A post-PSA Update on Trends in Prostate Cancer Incidence

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Background

- **1986: FDA approved PSA test to monitor disease status in prostate cancer patients**

- **1994: PSA test approved to aid in prostate cancer detection**

- **1988: Use of PSA for screening increasing dramatically**

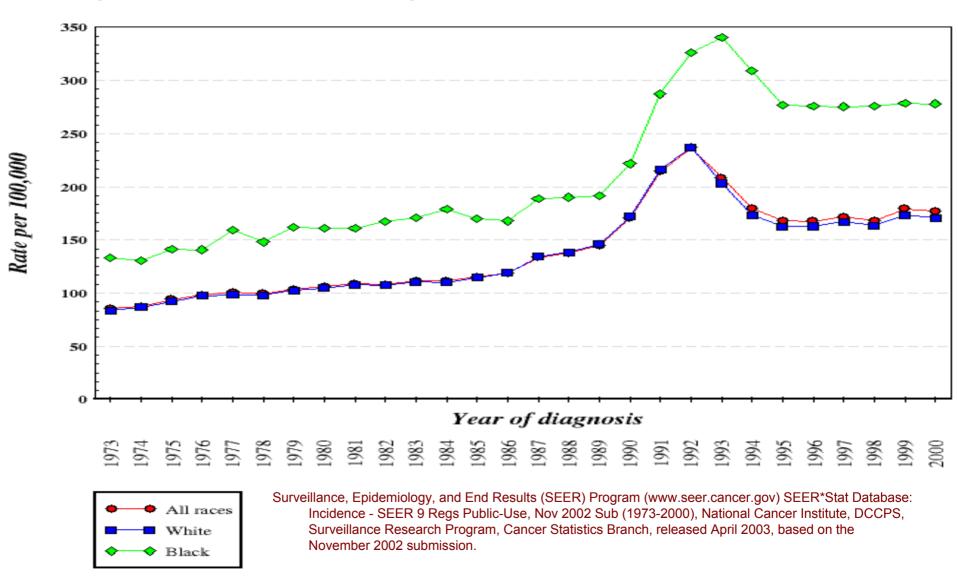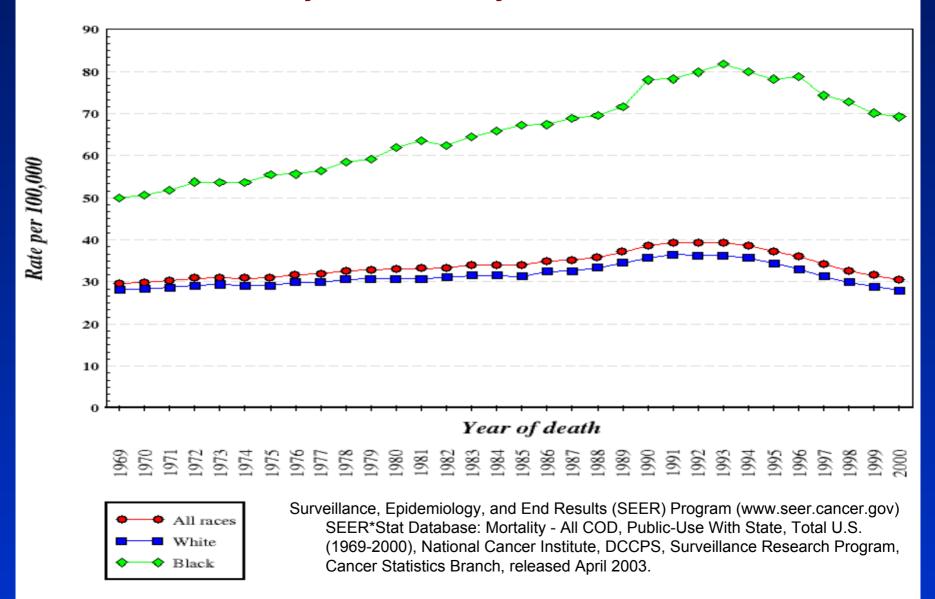# Figure 1: Age-Adjusted Prostate Cancer Incidence Rates/100,000 by Year and Race/Ethnicity

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 9 Regs Public-Use, Nov 2002 Sub (1973-2000), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2003, based on the November 2002 submission.

Figure 2: Age-Adjusted Prostate Cancer Mortality Rates/100,000 by Year by Race/Ethnicity

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov)
SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S.
(1969-2000), National Cancer Institute, DCCPS, Surveillance Research Program,
Cancer Statistics Branch, released April 2003.

Background (cont.)

- **Previous analyses of the effect of PSA screening on prostate cancer incidence have demonstrated:**
  - **That the immediate increase in rates after introduction of PSA as well as the subsequent decline is indicative of an increased dx of prevalent cases, and**
  - **Incidence trends paralleled percent of men receiving 1st PSA test (not 2nd or later testing)**

Background (cont.)

- A shift to earlier stage at diagnosis suggests the inclusion as well as of 'indolent' cases

- An increase in moderately differentiated tumors and decline in distant stage disease suggested that PSA testing had the potential to reduce mortality.

Background (cont.)

- **However: PSA screening is likely to have <u>length bias</u>, i.e. tendency to detect more slower growing (or indolent) tumors less likely to be fatal.**

- **And there has been poorer stage specific survival among distant stage cases after PSA's introduction which is consistent with the lower chance of screening to detect the fastest growing, most aggressive tumors during the short time that they are detectable at an early stage.**

Background (cont.)

- **Studies have found no difference in declines in mortality among areas with different intensities of PSA screening. (<u>Lead time bias</u>—PSA just detects tumors earlier with no impact on ultimate survival).**

- **Other explanations: Increased use of anti-androgen hormone therapy**
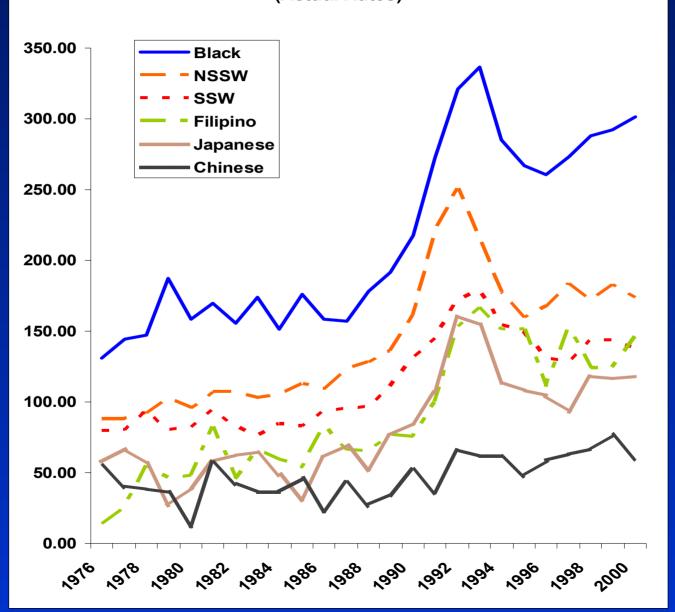
Methods

- **Cases included: Incident prostate cancer cases diagnosed between Jan. 1, 1976-Dec. 31, 2000 and reported to the Los Angeles Cancer Surveillance Program (CSP) as of Nov. 2002 (95% complete).**

- **Race/ethnicity is obtained from medical records and listings of common Spanish surnames.**

- **Denominator data is from US Census (1970-2000) linearly interpolated for years in between censuses.**

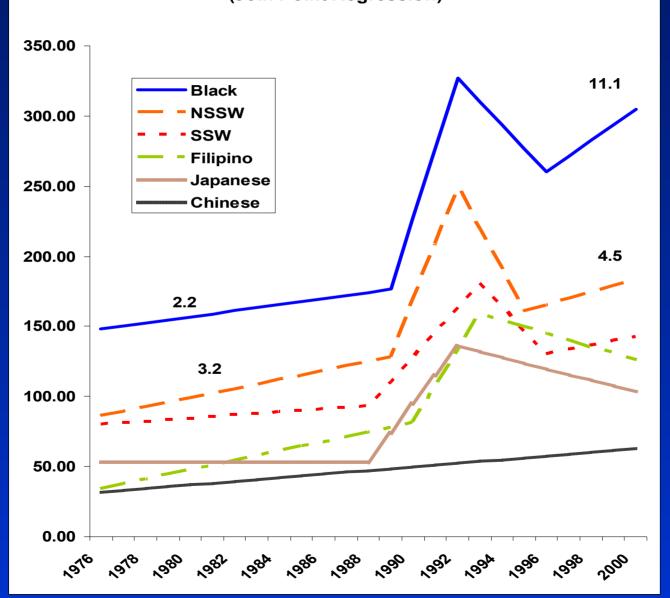- **Annual age-adjusted rates are calculated by direct method using the 2000 U.S. population as the standard.**

Methods (cont.)

- **Socioeconomic status is an ecological variable obtained from the median education and income from the census tract of the case at diagnosis.**

- **Use of PSA testing is obtained from the California Health Interview Survey (CHIS)**

- **Estimated annual percentage change (EAPC) in annual rates over time and their confidence intervals are assessed using the JoinPoint linear regression program.**
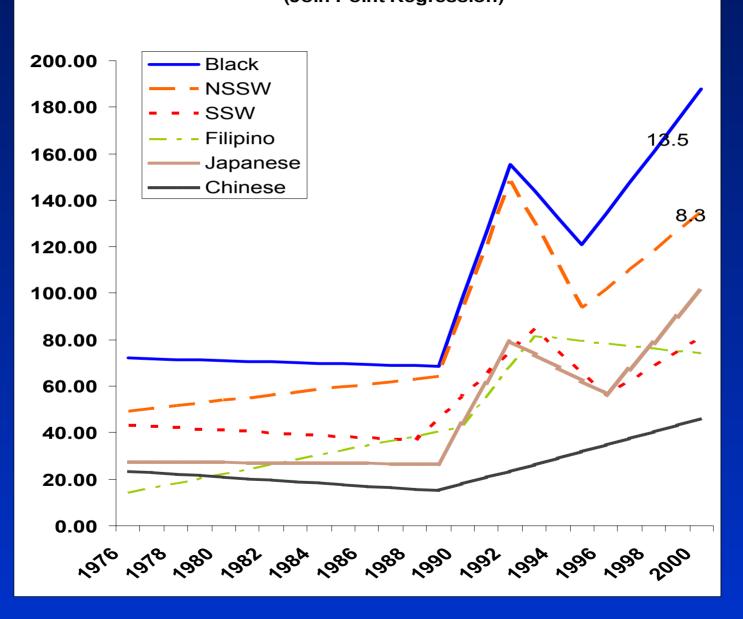
Age-Adjusted Incidence Rates /100,000 for All Invasive Prostate Cancer: Los Angeles County 1976-2000 (Actual Rates)

Age-Adjusted Incidence Rates /100,000 for All Invasive Prostate Cancer: Los Angeles County 1976-2000 (Join Point Regression)
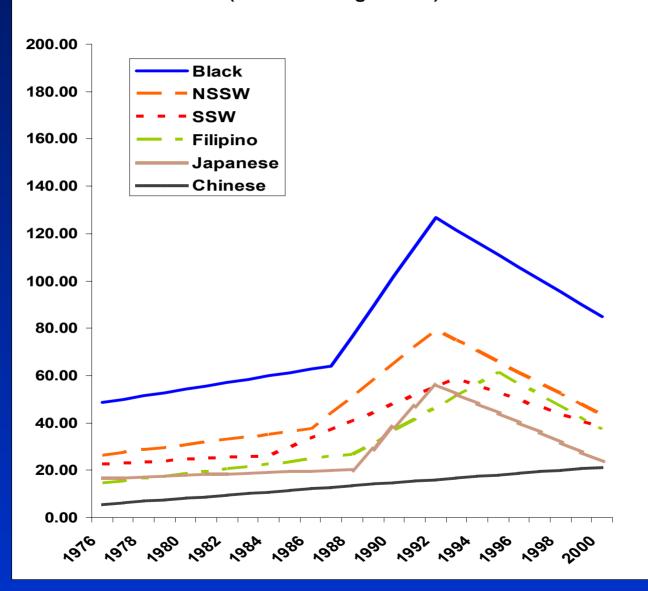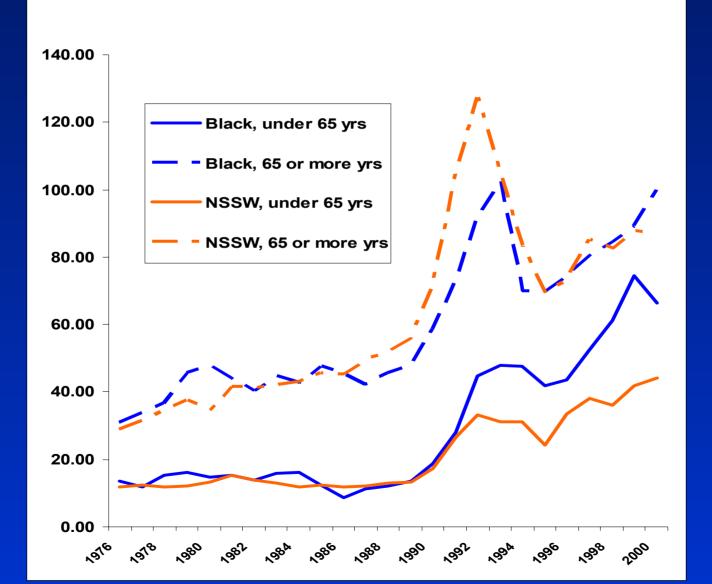
Age-Adjusted Incidence Rates /100,000 for Localized Prostate Cancer: Los Angeles County 1976-2000 (Join Point Regression)
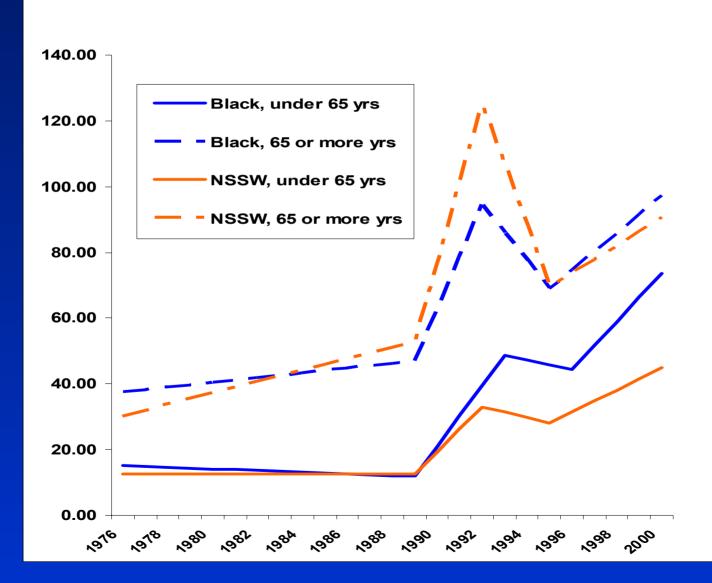
Age-Adjusted Incidence Rates /100,000 for Regional, Distant and Unstaged Prostate Cancer: Los Angeles County 1976-2000 (Join Point Regression)

Age Specific Incidence Rates per 100,000 for Localized Prostate Cancer for Blacks and Non-Spanish Surnamed Whites (NSSW), Los Angeles County: 1976-2000 (Actual Rates)

- Black, under 65 yrs
- Black, 65 or more yrs
- NSSW, under 65 yrs
- NSSW, 65 or more yrs

Age Specific Incidence Rates per 100,000 for Localized Prostate Cancer for Blacks and Non-Spanish Surnamed Whites (NSSW), Los Angeles County: 1976-2000 (Join Point Regression)

Since PSA screening is related to socioeconomic status, we compared age-adjusted prostate cancer incidence rates by Race/ethnicity and SES in four time periods for men <65 and 75+ (using inflection years from the joinpoint analyses) (extension of previous work by Liu et. al.):
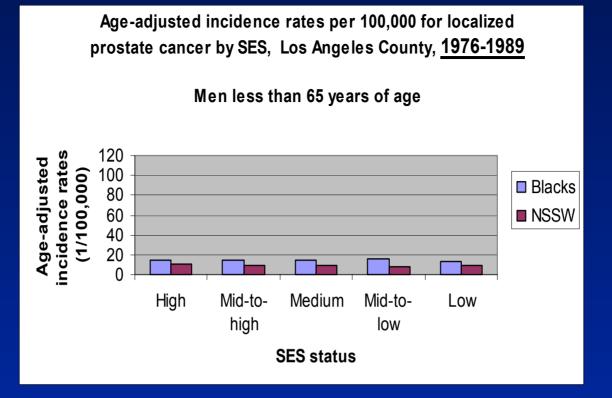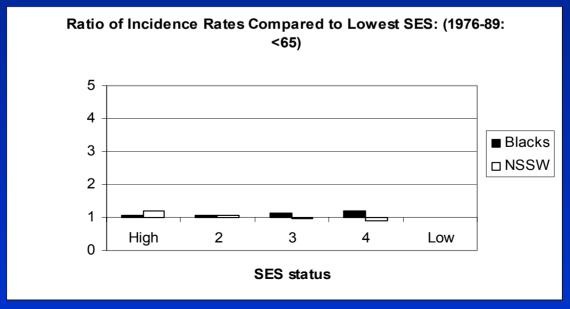
Pre-PSA: <1990

Introduction of PSA to
Previously unscreened
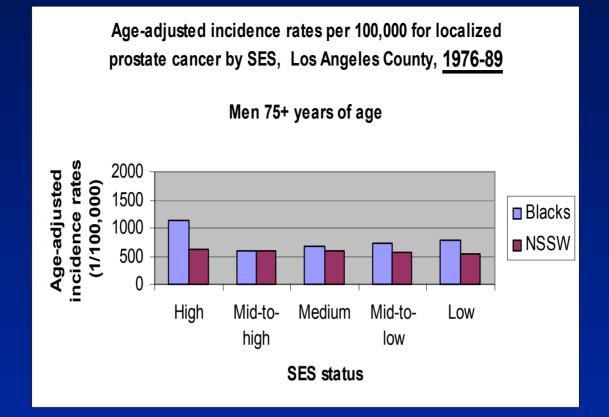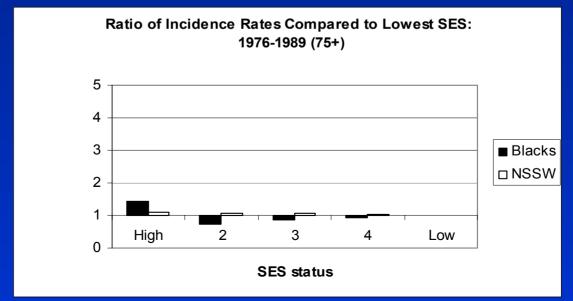population: 1990-1992
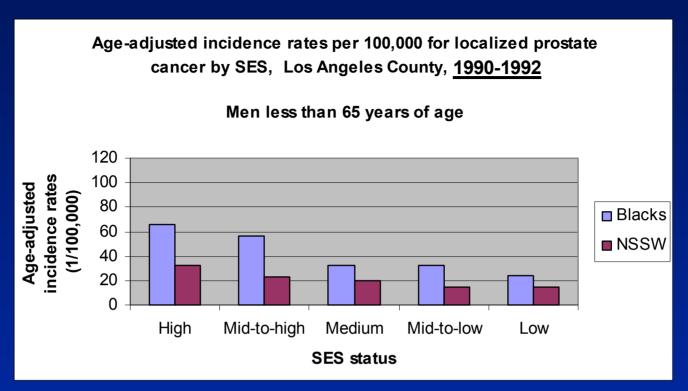
Immediate post-PSA   1993-1996
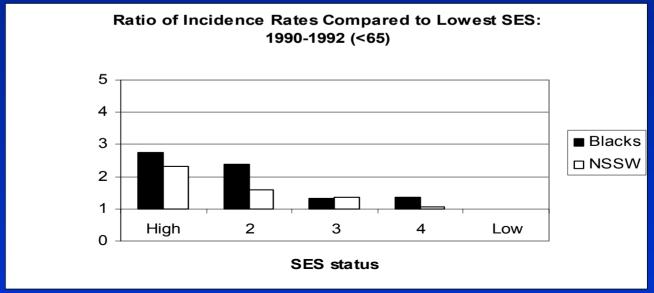
Recent period   1997-1999

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, <u>1976-1989</u>

Men less than 65 years of age

Ratio of Incidence Rates Compared to Lowest SES: (1976-89: <65)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, 1976-89

Men 75+ years of age

Ratio of Incidence Rates Compared to Lowest SES: 1976-1989 (75+)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, **1990-1992**

Men less than 65 years of age

Ratio of Incidence Rates Compared to Lowest SES: 1990-1992 (<65)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, 1990-92

Men 75+ years of age

Ratio of Incidence Rates Compared to Lowest SES: 1990-1992 (75+)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, 1993-1996

Men less than 65 years of age

Ratio of Incidence Rates Compared to Lowest SES: 1993-1996 (<65)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, 1993-96

Men 75+ years of age

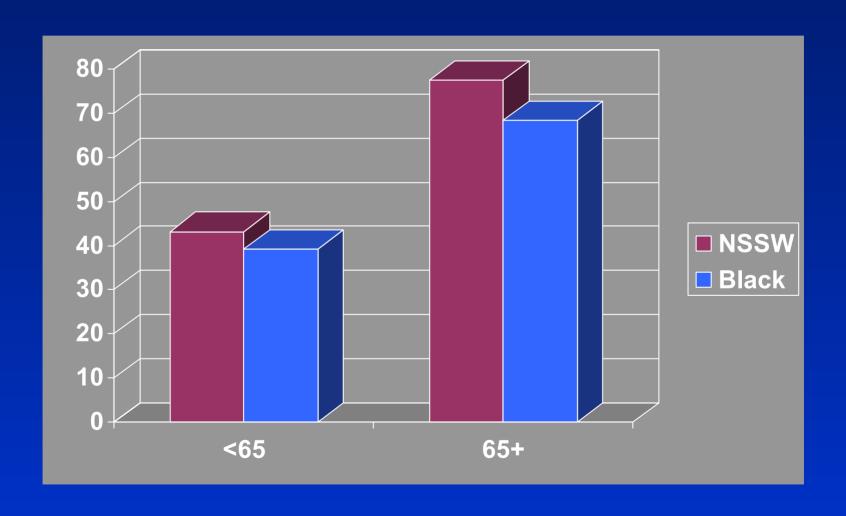Ratio of Incidence Rates Compared to Lowest SES: 1993-1996 (75+)

Percent of Men Having Had at Least One PSA Test by Race/ethnicity and Age Group: LA County, California Health Interview Survey, 2001
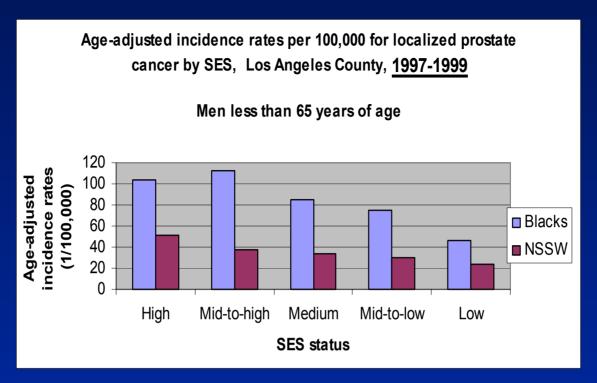
Percent of Men Having Had at Least One PSA Test by Race/ethnicity and Income Level: LA County, California Health Interview Survey, 2001
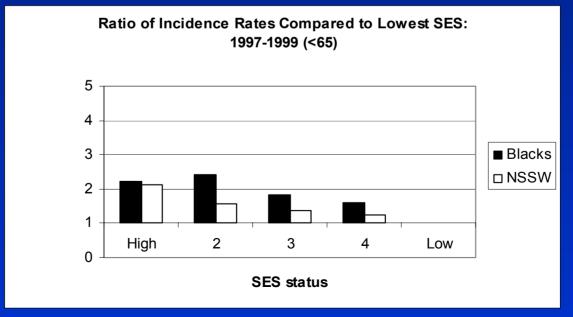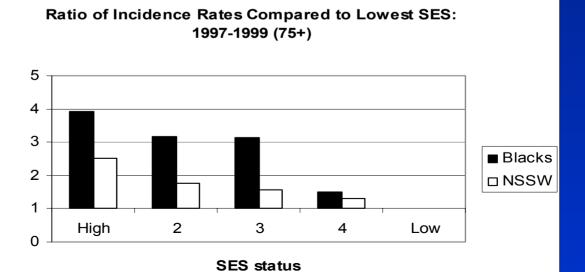
FPL=Federal Poverty Level

Percent of Men Having Had at Least One PSA Test by Race/ethnicity and Income Level and Age Group: LA County, California Health Interview Survey, 2001 (FPL=Federal Poverty Level)
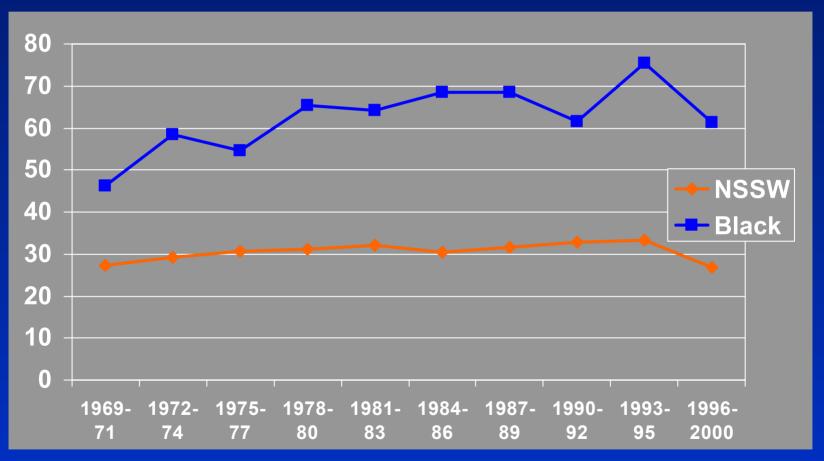
Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, **1997-1999**

Men less than 65 years of age

Ratio of Incidence Rates Compared to Lowest SES: 1997-1999 (<65)

Age-adjusted incidence rates per 100,000 for localized prostate cancer by SES, Los Angeles County, 1997-99

Men 75+ years of age

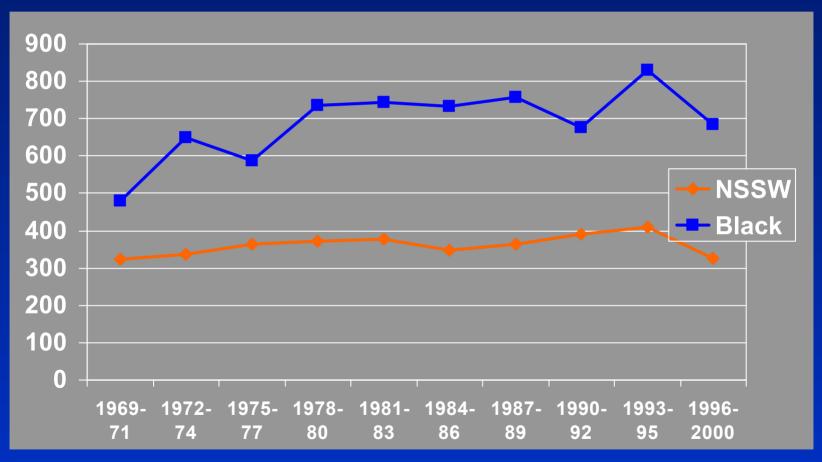**Ratio of Incidence Rates Compared to Lowest SES: 1997-1999 (75+)**

Age-Adjusted Mortality Rates per 100,000 for Prostate Cancer by Year, 1969-2000 by Race/Ethnicity: Los Angeles County

Source: SEER*Stat

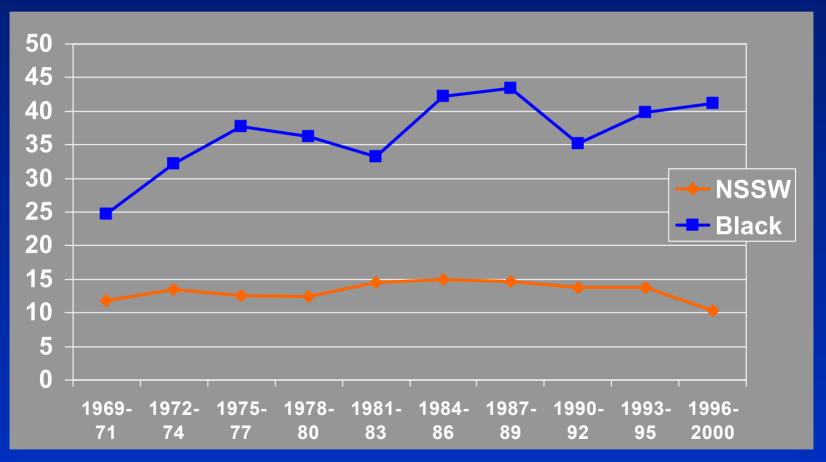Age-Adjusted Mortality Rates per 100,000 for Prostate Cancer by Year, 1969-2000 by Race/Ethnicity: Los Angeles County for AGES 75+

Source: SEER*Stat

Age-Adjusted Mortality Rates per 100,000 for Prostate Cancer by Year, 1969-2000 by Race/Ethnicity: Los Angeles County for AGES 50-64

Source: SEER*Stat

Summary

Recent trends indicate that the decline in prostate cancer incidence rates has ended, suggesting the immediate post-PSA increase seen was most likely due to an increased diagnosis of (previously undiagnosed) prevalent cases and earlier diagnosis of incident cases.

PSA testing is now widespread, although certain subgroups are less likely to be screened (e.g. low income younger men). Racial/ethnic differences (at least NSSW vs. African-American) have narrowed.

Rates are now increasing rapidly for African-Americans at a steeper rate than for NSSW-especially for localized disease among those <65. (Could there be greater 'overdiagnosis' among these men?). (Etzioni, et. al. JNCI, 94:981-90, 2002 estimates as much as 15% in Whites and 37% in Blacks may be 'overdiagnosed).
However, there is a troubling indication of an increase in mortality in this subgroup, which should be followed in the future.