine if the rate of change was significantly different from zero. The Joinpoint analyses were performed using the Joinpoint software, version 3.3, from the Surveillance Research Program of the US National Cancer Institute (available at http://srab.cancer.gov/joinpoint).

Of note, two different statistical models are used in the Joinpoint analyses, linear and log linear regression. In order to generate the APCs, the log linear model is used; however, if there are any zero values in the dependent variable due to small sample sizes in particular subpopulations, the log linear model drops that particular value from the analysis, and neither an APC nor a graphic line is generated by the software. In these cases (e.g. subpopulations of gall bladder cancer), we elected to use the linear model to generate a graphic line which is noted in the affected figures (http://srab.cancer.gov/joinpoint/faq/zeros.html).

D. RESULTS

D.1. Florida Persons of African Descent Population and Cancer Cases

D.1.1. Florida Persons of African Descent by Percentage of County Population 2007

The distribution of Florida Persons of African Descent as a percentage of the total population in each county in 2007 is represented as a map in **Figure 1**. Gadsden, Madison, and Hamilton Counties had the highest proportion of Persons of African Descent with 57%, 40%, and 38% of the total population being Persons of African Descent, respectively. There was a clear concentration of counties in northern Florida with the highest proportions of Persons of African Descent, while only Miami-Dade and Broward counties had proportions higher than 20% in southern Florida.

D.1.2. Florida Persons of African Descent by Proportion of Total State Population 2007

Figure 2 is a map showing the proportional distribution of total Florida persons of African Descent in the State by county in 2007. A majority of Persons of African Descent in Florida lived in the southern region of Florida, with about 41% residing in Miami-Dade, Broward, and Palm Beach counties alone. Another 23% resided in the counties of Orange and Hillsborough, which are located in central Florida, and Duval, which is located in northeastern Florida. A smaller percentage of persons of African Descent lived in parts of Northern Florida.

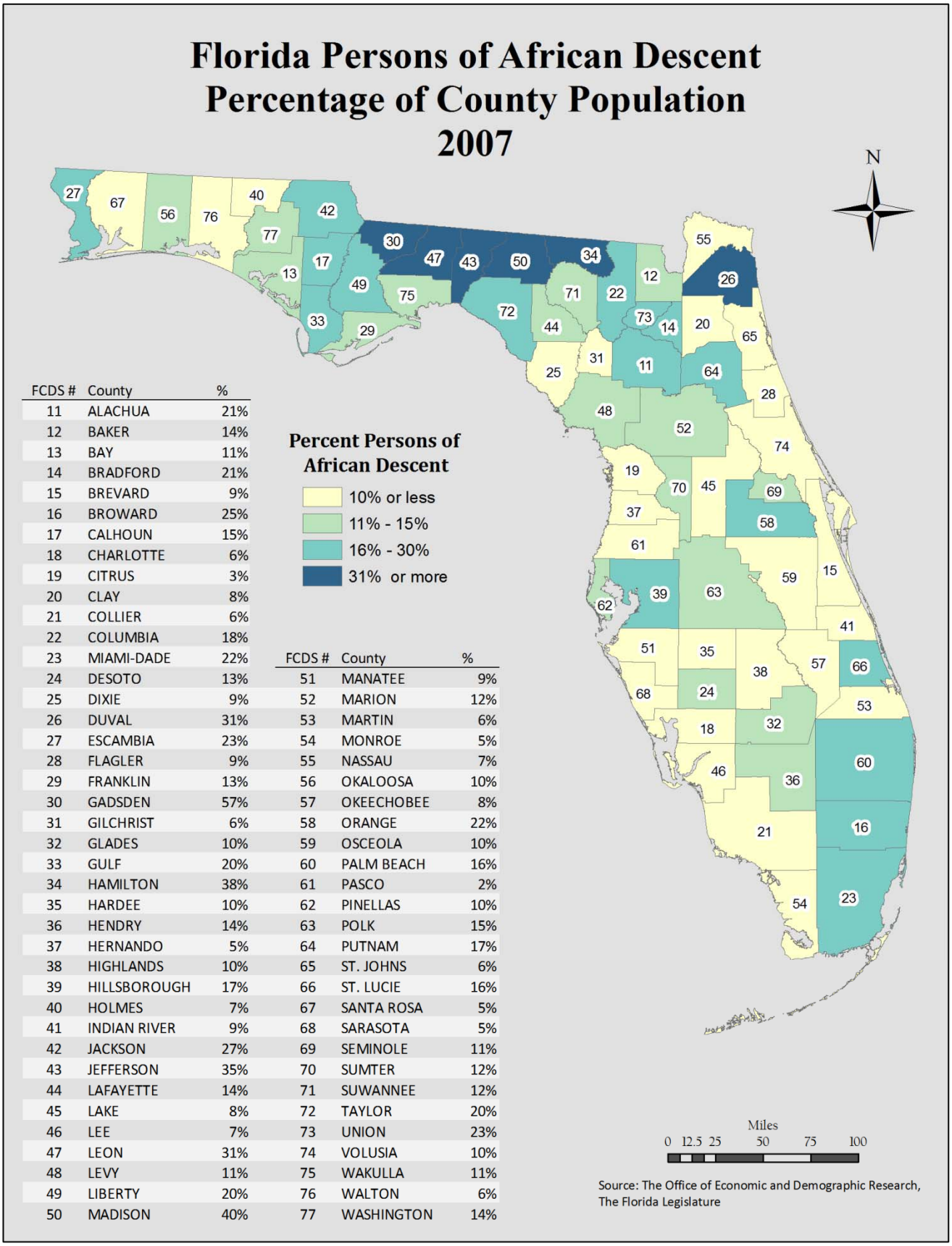
D.1.3. Florida Distribution of Persons of African Descent Cancers by County 2000-2007

The map of Florida Persons of African Descent age-adjusted cancer rates are displayed by county and are divided into quartiles (**Figure 3**). The age-adjusted rates are per 100,000 people and represent newly diagnosed cases between the years 2000 to 2007, pooled to provide more stable estimates than for a single year. Data for counties with less than 10 cases are suppressed. As a result, rates for three counties in northern Florida are suppressed. Counties within the highest quartile (with rates between 465 and 580) were dispersed throughout the state, with concentrations in central and northern Florida, and the northeast section of the Florida panhandle. Counties in the third highest quartile with rates between 433 and 464 were also distributed throughout the state with the highest number of contiguous counties located in the Central West region of Florida. Counties in the lower two quartiles were predominantly located in the Northern region of Florida.

D.1.4. Percentage of New Cancer Cases by Race and Site, 2000-2007

Figures 4 and **5** compare the ranking of primary sites for the year 2007 with the highest sex-specific proportion of cancer diagnoses in persons of African Descent as compared to Whites. Rankings are in order of the top White cancer diagnoses. Among males, race-specific cancer site rankings were similar for the top three cancers (prostate, lung and bronchus, and colorectal). Proportionally, males of African Descent had lower cases of bladder cancer, and slightly higher proportions of liver and stomach cancer. Among White females, the top five cancers consisted of cancer of the breast, lung and bronchus, colorectal, uterus, and Non Hodgkin's Lymphoma, while for females of African Descent the top five were cancers of the breast, colorectal, lung and bronchus, uterus, and cervix (NHL for 2007). Females of African Descent also had a higher proportion of cervical cancer, but a lower proportion of melanoma than did White females.

Figure 1.

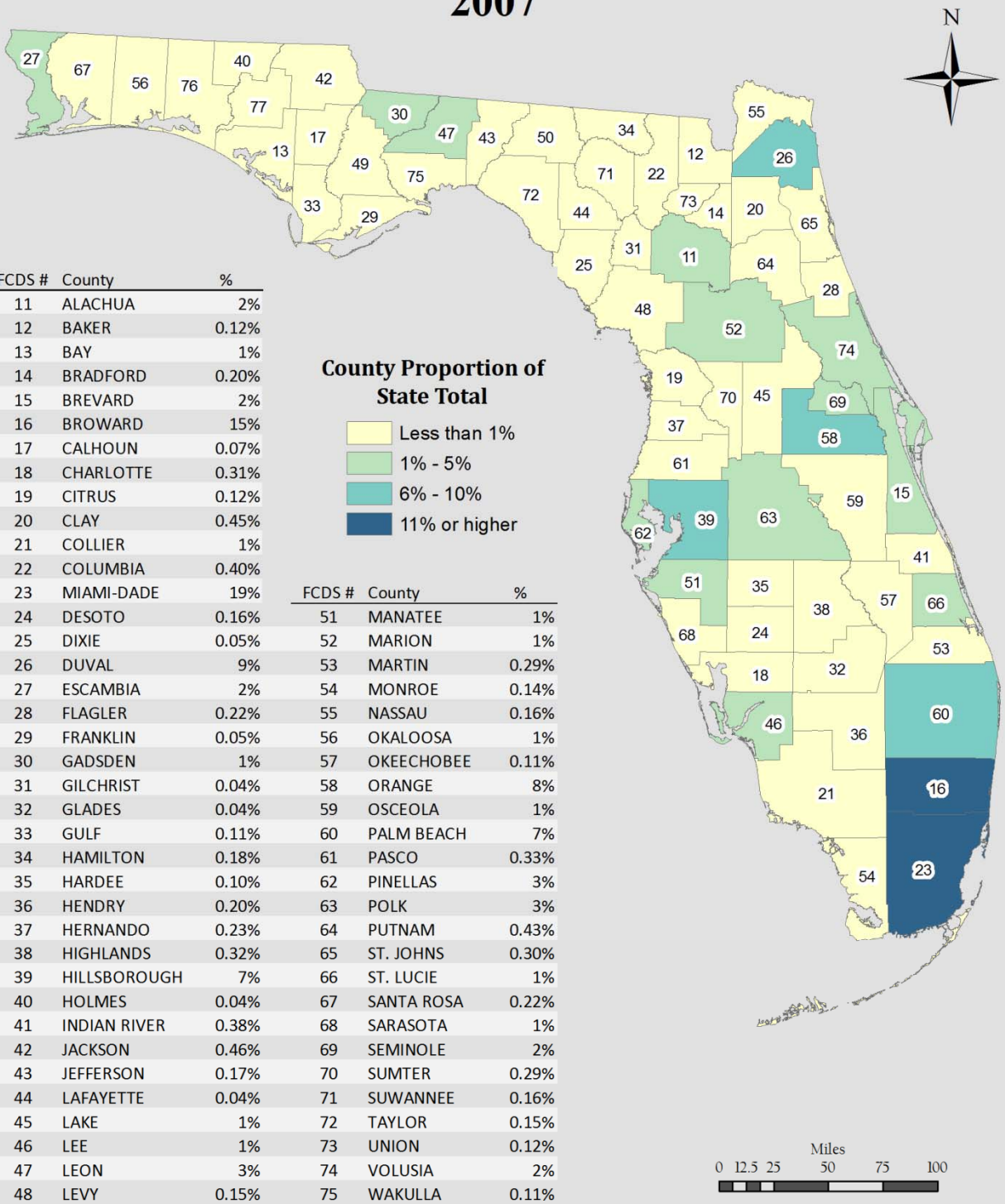


FCDS #	County	%
11	ALACHUA	21%
12	BAKER	14%
13	BAY	11%
14	BRADFORD	21%
15	BREVARD	9%
16	BROWARD	25%
17	CALHOUN	15%
18	CHARLOTTE	6%
19	CITRUS	3%
20	CLAY	8%
21	COLLIER	6%
22	COLUMBIA	18%
23	MIAMI-DADE	22%
24	DESOTO	13%
25	DIXIE	9%
26	DUVAL	31%
27	ESCAMBIA	23%
28	FLAGLER	9%
29	FRANKLIN	13%
30	GADSDEN	57%
31	GILCHRIST	6%
32	GLADES	10%
33	GULF	20%
34	HAMILTON	38%
35	HARDEE	10%
36	HENDRY	14%
37	HERNANDO	5%
38	HIGHLANDS	10%
39	HILLSBOROUGH	17%
40	HOLMES	7%
41	INDIAN RIVER	9%
42	JACKSON	27%
43	JEFFERSON	35%
44	LAFAYETTE	14%
45	LAKE	8%
46	LEE	7%
47	LEON	31%
48	LEVY	11%
49	LIBERTY	20%
50	MADISON	40%

FCDS #	County	%
51	MANATEE	9%
52	MARION	12%
53	MARTIN	6%
54	MONROE	5%
55	NASSAU	7%
56	OKALOOSA	10%
57	OKEECHOBEE	8%
58	ORANGE	22%
59	OSCEOLA	10%
60	PALM BEACH	16%
61	PASCO	2%
62	PINELLAS	10%
63	POLK	15%
64	PUTNAM	17%
65	ST. JOHNS	6%
66	ST. LUCIE	16%
67	SANTA ROSA	5%
68	SARASOTA	5%
69	SEMINOLE	11%
70	SUMTER	12%
71	SUWANNEE	12%
72	TAYLOR	20%
73	UNION	23%
74	VOLUSIA	10%
75	WAKULLA	11%
76	WALTON	6%
77	WASHINGTON	14%

Figure 2.

Florida Proportional Distribution of Persons of African Descent 2007



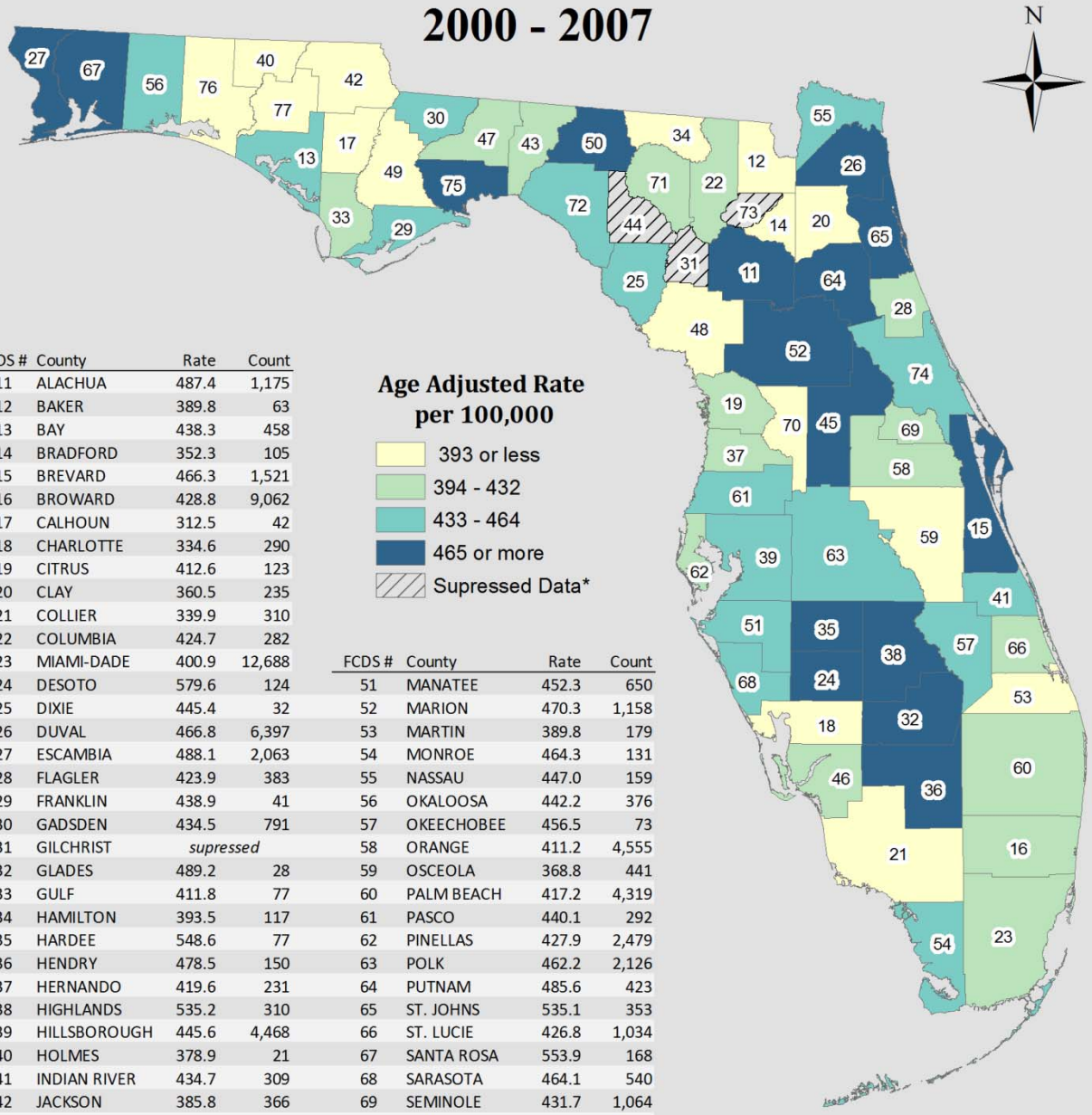
FCDS #	County	%
11	ALACHUA	2%
12	BAKER	0.12%
13	BAY	1%
14	BRADFORD	0.20%
15	BREVARD	2%
16	BROWARD	15%
17	CALHOUN	0.07%
18	CHARLOTTE	0.31%
19	CITRUS	0.12%
20	CLAY	0.45%
21	COLLIER	1%
22	COLUMBIA	0.40%
23	MIAMI-DADE	19%
24	DESOTO	0.16%
25	DIXIE	0.05%
26	DUVAL	9%
27	ESCAMBIA	2%
28	FLAGLER	0.22%
29	FRANKLIN	0.05%
30	GADSDEN	1%
31	GILCHRIST	0.04%
32	GLADES	0.04%
33	GULF	0.11%
34	HAMILTON	0.18%
35	HARDEE	0.10%
36	HENDRY	0.20%
37	HERNANDO	0.23%
38	HIGHLANDS	0.32%
39	HILLSBOROUGH	7%
40	HOLMES	0.04%
41	INDIAN RIVER	0.38%
42	JACKSON	0.46%
43	JEFFERSON	0.17%
44	LAFAYETTE	0.04%
45	LAKE	1%
46	LEE	1%
47	LEON	3%
48	LEVY	0.15%
49	LIBERTY	0.05%
50	MADISON	0.27%

FCDS #	County	%
51	MANATEE	1%
52	MARION	1%
53	MARTIN	0.29%
54	MONROE	0.14%
55	NASSAU	0.16%
56	OKALOOSA	1%
57	OKEECHOBEE	0.11%
58	ORANGE	8%
59	OSCEOLA	1%
60	PALM BEACH	7%
61	PASCO	0.33%
62	PINELLAS	3%
63	POLK	3%
64	PUTNAM	0.43%
65	ST. JOHNS	0.30%
66	ST. LUCIE	1%
67	SANTA ROSA	0.22%
68	SARASOTA	1%
69	SEMINOLE	2%
70	SUMTER	0.29%
71	SUWANNEE	0.16%
72	TAYLOR	0.15%
73	UNION	0.12%
74	VOLUSIA	2%
75	WAKULLA	0.11%
76	WALTON	0.11%
77	WASHINGTON	0.11%

Source: The Office of Economic and Demographic Research, The Florida Legislature

Figure 3.

Florida Persons of African Descent
Cancer Incidence Rates
All Sites
2000 - 2007



Age Adjusted Rate per 100,000

- 393 or less
- 394 - 432
- 433 - 464
- 465 or more
- Supressed Data*

FCDS #	County	Rate	Count
11	ALACHUA	487.4	1,175
12	BAKER	389.8	63
13	BAY	438.3	458
14	BRADFORD	352.3	105
15	BREVARD	466.3	1,521
16	BROWARD	428.8	9,062
17	CALHOUN	312.5	42
18	CHARLOTTE	334.6	290
19	CITRUS	412.6	123
20	CLAY	360.5	235
21	COLLIER	339.9	310
22	COLUMBIA	424.7	282
23	MIAMI-DADE	400.9	12,688
24	DESOTO	579.6	124
25	DIXIE	445.4	32
26	DUVAL	466.8	6,397
27	ESCAMBIA	488.1	2,063
28	FLAGLER	423.9	383
29	FRANKLIN	438.9	41
30	GADSDEN	434.5	791
31	GILCHRIST	*supressed*	
32	GLADES	489.2	28
33	GULF	411.8	77
34	HAMILTON	393.5	117
35	HARDEE	548.6	77
36	HENDRY	478.5	150
37	HERNANDO	419.6	231
38	HIGHLANDS	535.2	310
39	HILLSBOROUGH	445.6	4,468
40	HOLMES	378.9	21
41	INDIAN RIVER	434.7	309
42	JACKSON	385.8	366
43	JEFFERSON	427.1	163
44	LAFAYETTE	*supressed*	
45	LAKE	524.1	747
46	LEE	398.9	901
47	LEON	408.9	1,416
48	LEVY	384.9	108
49	LIBERTY	270.5	17
50	MADISON	467.5	239

FCDS #	County	Rate	Count
51	MANATEE	452.3	650
52	MARION	470.3	1,158
53	MARTIN	389.8	179
54	MONROE	464.3	131
55	NASSAU	447.0	159
56	OKALOOSA	442.2	376
57	OKEECHOBEE	456.5	73
58	ORANGE	411.2	4,555
59	OSCEOLA	368.8	441
60	PALM BEACH	417.2	4,319
61	PASCO	440.1	292
62	PINELLAS	427.9	2,479
63	POLK	462.2	2,126
64	PUTNAM	485.6	423
65	ST. JOHNS	535.1	353
66	ST. LUCIE	426.8	1,034
67	SANTA ROSA	553.9	168
68	SARASOTA	464.1	540
69	SEMINOLE	431.7	1,064
70	SUMTER	371.5	171
71	SUWANNEE	429.5	142
72	TAYLOR	454.3	108
73	UNION+	*supressed*	
74	VOLUSIA	448.3	1,348
75	WAKULLA	544.0	98
76	WALTON	247.2	60
77	WASHINGTON	389.9	78

Source: The Florida Cancer Data System, The Office of Economic and Demographic Research of the Florida Legislature

* Suppressed data consists of counties with fewer than 11 cases

\+ Union County rates are supressed due to inflated rates as a result of inmate patient care at a state correctional facility

Figure 4.

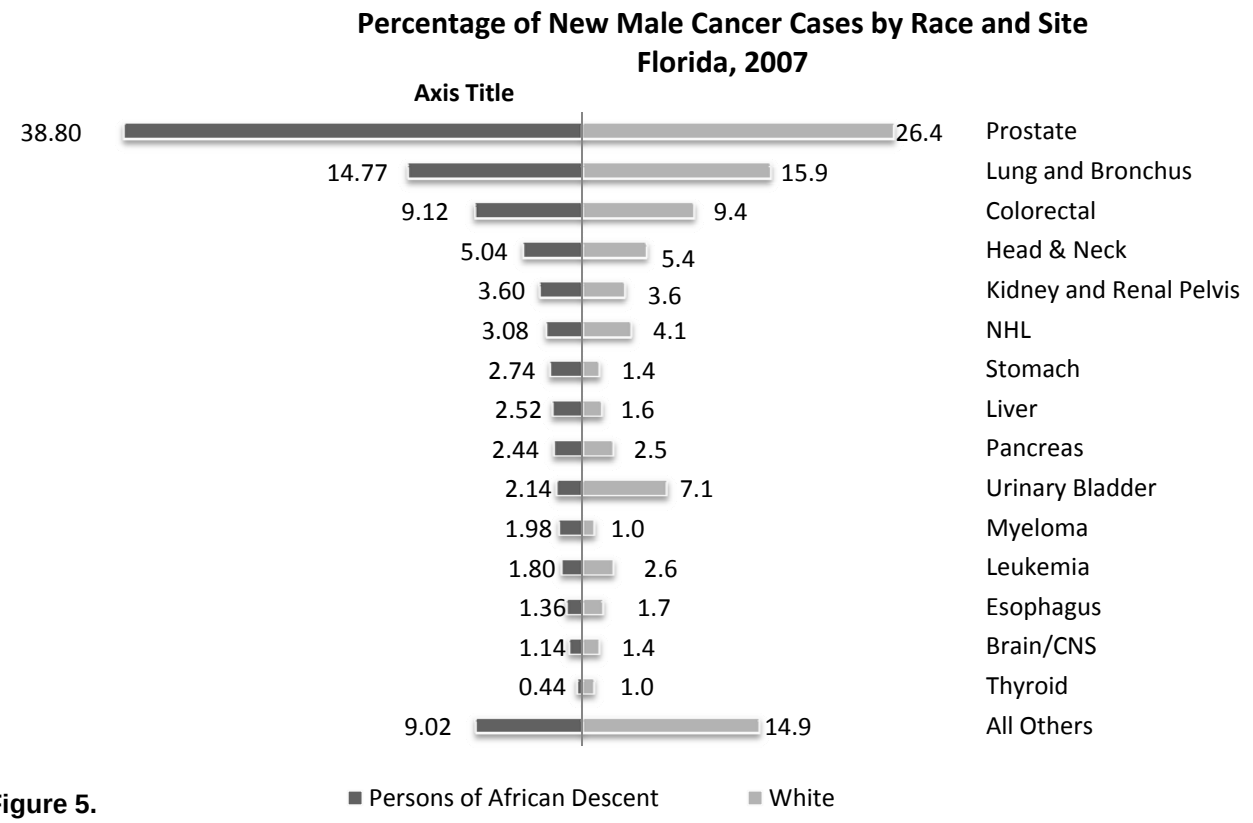
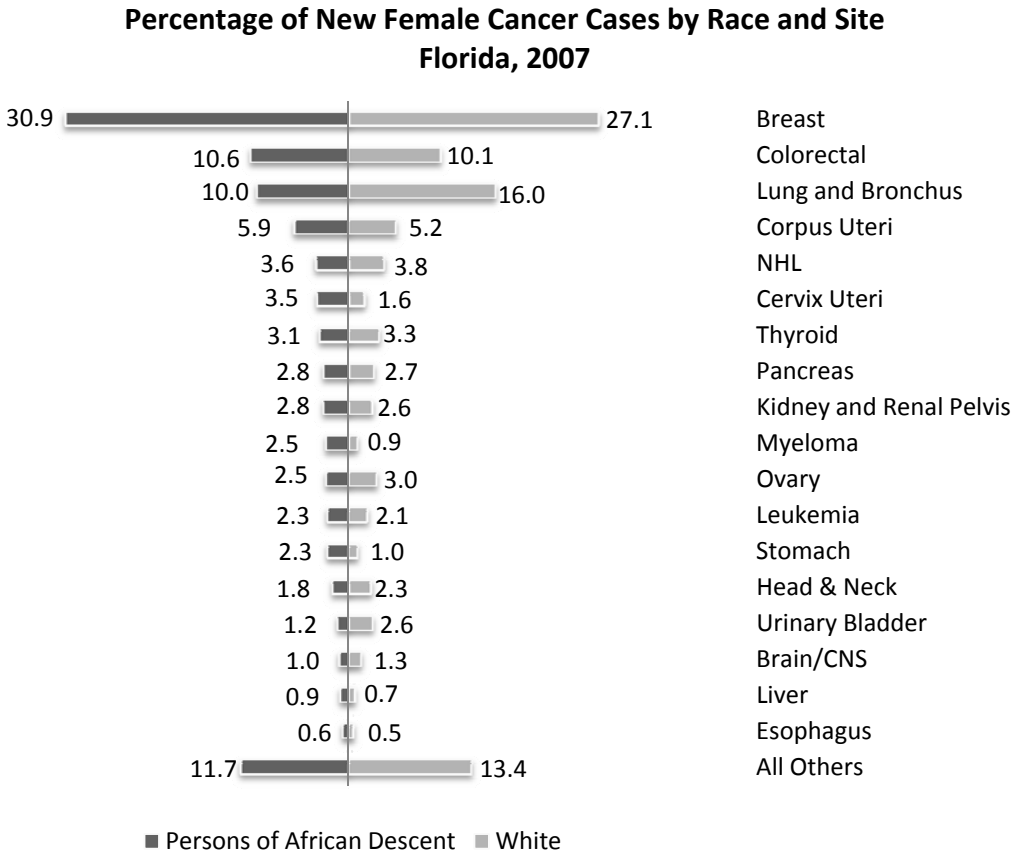


Figure 5.



D.2. Trends of the Cancers of Persons of African Descent: Joinpoint Results, 1988-2007

The following are the results of the Joinpoint analyses of the major cancers of persons of African Descent over the 1988-2007 time period comparing males and females of African Descent to White males and females by each cancer and by stage. The overall statistical significance was set to $\rho < 0.05$, and a maximum of three joinpoints and four line segments was allowed for each model. While all joinpoints presented in the following graphs are statistically significant, meaning there is a significant shift in the rate of cancer at a given point in time, the slope between joinpoints or the Annual Percent Change (APC), may not be significantly different from zero, as indicated in the graphs. For each cancer, there are figures illustrating the Joinpoint analysis described in the text. These descriptions are in reference to observed changes in slopes, but not to the statistical significance of APC figures. Statistical significance of APC figures are documented in tables located on the FCDS Website and indicated with a symbol on the graph next to corresponding trend lines. Differences in APCs between groups were not evaluated. Tables of both the observed and modeled joinpoint rates are also available on the FCDS Website (http://fcds.med.miami.edu/inc/statistics.shtml).

When evaluating Joinpoint analyses, decreasing trends of cancer rates are represented by downward sloping trend lines between the start of the analysis period in 1988 and the end in 2007, while upward sloping trend lines represent increasing trends in cancer rates. In some cases, there will be variable trends (e.g. initially increasing and then decreasing, or vice versa) over the entire time interval. Year specific rates reported in the text represent the observed incidence rate, whereas Joinpoint graphs depict the predicted incidence rate. While summaries of each cancer are described by Joinpoint trends over the entire study period, the 2007 observed rates are also included in the text to highlight the most current figures. When comparing cancer rates between persons of African Descent and Whites, health disparities can be demonstrated when either the rate of one group is decreasing while the other is increasing or remaining stable, or when the rate of decrease is different between the two groups. With regards to stage at diagnosis comparisons, health disparities would be demonstrated if there are increasing rates of persons diagnosed at distant and regional stage and/or decreasing rates of persons diagnosed at local stage since, in general, early diagnosis of cancer is associated with decreased morbidity and mortality. In particular, early diagnosis at a local stage is the anticipated goal for all screenable cancers (such as breast, colorectal, prostate, and cervical cancers). In addition to identifying disparities by stage, high levels of "Not Otherwise Specified (NOS)" cancers with regards to stage may also indicate disparities. Studies have shown that un-staged NOS cancer cases are more likely to occur among the elderly, minority populations, patients with lower levels of education and income, and those with a history of Medicaid or Medicare enrollment.[37-39] Lack of staging information can indicate that patients did not receive full diagnostic evaluations, which inhibit disease management and outcome of care assessments. Therefore, constant or increasing rates of NOS cancers can be considered to be an indirect health disparity indicator.

D.2.1. All Cancers

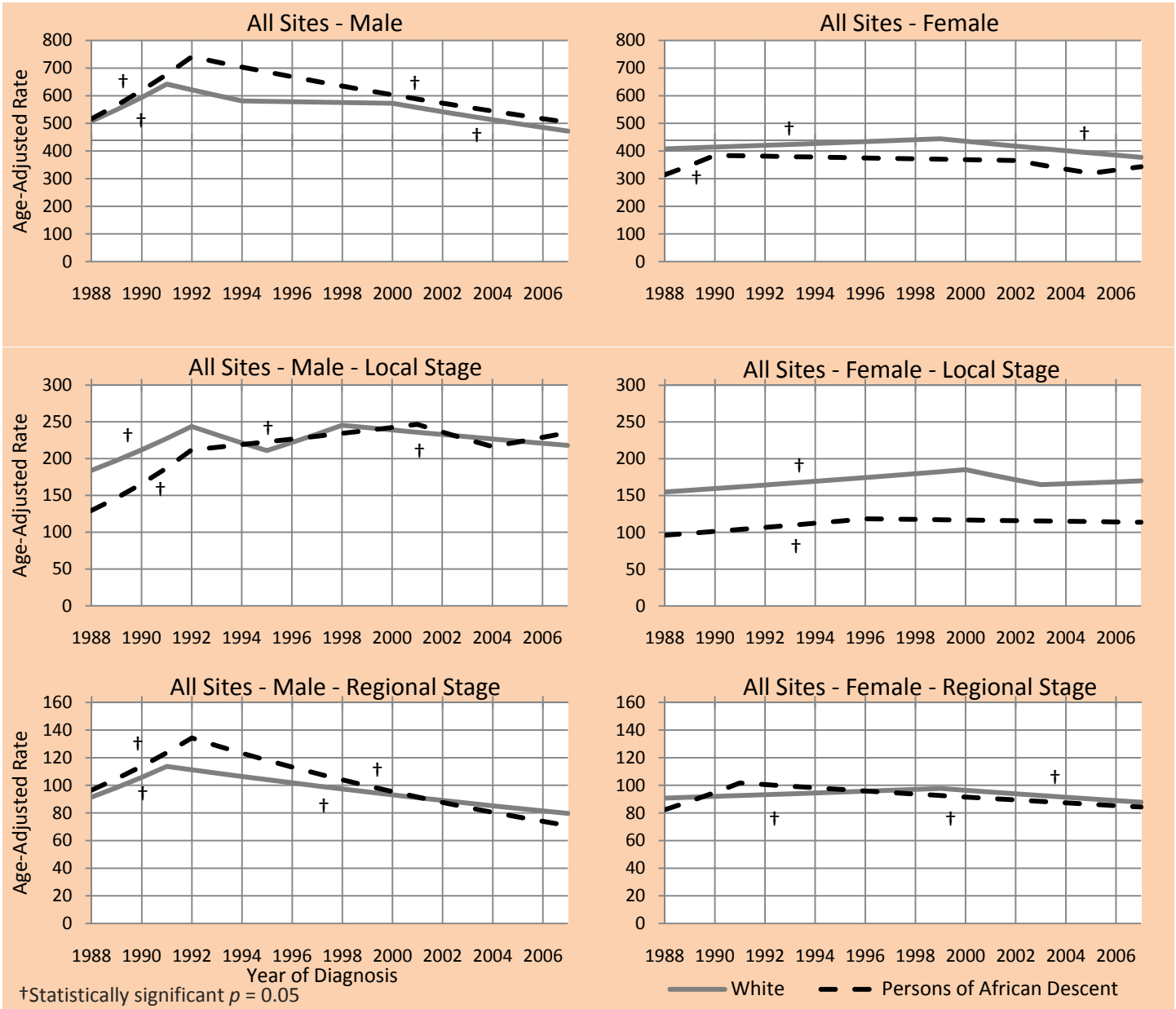
a) All cancers: Persons of African Descent vs. White by gender

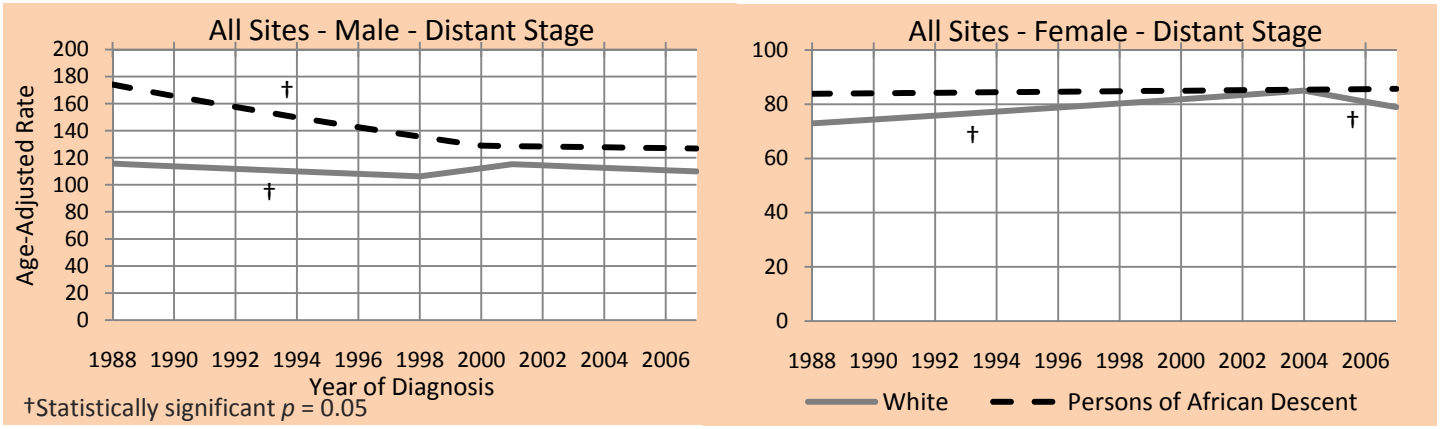
The highest age-adjusted overall cancer rates in 2007 were found in males of African Descent (530 cases/100,000), followed by White males (485 cases/100,000 persons), then White females (383 cases/100,000), and females of African Descent (349 cases/100,000). For all cancers, males had higher rates of cancer than females, regardless of race throughout the 1988 to 2007 time period. In general, for both persons of African Descent and Whites, after an initial increase in the first few years, there were decreasing trends in overall cancer rates over time. There was some indication of health disparities in that the actual rates and the decrease in cancer rates was greater for White males compared to males of African Descent, however, White females had higher cancer rates compared to females of African Descent for all cancers throughout the 1988-2007 time period.

b) Stage: local, regional, distant: Persons of African Descent vs. White by gender

There was an increasing trend for diagnosis at local stage for both groups but greater for males of African Descent relative to White males; local stage rates also increased for both female race groups although rates remaining consistently higher for Whites. After an initial increase, both Whites and persons of African Descent had decreasing rates of diagnosis at regional stage; distant stage diagnosis rates decreased for White males and males of African Descent, albeit with larger reductions in this latter race group. Females of African descent had stable rates of distant stage of diagnosis over the time period while white females had increasing rates from 1988-2004 with evidence of declining rates from 2005-2007. The trends of persons diagnosed as NOS decreased for all cancers for both persons of African Descent and Whites (not shown).

Figure 6. Persons of African Descent and Whites Joinpoint Incidence Trends, All Cancers by Gender and Stage, 1988-2007



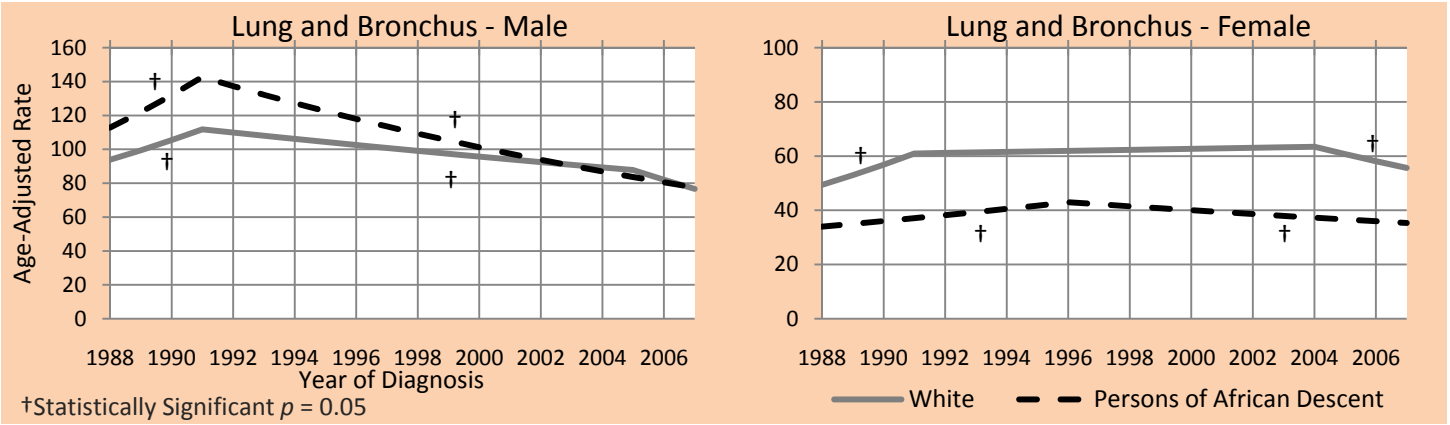


D.2.2. Lung and Bronchus Cancer

a) All lung and bronchus cancers: Persons of African Descent vs. White by gender

Overall throughout the time period, the age-adjusted rates of lung and bronchus cancer were substantially greater for males of African Descent (2007: 84 cases/100,000) and White males (2007: 77 cases/100,000) compared to White females (2007: 56 cases/100,000) and females of African Descent (2007: 37 cases/100,000). Peak lung cancer incidence rates in males occurred in 1991 with significant reductions in both race groups throughout the remaining time period with larger relative rate reductions in persons of African Descent resulting in nearly equivalent rates by 2007. Both female race groups experienced increased early stage diagnosis in the survey period with later modest, but significant rates reductions, although Whites consistently experienced higher rates of lung cancer relative to females of African Descent.

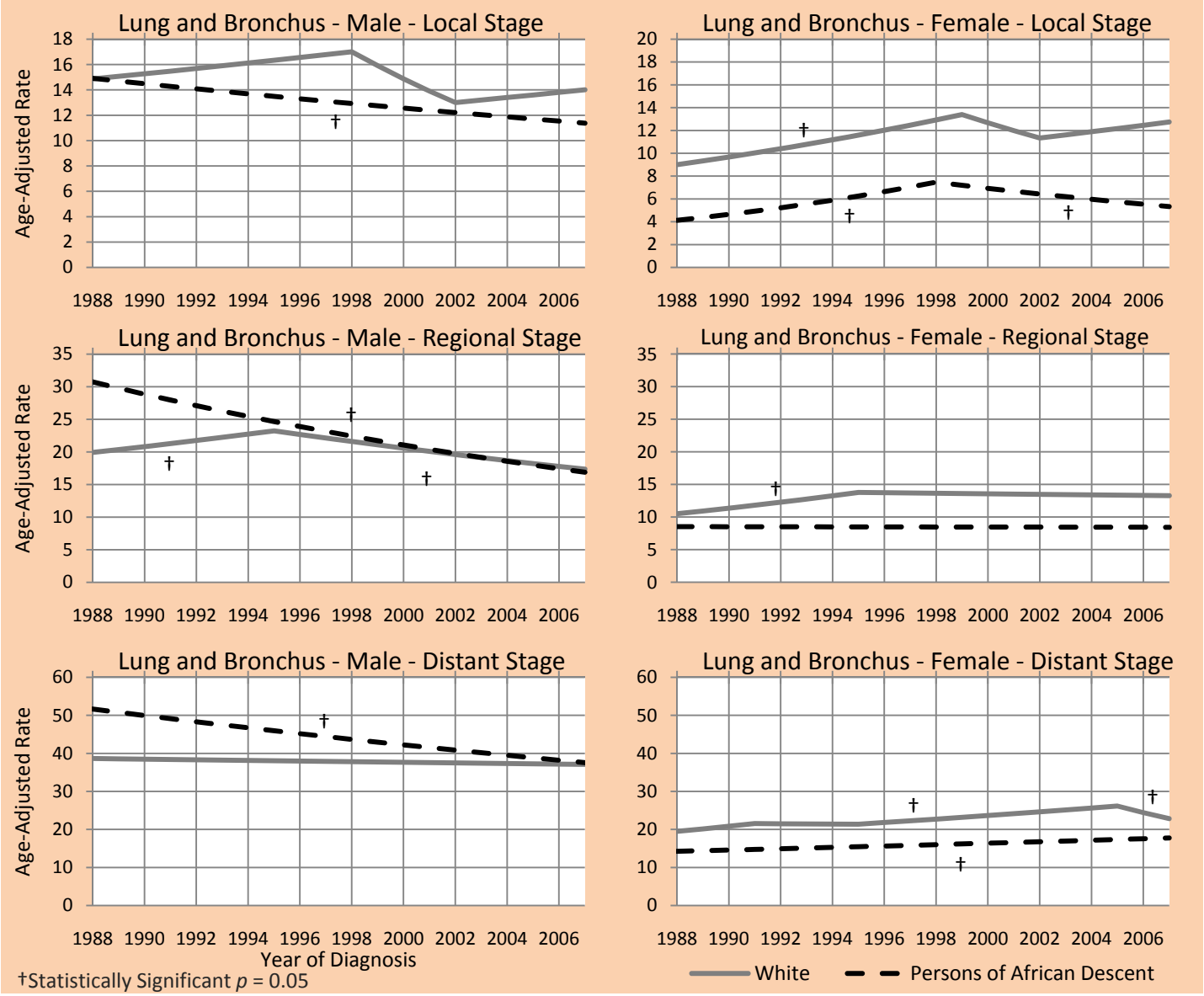
Figure 7. Persons of African Descent and Whites Joinpoint Incidence Trends, Lung & Bronchus Cancer by Gender, 1988-2007



b) Lung and bronchus cancer stage: local, regional, distant: Persons of African Descent vs. White by gender

There was a marked increase in rates early in the time period for females of African Descent in diagnosis at the local stage, which became a decreasing trend over time, while White females had increasing rates of diagnosis at local stage throughout the time period; similar patterns were seen for diagnosis at regional and distant stage. White males and males of African Descent had decreasing trends of diagnosis at local, regional and distant stages. For these later two stages rates of decline were steeper in males of African Descent eliminating racial disparities in rates seen earlier in the survey period. The rates of persons diagnosed as NOS decreased for both persons of African Descent and Whites.

Figure 8. Persons of African Descent vs Whites Joinpoint Incidence Trends, Lung & Bronchus Cancer by Gender and Stage, 1988-2007



D.2.3. Prostate Cancer (males only)

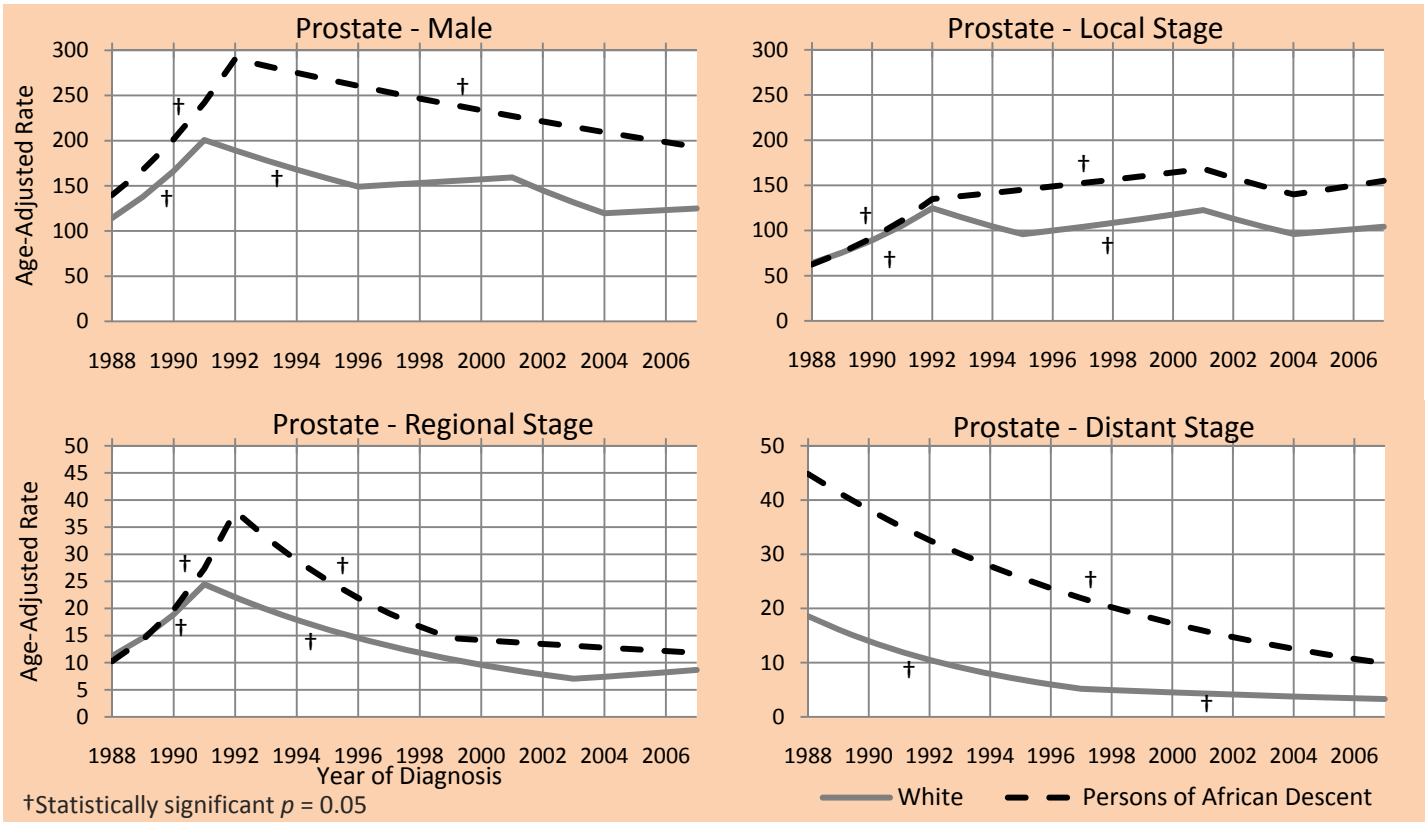
a) All prostate cancers: males of African Descent vs. White males

Overall throughout the time period, the age-adjusted rates of prostate cancer were much greater for males of African Descent (2007: 206 cases/100,000) compared to White males (2007: 126 cases/100,000). Both White males and males of African Descent had substantial increases in prostate cancer at the beginning of the time period, likely associated with the increased use of PSA as a prostate cancer screening tool. However by the early 1990s, substantial decreases in the prostate cancer trends occurred for both White males and males of African Descent, starting somewhat earlier for White males.

b) Prostate cancer stage: local, regional, distant: males of African Descent vs. White males

Over the time period, the rates of local prostate cancer variably increased and decreased, ultimately decreasing for both White males and males of African Descent with marked decreases in the regional and distant stage rates, possibly indicating increased early screening for this cancer (for males of African Descent at a greater rate than White males). Rates of distant stage prostate cancer were markedly higher for persons of African Descent relative to Whites; however the rate of decline was steeper for this race group over the survey period reducing, but not eliminating this disparity. Although the rates of persons diagnosed as NOS initially increased for both persons of African Descent and Whites, by the end of the time period there were substantial decreases in these rates for both subpopulations.

Figure 9. Persons of African Descent vs Whites Joinpoint Incidence Trends, Prostate Cancer by Stage, 1988-2007



D.2.4. Breast Cancer (females only)

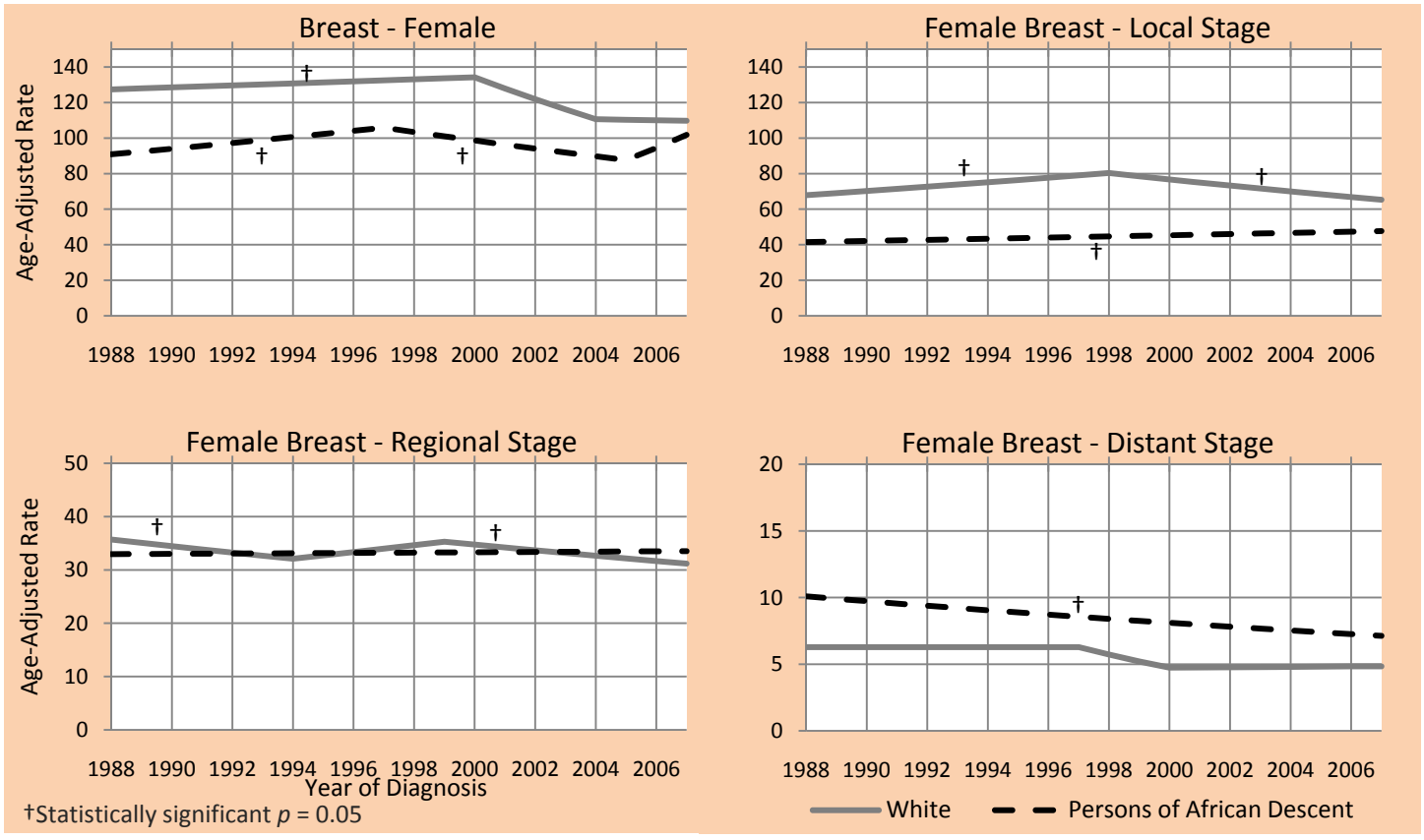
a) All breast cancers: females of African Descent vs. White females

Throughout the time period, the age-adjusted rates of breast cancer were greater for White females (2007: 109 cases/100,000) compared to females of African Descent (2007: 104 cases/100,000). Both groups experienced increases in incidence rates early in the time period which latter reversed, significantly so for females of African Descent. However there was a recent, but non-significant increase in rates for this group starting in 2005 which, in combination with declining rates in Whites, led to the near elimination in the race gap in rates in 2007.

b) Breast cancer stage: local, regional, distant: Females of African Descent vs. White females

Over the time period, initially, both White females and females of African Descent were increasingly diagnosed at local stage, with an eventual decrease among White females for local and regional stage. There were modest but significant reductions in the incidence of regional stage cancers in Whites with little change in rates for females of African Descent. Despite a lower overall breast cancer incidence rate among persons of African Descent, this race group experienced significantly higher rates of distant-stage breast cancer throughout the survey period. However, rates of distant stage cancers did significantly decrease over the survey period in this race group partially closing this gap by 2007. The rates of persons diagnosed as NOS decreased substantially for both persons of African Descent and White females throughout the time period.

Figure 10. Persons of African Descent vs Whites Joinpoint Incidence Trends, Breast Cancer by Stage, 1988-2007

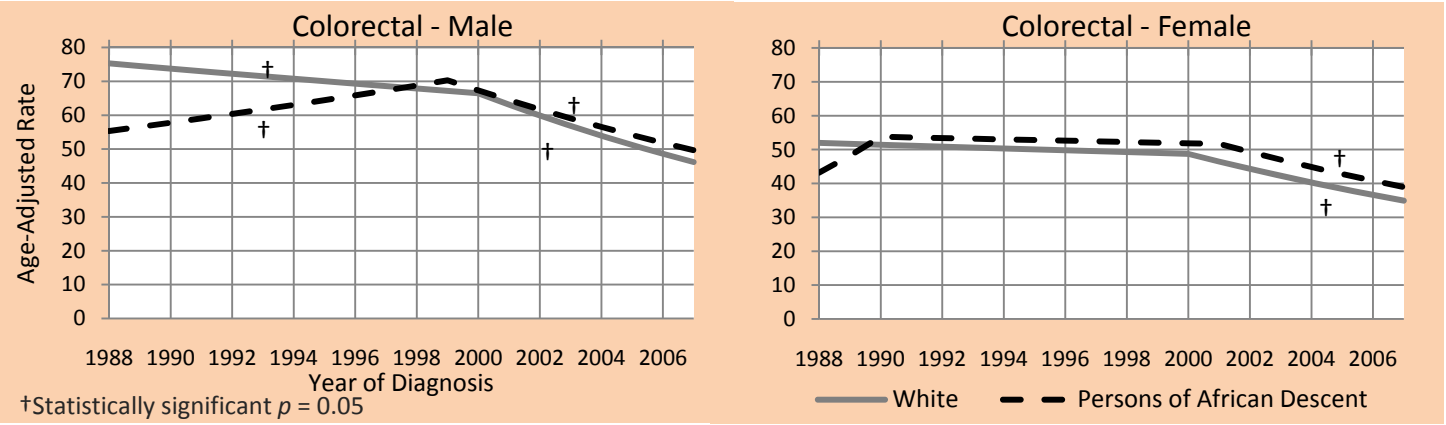


D.2.5. Colorectal Cancer

a) All colorectal cancers: Persons of African Descent vs. White by gender

The age-adjusted rates of colorectal cancer decreased substantially over the time period, ultimately males of African Descent had slightly higher rates (2007: 50 cases/100,000) compared to White males (2007: 47 cases/100,000), similarly rates for females of African Descent were slightly higher (2007: 38 cases/100,000) relative to White females (2007: 36 cases/100,000).

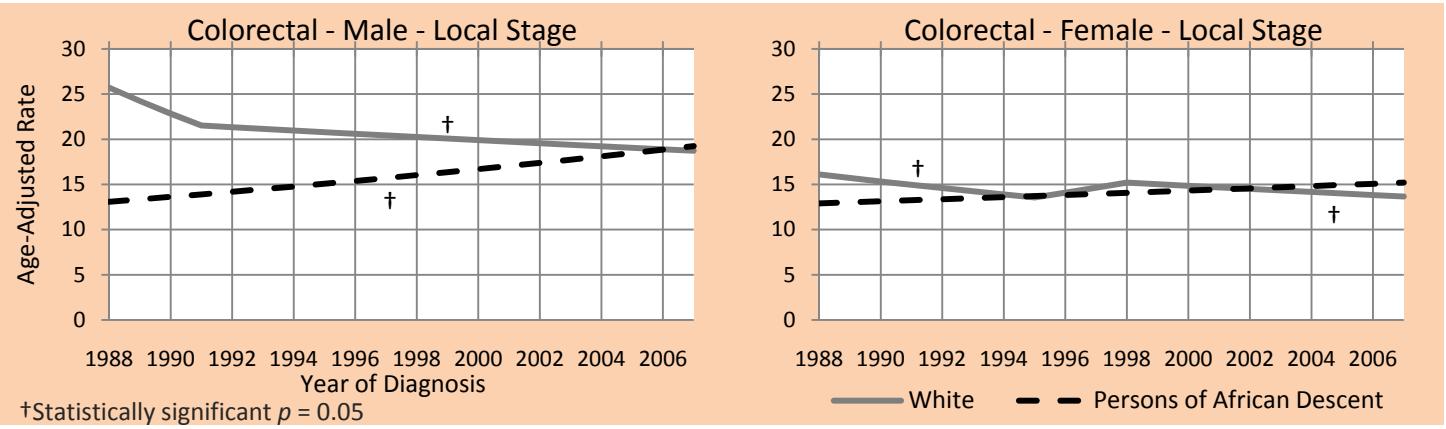
Figure 11. Persons of African Descent vs Whites Joinpoint Incidence Trends, Colorectal Cancer by Sex, 1988-2007

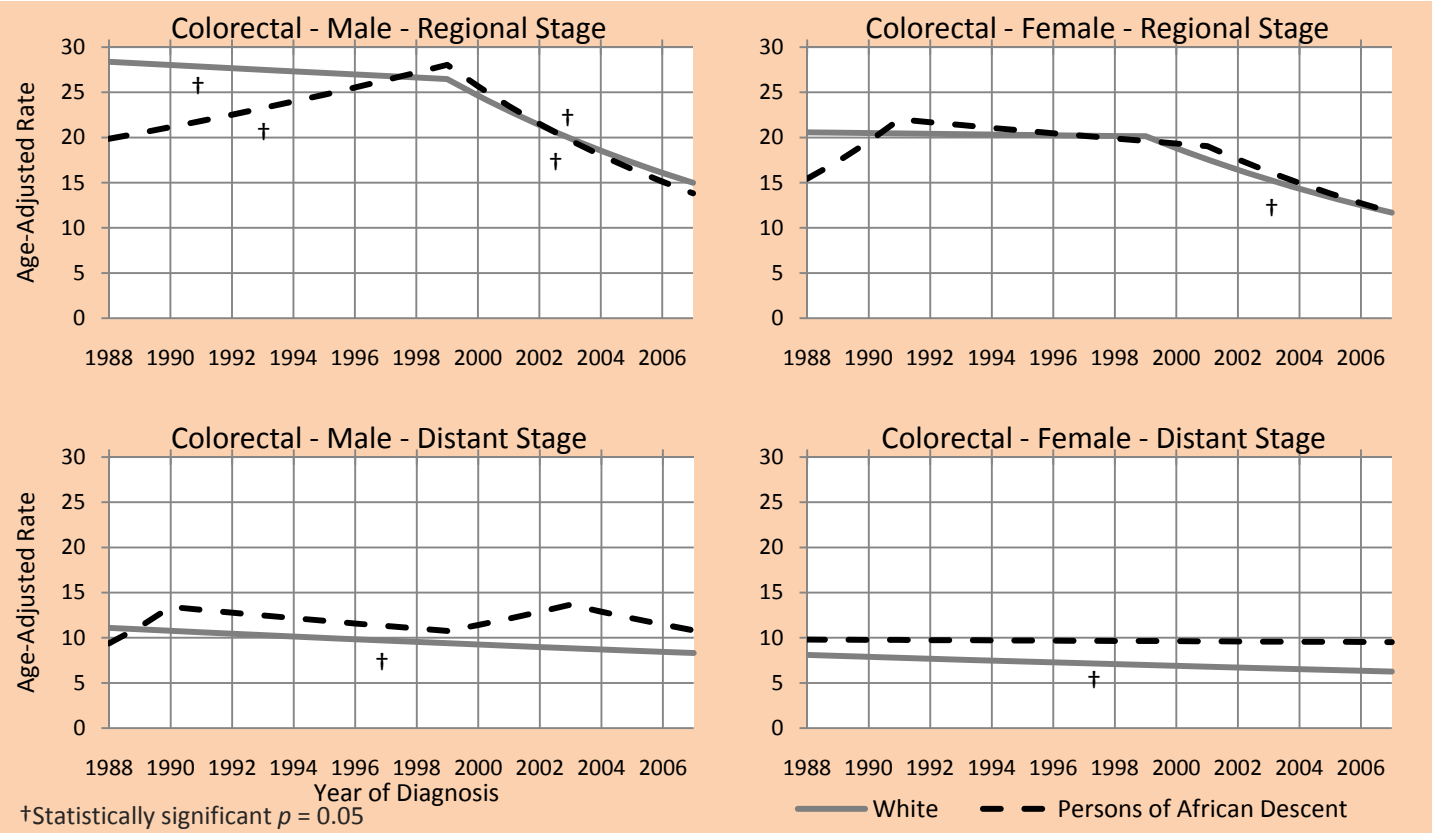


b) Colorectal stage: local, regional, distant: Persons of African Descent vs. White by gender

Over the time period, both White and persons of African Descent were decreasingly diagnosed at regional and distant stage, while the rates of local stage diagnosis mildly increased among persons of African Descent towards the end of the time period, possibly indicating a positive screening effect. Of interest both males and females of African Descent were more likely to be diagnosed at distant stage over the entire time period indicating possible health disparities although by the end of the time period diagnosis at a local stage appeared to be similar for both Whites and persons of African Descent. Ultimately, the rates of persons diagnosed as NOS decreased substantially for both Persons of African Descent and White males and females throughout the time period.

Figure 12. Persons of African Descent vs Whites Joinpoint Incidence Trends, Colorectal Cancer by Gender and Stage, 1988-2007



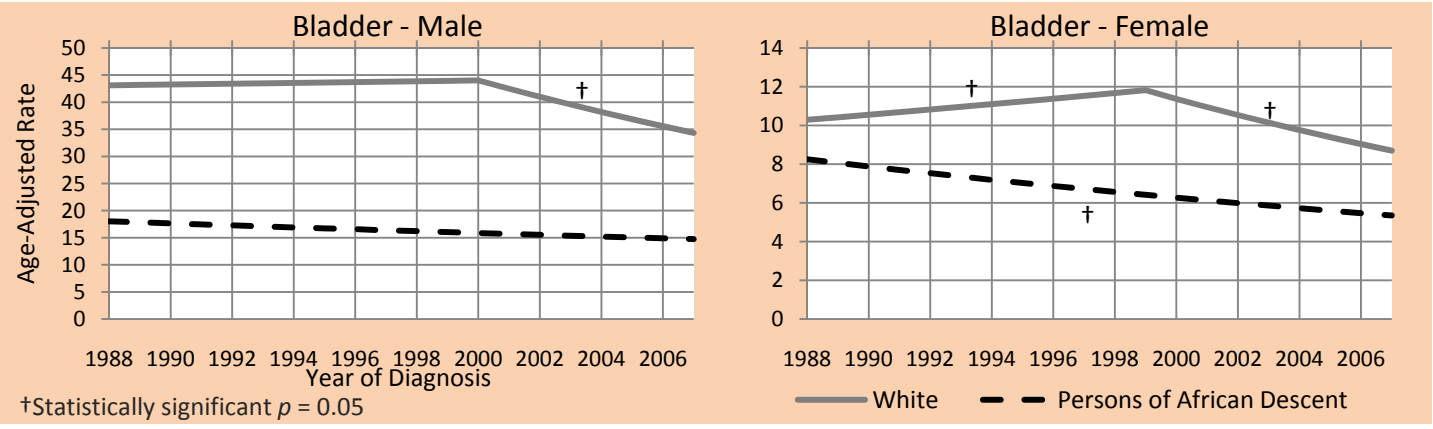


D.2.6. Bladder Cancer (including in situ)

a) All bladder cancers: Persons of African Descent vs. White by gender

Overall throughout the time period, the age adjusted rates of bladder cancer were substantially greater for White males (2007: 35 cases/100,000) compared to males of African Descent (2007: 15 cases/100,000) and White females (2007: 9 cases/100,000) and females of African Descent (2007: 5 cases/100,000). Bladder cancer rates decreased among both male and females of African Descent throughout the time period. Despite some variability in trend, ultimately bladder cancer rates decreased among both male and female Whites.

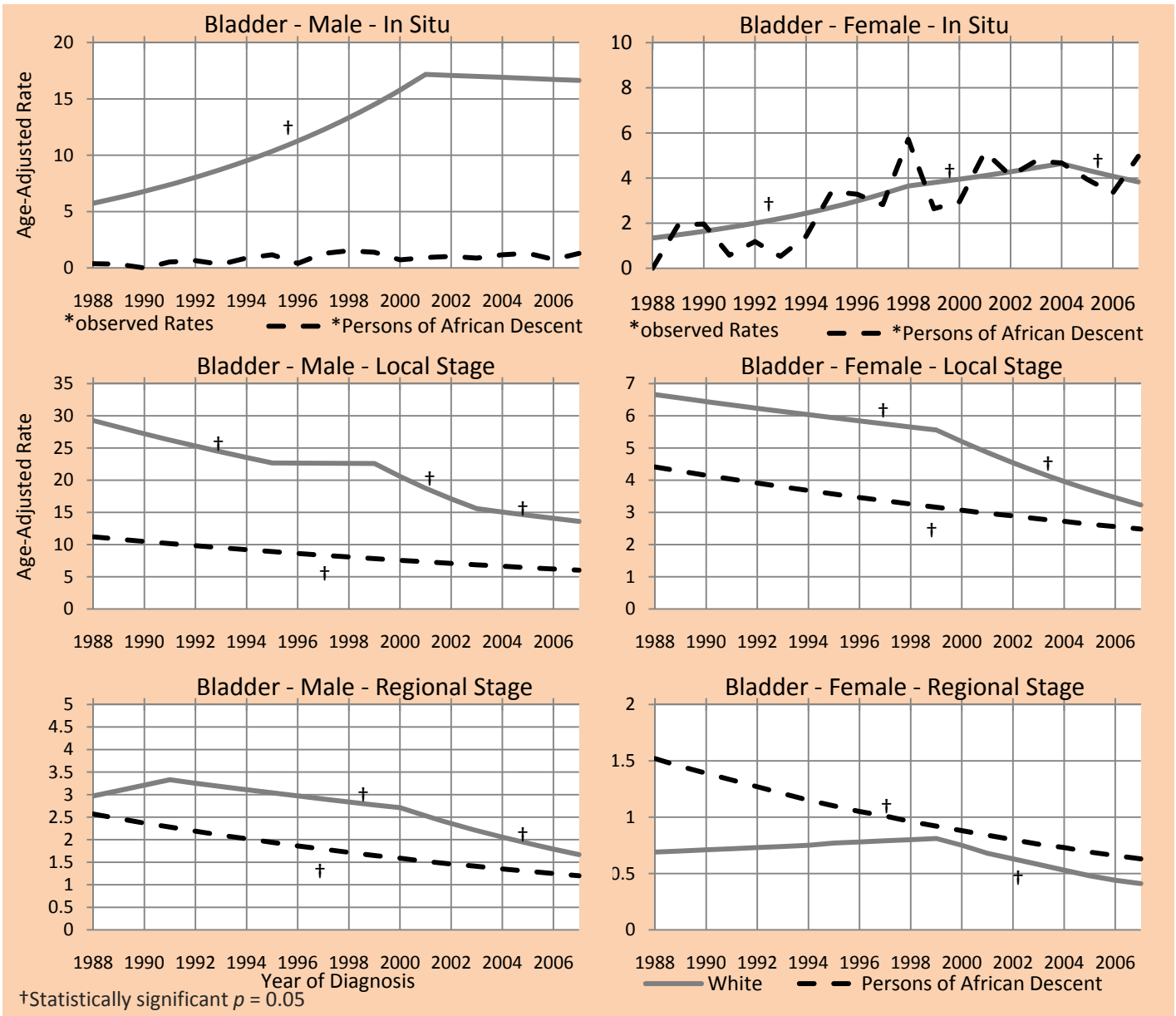
Figure 13. Persons of African Descent vs Whites Joinpoint Incidence Trends, Bladder Cancer by Gender, 1988-2007

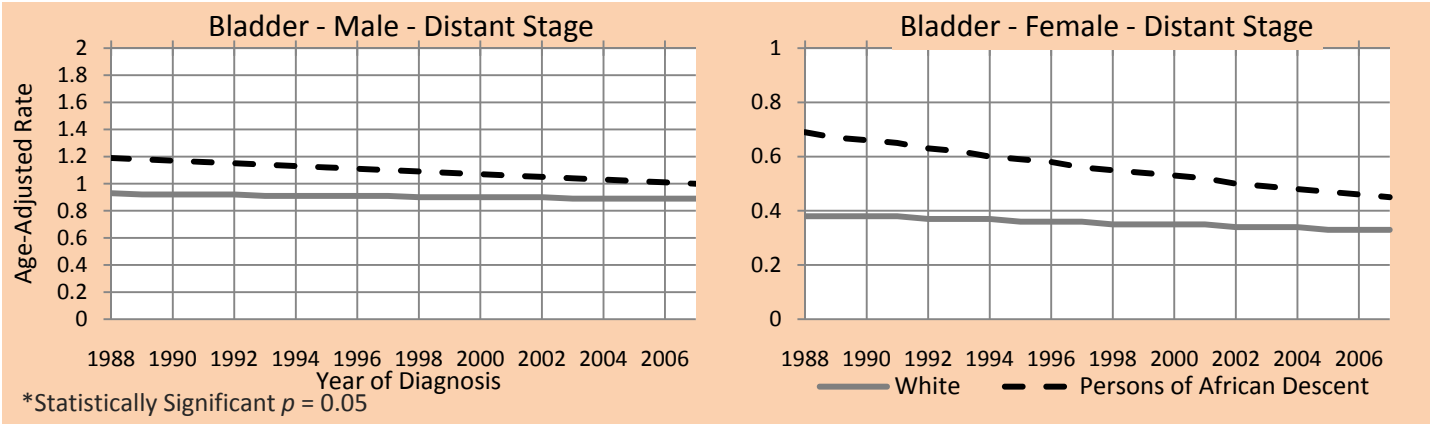


b) Bladder cancer stage: in situ local, regional, distant: Persons of African Descent vs. White by gender

Over the time period, females of African Descent were increasingly diagnosed at in situ stage with decreased diagnosis at all other stages; males of African Descent had no change in the rate of diagnosis, while for males there was a dramatic increase in in situ diagnoses for White males which leveled off starting in 2001. Local stage diagnoses decreased significantly in all race-sex groups with consistently lower rates in persons of African Descent relative to Whites. Regional diagnosis rates also decreased for all subgroups. There were greater relative reductions in distant diagnoses seen among males of African Descent relative to White males who saw stable rates over the time period. Females of African Descent also experienced greater reductions in the rate of distant bladder cancer relative to White females. Ultimately, the rates of persons diagnosed as NOS decreased substantially for both male and female whites and females of African Descent throughout the time period, with little to no change among men of African Descent.

Figure 14. Persons of African Descent vs Whites Joinpoint Incidence Trends, Bladder Cancer by Gender and Stage, 1988-2007



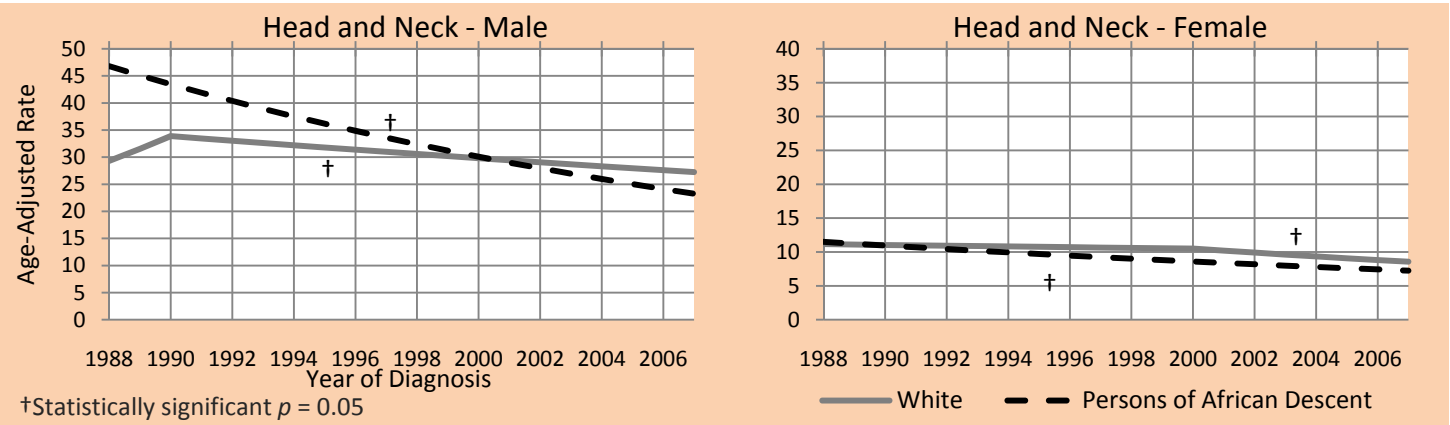


D.2.7. Head and Neck Cancer

a) All head and neck cancers: Persons of African Descent vs. White by gender

Overall throughout the time period, the age-adjusted rates of head and neck cancer were greater for White males (2007: 27 cases/100,000) and males of African Descent (2007: 25 cases/100,000) compared to White females (2007: 9 cases/100,000) and to females of African Descent (2007: 6 cases/100,000). Over the time period, there was an overall decrease in head and neck cancer trends for both Persons of African Descent and Whites, with a dramatic reduction in rates noted for males of African Descent which eliminated a race-gap in rates evident early in the survey period.

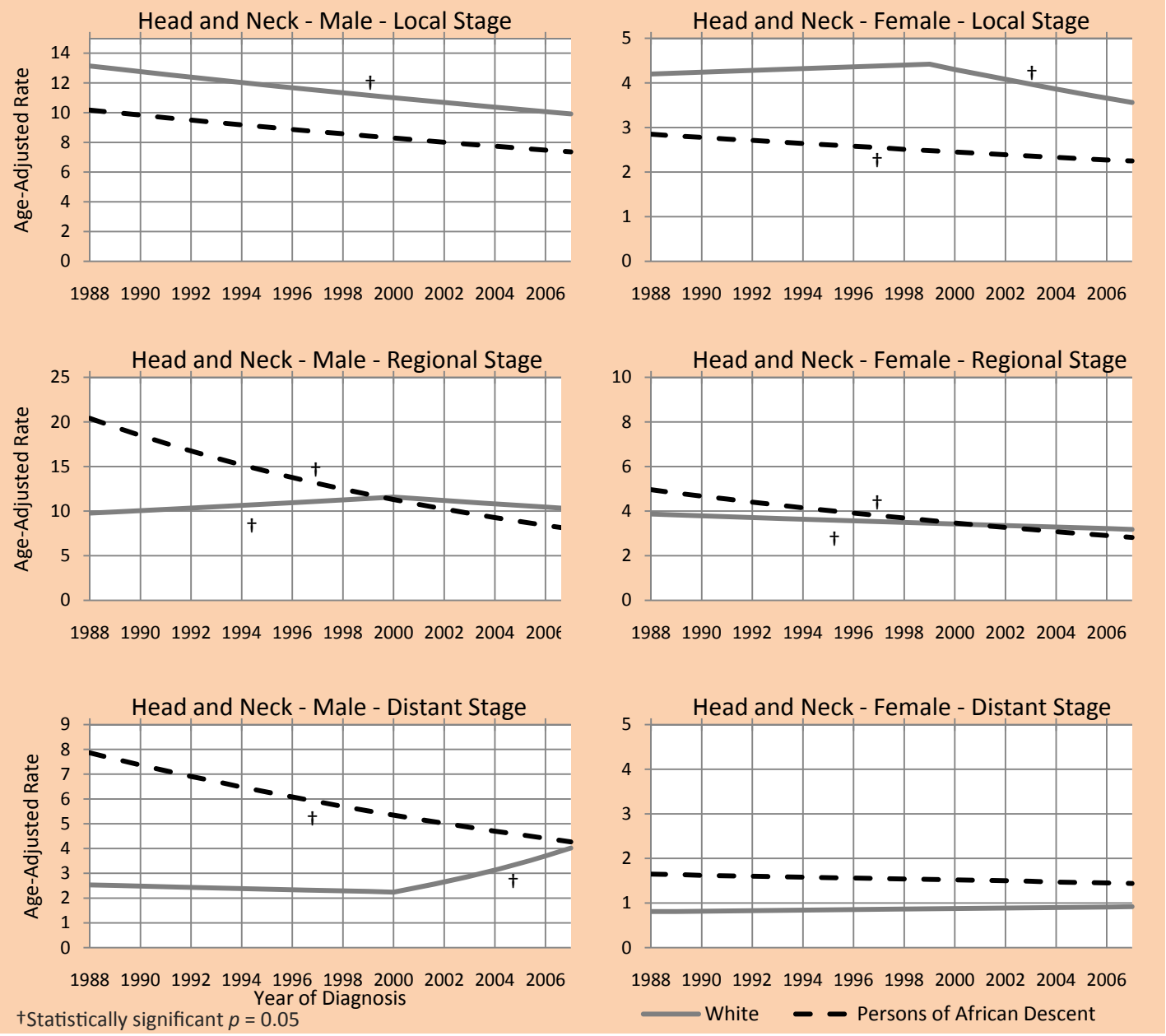
Figure 15. Persons of African Descent vs Whites Joinpoint Incidence Trends, Head & Neck Cancer by Gender, 1988-2007



b) Head and neck cancer stage: local, regional, distant: Persons of African Descent vs. White by gender

Over the time period, the overall trend was decreasing diagnosis at local and regional stage for both Whites and persons of African Descent, with the exception of White males. Distant stage diagnoses decreased among males of African Descent and increased for White males. Males and Females of African Descent were less likely to be diagnosed at a local stage and more likely to be diagnosed at a distant stage compared to their White counterparts, indicating a possible health disparity. However differences in rates decreased slightly for women over the time period, while males of African Descent experienced dramatic reduction in distant stage diagnoses throughout the survey period, which, in combination with a recent significant increase distant stage diagnoses in White males, completely eliminated this race gap by 2007. The rates of persons diagnosed as NOS decreased for both Persons of African Descent and White males and females throughout the time period, particularly for Persons of African Descent.

Figure 16. Persons of African Descent vs Whites Joinpoint Incidence Trends, Head & Neck Cancer by Gender and Stage, 1988-2007

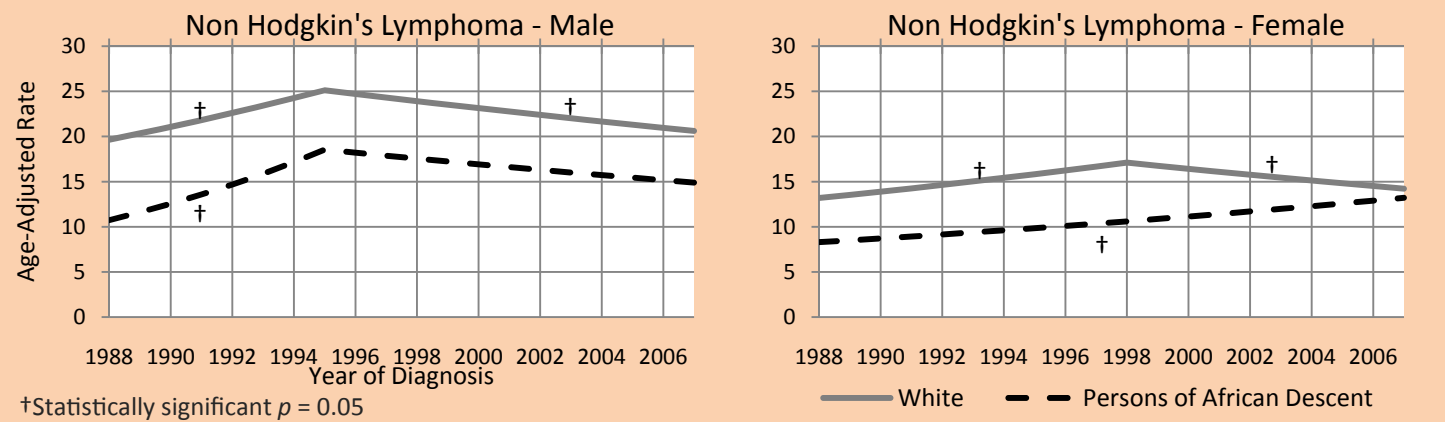


D.2.8. Non Hodgkin's Lymphoma (NHL)

a) All non Hodgkin's lymphoma cancers: Persons of African Descent vs. White by gender

Overall, the age-adjusted rates of non Hodgkin's lymphoma cancer were variable throughout the time period. Ultimately, however the rates were higher for White males (2007: 21 cases/100,000) and males of African Descent (2007: 14 cases/100,000), but similar for White females (2007: 14 cases/100,000) and females of African Descent (2007: 13 cases/100,000). After experiencing initial increases, White males and males of African Descent had decreasing trends in Non Hodgkin's lymphoma starting in 1995. White females also experienced increasing trends which peaked in 1998 with subsequent declines. Females of African Descent which had initially lower rates of non-Hodgkin's lymphoma relative to Whites experienced increasing trends throughout the survey period which led to near equivalence in rates by 2007.

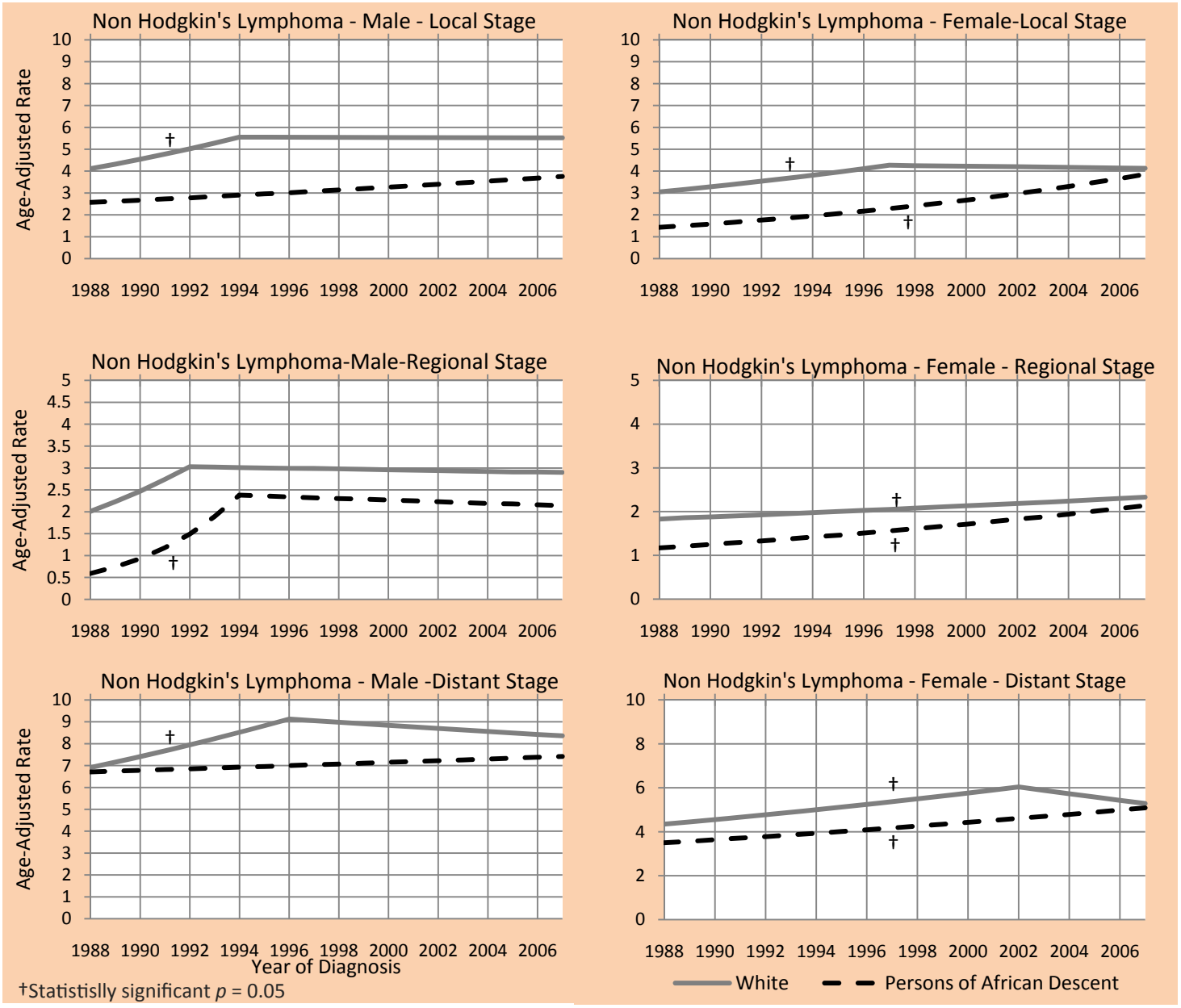
Figure 17. Persons of African Descent vs Whites Joinpoint Incidence Trends, NHL Cancer by Gender, 1988-2007



b) Non Hodgkin's lymphoma stage: local, regional, distant: Persons of African Descent vs. White by gender

Over the time period, White females and females of African Descent were increasingly diagnosed at local, regional and distant stages. White males had relatively stable rates of diagnosis at local, regional and distant stages for a majority of the time period, while males of African Descent were increasingly diagnosed at local, regional and distant stages. Females of African Descent were less likely to be diagnosed at local stage but also at regional and distant stages compared to their White counterparts throughout the time period, although the relative increase in rates was greater for the former race group, closing the race-specific gap in rates. The trends of persons diagnosed as NOS decreased for both Persons of African Descent and White males throughout the time period. White females experienced a slight increase in NOS rates over time.

Figure 18. Persons of African Descent vs Whites Joinpoint Incidence Trends, NHL Cancer by Gender and Stage, 1988-2007



D.2.9. Ovarian Cancer (females only)

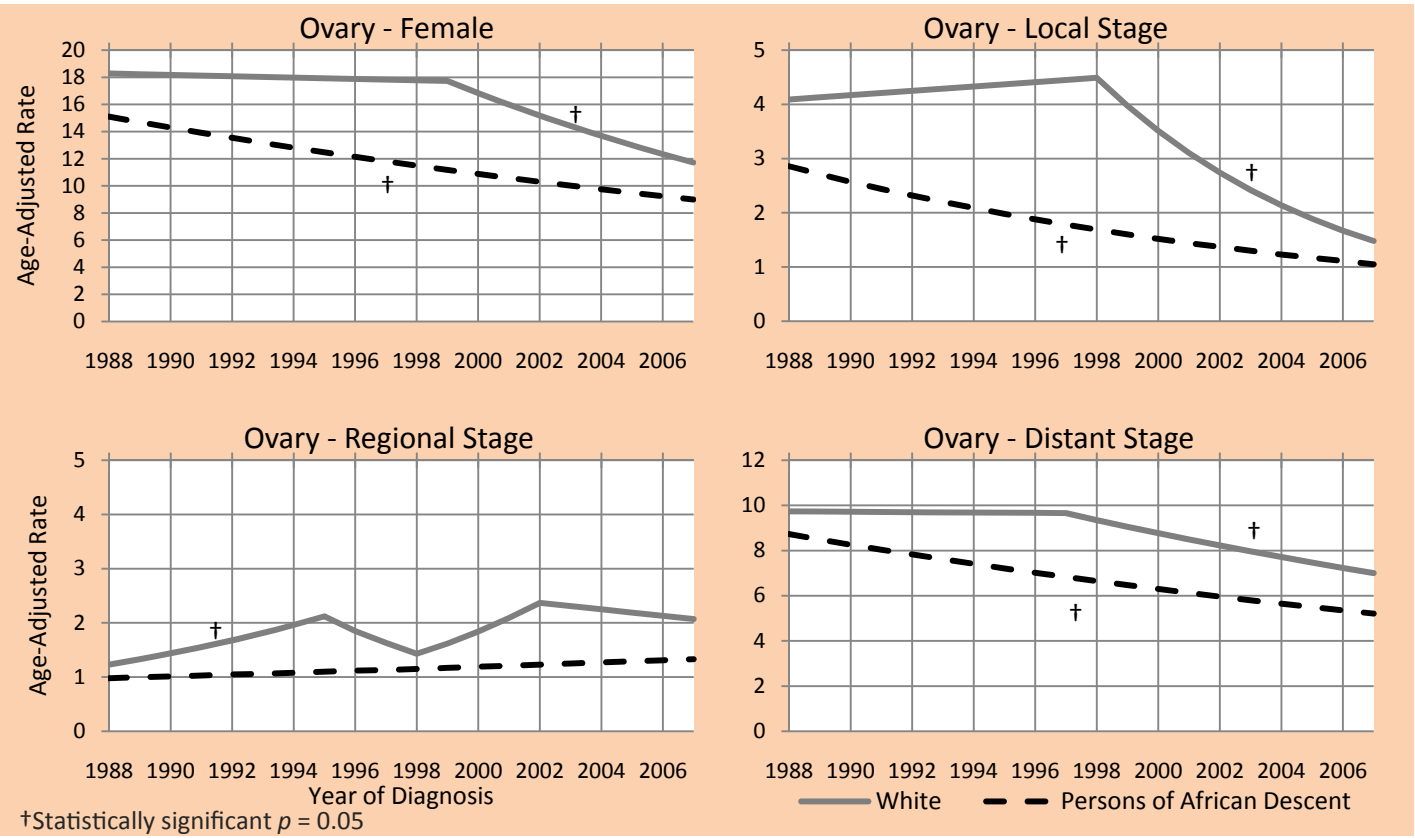
a) All ovarian cancers: Persons of African Descent vs. White females

The age-adjusted rates of ovarian cancer were higher in White females (2007: 12 cases/100,000) relative to persons of African Descent (2007: 8 cases/100,000). Both females of African Descent and White females had decreasing trends in ovarian cancer throughout the time period.

b) Ovarian cancer stage: local, regional, distant: Persons of African Descent vs. White females

Over the time period, both White females and females of African Descent were decreasingly diagnosed at local stage and increasingly diagnosed at regional stage with a decrease in diagnosis at distant stage for both subpopulations. Females of African Descent were less likely to be diagnosed at local stage but also at regional and distant stages compared to their White counterparts throughout the time period. The trends of persons diagnosed as NOS decreased for both Persons of African Descent and White females throughout the time period.

Figure 21. Persons of African Descent vs Whites Joinpoint Incidence Trends, Ovarian Cancer by Stage, 1988-2007



D.2.10. Cervical Cancer (females only)

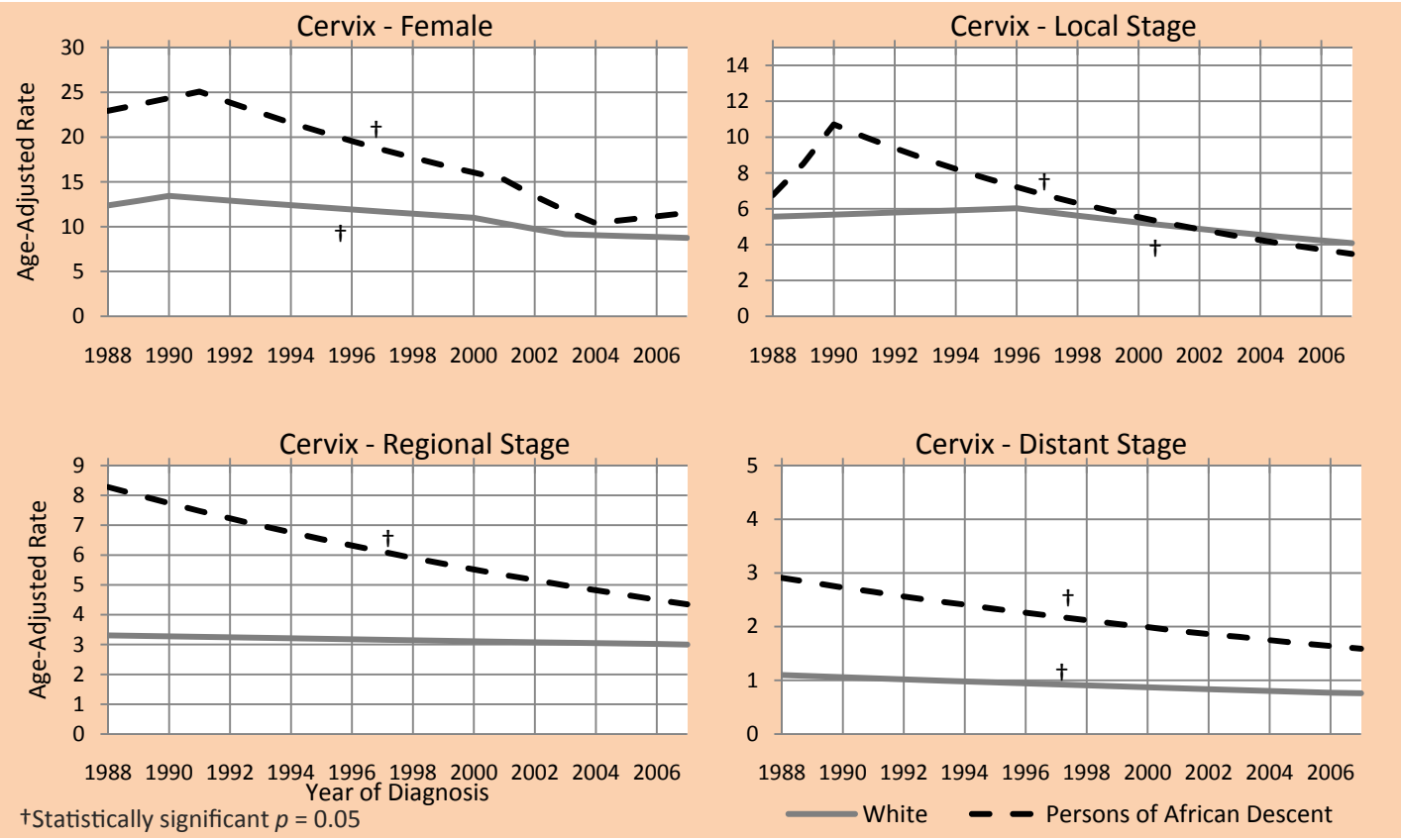
a) All cervical cancers: Persons of African Descent vs. White females

The age-adjusted rates of cervical cancer were slightly higher for females of African Descent (2007: 11 cases/100,000) compared to White females (2007: 9 cases/100,000). Over the time period, both Persons of African Descent and White females experienced decreasing trends of cervical cancer.

b) Cervical cancer stage: local, regional, distant: Persons of African Descent vs. White females

Over the time period, both White females and females of African Descent were decreasingly diagnosed at local, regional and distant stages with the greatest decreases seen among females of African Descent. Relative to Whites regional-stage diagnoses fell most dramatically among females of African Descent, following by distant stage trends. However, rates for both regional and distant-stage cancers remained higher for persons of African Descent by the end of the survey period. The trends of persons diagnosed as NOS decreased for both Persons of African Descent and White females throughout the time period, with a greater decrease among females of African Descent.

Figure 22. Persons of African Descent vs Whites Joinpoint Incidence Trends, Cervical Cancer by Stage, 1988-2007

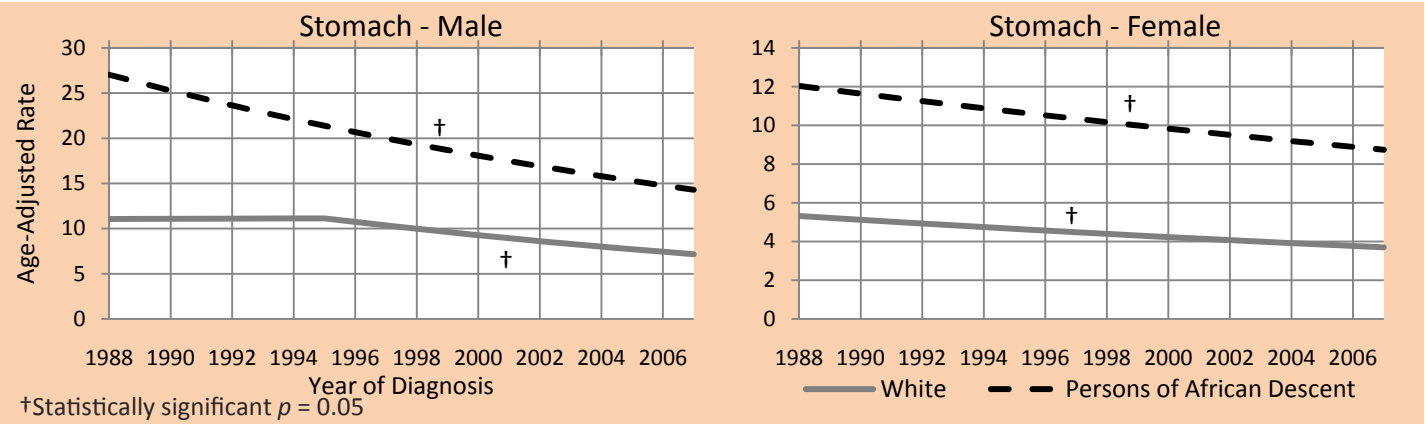


D.2.11. Stomach Cancer

a) All stomach cancers: Persons of African Descent vs. White by gender

Overall throughout the time period, the age-adjusted rates of stomach cancer were higher among males of African Descent (2007: 15 cases/100,000) compared to White males (2007: 7 cases/100,000) and females of African Descent (2007: 9 cases/100,000) compared to White females (2007: 4 cases/100,000). Over the time period, both males and females of African Descent had decreasing trend in stomach cancer rates; White males and females had slight decreases over the same time period. The steepest decline in rates occurred in males of African Descent resulting in a narrowing of the gap in rates relative to whites over the survey period.

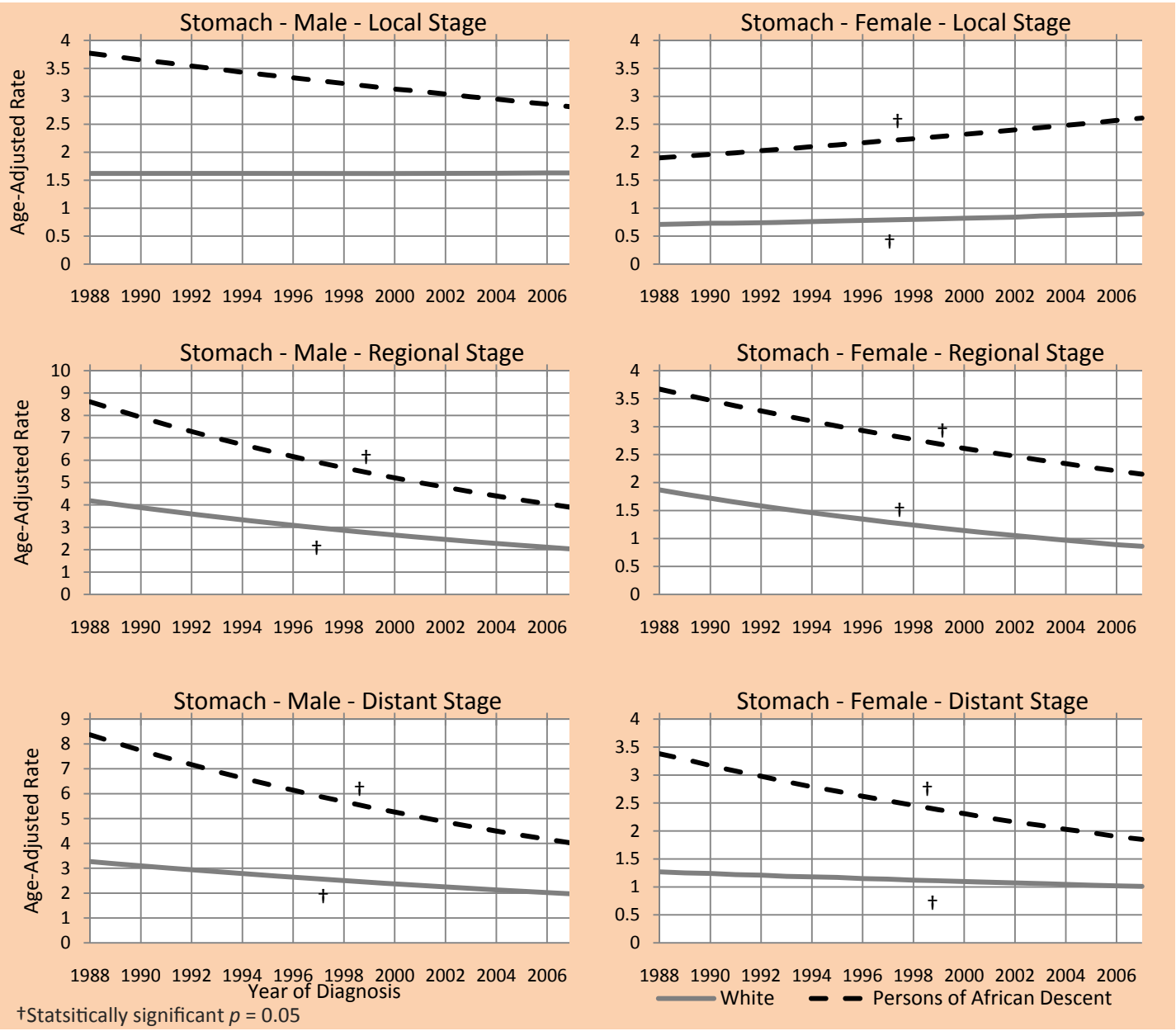
Figure 23. Persons of African Descent vs Whites Joinpoint Incidence Trends, Stomach Cancer by Gender, 1988-2007



b) Stomach cancer stage: local, regional, distant: Persons of African Descent vs. White by gender

Local, regional, and distant stage rates of stomach cancer declined for males of African Descent, while whites experienced declines in regional and distant stages only. Rates of decline for these latter two stages were steeper for males of African Descent resulting in a narrowing of the race gap over time. Similar patterns were noted among females for regional and distant stage cancers, but with a larger gap reduction for distant stage cancers. Over the time period, there was an increasing trend in local stage rates among females of African Descent and a generally stable trend among White females. The trends of persons diagnosed as NOS decreased for both Persons of African Descent and White males and females throughout the time period.

Figure 24. Persons of African Descent vs Whites Joinpoint Incidence Trends, Stomach Cancer by Gender and Stage, 1988-2007



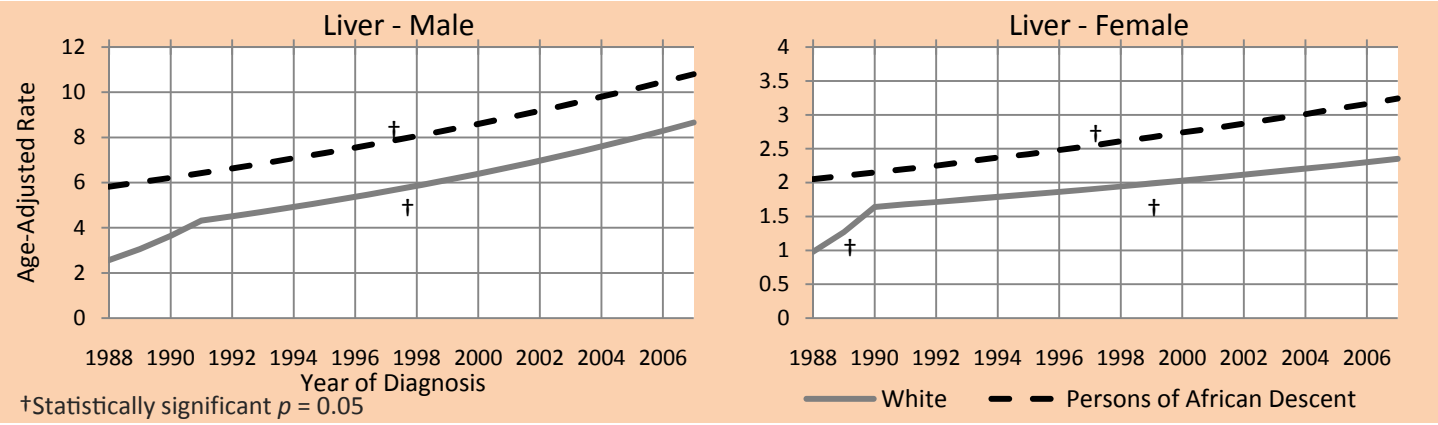
†Statsitically significant $p = 0.05$

D.2.12. Liver Cancer

a) All liver cancers: Persons of African Descent vs. White by gender

Overall throughout the time period, the age-adjusted rates of liver cancer were higher among males of African Descent (2007: 12 cases/100,000) compared to White males (2007: 8 cases/100,000) and females of African Descent (2007: 3 cases/100,000) compared to White females (2007: 2 cases/100,000). Over the time period, there were increasing trends in the liver cancer rates for both persons of African Descent and for Whites.

Figure 25. Persons of African Descent vs Whites Joinpoint Incidence Trends, Liver Cancer by Gender, 1988-2007

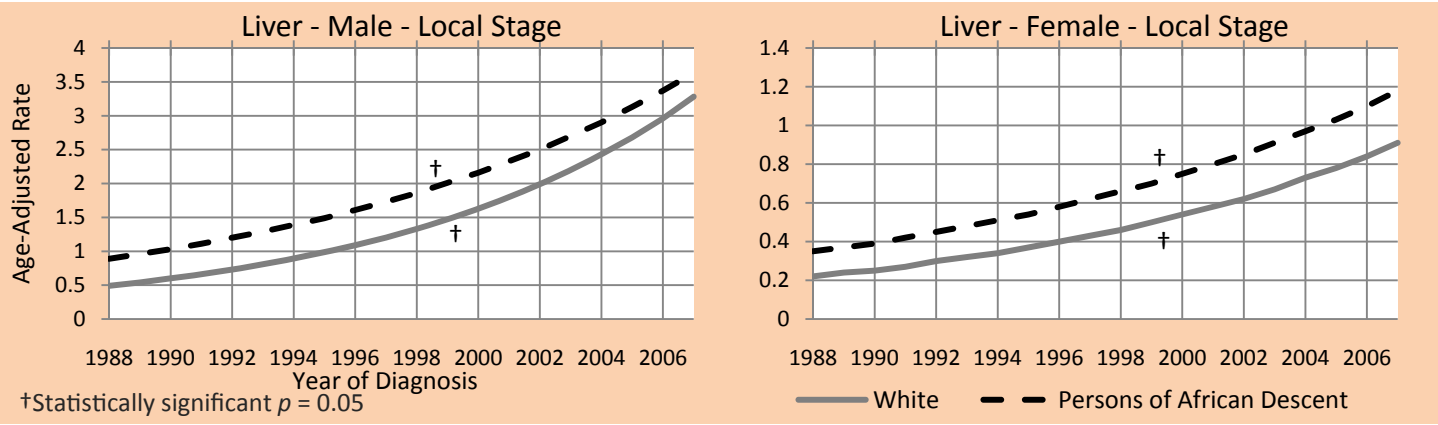


†Statistically significant $p = 0.05$

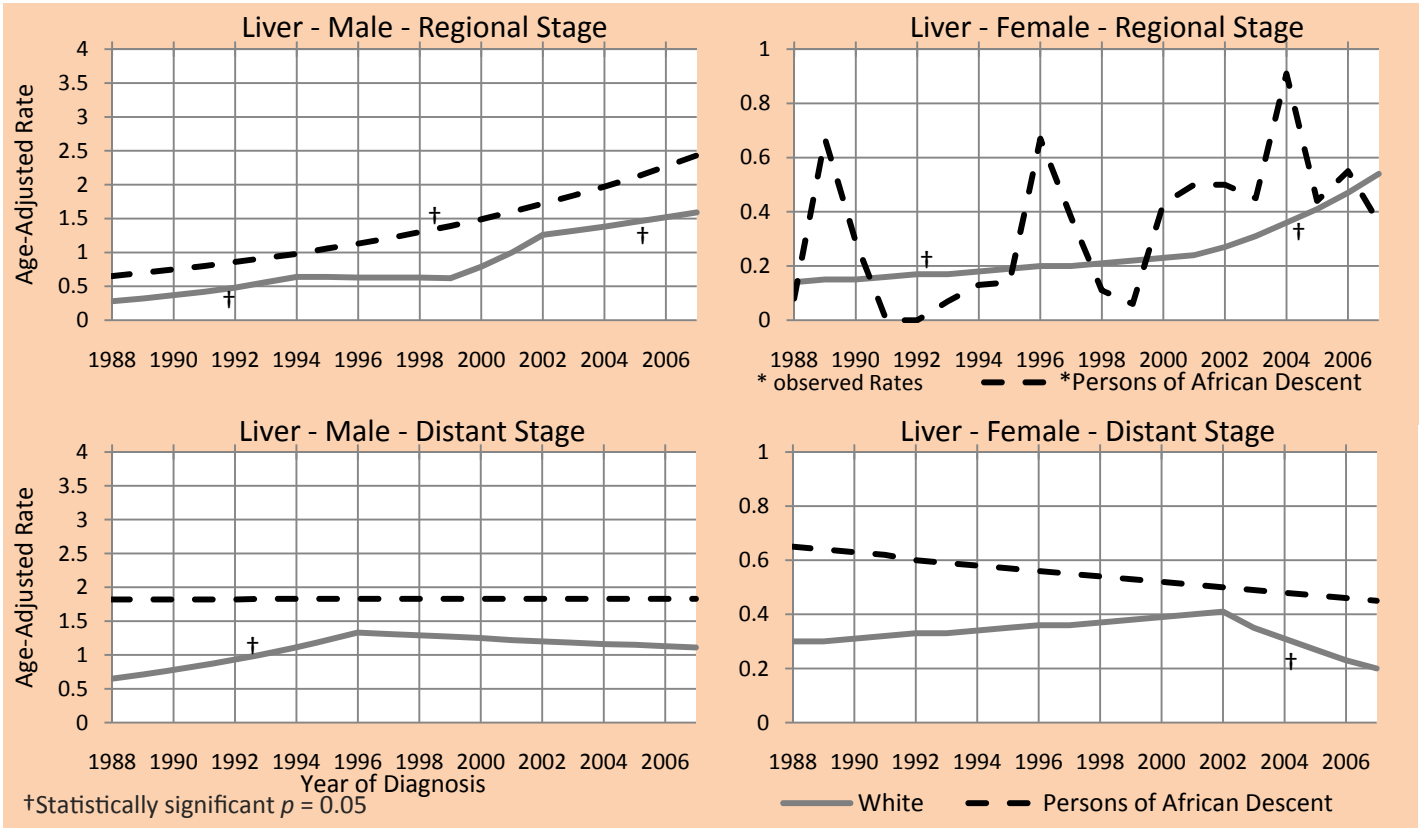
b) Liver cancer stage: local, regional, distant: Persons of African Descent vs. White by gender

Over the time period, both Whites and persons of African Descent of both genders were increasingly diagnosed at a local and regional stage, with variable rates for females of African Descent. Trends in rates for distant stage diagnoses were generally stable among males and were slightly decreasing among females. Males and Females of African Descent were more likely to be diagnosed at local stage, but also more likely to be diagnosed at regional and distant stages compared to their White counterparts throughout the time period. The trends of persons diagnosed as NOS were generally stable for Persons of African Descent, increased for White males and decreased for white females throughout the time period.

Figure 26. Persons of African Descent vs Whites Joinpoint Incidence Trends, Liver Cancer by Gender and Stage, 1988-2007



†Statistically significant $p = 0.05$



D.3. Percentage Distributions for All Cancer

D.3.1. Persons of African Descent versus Whites by Gender

The total number of cancers was greater in males relative to females irrespective of race and was substantially greater for Whites compared to Persons of African Descent, as would be expected based on the number of Whites and Persons of African Descent residing in the Florida population as well as their individual cancer rates: Persons of African Descent female cases (47,545), Persons of African Descent male cases (78,059), White female cases (767,731), and White male cases (893,053). The percentage distribution of the major cancers by gender and by ethnicity is displayed in both tabular and graphic form (Table 1 and Figure 29). Male Persons of African Descent had similar distributions of the tobacco-related cancers (i.e. lung, and head and neck) than White males, with the exception of Urinary Bladder cancers (2% versus 7%, respectively), and comparable distributions for colorectal, non-Hodgkin's Lymphoma, and stomach cancers. Males of African Descent had a greater proportion of prostate cancer than did White males (36% versus 28%, respectively). Among females, the distribution for colorectal, and breast cancers were similar, whereas white females had a greater proportion of lung and bronchus cancer than did females of African Descent (15% versus 10%, respectively). The proportion of cervical and stomach cancers were greater for females of African Descent than for white females. The distribution for all other cancers was comparable.

Figure 29. Persons of African Descent vs. Whites Percent Cancer Distribution by Site and Sex, 1988-2007

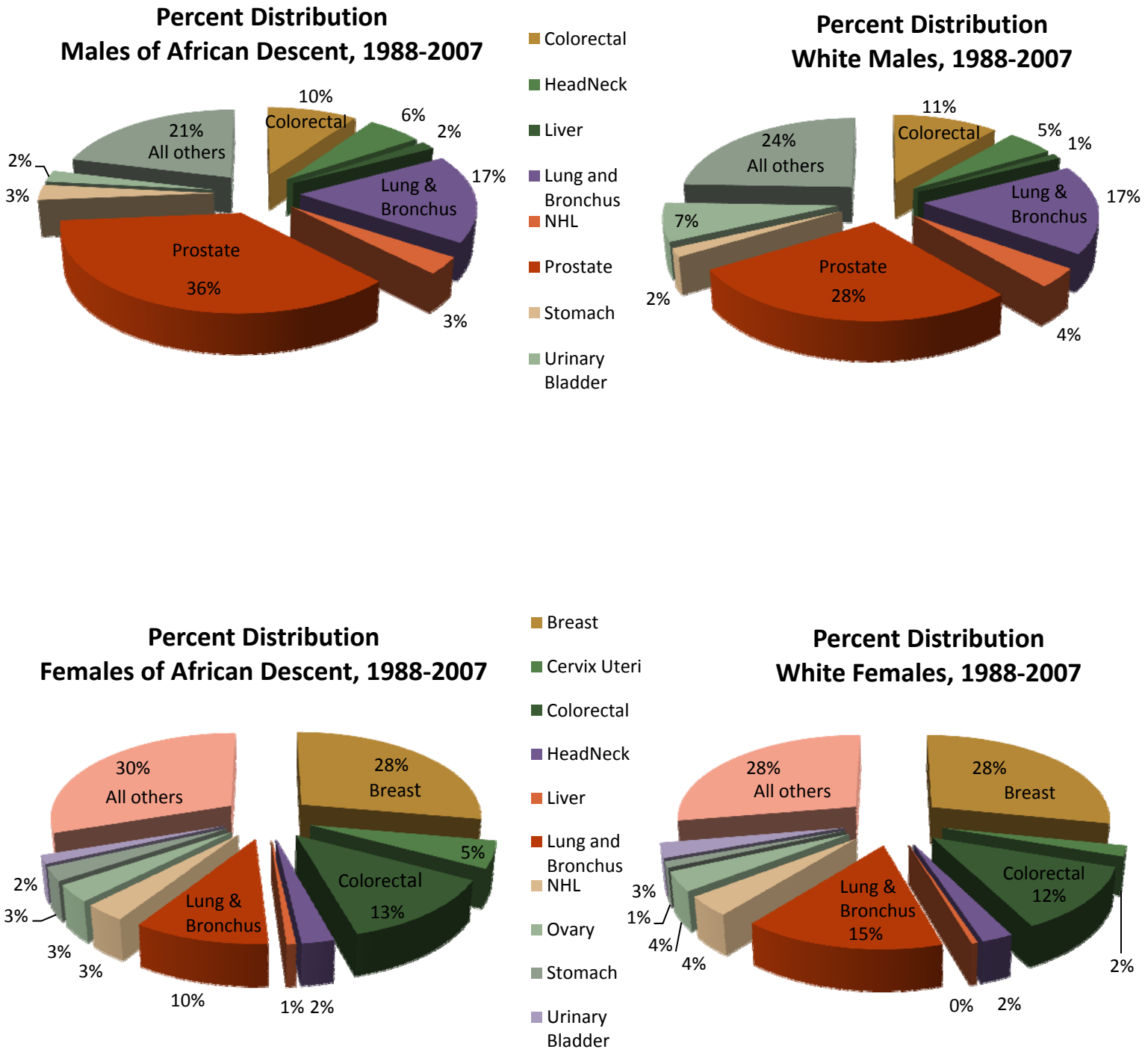


Table 1. Percent Distribution of Major Cancers by Race and Gender, 1988-2007

	Female		Male	
Cancer type	Persons of African Descent	White	Persons of African Descent	White
Lung and Bronchus	10%	15%	17%	17%
Prostate			36%	28%
Breast (female)	28%	28%		
Colorectal	13%	12%	10%	11%
Urinary Bladder	2%	3%	2%	7%
NHL	3%	4%	3%	4%
Head & Neck	2%	2%	6%	5%
Cervix Uteri	5%	2%		
Ovary	3%	4%		
Stomach	3%	1%	3%	2%
Liver	1%	0%	2%	1%
All Others	30%	28%	21%	24%
All Cancers (N)	47,454	767,731	78,059	893,053

E. DISCUSSION

This Report extends our knowledge of the epidemiology of cancer in Persons of African Descent in several ways: 1) it provides the first detailed examination of the cancer experience in a state with a large and diverse population of Persons of African Descent; 2) it presents both the relative distribution of cancer cases across Persons of African Descent in comparison to Whites, and examines trends over more than a decade in the cancer rates in these two race groups. By undertaking both analyses we are able to not only discuss relative differences in cancer rates among Persons of African Descent in these two race groups, but also permits an examination of whether persistent disparities in cancer rates are diminishing.[12-15,18,23-25] Below, we summarize and then integrate our findings with the existing literature on cancer in Persons of African Descent, with a focus on the trajectory of cancer health disparities in relation to Whites, and discuss implications for cancer control in this segment of the Florida population.

E.1. Overall Cancer Trends in Florida Persons of African Descent Relative to Whites

The overall cancer incidence rate for males of African Descent increased in the early years of the Registry, peaking in 1992, and beginning a steady decrease through the end of the survey period (Figure 6). Although the peak rate in 1992 for Persons of African Descent was greater than the peak rate for Whites, both race groups had very similar overall rates at the beginning and ending survey period. In comparison to males, the race-specific cancer rates were lower in females. There were increases early in the survey period followed by gradual reductions in rates. Females of African Descent had consistently lower rates relative to whites, although the large race gap evident early in the survey period largely disappeared as the result of a significantly upward trend in this race group. Cancer rates for white females have been slowly but significantly decreasing since 2000, but rates for females of African Descent increased (non-significantly) in the last three years, raising the possibility that if these trends continue, rates for these race groups will achieve parity and even 'cross-over' indicating a growing disparity for this race group.

E.2. Overall Stage-Specific Cancer Trends in Florida Persons of African Descent Relative to Whites

In addition to the goal of overall population-level reductions in the cancer rates, it is also important to monitor trends in stage-specific cancer rates since initial diagnosis at the regional and especially distant stages given that overall survival rates are much higher than when cancer is detected at its earliest stages. The overall rate of distant stage cancer incidence in male Persons of African Descent decreased steadily and significantly from 1988-1998, at a faster rate than for White males, although the rate of this reduction subsequently started to flatten out in subsequent years. Rates also significantly declined in this earlier time period for Whites and then increased non-significantly for three years before starting to fall again. In recent years the trend lines for both race groups have been roughly parallel with higher rates in Persons of African Descent. Rates of distant stage cancers among females of African Descent remained steady across the survey period, while rates for Whites steadily increased until 2004 when they reached parity with rates for females of African Descent. Since that time rates have been significantly decreasing in Whites while remaining steady in Persons of African Descent, raising the possibility of a growing disparities of distant stage cancers in the coming years.

E.3. Summary of Cancer-Related Health Disparities in Floridians of African Descent

Presented in Table 2 is a summary of the cancer disparities identified in our analysis of Floridians of African Descent for the selected cancers analyzed in this report. The sex-specific ratio of overall and distant-stage cancer rates for year 2007 among Persons of African Descent versus Whites is identified in the table as either larger than one (indicating higher rates in the former versus latter race group), lower than one (indicating lower rates in the former versus latter group), or the rates are roughly equivalent. Also presented in Table 2 is a summary of the direction of the gender-specific relative overall and distant-stage trends when comparing Persons of African Descent versus Whites over time. These trends are identified as either reflecting an increasing gap in rates over time, a decreasing gap in rates over time, or no change in the gap over time. Cells in dark grey indicate that this ratio of cancers in Persons of African Descent relative to Whites was increasing over time (indicating an increasing disparity), while cells highlighted in light grey indicate that disparities are diminishing over time.

In 2007 there were several notable cancer incidence rates which were lower in Persons of African Descent relative to whites, including several of the tobacco-associated cancers (e.g., bladder and head and neck). However, overall incidence rates of stomach, liver, cervical, and prostate cancer were all higher in Persons of African Descent relative to Whites. Race-specific differences in rates of late-stage cancers in 2007 were even more pronounced than the overall cancer incidence comparisons. For example, despite lower relative rates of bladder cancer, Persons of African Descent actually had higher rates of distant-stage bladder cancer relative to whites, suggesting differences in early detection and/or differences in tumor growth rates. However, as indicated by the light grey cells in Table 2, one promising trend also noted is that the gap in the ratio of Persons of African Descent versus White distant-stage cancer rates is diminishing over time for many cancers including for stomach, liver, prostate, cervical, lung (males only), and head and neck (males only).

Table 2. Table summarizing cancer incidence rate and incidence rate trend disparities in Floridians of African Decent versus White Floridians: the 1988-2007 Florida Cancer Data System

Cancer Type	Ratio of 2007 rates: PAD* vs. Whites	Trend in 1988-2007 rates: PAD* vs. Whites	Ratio of 2007 distant-stage rates: PAD* vs. Whites	Trend in 1988-2007 distant-stage rates: PAD* vs. Whites
Overall	Males: ↑ PAD/W	Males: No GAP Δ	Males: ↑ PAD/W	Males: ↓ GAP Δ
	Females: ↓ PAD/W	Females: ↓ GAP Δ	Females: ↑ PAD/W	Females: No GAP Δ
Lung and Bronchus	Males: ~ PAD/W	Males: ↓ GAP Δ	Males: ~ PAD/W	Males: ↓ GAP Δ
	Females: ↓ PAD/W	Females: No GAP Δ	Females: ↓ PAD/W	Females: No GAP Δ
Prostate	Males: ↑ PAD/W	Males: ↑ GAP Δ	Males: ↑ PAD/W	Males: ↓ GAP Δ
Breast	Females: ↓ PAD/W	Females: ↓ GAP Δ	Females: ↑ PAD/W	Females: ↓ GAP Δ
Colorectal	Males: ↑PAD/W	Males: ↓ GAP Δ	Males: ↑ PAD/W	Males: No GAP Δ
	Females: ↑ PAD/W	Females: No GAP Δ	Females: ↑ PAD/W	Females: ↑ GAP Δ
Bladder	Males: ↓ PAD/W	Males: ↓ GAP Δ	Males: ↑ PAD/W	Males: No GAP Δ
	Females: ↓ PAD/W	Females: No GAP Δ	Females: ↑ PAD/W	Females: ↓ GAP Δ
Head and Neck	Males: ↓ PAD/W	Males: ↓ GAP Δ	Males: ~ PAD/W	Males: ↓ GAP Δ
	Females: ↓ PAD/W	Females: ↑ GAP Δ	Females: ↑ PAD/W	Females: No GAP Δ
Non Hodgkin's Lymphoma	Males: ↓ PAD/W	Males: No GAP Δ	Males: ↓ PAD/W	Males: ↑ GAP Δ
	Females: ~ PAD/W	Females: ↓ GAP Δ	Females: ~ PAD/W	Females: ↓ GAP Δ
Ovarian	Females: ↓ PAD/W	Females: No GAP Δ	Females: ↓ PAD/W	Females: ↑ GAP Δ
Cervical	Females: ↑ PAD/W	Females: ↓ GAP Δ	Females: ↑ PAD/W	Females: ↓ GAP Δ
Stomach	Males: ↑ PAD/W	Males: ↓ GAP Δ	Males: ↑ PAD/W	Males: ↓ GAP Δ
	Females: ↑ PAD/W	Females: No GAP Δ	Females: ↑ PAD/W	Females: ↓ GAP Δ
Liver	Males: ↑ PAD/W	Males: No GAP Δ	Males: ↑ PAD/W	Males: ↓ GAP Δ
	Females: ↑ PAD/W	Females: No GAP Δ	Females: ↑ PAD/W	Females: ↓ GAP Δ

*PAD= Persons of African Descent; ~= roughly equivalent cancer rates; ↑= PAD/W ratio greater than 1; ↓= PAD/W ratio less than 1; Δ= change in PAD/W incidence race gaps; = diminishing disparity; = increasing disparity

E.4. Comparison of Select 2007 Florida Incidence Rates with Pooled Data from 43 Population-Based Registries

The 2010 annual American Cancer Society (ACS) report included detailed tables summarizing the cancer experience of Persons of African Descent relative to Whites, using data pooled over years 2002-2006 from 43 registries covering 86% of the US population (including data from the FDCS registry) (Edwards 2008).[51] A table comparing these rate ratios is provided below along with the direction of Persons of African Descent to Whites incidence rates in Florida in 2007 (Table 3). Findings from Florida largely reflect the cancer experience of Persons of African Descent relative to Whites nationwide with the exception of the rate ratios for head in neck cancer which were 0.69 and 1.09, respectively in Florida and in the pooled ACS analysis. These differences may be driven, in part, by lower historical rates of smoking among Floridians of African Descent relative to Persons of African Descent living in other regions of the country, and/or higher smoking rates among White Floridians versus Whites living elsewhere, although definitive race-specific historical data on smoking rates is lacking.[37]

Table 3. Directionality of Selected Persons of African Descent/Whites Cancer Incidence Rate Ratios: Pooled Data from 43 US Cancer Registries (2002-2006) versus Florida (2007)

	Male Persons of African Descent/Whites Cancer Incidence Rate Ratio			Female Persons of African Descent/Whites Cancer Incidence Rate Ratio	
Cancer Site	38 States[†]	Florida		38 States[†]	Florida
All Sites	↑	↑		↓	↓
Lung and Bronchus	↑	↑		↓	↓
Prostate (males only)	↑	↑			
Breast (females only)				↓	↓
Colorectal	↑	↑		↑	↑
Bladder	↓	↓		↓	↓
Head and Neck	↑	↓		↓	↓
Non-Hodgkin's Lymphoma	↓	↓		↓	↓
Ovarian (females only)				↓	↓
Cervical (females only)				↑	↑
Stomach	↑	↑		↑	↑
Liver	↑	↑		↑	↑
[†]Data from American Cancer Society 2010 report [1]					

E.5. Summary of Cancer Disparities in Floridians of African Descent: 2007 and Beyond

Relative to Whites, cancer rates for persons of African Descent were sometimes lower particularly for select tobacco-associated cancers (e.g., bladder, head and neck, female lung), suggesting a lower historic exposure to tobacco products. Despite higher smoking rates in persons of African Descent relative to Whites for the nation as a whole (2008: 20.6% versus 18.7%), smoking rates in Floridians of African Descent remain substantially lower than those of White Floridians (2008: 12.7% versus 19.7%), raising the strong possibility that future generations of Floridians of African Descent will continue to experience rates of tobacco-associated cancers which are lower than that of White Floridians.[52] However, rates for lung cancer, while declining in both race groups, have now reached parity among males. Smokers of African Descent may be more susceptible to the development of lung cancer relative to Whites and smokers from other race groups.[53]

As indicated in Table 3 there has also been progress in reducing the persons of African Descent to White gap for select cancers, and especially for distant stage cancers. Nevertheless, in 2007 disparities remain for many cancers examined in this report. For overall cancer the largest disparities in the overall cancer rates for persons of African Descent include: female stomach cancer (rate ratio=2.4), male stomach cancer (2.1), prostate cancer (1.6), male liver cancer (1.4), cervical cancer (1.3), and female liver (1.3). Disparities for distant stage cancers included prostate (rate ratio=3.2), cervical (2.3), breast (2.1), male stomach (2.0), female stomach (1.8), male colorectal (1.3), male liver (1.5) and female colorectal (1.4). Of note, four of these distant stage cancers are amenable to early detection via screening. Therefore, more aggressive screening and cancer education programs targeting Floridians of African Descent are needed to lower these persistent disparities.

APPENDIX 1. Major Persons of African Descent Cancers: International Classification of Disease (ICD) and FCDS Coding

Cancer Site and FCDS Number		Incidence ICD-0-3 Codes	Mortality ICD-9 codes (1979-1998)	Mortality ICD-10 codes (1998 +)
All				
		C00-C97	140-208, 238.6	C00-C97
Lung/Bronchus				
36	Lung and Bronchus	C34	162.2-162.5, 162.8-162.9	C34
Prostate				
51	Prostate	C61.9	185	C61.9
Breast				
43	Breast	C50	174-175	C50
Colorectal				
14-22	Colon	C18, C26	153, 159.0	C18, C26.0
23-24	Rectum and Rectosigmoid Junction	C19.9, C20.9	154.0-154.1	C19.9-C20.9
Bladder (includes in situ)				
55	Bladder	C67	188	C67
Head and Neck				
1	Lip	C00	140	C00
2	Tongue	C01-C02	141	C01-C02
3	Salivary Gland	C07.9-C08	142	C07-C08
4	Floor of Mouth	C04	144	C04
5	Gum and Other Mouth	C03, C05-C06	143, 145	
6	Nasopharynx	C11	147	C11
7	Tonsil	C09	146.0-146.2	C09
8	Oropharynx	C10	146.3-146.9	C10
9	Hypopharynx	C12, C13	148	C12-C13
10	Other Buccal Cavity and Pharynx	C14, C14.2-C14.8	149	C14
34	Nasal Cavities, Middle Ear and Accessory Sinuses	C30- C31	160	C30-C31
35	Larynx	C32	161	C32

Cancer Site and FCDS Number		Incidence ICD-0-3 Codes	Mortality ICD-9 codes (1979-1998)	Mortality ICD-10 codes (1998 +)
Non Hodgkin's				
66	NHL Nodal	C02.4, C09.8, C09.9, C11.1, C14.2, C37.9, C42.2, C77	200	C82-C85, B21.1, B21.2
67	NHL Extra-nodal	C00-C02.3, C02.5-C09.7, C10-C11, C11.2-C14.1, C14.3-C38.7, C38-C42.1-C42.3-C76.9, C78-C99	202.0-202.2, 202.8-202.9	Not available
Ovary				
47	Ovary	C56.9	183	C56.9
Cervix				
44	Cervix	C53	180	C53
Stomach				
12	Stomach	C16	151	C16
Liver				
26	Liver	C22	155.0, 155.2	C22

REFERENCES

1. US Census. 2008 Population Estimates. www.census.gov/popest/estimates.html (Accessed on March 30, 2010). 2008.
2. Florida Economic Estimating Conference. Office of Economic & Demographic Research. The Florida Legislature. http://edr.state.fl.us/conferences/fleconomic/floridaeconomic.htm. (Accessed on March 30, 2010). 2010.
3. McKinnon JD, Bennett CE. We the people: Blacks in the United States. Census 2000 Special Reports. August 2005.
4. Shavers VL, Shavers BS. Racism and health inequity among Americans. *J Natl Med Assoc* 2006; 98(3):386-96.
5. American Cancer Society (ACS). Cancer facts & figures for African Americans 2009-2010. Atlanta: American Cancer Society, 2009.
6. Institute of Medicine (IOM). Unequal treatment: Confronting racial and ethnic disparities in health care. Washington, DC: the National Academy of Science, 2002.
7. Goldberg J, Hayes W, Huntley J. Understanding health disparities. Health Policy Institute of Ohio. November 2004.
8. Shavers VL, Brown ML. Racial and ethnic disparities in the receipt of cancer treatment. *J Natl Cancer Inst* 2002; 94(5):334-57.
9. Wolff M, Bates T, Beck B, Young S, Ahmed SM, Maurana C. Cancer prevention in underserved African American communities: barriers and effective strategies--a review of the literature. *WMJ* 2003; 102(5):36-40.
10. Ghafoor A, Jemal A, Cokkinides V, Cardinez C, Murray T, Samuels A, Thun MJ. Cancer Statistics for African Americans. *CA Cancer J Clin* 2002; 52:326.
11. Garofalo JP, Hamann HA, Ashworth K, Baum A. Stress and quality of life in African American cancer survivors. *Ethn Dis* 2006; 16(3):732-8.
12. Intercultural Cancer Council. Cancer fact sheets: African Americans and cancer. http://iccnetwork.org/cancerfacts/ICC-CFS1.pdf, (Accessed on April 7, 2010). 2010.
13. Jemal A, Siegel R, Ward E, Hao Y, Xu J, Thun MJ. Cancer statistics, 2009. *CA Cancer J Clin* 2009; 59(4):225-49.
14. Briggs NC, Levine RS, Hall I, Cosby O, Brann EA, Hennekens CH. Occupational risk factors for selected cancers among African American and White men in the United States. *AJPH* 2003; 93(10): 748-1752.
15. Ward E, Jemal A, Cokkinides V, Singh GK, Cardinez C, Ghafoor A, Thun M. Cancer disparities by race/ethnicity and socioeconomic status. *CA Cancer J Clin* 2004; 54(2):78-93.
16. Kolb B, Wallace AM, Hill D, Royce M. Disparities in cancer care among racial and ethnic minorities. *Oncology* (Williston Park) 2006; 20(10):1256-61.
17. Siminoff LA, Ross L. Access and equity to cancer care in the USA: a review and assessment. *Postgrad Med J* 2005; 81(961):674-9.
18. American Cancer Society. Cancer Facts & Figures 2009. Atlanta: American Cancer Society; 2009. http://www.cancer.org/downloads/STT/500809web.pdf (accessed July 30, 2009).
19. Landrine H, Corral I. Separate and unequal: residential segregation and black health disparities. *Ethn Dis* 2009; 19(2):179-84.
20. Robillard AG, Larkey L. Health disadvantages in colorectal cancer screening among African Americans: considering the cultural context of narrative health promotion. *J Health Care Poor Underserved* 2009; 20(2 Suppl):102-19.
21. Berry J, Bumpers K, Ogunlade V, Glover R, Davis S, Counts-Spriggs M, Kauh J, Flowers C. Examining racial disparities in colorectal cancer care. *J Psychosoc Oncol* 2009; 27(1):59-83.
22. Vona-Davis L, Rose DP. The influence of socioeconomic disparities on breast cancer tumor biology and prognosis: a review. *J Womens Health* (Larchmt) 2009; 18(6):883-93.
23. NIH Office of Minority Health. Cancer and African Americans. http://raceandhealth.hhs.gov/templates/content.aspx?ID=2826, (Accessed on March 20, 2010). 2010.
24. Powe BD, Hamilton J, Hancock N, Johnson N, Finnie R, Ko J, Brooks P, Boggan M Jr. Quality of life of African American cancer survivors. A review of the literature. Cancer 2007; 15;109(2 Suppl):435-45.

25. Alexander DD, Waterbor J, Hughes T, Funkhouser E, Grizzle W, Manne U. African-American and Caucasian disparities in colorectal cancer mortality and survival by data source: an epidemiologic review. *Cancer Biomark* 2007;3(6):301-13.
26. Stewart JH. Lung carcinoma in African Americans: a review of the current literature. *Cancer* 2001; 91(12): 2476-2482.
27. Kim AW, Liptay MJ, Higgins RS. Contemporary review on the inequities in the management of lung cancer among the African-American population. *J Natl Med Assoc* 2008; 100(6):683-8.
28. Hongo M, Nagasaki Y, Shoji T. Epidemiology of esophageal cancer: Orient to Occident. Effects of chronology, geography and ethnicity. *J Gastroenterol Hepatol* 2009; 24(5):729-35.
29. Evans S, Metcalfe C, Ibrahim F, Persad R, Ben-Shlomo Y. Investigating Black-White differences in prostate cancer prognosis: A systematic review and meta-analysis. *Int J Cancer* 2008; 123(2):430-5.
30. Dimou A, Syrigos KN, Saif MW. Disparities in colorectal cancer in African-Americans vs Whites: before and after diagnosis. *World J Gastroenterol* 2009; 15(30):3734-43.
31. Rouhani P, Hu S, Kirsner RS. Melanoma in Hispanic and black Americans. *Cancer Control* 2008; 15(3):248-53.
32. Williams H, Powell IJ. Epidemiology, pathology, and genetics of prostate cancer among African Americans compared with other ethnicities. *Methods Mol Biol* 2009; 472:439-53.
33. Odedina FT, Akinremi TO, Chinegwundoh F, Roberts R, Yu D, Reams RR, Freedman ML, Rivers B, Green BL, Kumar N. Prostate cancer disparities in Black men of African descent: a comparative literature review of prostate cancer burden among Black men in the United States, Caribbean, United Kingdom, and West Africa. *Infect Agent Cancer* 2009; 4 Suppl 1:S2.
34. Allard JE, Maxwell GL. Race disparities between black and white women in the incidence, treatment, and prognosis of endometrial cancer. *Cancer Control* 2009 Jan; 16(1):53-6.
35. Newman LA. Breast cancer in African-American women. *Oncologist* 2005 Jan; 10(1):1-14.
36. Gerend MA, Pai M. Social determinants of Black-White disparities in breast cancer mortality: a review. *Cancer Epidemiol Biomarkers Prev* 2008; 17(11):2913-23.
37. Lee DJ, Voti L, MacKinnon J, Koniaris LG, Fleming LE, Huang Y, Wohler B, Franceschi D, Dietz NA, Sherman R, Soler Vila H. Gender and race specific comparison of tobacco-associated cancer incidence trends in Florida with SEER regional cancer incidence cata. *Cancer Causes and Control* 2008; 19:711-723.
38. Molina MA, Cheung MC, Perez EA, Byrne MM, Franceschi D, Moffat FL, Livingstone AS, Goodwin WJ, Gutierrez JC, Koniaris LG. African Americans and poor patients have a dramatically worse prognosis for head and neck cancer: an examination of 20,915 patients. *Cancer* 2008; 113(10):2797-806.
39. Hu S, Parmet Y, Allen G, Parker DF, Ma F, Rouhani P, Kirsner RS. Disparity in melanoma: a trend analysis of melanoma incidence and stage at diagnosis among whites, Hispanics, and blacks in Florida. *Arch Dermatol* 2009; 145(12):1369-74.
40. Brookfield KF, Cheung MC, Gomez C, Yang R, Nieder AM, Lee DJ, Koniaris LG. Survival disparities among African American women with invasive bladder cancer in Florida. *Cancer* 2009; 115(18):4196-209.
41. Cheung MC, Zhuge Y, Yang R, Koniaris LG. Disappearance of racial disparities in gastrointestinal stromal tumor outcomes. *J Am Coll Surg* 2009; 209(1):7-16.
42. Brookfield KF, Cheung MC, Lucci J, Fleming LE, Koniaris LG. Disparities in survival among women with invasive cervical cancer: a problem of access to care. *Cancer* 2009; 115(1):166-78.
43. Patel NR, Rollison DE, Barnholtz-Sloan J, Mackinnon J, Green L, Giuliano AR. Racial and ethnic disparities in the incidence of invasive cervical cancer in Florida. *Cancer* 2009; 1;115(17):3991-4000.
44. Kobetz E, Dunn Mendoza A, Menard J, Finney Rutten L, Diem J, Barton B, Kornfeld J, McKenzie N. One size does not fit all: differences in HPV knowledge between Haitian and Women of African Descent. *Cancer Epidemiol Biomarkers Prev* 2010; 19(2):366-70.
45. Yang R, Cheung MC, Hurley J, Byrne MM, Huang Y, Zimmers TA, Koniaris LG. A comprehensive evaluation of outcomes for inflammatory breast cancer. *Breast Cancer Res Treat* 2009; 117(3):631-41.
46. Fritz A, Percy C, Jack A. International classification of diseases of oncology. Geneva: World Health Organiziation; 2000.
47. Ries LAG, Harkins D, Krapcho M, Mariotto A, Miller BA, Feuer EJ, Clegg L, Eisner MP, Horner MJ, Howlader N, Hayat M, Hankey BF, Edwards BK. SEER cancer statistics review, 1975-2003. National Cancer institute. Bethesda,

MD, http://seer.Cancer.Gov/csr/1975_2003/, based on November 2005 SEER data submission, posted to the SEER website, 2006.
48. Huang Y, et al., Florida annual cancer report: 2004 incidence and mortality. 2007
49. Surveillance, Epidemiology, and End Results (SEER) program. SEER*Stat 6.6.2. Available at: www.seer.cancer.gov. (accessed April 15, 2010). National Cancer Institute; 2010.
50. Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for Joinpoint regression with applications to cancer rates. *Stat Med* 2000; 19(3):335-351.
51. Edwards BK, Ward E, Kohler BA, Eheman C, Zauber AG, Anderson RN, Jemal A, Schymura MJ, Lansdorp-Vogelaar I, Seeff LC et al.: Annual report to the nation on the status of cancer, 1975-2006, featuring colorectal cancer trends and impact of interventions (risk factors, screening, and treatment) to reduce future rates. *Cancer.*2008; 116: 544-73.
52. Kaiser Family Foundation. Statehealthfacts.org. Florida: Percent of Adults who Smoke by Race/Ethnicity, 2008. http://www.statehealthfacts.org/profileind.jsp?ind=82&cat=2&rgn=11 (accessed June 13, 2010). 2010.
53. Haiman CA, Stram DO, Wilkens LR, Pike MC, Kolonel LN, Henderson BE and Le Marchand L: Ethnic and racial differences in the smoking-related risk of lung cancer. *N Engl J Med* 2006; 354: 333-42