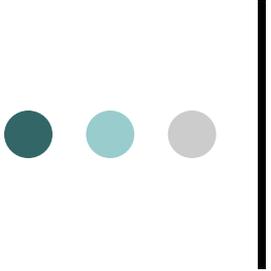


From Data to Action: The Role of Cancer Registries

Appathurai Balamurugan, MD, MPH

Section Chief, Chronic Disease Epidemiology, ADHHS

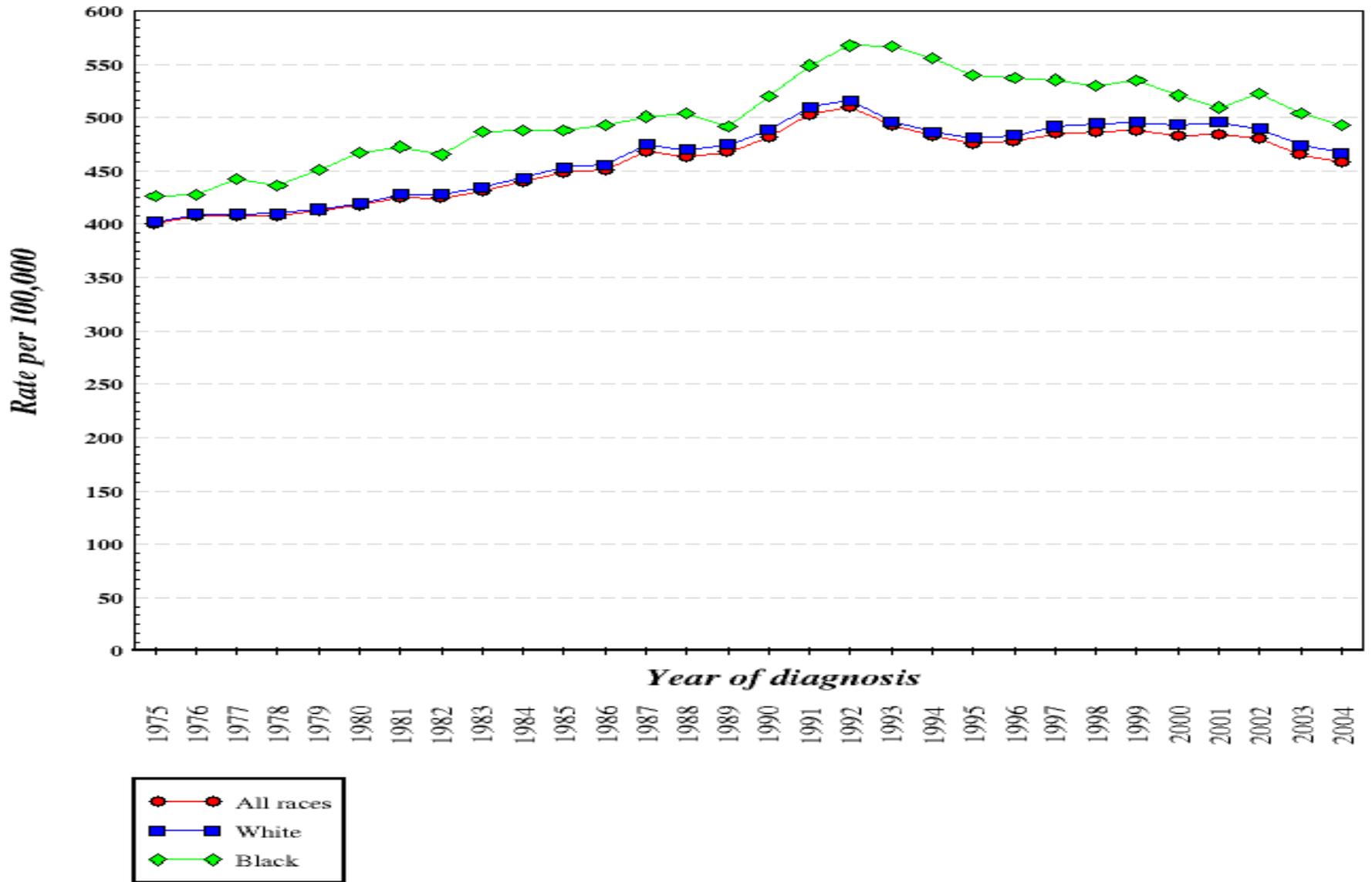
Assistant Professor, Department of Epidemiology, UAMS COPH



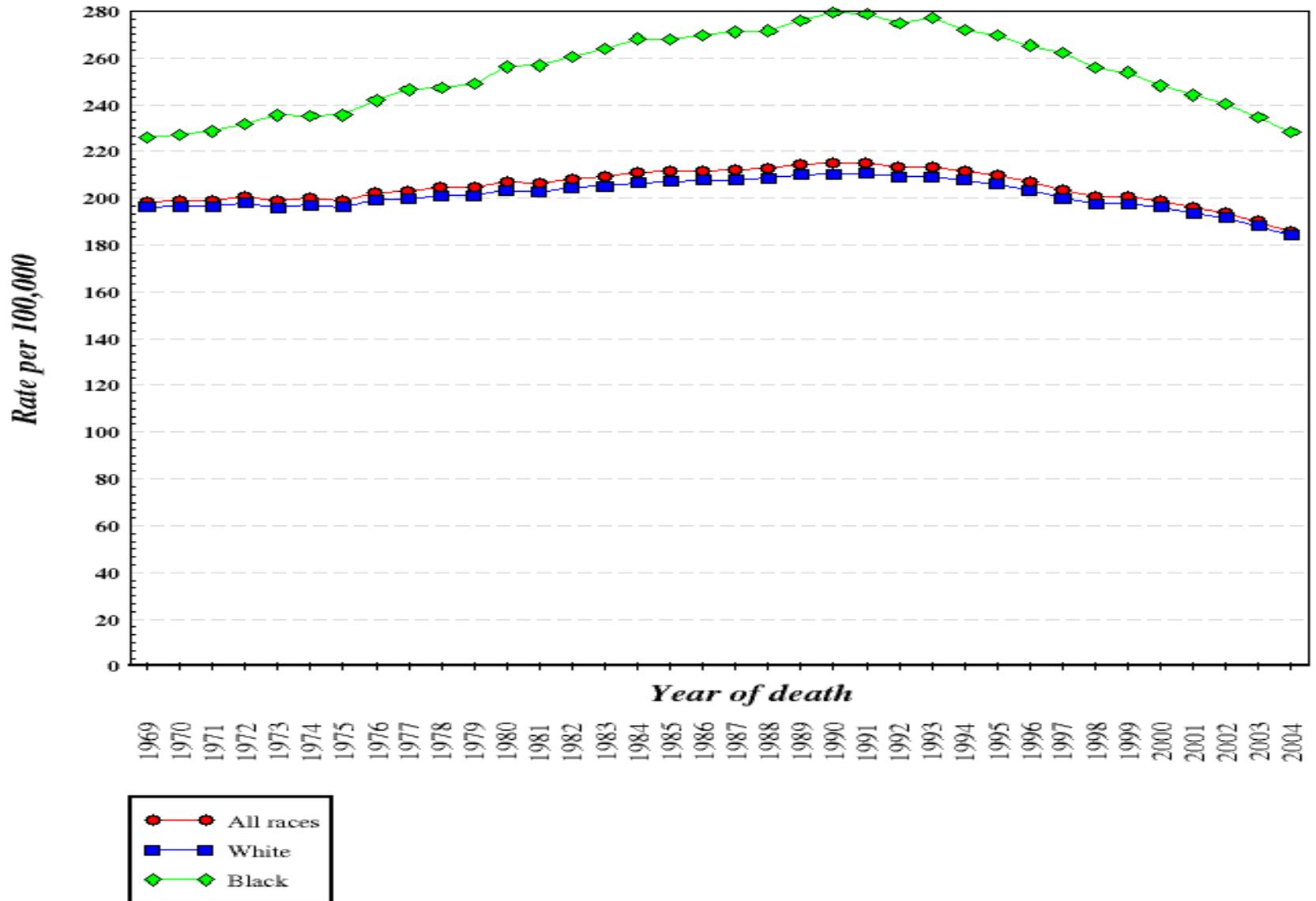
Outline

- Current trends in Cancer
- Data driving Research
- Research driving Policy
- Policy driving Action
- Are we there yet?

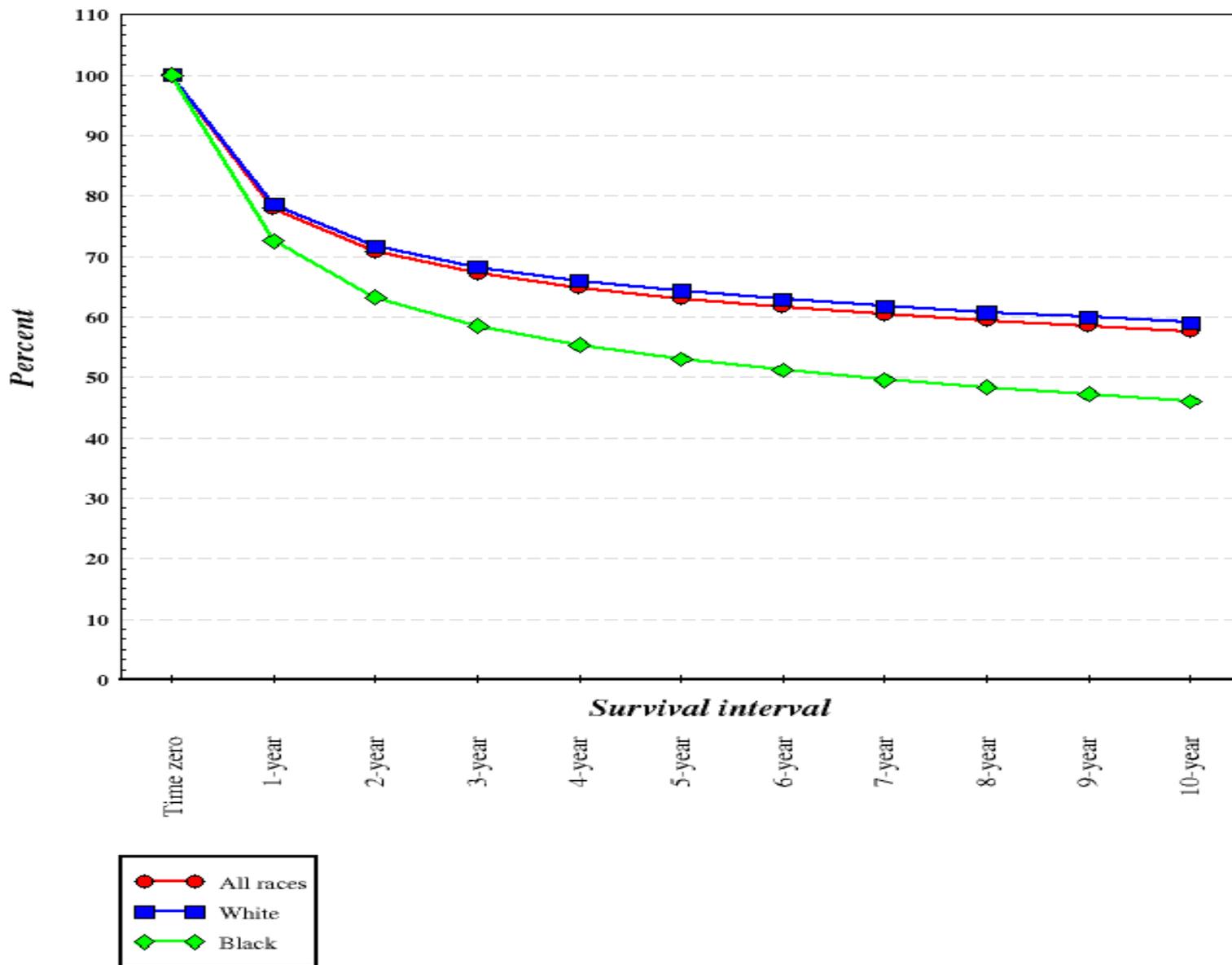
Cancer Incidence rates in the US, 1975-2004, SEER 9 data



Cancer Mortality rates in the US, 1975-2004, SEER 9 data

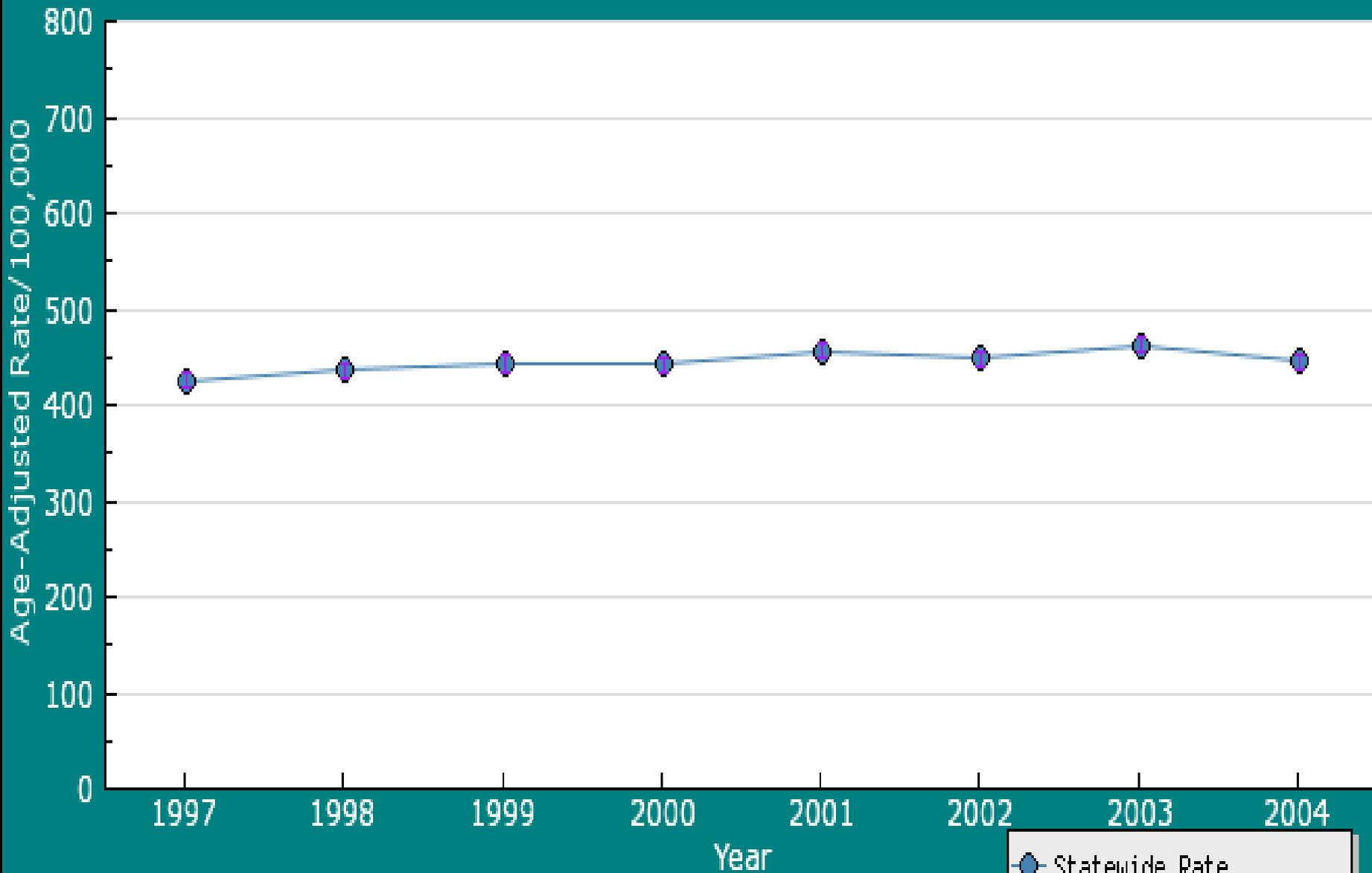


5 year relative survival rates in the US, 1988-2003, SEER 9 data



Invasive Cancer Incidence Rates in Arkansas

All Sites, 1997-2004

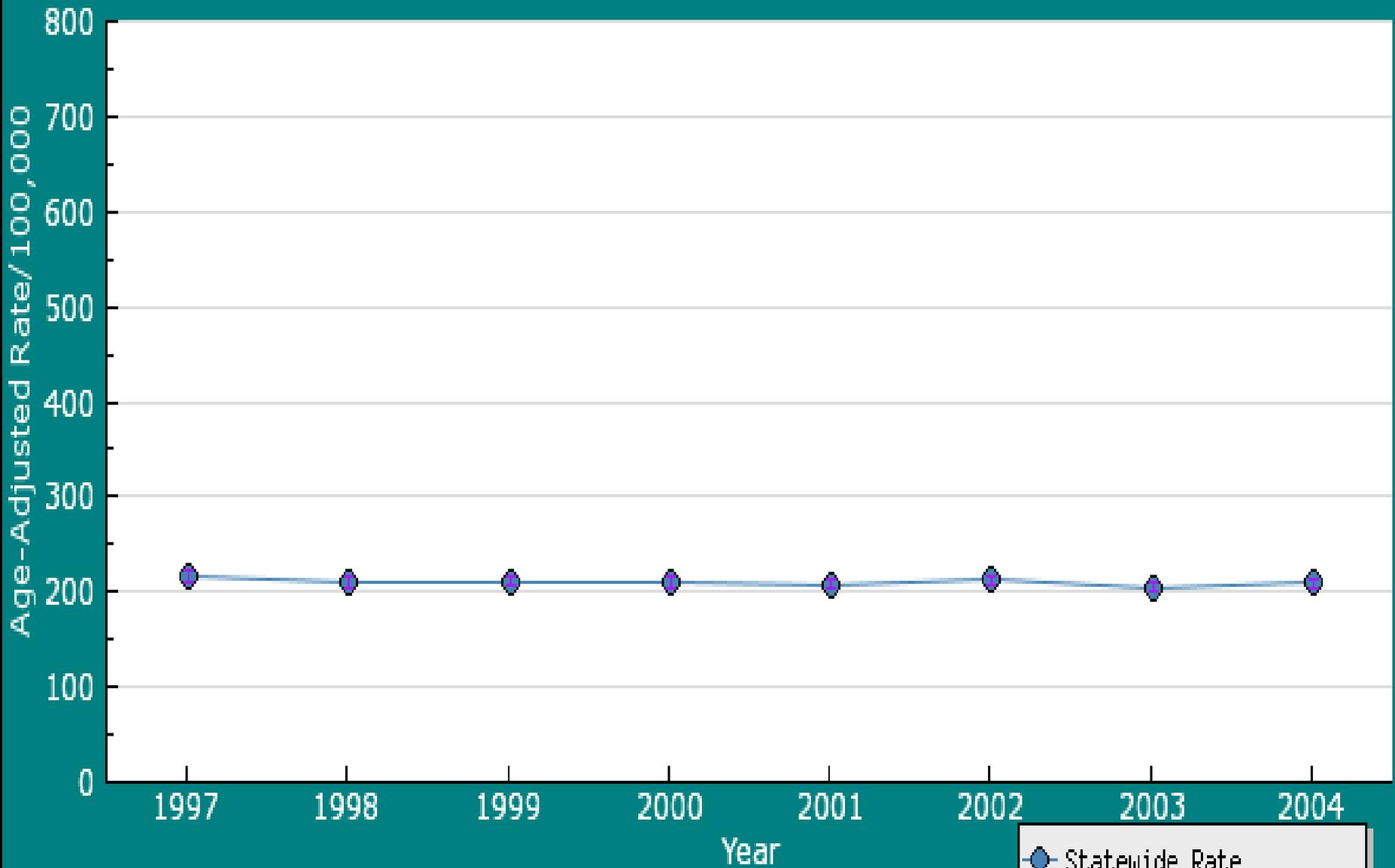


Age-Adjusted to the 2000 U.S. Standard Million Population

◆ Statewide Rate
■ 95% Confidence Interval

Cancer Mortality Rates in Arkansas

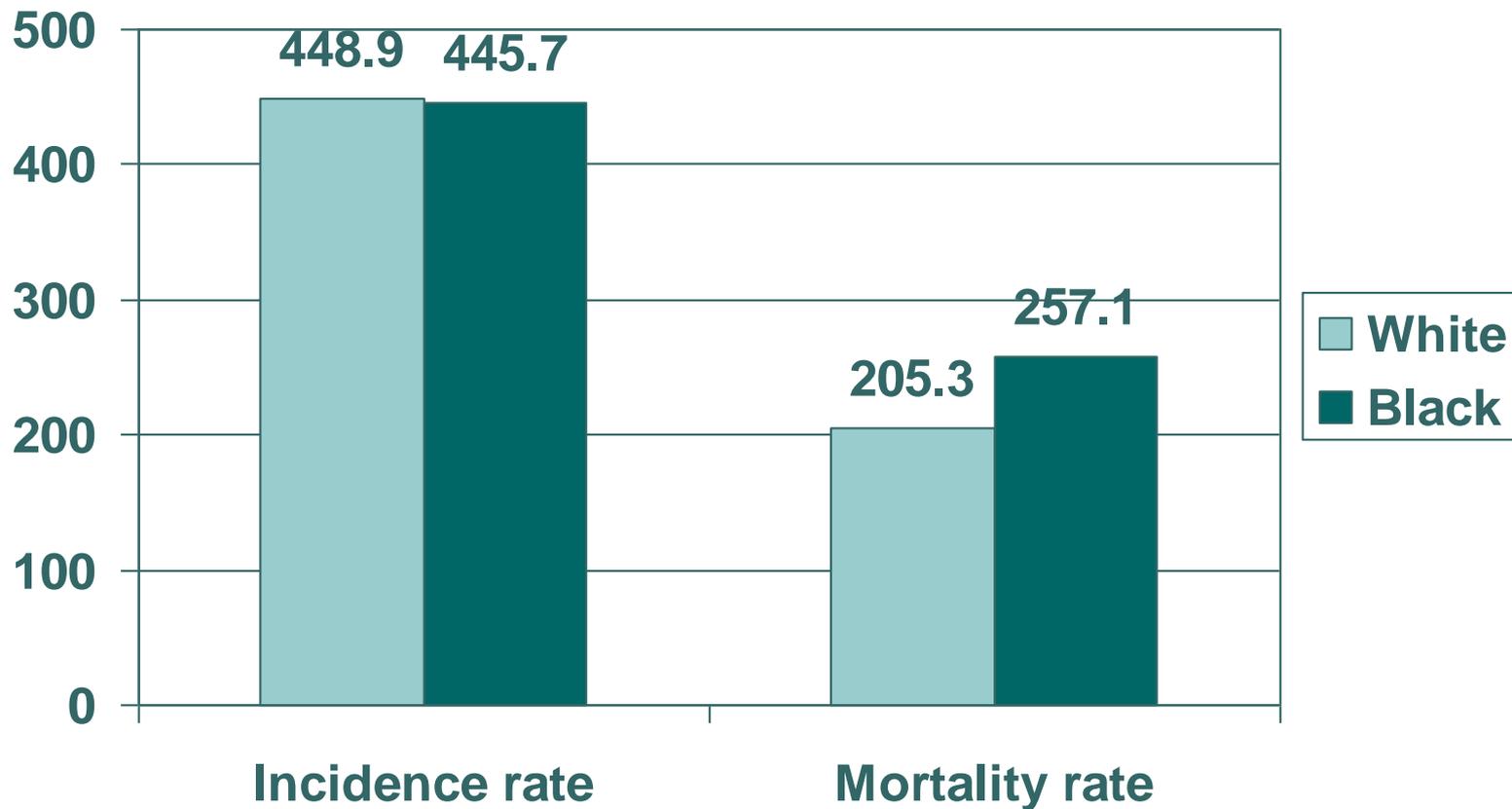
All Sites, 1997-2004



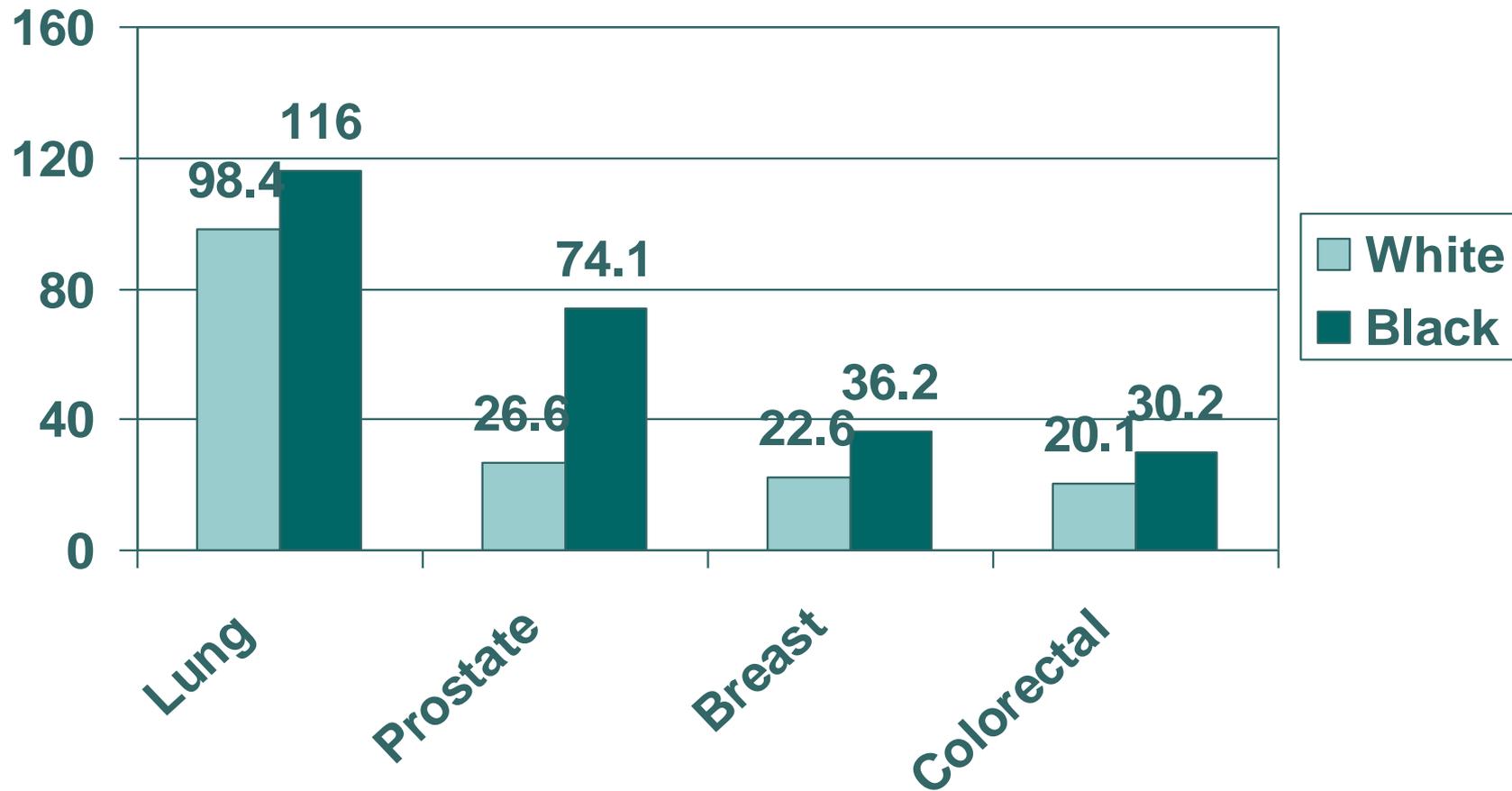
Age-Adjusted to the 2000 U.S. Standard Million Population

◆ Statewide Rate
■ 95% Confidence Interval

Arkansas Central Cancer Registry Data, All cancers, 1999-2004



Arkansas Mortality Data, 1999-2004

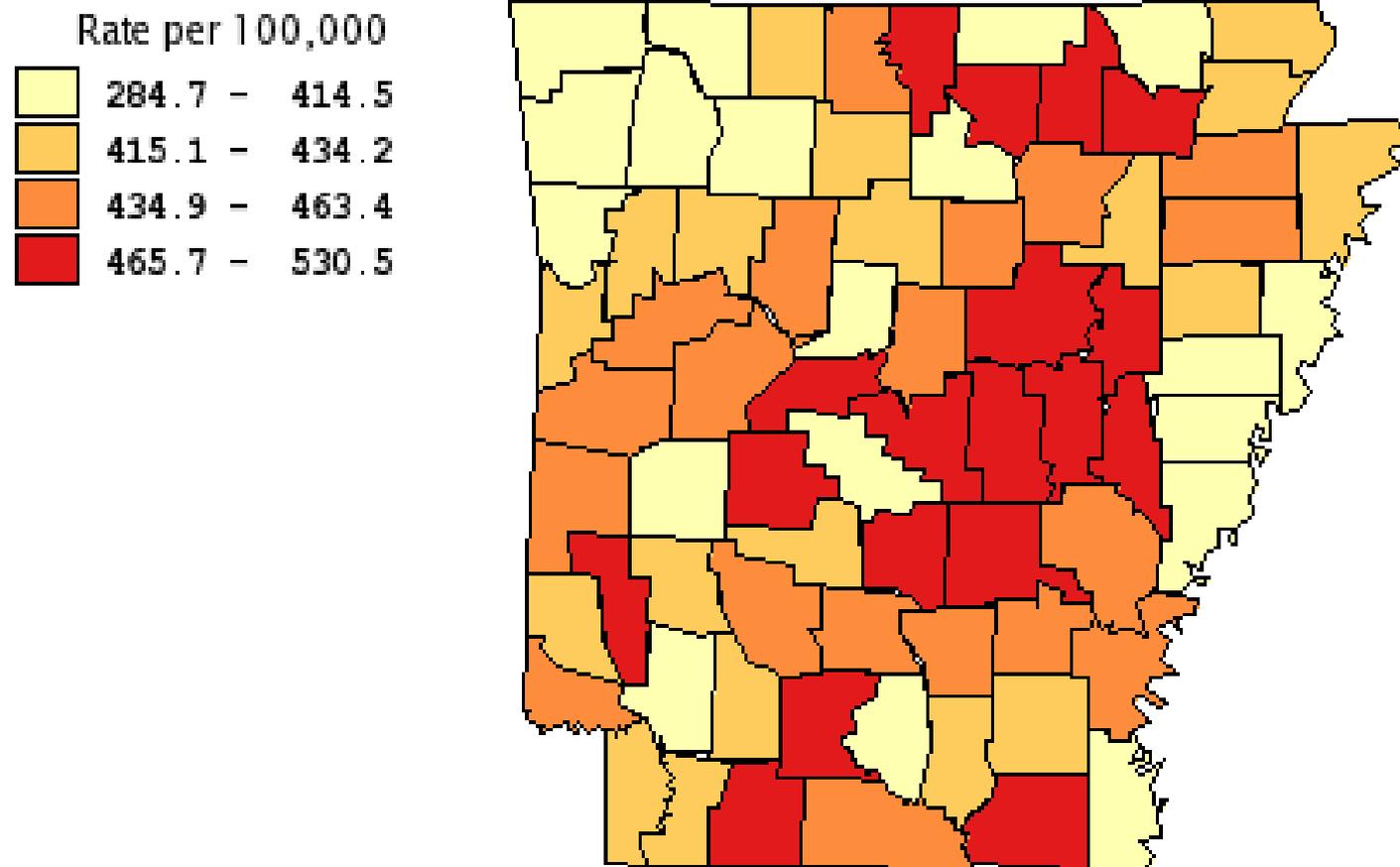


Age-Adjusted Invasive Cancer Incidence Rates by County in Arkansas

All Sites, 1997-2004

Total Population 1997-2004

Age-Adjusted to the 2000 U.S. Standard Million Population



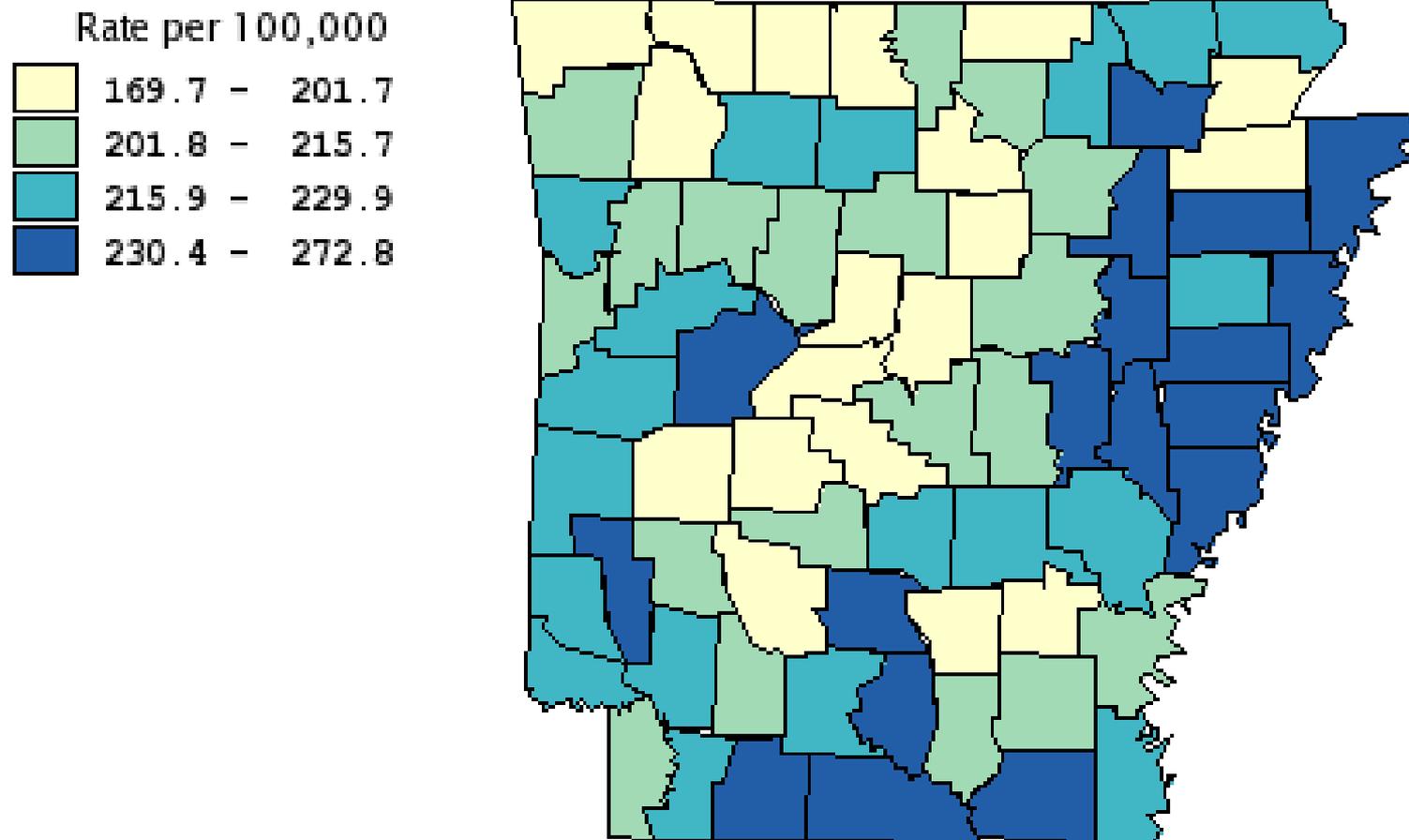
Copyright (C) 2007 Arkansas Cancer Registry

Age-Adjusted Cancer Mortality Rates by County in Arkansas

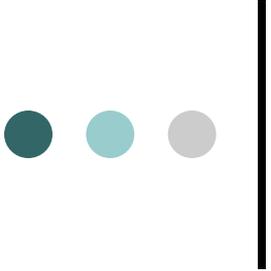
All Sites, 1999-2004

Total Population 1999-2004

Age-Adjusted to the 2000 U.S. Standard Million Population



Copyright (C) 2007 Arkansas Cancer Registry



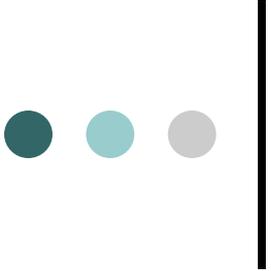
Data → Research

- “Bench-to-Bedside”

- “Bench-to-trench”

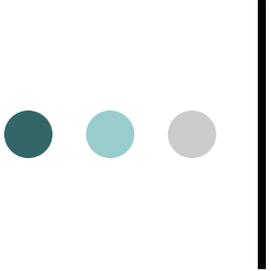
- Understanding cause → Changing Practice





Key Research findings

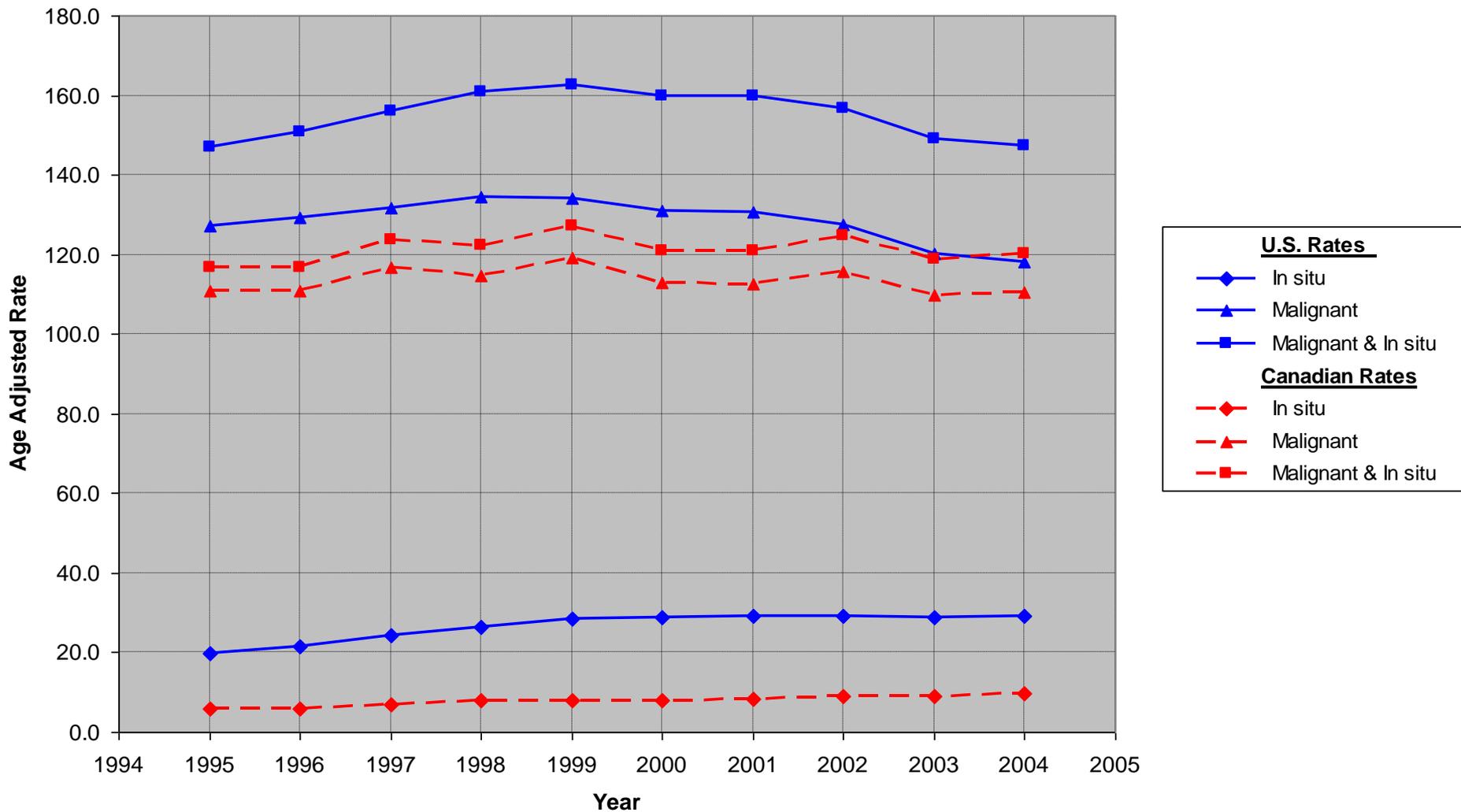
- Decline in Breast cancer incidence!
- Prostate cancer deaths!



Women's Health Initiative Study

- Oestrogen + Progesterone pill – Increased the risk of breast cancer, CHD, and stroke
- Oestrogen alone – Increased the risk of stroke, did not affect IHD

Age Adjusted Cancer Incidence Rates in Selected Areas in the U.S. and Canada* Female Breast Cancer, All Races, All Ages, 1995-2004



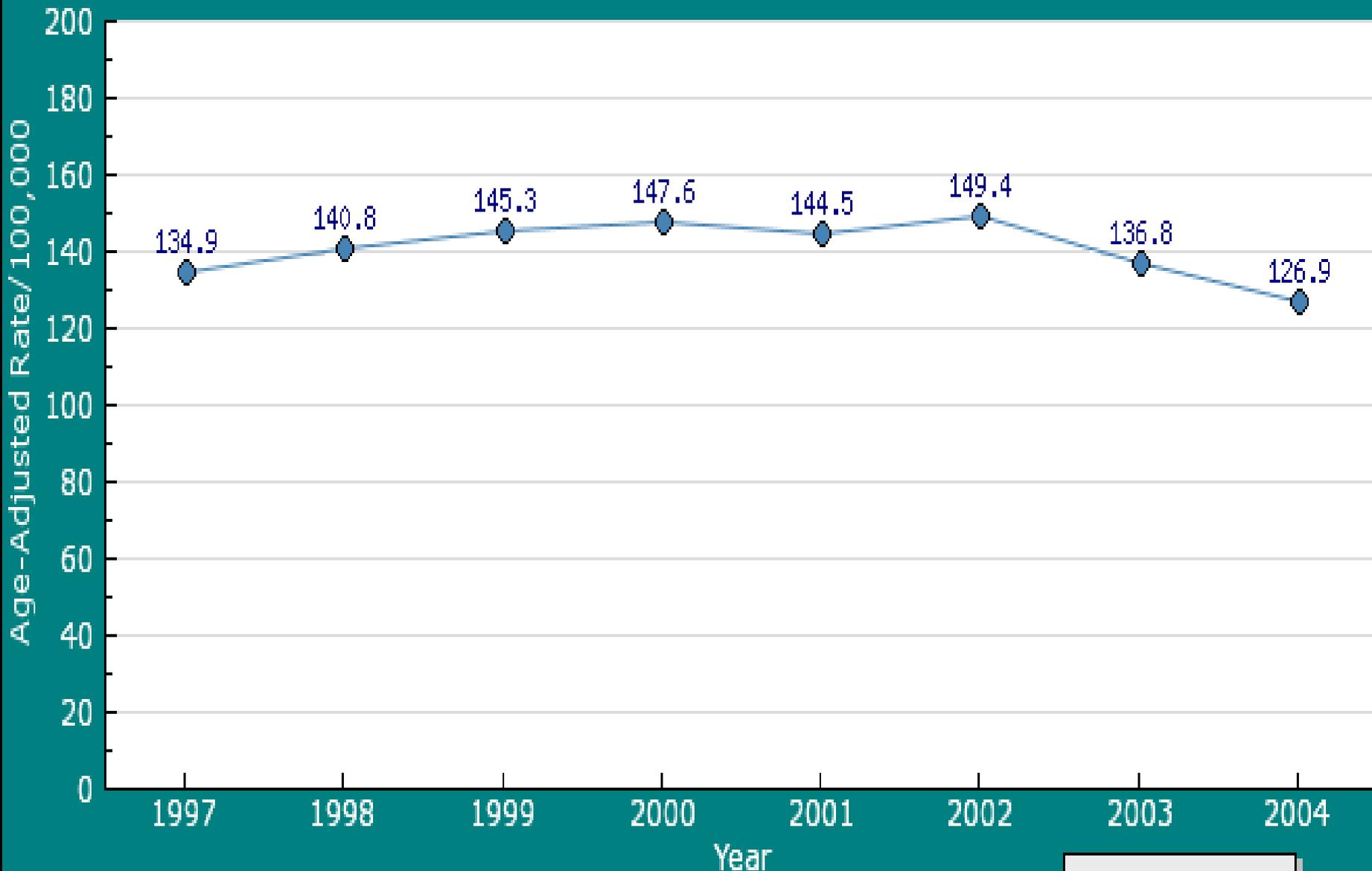
Includes registries that meet the NAACCR Criteria for high quality data for 1995-2004.

U.S. - California, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Illinois, Iowa, Kentucky, Louisiana, Maine, Nebraska, New Jersey, New Mexico, New York, Pennsylvania, Rhode Island, Texas, Utah, Washington, Wyoming, Metro Atlanta, Metro Detroit.

Canada - Alberta, Manitoba, New Brunswick, Ontario, Saskatchewan.

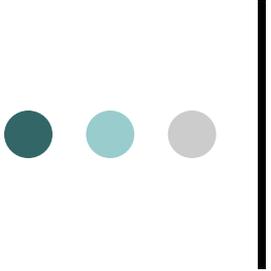
Cancer Incidence Rates in Arkansas

Female Breast, 1997-2004



Age-Adjusted to the 2000 U.S. Standard Million Population

Statewide Rate



Prostate cancer study

- Impact of screening on prostate cancer incidence
- Deaths due to prostate cancer on the decline – Is it real?

Prostate Cancer Incidence rates in the US, 1975-2004, SEER 9 data

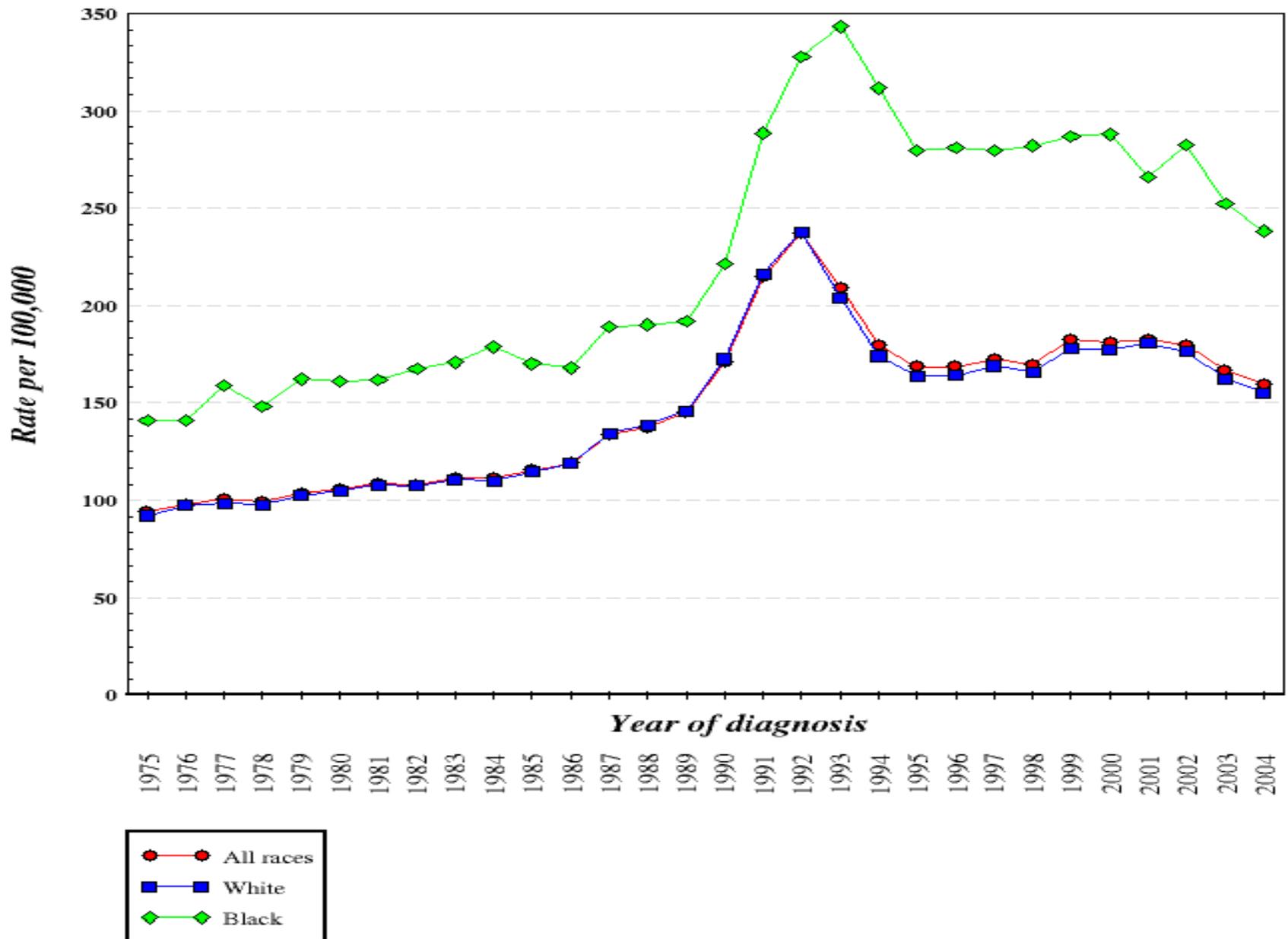


Figure 1. Prostate cancer deaths in Arkansas and in US

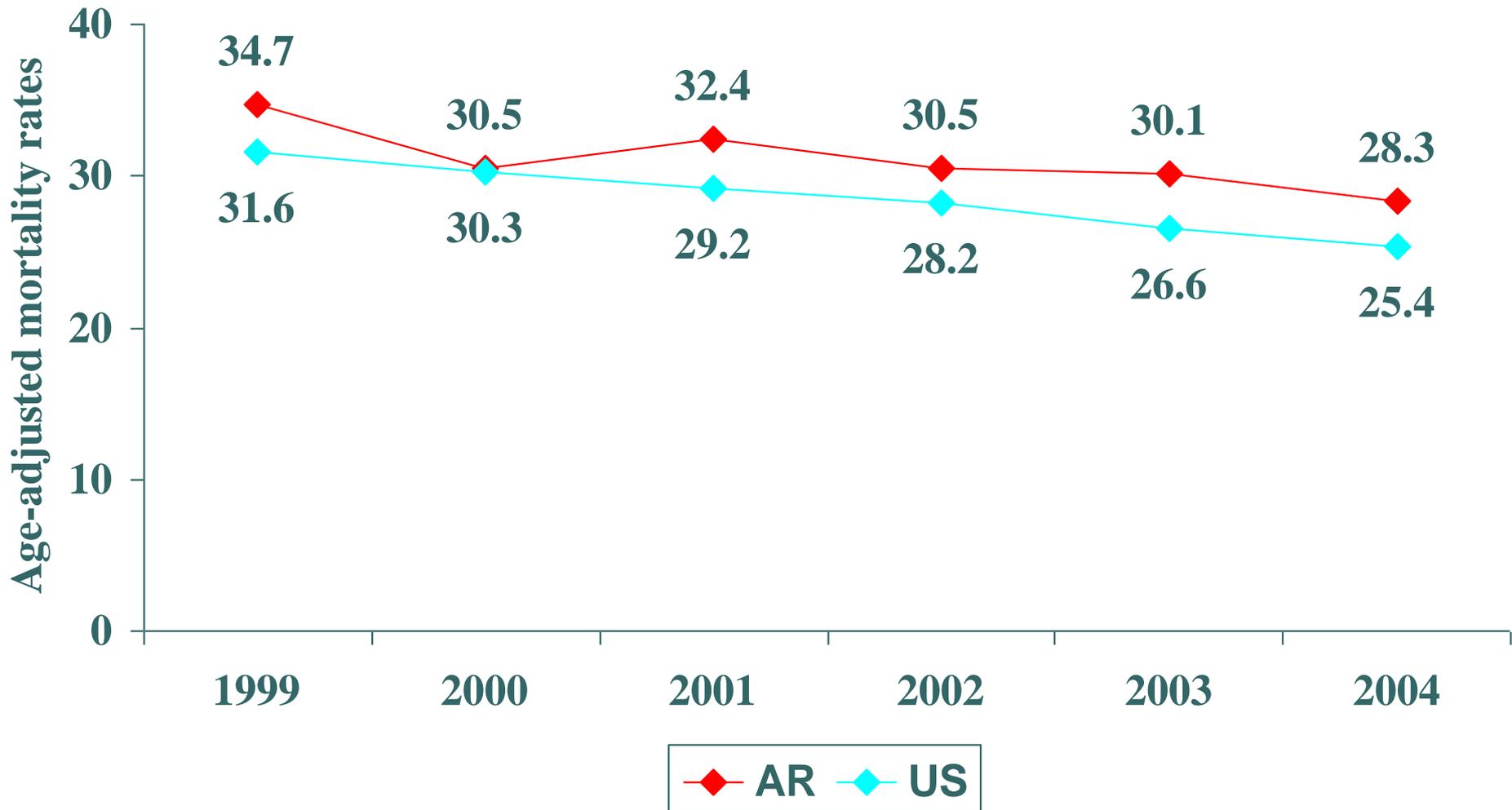
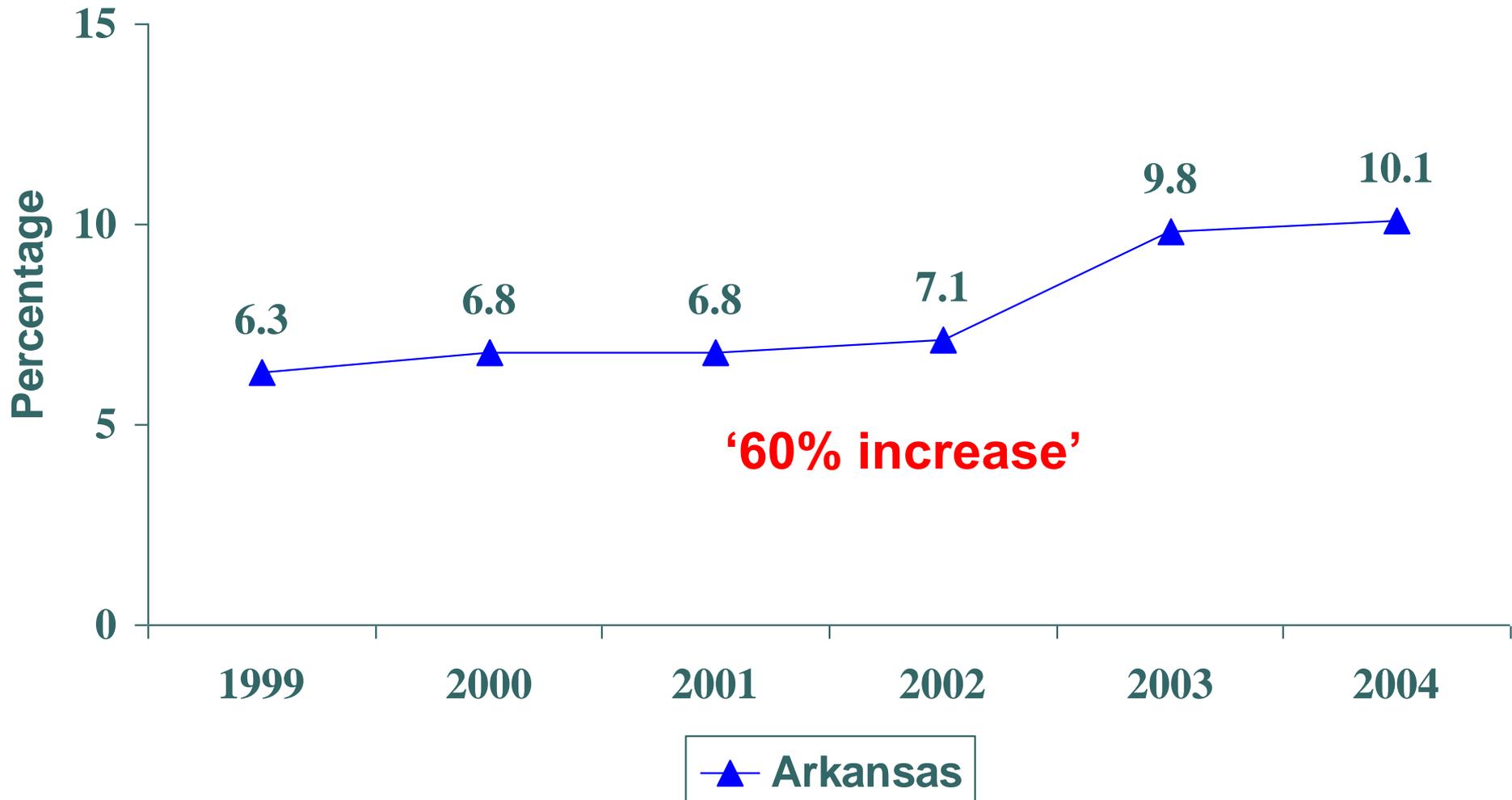
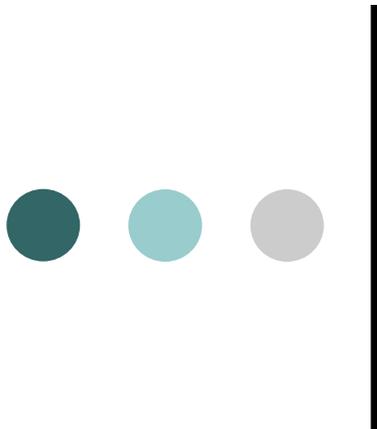


Figure 2. Deaths due to Prostate cancer among adults < 65 years of age, in Arkansas





Premature deaths due to Prostate Cancer: The Role of Diagnosis and Treatment

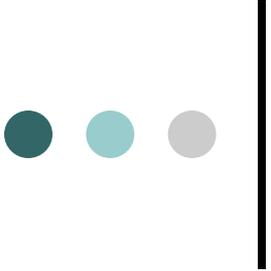
Appathurai Balamurugan MD, MPH

S William Ross MD

Chris Fisher, BS

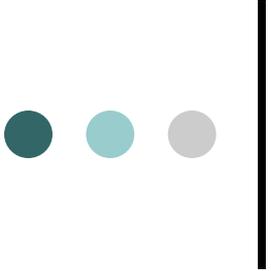
Jim Files, BS

[Arkansas Central Cancer Registry](#)



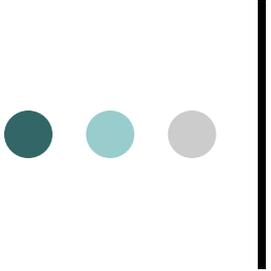
Objectives of our formative study

- To study the demographic and disease-specific characteristics of adults younger than 65 years of age, who died during the period 1999-2004 due to prostate cancer



Premature deaths & YPLL

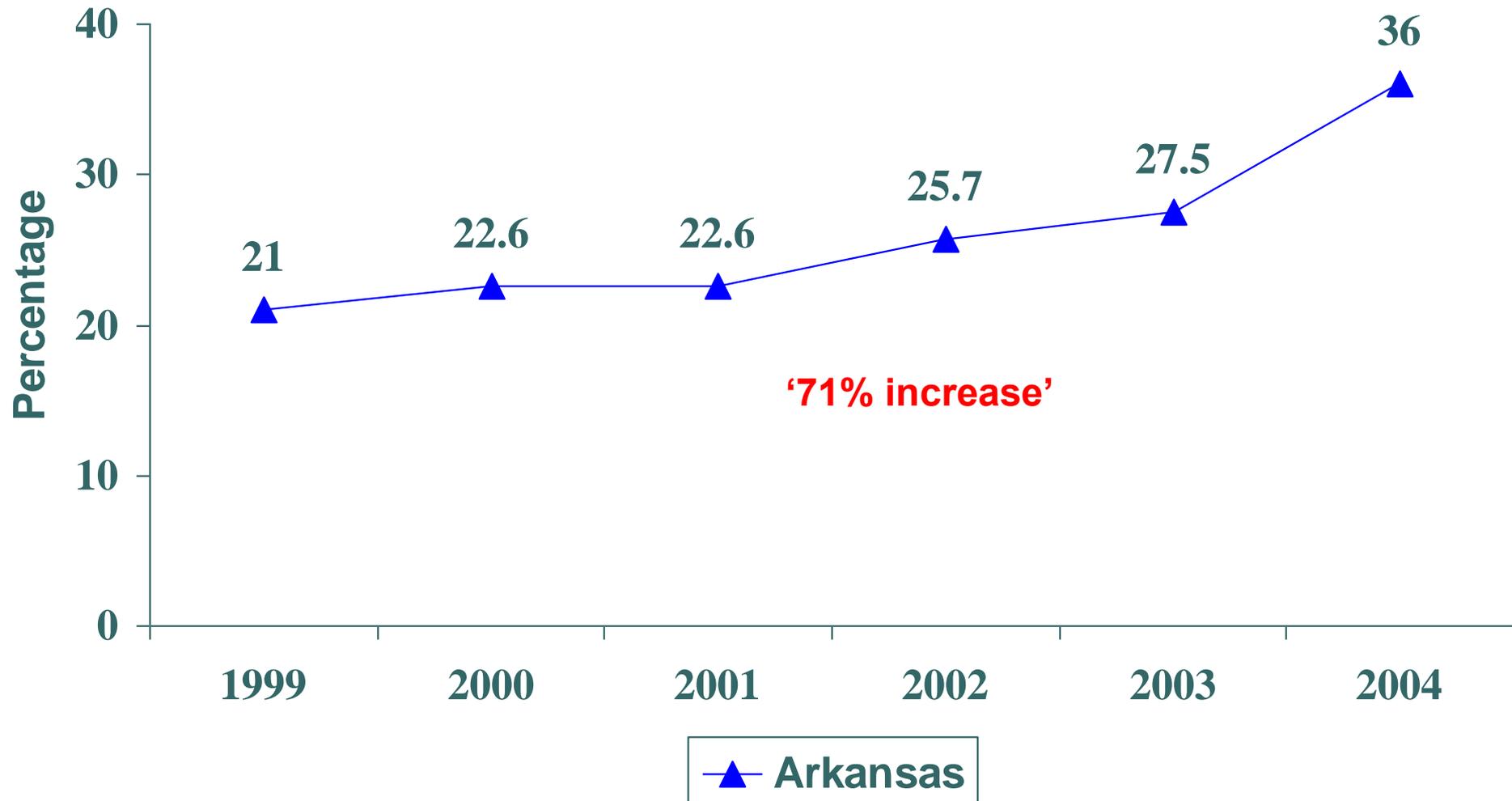
- Deaths among adults younger than 65 years of age (working-age adults) is defined as 'Premature deaths'.
- Years of Potential Life Lost (YPLL) is the measure used to assess the impact of premature deaths.

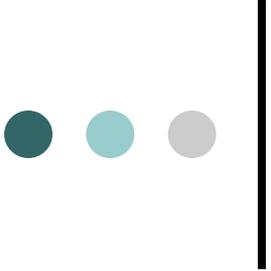


More Premature deaths can be due to:

- More new cases of prostate cancers < 65 years of age
- Can it be explained by any other reason?

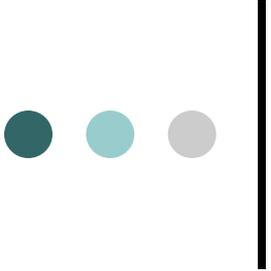
Figure 3. New cases of Prostate cancer among adults < 65 years of age in Arkansas





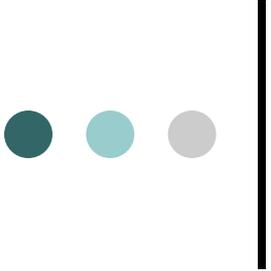
Implications

- Studies have found that men diagnosed with prostate cancer in 50s were more likely (60%) to die prematurely.
- Identifying their characteristics and fostering early diagnosis and appropriate treatment could prevent the premature deaths due to prostate cancer.



Methods

- Calculate YPLL for premature deaths due to Prostate cancer
- We linked the death records of adults who died due to prostate cancer during the period 1999-2004 to the incidence data collected at the Arkansas Central Cancer Registry.
- Compare the characteristics of those died due to prostate cancer < 65 years of age to those died due to prostate cancer 65 years and older



Methods

- Univariate Analysis
- Bivariate Analysis – Chi-square
- Multivariate Logistic regression model
 - Backward elimination and Stepwise regression

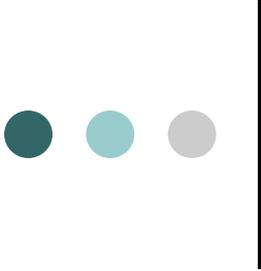
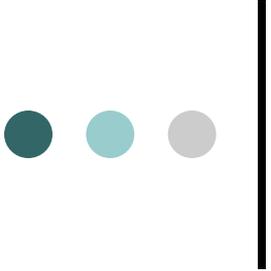


Table 1. List of dependent and independent variables

Variables	Definition
<p><i>Dependent variable</i> Deaths due to prostate cancer</p> <p><i>Independent Variables</i> Age at diagnosis Race Family History SEER Summary stage Histology Treatment</p>	<p>Deaths < 65 years of age (Premature deaths: yes=1, no=2)</p> <p>1=0-39, 2=40-49, 3=50-59, 4=60 yrs & older 1=White, 2=Black 1= No family history, 2= Family history present 0=in situ, 1=localized, 2=regional, 3=distant 1=Adenocarcinoma in situ, NOS, 2= Small cell carcinoma, NOS, 3= Malignant neoplasm, 4= Carcinoma, NOS 0= No treatment, 1= one form of treatment, 2= two forms of treatment, 3= three forms of treatment, 4= four forms of treatment</p>



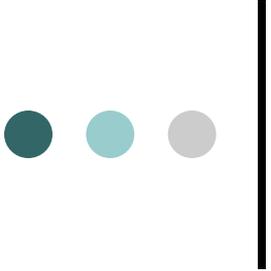
Results

Years of Potential Life Lost (YPLL)

- Number of deaths due to prostate cancer <65 years in Arkansas (99-04) = 108
- Range = 43-64 years of age
- YPLL = 661
- YPLL rate per 100,000 people per year = 9.5

Table 2. Characteristics of adults who died prematurely due to prostate cancer (Note: † - Statistically significant)

Characteristics	Adults who died <65 years of age (%)	P-value
<i>Age at diagnosis</i>		
0-39	0	0.000 †
40-49	100.0	
50-59	93.8	
60 years or older	4.5	
<i>Race</i>		
White	10.6	0.107
Black	15.9	
<i>Family History</i>		
No family history	9.7	0.031 †
Family history present	17.3	
<i>SEER Summary stage</i>		
In situ	4.2	0.000 †
Localized	16.0	
Regional	19.1	
Distant	12.4	
<i>Histology</i>		
Adenocarcinoma in situ, NOS	11.4	0.494
Small cell carcinoma, NOS	33.3	
Malignant neoplasm	17.1	
Carcinoma, NOS	9.1	
<i>Treatment</i>		
No treatment	9.0	0.007 †
One form of treatment	11.4	
Two forms of treatment	14.6	
Three forms of treatment	31.0	
Four forms of treatment	0.0	



Results summarized

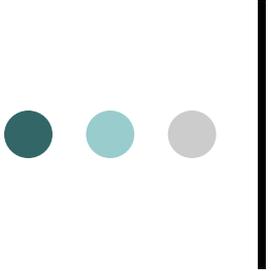
- 11.4 % (N=108) of people who died due to prostate cancer, died prematurely.
- Findings from unadjusted bivariate analysis showed that:
 - Significantly higher proportion of those diagnosed in the 40-59 age group were likely to have died prematurely ($p=0.000$).
 - Significantly higher proportion of those with family history ($p=0.031$), those with a regional or distant metastases ($p=0.000$), and those who received 2 or 3 forms of treatment were likely to have died prematurely ($p=0.007$).
 - There were no significant differences by race or histology.

Table 3. Adjusted characteristics of adults who died prematurely due to prostate cancer

Characteristics	OR * (95% CI†)	P-value
Age at diagnosis		
60 years and older vs. 40-49	0.000 (0.000, 0.000)	0.999
60 years and older vs. 50-59	0.002 (0.001, 0.008)	0.000 ‡
Race		
White vs. Black	0.515 (0.250, 1.062)	0.072
SEER summary stage		
Distant vs. Localized	3.990 (1.659, 9.595)	0.002 ‡
Distant vs. Regional	2.242 (0.695, 7.236)	0.177
Treatment		
One form vs. two form	1.487 (0.634, 3.488)	0.361
One form vs. three form	1.091 (0.390, 3.049)	0.869
One form vs. four form	0.585 (0.120, 2.849)	0.507
Histology		
Adenocarcinoma in situ, NOS vs. Small cell carcinoma, NOS	0.141 (0.012, 1.658)	0.119
Adenocarcinoma in situ, NOS vs. Malignant Neoplasm	0.265 (0.050, 1.390)	0.116
Adenocarcinoma in situ, NOS vs. Carcinoma, NOS	1.036 (0.134, 8.018)	0.973

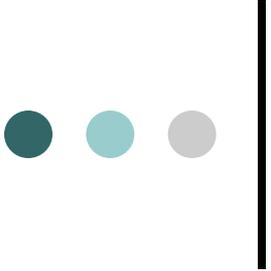
* OR = Odds ratio † 95% CI = 95% confidence interval ‡ statistically significant

Note: Family history and Age at death were dropped from the model due to lack of significance.



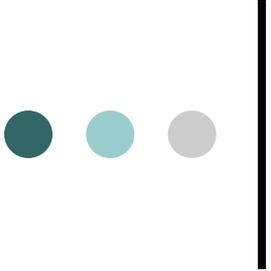
Results summarized

- After adjusting for the covariates in the multivariate model:
 - Those diagnose 60 years and older were less likely to die prematurely (OR=0.002, 95% CI 0.001, 0.008).
 - Those with a distant metastases at diagnosis were more likely to die prematurely (OR=3.990, 95% CI 1.659, 9.595)



Limitations

- 46% case ascertainment rate (951/2063)
- Selection bias
- Missing data – Screening results, family history



Conclusions

- In spite of the limitations, our formative study provides some insight for future research
- Epidemiologic profiling of those who die prematurely due to prostate cancer will assist fostering preventive measures and avert deaths.



Research driving Policy

Arkansas Clean Indoor Act



FOSTER ← KLEISER

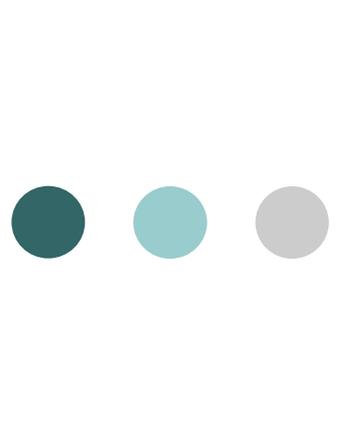
**Smoke.
Because no
one should infringe
upon your right
to cough up black phlegm.**

Warning: The Surgeon General Has Determined
That Cigarette Smoking Is Dangerous to Your Health.

8 mg "tar", 0.7 mg nicotine av. per cigarette by FTC method.

New York Trans-fat Free





Policy driving Action



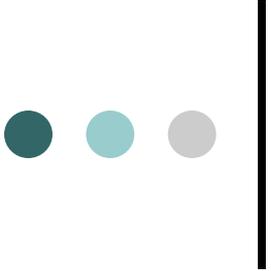
THE CONGRESSIONAL CANCER

Cancer Action
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Promise

109th and 110th Congresses

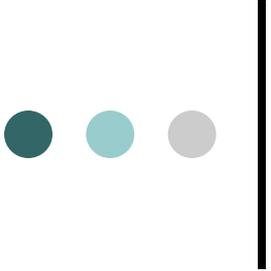


Legislative actions at the Capitol

U.S. Senate Votes to Add \$2.2 Billion to Health Budget

This additional funding could allow for more money for:

- Cancer research funding at the National Cancer Institute
- Mammograms for uninsured women
- In addition, more than 130 House Members have signed onto a letter calling for \$1.9 billion in additional funds for NIH.



Legislative actions in States

- **New Mexico Passes Colon Cancer Screening Bill**

Illinois volunteers rally in support of their smoke-free bill. Governor Bill Richardson signed a bill that would require private insurance companies to include coverage for colon cancer screenings.

- **Iowa Tobacco Tax Increased by \$1.00**

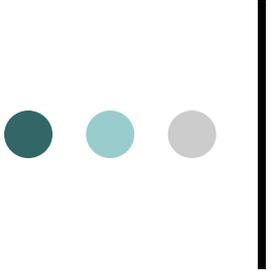
Iowa's tobacco tax increased to \$1.36 after Governor Culver signed a bill that added one dollar to the existing tax. With the increase, Iowa went from having the 8th lowest state tobacco tax to the 17th highest.

- **New Mexico Becomes 22nd State To Pass Smoke-Free Law**

Governor Bill Richardson signed the Dee Johnson Clean Indoor Air Act, a comprehensive smoke-free bill that was passed overwhelmingly by the state House and Senate. Effective June 15, nearly all workplaces, including restaurants and bars, will become smoke-free.



ARKANSAS'
CANCER
PROMISE



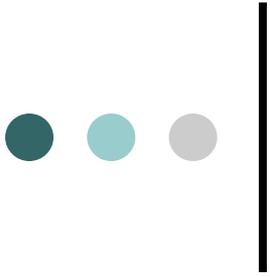
Key components:

- Make Health System Reform a Priority
- Reduce and Prevent suffering from Tobacco-related illness
- Expand Access to Quality Cancer Care through prevention and detection
- Reduce the cancer burden among disadvantaged populations
- Promote research that addresses disparities in cancer screening, diagnosis and treatment



Are we there yet?

Not yet but we are getting there.....



What you do makes a difference..