

PROSTATE CANCER INCIDENCE AND MORTALITY RATES
FOR FLORIDA BY RACE AND AGE 1990 – 1997



PROSTATE CANCER INCIDENCE AND MORTALITY RATES FOR FLORIDA BY RACE AND AGE 1990 – 1997

Prostate cancer rates in Florida have been changing rapidly since the introduction of improved screening techniques in the late 80's. These changes may be due to increased detection of cases that would have previously gone undetected, or there may be changes in the rate at which men get prostate cancer. The answer as to which of these is the case is not definitive at present, but there are data that seem to indicate that most of the change is due to increased detection rather than changes in the rate of the disease.

There are some familiar patterns in the prostate cancer incidence and mortality data for Florida. Graph 1 shows prostate cancer incidence rates by age and race, and graph 2 shows death rates by age and race. These graphs show that like the rates for most other cancers, prostate cancer incidence and mortality rates increase drastically with age. These graphs also show that in each age group, black men have higher incidence and mortality rates than white men. The differences in rates between black and white men are generally more pronounced for the mortality rates (graph 2) compared to the incidence rates (graph 1). Mortality rates are also higher for black men for all causes of death besides prostate cancer, as shown in graph 4, but the mortality rate difference is proportionally greater for prostate cancer. Graph 1 shows that black men are at greater risk for getting prostate cancer. Graph 2 shows that black men are much more likely to die from it than white men. Data from these 2 graphs are combined in graph 3 where the deaths to cases ratios are higher for black men across all ages.

It is useful to consider both incidence and mortality differences because each is affected by different factors. Generally, incidence can be reduced by eliminating or reducing risk factors. Mortality is influenced more by the effectiveness of screening and treatment, as well as by co-morbidity. Since both incidence and mortality are high for black men, it might be inferred that improvements in risk factor reduction, screening and treatment would all be necessary to reduce both the incidence and mortality rates for black men.

If prostate cancer mortality rates for black men were reduced to the level for white men, the number of prostate cancer deaths among black men would be much lower. This lower number can be called the expected number of deaths for black men. The difference between the expected number of deaths and the actual number of deaths can then be labeled excess deaths. The total excess deaths can be separated into those that are due to the higher risk of getting prostate cancer and those that are due to the higher risk of dying from the cancer once it is present. To eliminate all of the excess deaths, both the risk of getting the cancer and the risk of dying from the cancer once it is diagnosed, would have to be reduced. Graph 5 is an attempt to illustrate these concepts.

The expected deaths in graph 5 are computed by applying the white prostate cancer death rates to the black population. The excess deaths are then shown as the parts of the bars that are on top of the expected deaths. The portion of the deaths labeled "Deaths attributable to high incidence rate" are the excess deaths that could be eliminated if the black incidence rate were reduced to the level of the white incidence rate. There would

still be excess deaths due to the greater risk of dying from prostate cancer after it is diagnosed and this is represented by the portions of the bars labeled “Deaths attributable to high mortality rate”. In over simplified terms, it might be said that the deaths from high incidence rate are those that could be eliminated through reducing risk factors and the deaths from high mortality rate are those that could be eliminated by improving screening and treatment.

The problem here is the only known risk factors are so weakly associated with prostate cancer that eliminating them would eliminate only a small number of the excess deaths. Likewise the benefits of screening and treatment are not well quantified and changes in these areas would probably not eliminate many of the excess deaths. This can be seen in graph 6 where the age adjusted incidence and death rates are plotted across time. Widespread use of the prostate specific antigen screening test (PSA) began in the late 80’s. This screening test is more sensitive than previous methods and largely due to its introduction, the apparent incidence of prostate cancer increased dramatically in the late 80’s and early 90’s.

The PSA screening has apparently also resulted in fewer cancers being diagnosed at the distant stage. This can be seen in graph 7 where the percent diagnosed at the distant stage has declined for both black and white men. Cases diagnosed at the distant stage have also declined relative to the male population age 40 and over. This is shown in graph 8.

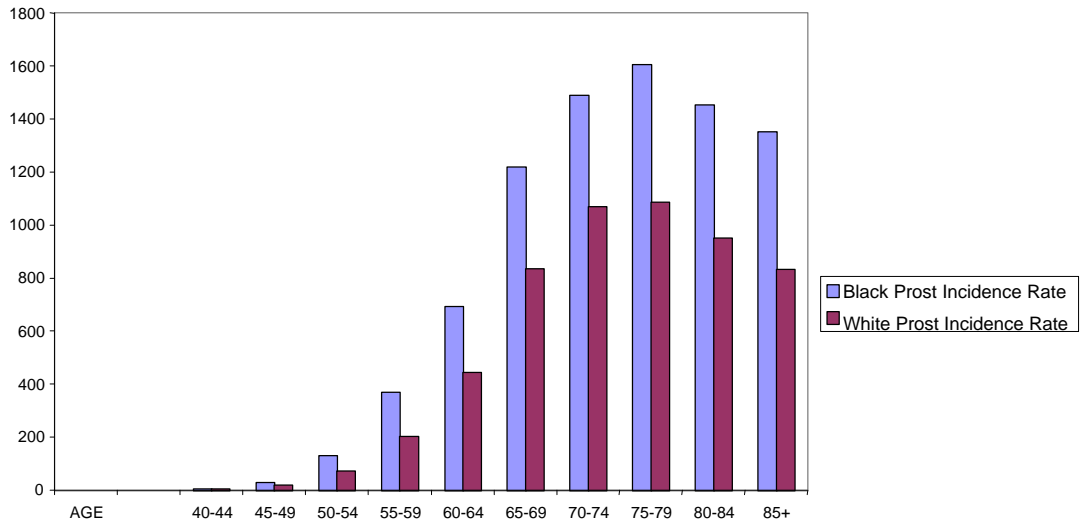
As the backlog of undetected cancer cases was reduced in the early 90’s, the incidence rate declined but did not return to the pre-PSA level, probably due to the improved sensitivity of the PSA test. The increase in the incidence rates and the decreasing proportion of cases diagnosed at the distant stage, might indicate that improved screening has led to diagnosis of cases that would have gone undetected before, and cases are also being diagnosed earlier.

Better and earlier detection usually results in decreases in mortality and in the years 1990 through 1997 there was a general decrease in the age adjusted prostate cancer mortality rates. In the peak year of 1990, the age adjusted death rate was 58.84 per 100,000 males for non-white men and 22.80 for white men. In 1997 these rates were 45.86 and 18.27, respectively, which is 22% lower for non-white males and 20% lower for white males. This may be the beginning of beneficial effects of the screening test and/or improved treatments.

In summary, for prostate cancer in Florida, the rates of incidence and mortality are higher for black men compared to white men. This is consistent across all ages. Mortality rates for causes other than prostate cancer are also higher for black men but not to as great a degree as for prostate cancer. The high mortality rates appear to be the result of both a high risk of getting prostate cancer and a high risk of dying from it once it is present. This suggests that improvements are needed in both risk factor reduction, and screening and treatment for black men. However, given the current situation regarding these factors, it is unlikely that improvements in these areas can completely eliminate the difference between the black and white mortality rates.

Graph 1

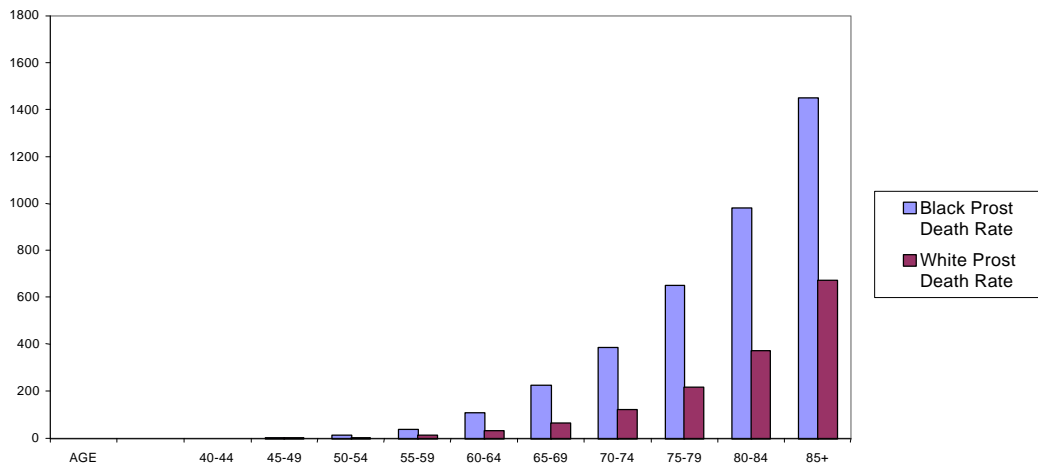
1990 - 1996 FLORIDA PROSTATE CANCER INCIDENCE RATES PER 100,000 MALES BY AGE AND RACE



Graph done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

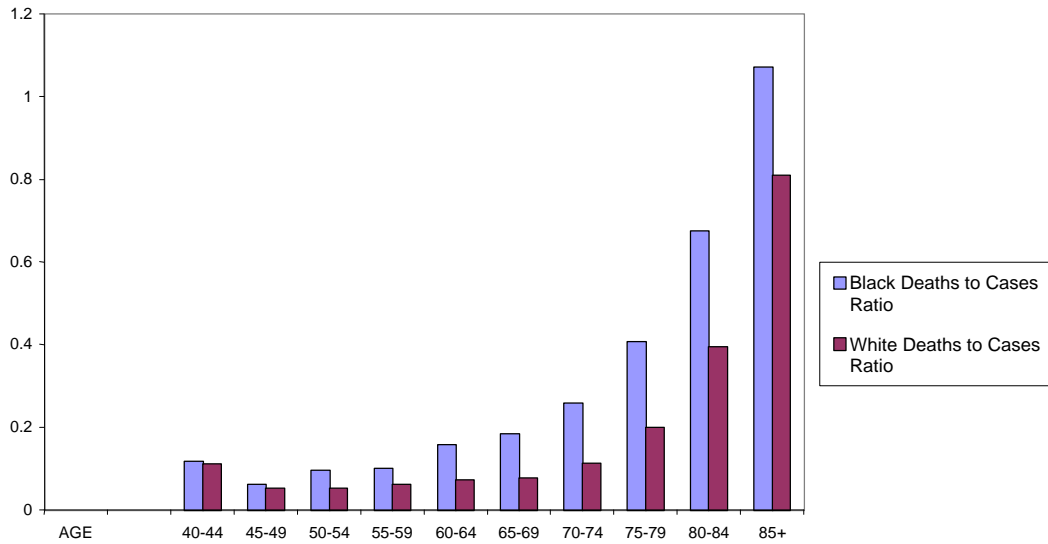
Graph 2

1990 - 1996 FLORIDA PROSTATE CANCER DEATH RATES PER 100,000 MALES BY AGE AND RACE



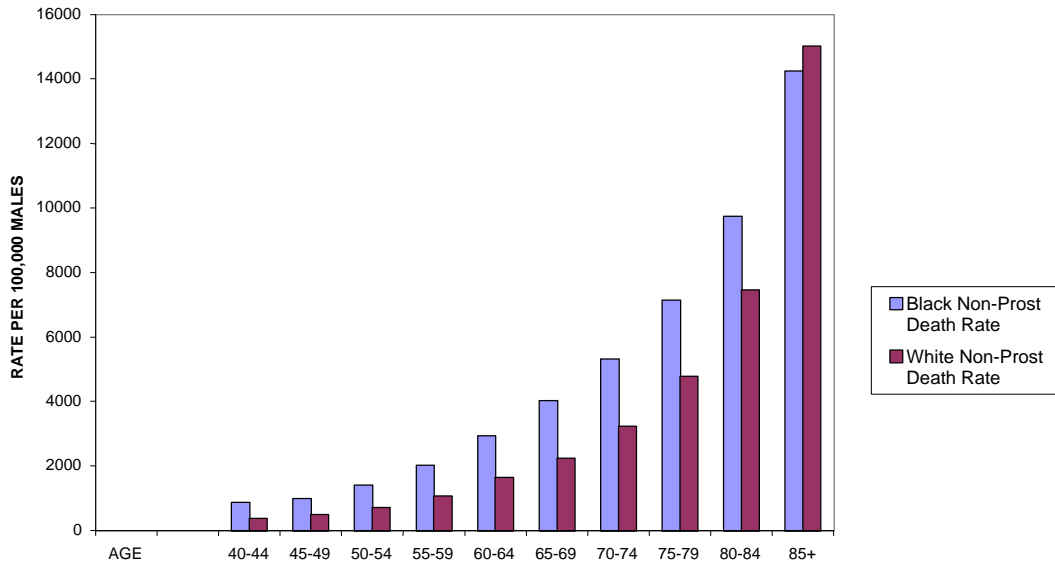
Graph done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Graph 3 **1990 - 1996 FLORIDA PROSTATE CANCER DEATHS TO CASES RATIO BY RACE AND AGE**



Graph done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

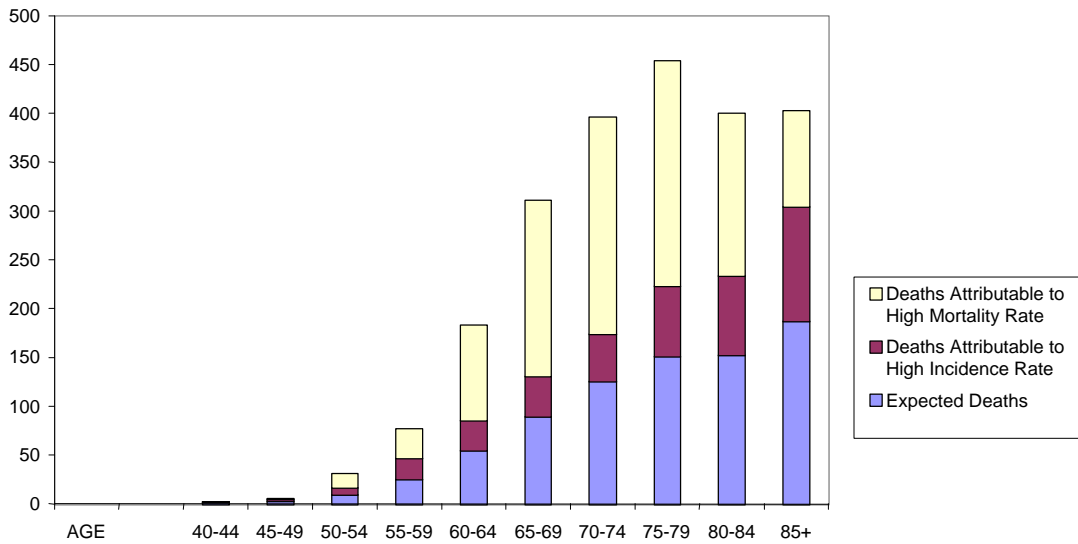
Graph 4 **1990 - 1996 FLORIDA DEATH RATES PER 100,000 MALES BY AGE AND RACE FOR ALL CAUSES EXCEPT PROSTATE CANCER**



Graph done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Graph 5

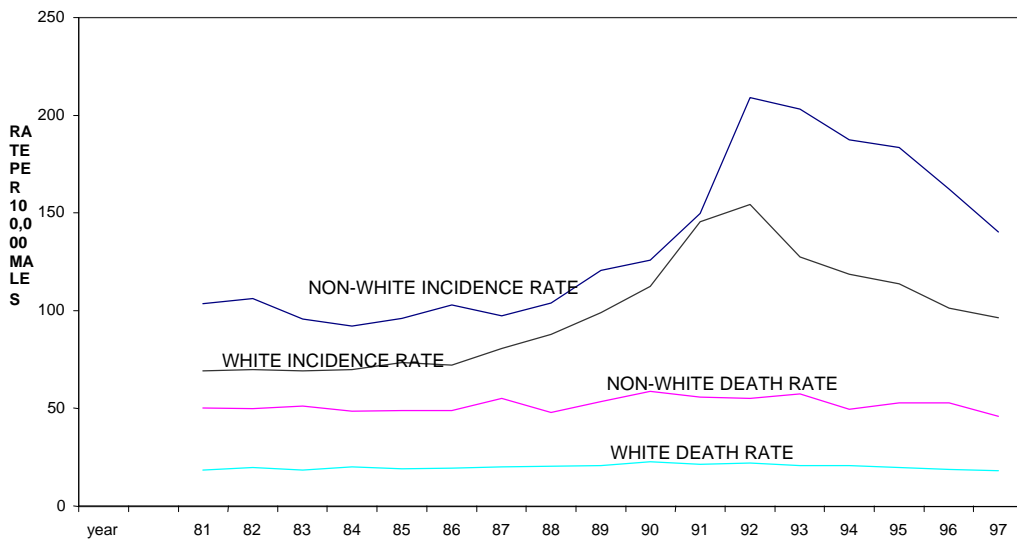
1990 -1996 FLORIDA PROSTATE CANCER DEATHS FOR BLACK MALES



Graph done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Graph 6

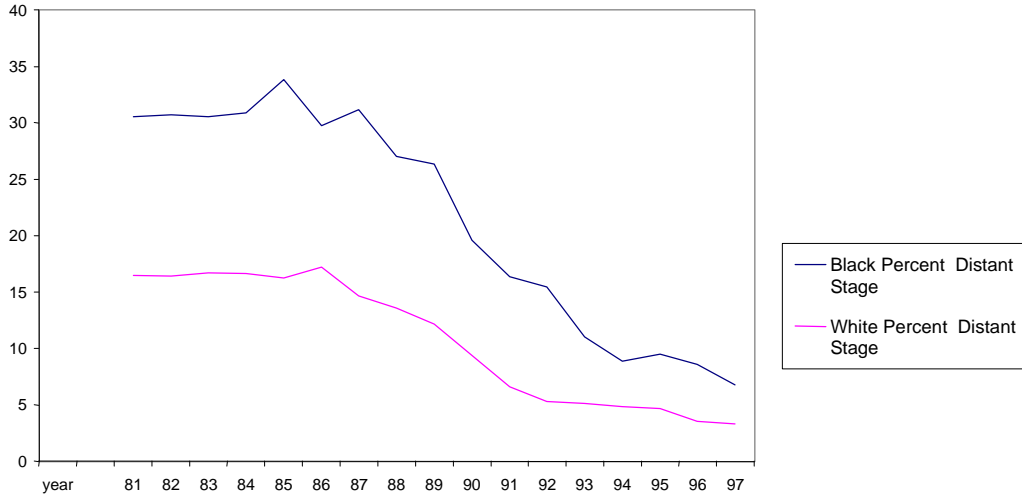
FLORIDA AGE ADJUSTED PROSTATE CANCER INCIDENCE AND DEATH RATES



Graph done by Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Graph 7

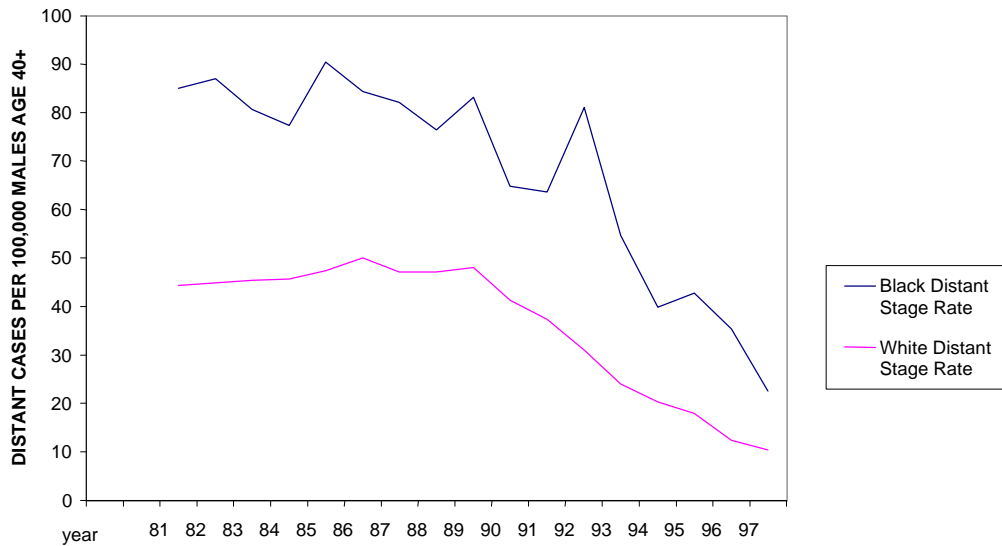
FLORIDA PERCENT DISTANT STAGE PROSTATE CANCER CASES



Graph done by Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Graph 8

FLORIDA DISTANT STAGE PROSTATE CANCER RATE



Graph done by Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 1

1990 - 1996 FLORIDA PROSTATE CANCER INCIDENCE RATES
PER 100,000 MALES BY AGE AND RACE

| AGE | BLACK PROSTATE CANCER INCIDENCE RATE PER 100,000 MALES | WHITE PROSTATE CANCER INCIDENCE RATE PER 100,000 MALES | RATE RATIO BLACK TO WHITE |
|-------|--|--|---------------------------------|
| 40-44 | 4.1 | 2.5 | 1.61 |
| 45-49 | 29.7 | 17.6 | 1.69 |
| 50-54 | 128.2 | 72.0 | 1.78 |
| 55-59 | 370.2 | 201.0 | 1.84 |
| 60-64 | 692.2 | 444.8 | 1.56 |
| 65-69 | 1218.0 | 834.8 | 1.46 |
| 70-74 | 1488.2 | 1069.8 | 1.39 |
| 75-79 | 1604.5 | 1087.7 | 1.48 |
| 80-84 | 1454.0 | 948.9 | 1.53 |
| 85+ | 1352.5 | 832.3 | 1.63 |
| ALL | 439.8 | 457.2 | 0.96 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 2

1990 - 1996 FLORIDA PROSTATE CANCER MORTALITY RATES
PER 100,000 MALES BY AGE AND RACE

| AGE | BLACK PROSTATE CANCER MORTALITY RATE PER 100,000 MALES | WHITE PROSTATE CANCER MORTALITY RATE PER 100,000 MALES | RATE RATIO BLACK TO WHITE |
|-------|--|--|---------------------------------|
| 40-44 | 0.48 | 0.28 | 1.70 |
| 45-49 | 1.86 | 0.93 | 2.00 |
| 50-54 | 12.35 | 3.74 | 3.30 |
| 55-59 | 37.41 | 12.31 | 3.04 |
| 60-64 | 108.93 | 32.60 | 3.34 |
| 65-69 | 225.35 | 64.73 | 3.48 |
| 70-74 | 384.42 | 121.50 | 3.16 |
| 75-79 | 653.33 | 217.41 | 3.01 |
| 80-84 | 982.44 | 373.93 | 2.63 |
| 85+ | 1449.64 | 674.04 | 2.15 |
| ALL | 129.98 | 83.36 | 1.56 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 3

1990 - 1996 FLORIDA PROSTATE CANCER DEATHS TO CASES RATIO BY RACE AND AGE

| AGE | BLACK PROSTATE CANCER DEATHS TO CASES RATIO | WHITE PROSTATE CANCER DEATHS TO CASES RATIO | BLACK TO WHITE RATIO |
|-------|--|--|----------------------------|
| 40-44 | 0.12 | 0.11 | 1.06 |
| 45-49 | 0.06 | 0.05 | 1.18 |
| 50-54 | 0.10 | 0.05 | 1.85 |
| 55-59 | 0.10 | 0.06 | 1.65 |
| 60-64 | 0.16 | 0.07 | 2.15 |
| 65-69 | 0.19 | 0.08 | 2.39 |
| 70-74 | 0.26 | 0.11 | 2.27 |
| 75-79 | 0.41 | 0.20 | 2.04 |
| 80-84 | 0.68 | 0.39 | 1.71 |
| 85+ | 1.07 | 0.81 | 1.32 |
| ALL | 0.30 | 0.18 | 1.62 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 4

1990 - 1996 FLORIDA DEATH RATES PER 100,000 MALES BY AGE AND RACE FOR ALL CAUSES EXCEPT PROSTATE CANCER

| AGE | BLACK NON-PROST DEATH RATE | WHITE NON-PROST DEATH RATE | BLACK TO WHITE RATIO |
|-------|-------------------------------------|-------------------------------------|----------------------------|
| 40-44 | 859.77 | 374.72 | 2.29 |
| 45-49 | 977.69 | 489.60 | 2.00 |
| 50-54 | 1404.99 | 717.54 | 1.96 |
| 55-59 | 2024.04 | 1065.38 | 1.90 |
| 60-64 | 2932.07 | 1627.20 | 1.80 |
| 65-69 | 4012.09 | 2233.79 | 1.80 |
| 70-74 | 5317.88 | 3221.54 | 1.65 |
| 75-79 | 7154.99 | 4780.77 | 1.50 |
| 80-84 | 9748.25 | 7463.93 | 1.31 |
| 85+ | 14258.99 | 15027.09 | 0.95 |
| ALL | 2484.57 | 2325.48 | 1.07 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 5

1990 - 1996 FLORIDA PROSTATE CANCER DEATHS FOR BLACK MALES

| AGE | EXPECTED DEATHS | EXCESS DEATHS ATTRIBUTABLE TO HIGH INCIDENCE RATE | EXCESS DEATHS ATTRIBUTABLE TO HIGH MORTALITY RATE | TOTAL |
|-------|-----------------|---|---|-------|
| 40-44 | 1 | 1 | 1 | 3 |
| 45-49 | 3 | 2 | 1 | 6 |
| 50-54 | 9 | 7 | 14 | 31 |
| 55-59 | 25 | 21 | 30 | 77 |
| 60-64 | 55 | 30 | 98 | 183 |
| 65-69 | 89 | 41 | 181 | 311 |
| 70-74 | 125 | 49 | 222 | 396 |
| 75-79 | 151 | 72 | 231 | 454 |
| 80-84 | 152 | 81 | 167 | 400 |
| 85+ | 187 | 117 | 98 | 403 |
| ALL | 799 | 422 | 1043 | 2264 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 6

FLORIDA AGE ADJUSTED PROSTATE CANCER INCIDENCE AND DEATH RATES

| YEAR | NON-WHITE AGE ADJ. INCIDENCE RATE | WHITE AGE ADJ. INCIDENCE RATE | NON-WHITE TO WHITE INCIDENCE RATE RATIO | NON-WHITE AGE ADJ. DEATH RATE | WHITE AGE ADJ. DEATH RATE | NON-WHITE TO WHITE DEATH RATE RATIO |
|------|-----------------------------------|-------------------------------|---|-------------------------------|---------------------------|-------------------------------------|
| 1981 | 103.40 | 69.05 | 1.50 | 50.22 | 18.37 | 2.73 |
| 1982 | 106.20 | 69.90 | 1.52 | 49.94 | 19.71 | 2.53 |
| 1983 | 95.69 | 69.35 | 1.38 | 51.29 | 18.46 | 2.78 |
| 1984 | 92.14 | 69.80 | 1.32 | 48.67 | 19.98 | 2.44 |
| 1985 | 96.22 | 73.44 | 1.31 | 49.12 | 19.04 | 2.58 |
| 1986 | 103.12 | 72.17 | 1.43 | 49.08 | 19.36 | 2.54 |
| 1987 | 97.39 | 80.42 | 1.21 | 55.10 | 20.06 | 2.75 |
| 1988 | 103.93 | 87.66 | 1.19 | 47.84 | 20.26 | 2.36 |
| 1989 | 120.69 | 99.01 | 1.22 | 53.61 | 20.99 | 2.55 |
| 1990 | 125.92 | 112.36 | 1.12 | 58.84 | 22.80 | 2.58 |
| 1991 | 149.60 | 145.78 | 1.03 | 55.77 | 21.62 | 2.58 |
| 1992 | 208.96 | 154.41 | 1.35 | 55.33 | 21.90 | 2.53 |
| 1993 | 203.04 | 127.52 | 1.59 | 57.57 | 20.87 | 2.76 |
| 1994 | 187.50 | 118.63 | 1.58 | 49.63 | 20.68 | 2.40 |
| 1995 | 183.26 | 113.76 | 1.61 | 52.99 | 19.70 | 2.69 |
| 1996 | 162.21 | 101.39 | 1.60 | 53.02 | 18.74 | 2.83 |
| 1997 | 140.20 | 96.38 | 1.45 | 45.86 | 18.27 | 2.51 |
| ALL | 137.81 | 98.51 | 1.40 | 52.11 | 20.08 | 2.60 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 7

FLORIDA PERCENT DISTANT STAGE
PROSTATE CANCER CASES

| YEAR | BLACK PERCENT DISTANT STAGE | WHITE PERCENT DISTANT STAGE | BLACK TO WHITE RATIO |
|------|--------------------------------------|--------------------------------------|----------------------------|
| 1981 | 30.53 | 16.50 | 1.85 |
| 1982 | 30.71 | 16.42 | 1.87 |
| 1983 | 30.51 | 16.71 | 1.83 |
| 1984 | 30.85 | 16.63 | 1.85 |
| 1985 | 33.80 | 16.26 | 2.08 |
| 1986 | 29.70 | 17.19 | 1.73 |
| 1987 | 31.15 | 14.64 | 2.13 |
| 1988 | 27.04 | 13.60 | 1.99 |
| 1989 | 26.35 | 12.17 | 2.16 |
| 1990 | 19.62 | 9.37 | 2.09 |
| 1991 | 16.39 | 6.65 | 2.47 |
| 1992 | 15.46 | 5.30 | 2.92 |
| 1993 | 11.02 | 5.12 | 2.15 |
| 1994 | 8.89 | 4.87 | 1.82 |
| 1995 | 9.52 | 4.69 | 2.03 |
| 1996 | 8.56 | 3.56 | 2.40 |
| 1997 | 6.76 | 3.33 | 2.03 |
| ALL | 18.11 | 9.18 | 1.97 |

Table done by Florida Dept. of Health Bureau of Epidemiology
Data Source: Florida Cancer Data System

Table 8

FLORIDA DISTANT STAGE PROSTATE CANCER RATE

| YEAR | BLACK DISTANT STAGE RATE PER 100,000 MALES AGE 40+ | WHITE DISTANT STAGE RATE PER 100,000 MALES AGE 40+ | BLACK TO WHITE RATE RATIO |
|------|--|--|---------------------------------|
| 1981 | 84.93 | 44.30 | 1.92 |
| 1982 | 87.07 | 44.87 | 1.94 |
| 1983 | 80.64 | 45.43 | 1.78 |
| 1984 | 77.29 | 45.69 | 1.69 |
| 1985 | 90.48 | 47.43 | 1.91 |
| 1986 | 84.38 | 49.97 | 1.69 |
| 1987 | 82.07 | 47.19 | 1.74 |
| 1988 | 76.46 | 47.20 | 1.62 |
| 1989 | 83.24 | 47.97 | 1.74 |
| 1990 | 64.82 | 41.30 | 1.57 |
| 1991 | 63.68 | 37.39 | 1.70 |
| 1992 | 81.03 | 31.01 | 2.61 |
| 1993 | 54.67 | 24.02 | 2.28 |
| 1994 | 39.90 | 20.28 | 1.97 |
| 1995 | 42.86 | 17.97 | 2.38 |
| 1996 | 35.42 | 12.41 | 2.85 |
| 1997 | 22.61 | 10.39 | 2.18 |
| ALL | 64.59 | 34.45 | 1.87 |

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