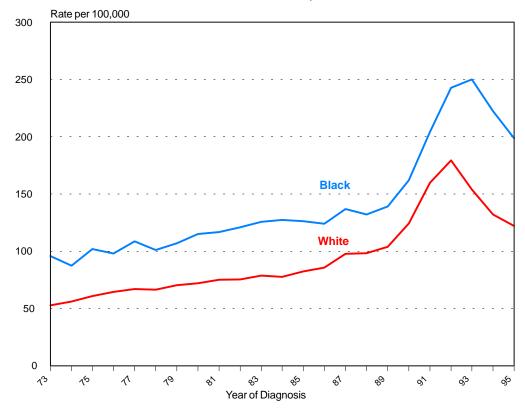S ubstantial changes in prostate cancer incidence have occurred since the introduction of the prostate-specific antigen (PSA) blood test. This test was first approved by the Food and Drug Administration in 1986 as a method to monitor prostate cancer progression. The potential of the PSA test as a cancer screening tool was quickly recognized, leading to its widespread use in early detection programs.

Prostate cancer incidence rates increased gradually in black and white men from 1973 through the late 1980s, when rates began to rise sharply (Figure 2.1). Between 1986 and 1992, when the rate peaked in whites, the overall age-adjusted incidence rate increased by 108%, from 86 to 179 per 100,000 men per year. The overall rate in blacks peaked in 1993, representing a 102% increase from 1986 to 1993 (from 124 to 250 per 100,000).

Following these peak incident years, a decline in incidence was observed in both racial groups. As shown in Figure 2.2, these patterns are apparent in both white and black men under age 65 years, those aged 65-74, and men aged 75 years and older at diagnosis. The increase was most pronounced in younger men (age < 65), whereas the recent decline was primarily observed in men aged 75 years and older.

Figure 2.1
Prostate Cancer
SEER Incidence Rates, 1973-1995

Note: Rates are age-adjusted to the 1970 U.S. standard. Rates from 1973-1987 are based on data from the 9 standard SEER registries. Data from San Jose and Los Angeles are included in the rate calculations for 1988-1995.

Reasons for these changing patterns are not entirely clear. Although the recent peak in prostate cancer incidence is likely due to PSA-based screening, the modest increase prior to the PSA era may reflect, in part, changes in the prevalence of risk factors in the population.

There has also been a shift in the age-specific incidence of prostate cancer toward younger ages at diagnosis (Figure 2.3). Age curves comparing the period prior to PSA availability (1980-1985) with the PSA era (1990-1995) indicate a decrease in mean age at diagnosis of 1.7 years in whites and 1.3 years in blacks. Based on data from the most recent six-year period, black men have a younger mean (1.9 years younger) and median (2 years younger) age at diagnosis compared to whites.

Prostate cancer mortality increased over the past two decades in both white and black men (Figure 2.4), based on data for both the entire U.S. population and for the SEER geographic regions. Among white men in the U.S., the age-adjusted mortality rate increased from 20.3 per 100,000 in 1973 to a peak of 24.7 per 100,000 in 1991. Subsequently, the mortality rate declined to 22.9 per 100,000 in 1995, representing about a 7.3% decrease from 1991 to 1995.

Among blacks, the prostate cancer mortality rate based on U.S. data was 39.5 per 100,000 in 1973 and rose to a peak of 56.2 per 100,000 men in 1993. A 4.8% decline in overall mortality was noted in 1995 (53.5 per 100,000).

Mortality rates based on SEER data are consistent with those for the whole U.S. population. These data provide evidence that the SEER data are representative of the entire U.S. population with respect to trends in prostate cancer mortality rates, although SEER rates fluctuate more due to smaller numbers of deaths recorded in the SEER areas compared to the nation.
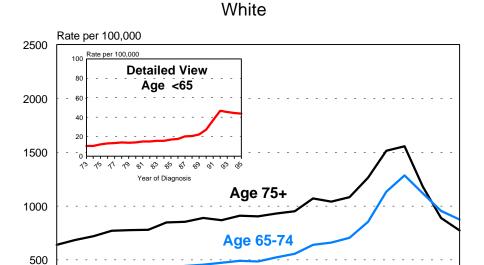
The overall mortality trends vary by age in whites and blacks (Figure 2.5). In whites under age 75, mortality rates peaked in 1990 at 2.7 (aged less than 65) and 111.5 (aged 65-74) per 100,000 men and then declined to 2.3 and 95.2, respectively, in 1995. This represents about a 15% decrease in mortality for white man under age 75. The mortality rate in older (aged 75+) whites peaked in 1993 at 420.0 per 100,000. In blacks under age 65, the mortality rate peaked in 1992 at 7.8 per 100,000 and then dropped to 6.9 in 1995. Mortality in middle-aged (65-74 years) blacks peaked in 1994 at 281.7 per 100,000. In older (aged 75+) blacks, there was a steady rise in the mortality rate from 1974 to its peak in 1993 at 874.9 per 100,000. This represents a 69% increase in the mortality rate for older black men over the 20-year period.

The age-specific mortality curves for two time periods, 1980-1985 and 1990-1995, indicate that both the mean and median ages at death from prostate cancer have increased by 1.4 years and 1 year, respectively, in both races (Figure 2.6). During the most recent time period, the median age at death from prostate cancer was 78 years in whites and 76 years in blacks.

Despite the recent decline in mortality rates (Figure 2.4), the actual number of men dying of prostate cancer declined for the first time in 1995 (Figure 2.7). Figure 2.7 also shows the estimated number of newly diagnosed prostate cancer cases in the U.S. population for 1990-1995, assuming that the annual age-specific incidence rates observed in the SEER regions are representative of the U.S.

population as a whole. The recent decrease in the age-adjusted incidence rate of prostate cancer is reflected in the declining number of cases estimated to have been diagnosed each year from 1993 through 1995 compared to 1992.

Figure 2.2

Prostate Cancer
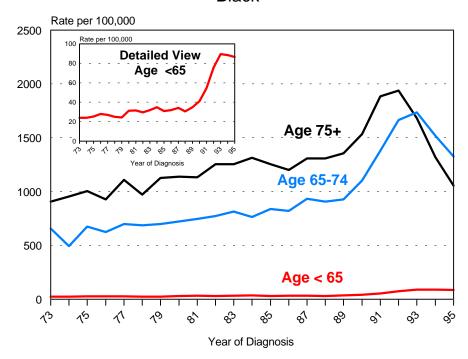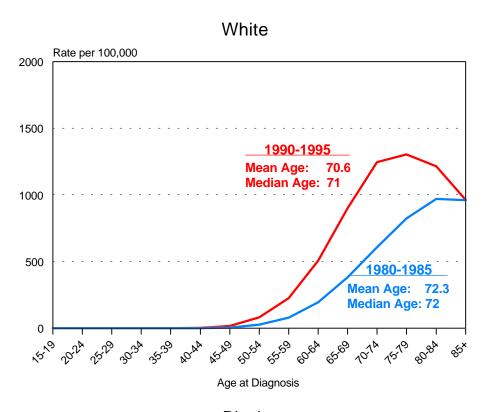## SEER Incidence Rates by Age at Diagnosis, 1973-1995
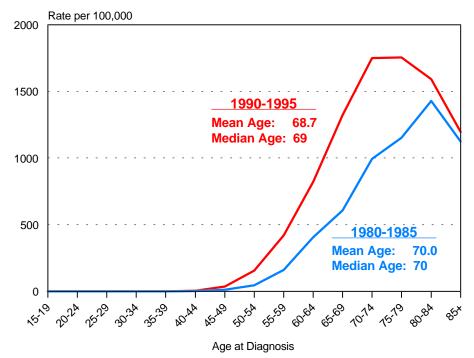
White

Black

Note: Rates are age-adjusted to the 1970 U.S. standard. Rates from 1973-1987 are based on data from the 9 standard SEER registries. Data from San Jose and Los Angeles are included in the rate calculations for 1988-1995.

Figure 2.3

Prostate Cancer
SEER Incidence Rates by Age at Diagnosis for Two Time Periods

White

Rate per 100,000

1990-1995
Mean Age: 70.6
Median Age: 71

1980-1985
Mean Age: 72.3
Median Age: 72

Age at Diagnosis

Black

Rate per 100,000

1990-1995
Mean Age: 68.7
Median Age: 69

1980-1985
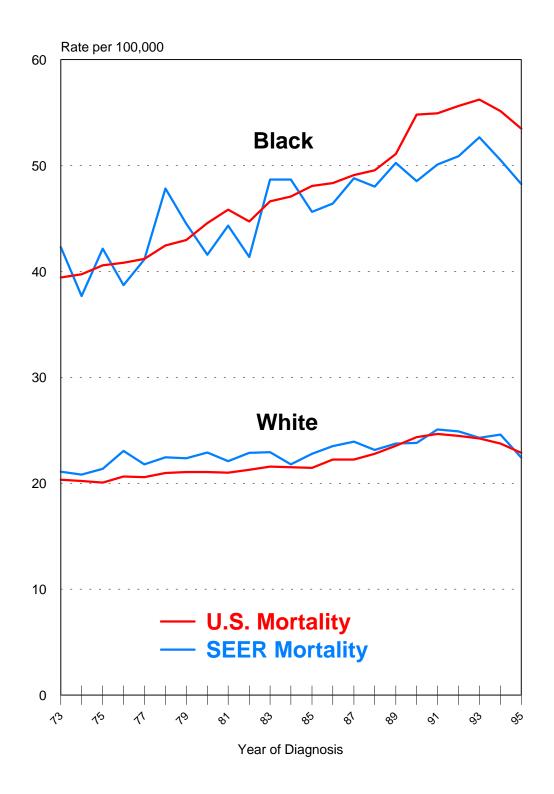Mean Age: 70.0
Median Age: 70

Age at Diagnosis

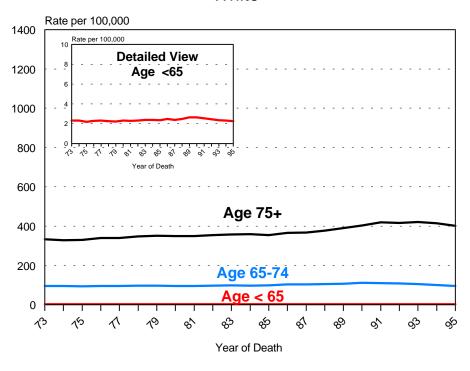Note: Based on data from the 9 standard SEER registries.

Figure 2.4

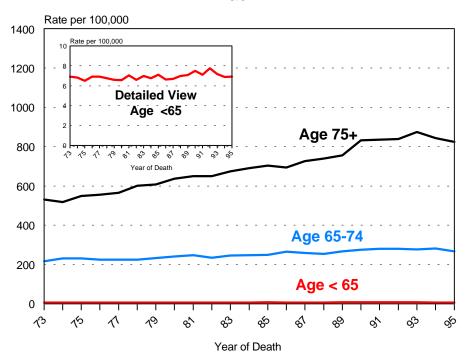## Prostate Cancer
Mortality Rates, 1973-1995

Note: Rates are age-adjusted to the 1970 U.S. standard. SEER rates are based on data from the 9 standard registries for 1973-1987, data from San Jose and Los Angeles are included in the 1988-1995 rates.

Figure 2.5

Prostate Cancer
U.S. Mortality Rates by Age at Death, 1973-1995

White

Rate per 100,000

Detailed View Age <65

Year of Death

Age 75+

Age 65-74

Age < 65

Year of Death

Black

Rate per 100,000

Detailed View Age <65

Year of Death

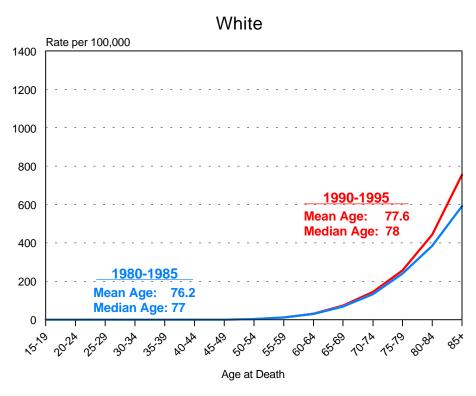**Age 75+**

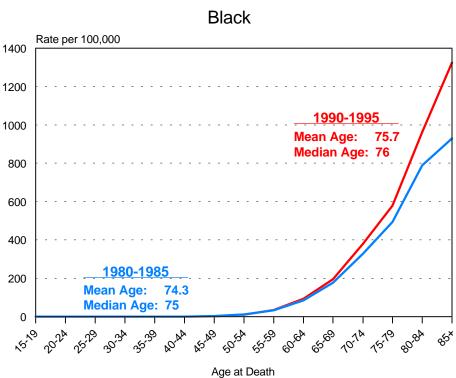**Age 65-74**

Age < 65

Year of Death

Note: Rates are age-adjusted to the 1970 U.S. standard.

Figure 2.6

Prostate Cancer
U.S. Mortality Rates by Age at Death for Two Time Periods

White

Rate per 100,000

1990-1995
Mean Age: 77.6
Median Age: 78

1980-1985
Mean Age: 76.2
Median Age: 77

Age at Death

Black

Rate per 100,000

1990-1995
Mean Age: 75.7
Median Age: 76

1980-1985
Mean Age: 74.3
Median Age: 75

Age at Death

Note: Rates are age-adjusted to the 1970 U.S. standard.

Figure 2.7

Prostate Cancer
Incidence and Mortality in the United States, 1990-1995

*Estimates obtained by multiplying the age-specific incidence rates for the 11 SEER registries by the U.S. population for each year.