



The Social Shaping of Population Health



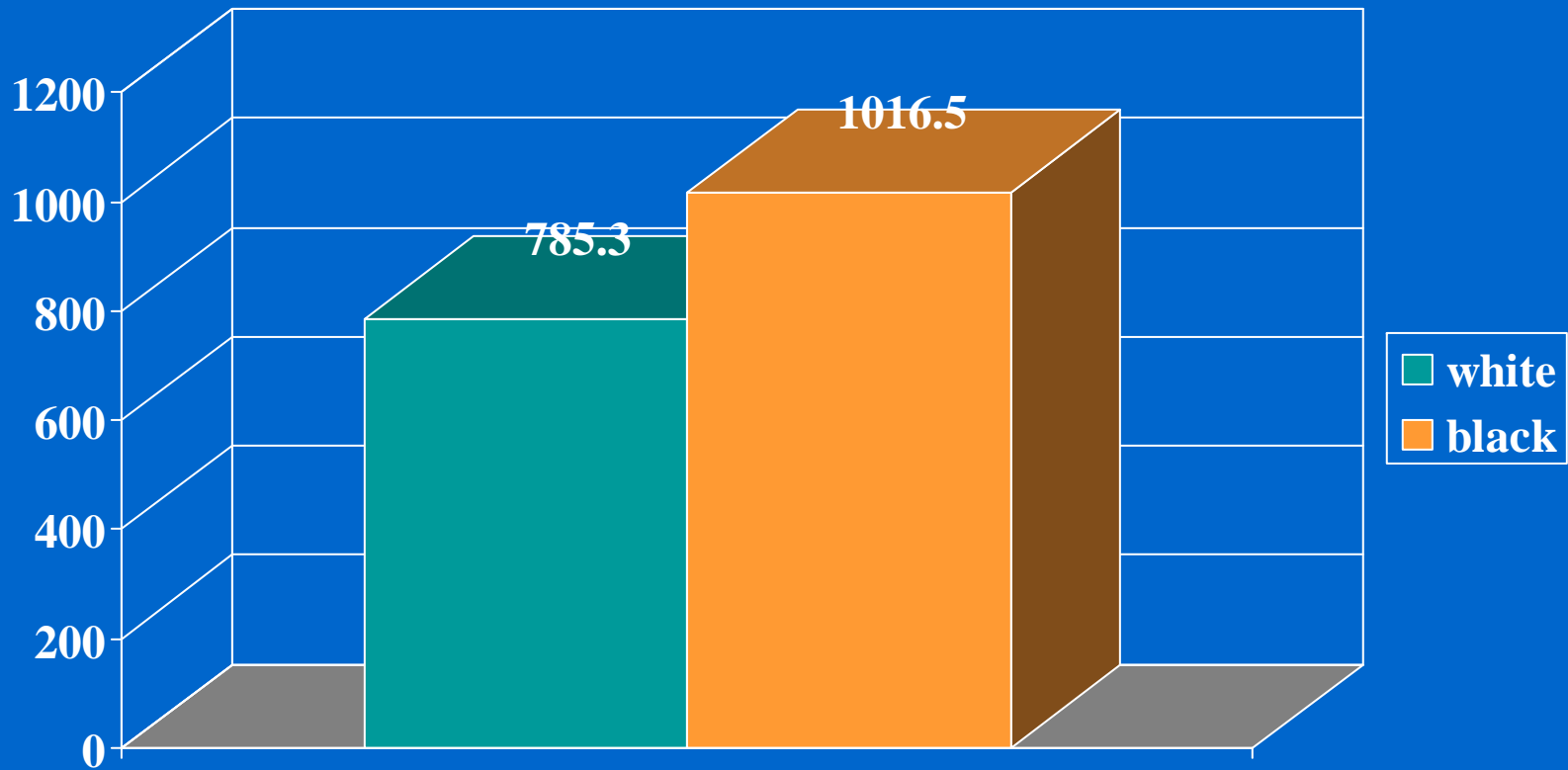
Bruce Link

Disparities in Child Health and
Development

May 20, 2010

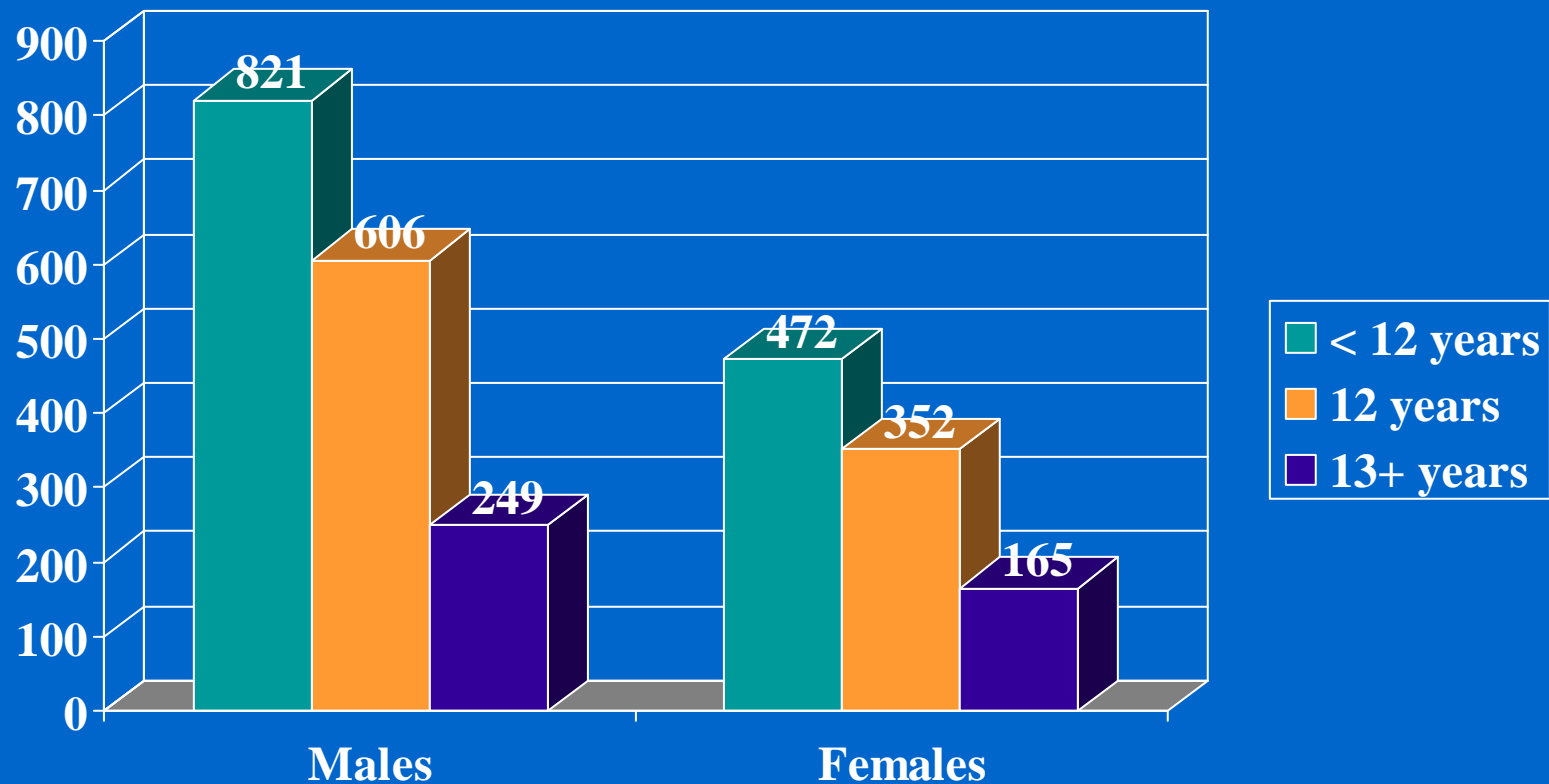


U.S. All Cause Age-adjusted Death Rates Per 100,000 by Race – 2005



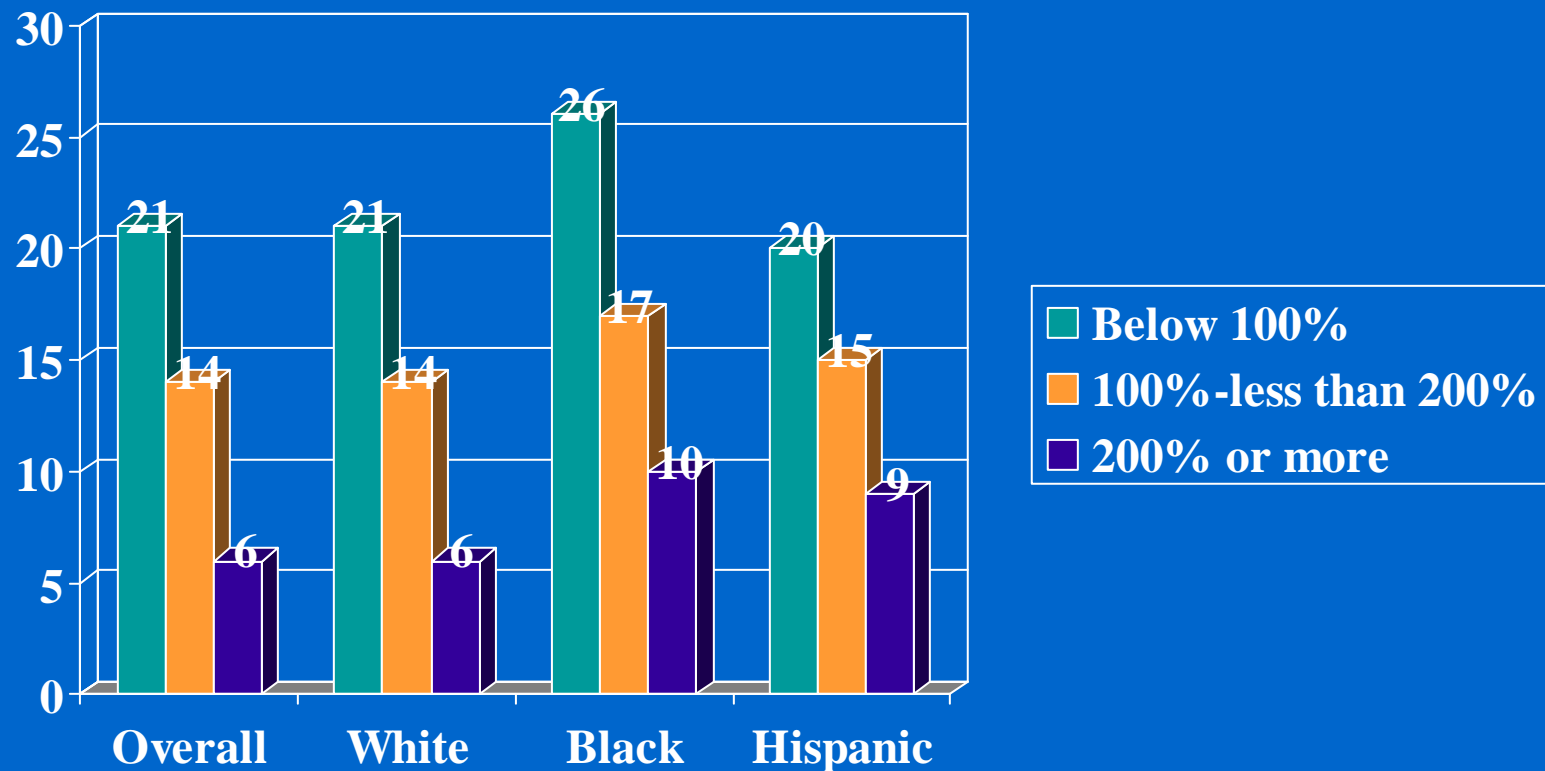
National Center for Health Statistics – Health United States 2008

U.S. All Cause Age-adjusted Death Rates Per 100,000 People Ages 25-64 by Education -- 2005



National Center for Health Statistics – Health United States 2008

U.S. Percent Fair or Poor Self-Reported Health by Poverty Level and Race/Ethnicity

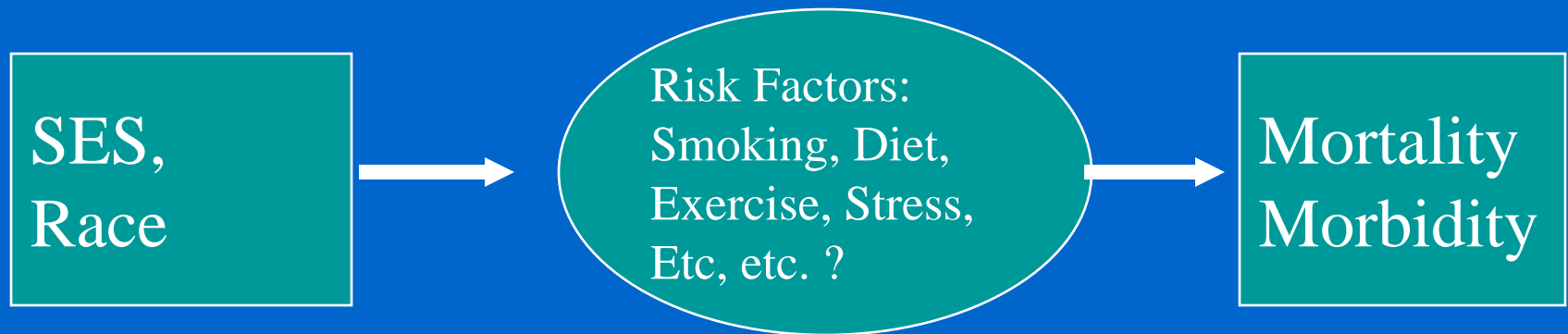




Explanatory Paradigms And the Role of Social Factors in Population Health

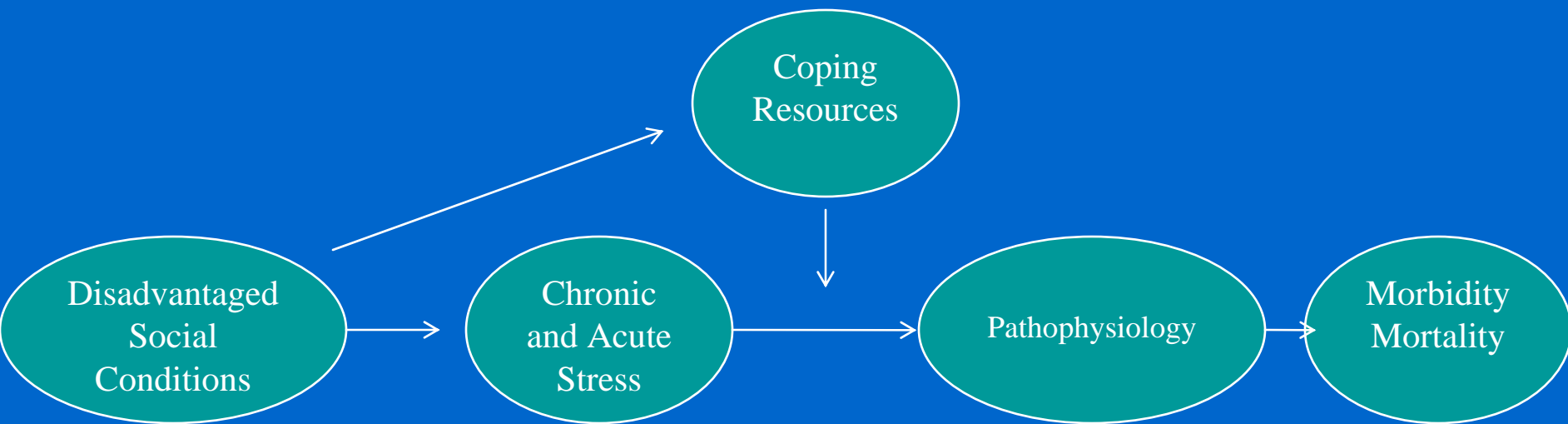


The Risk Factor Approach

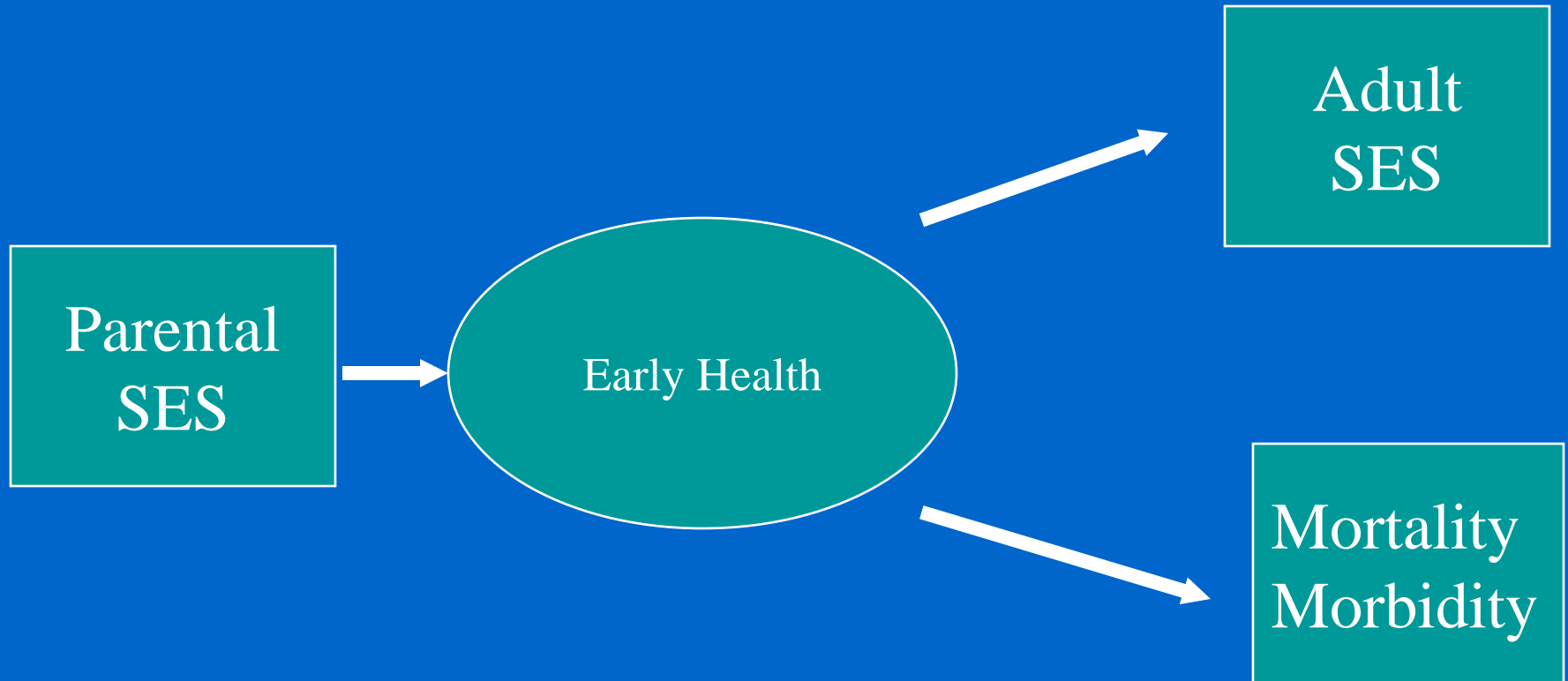


Stress Paradigm

Substantial attention has been directed towards the following schema



Health Selection Approach

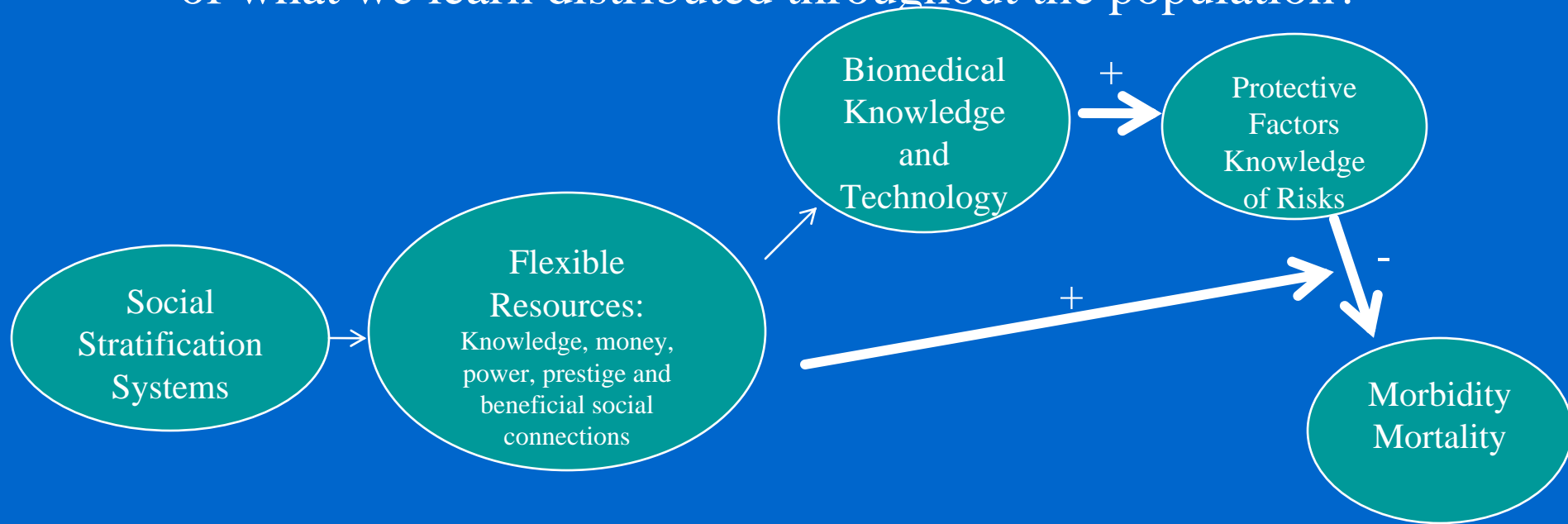


The Core Idea of the Social Shaping Approach

- Bio-medical knowledge and technology have created the capacity for humans to avoid disease and circumvent early death. This transformation of disease causation from cruel fate, accident and bad luck to circumstances that are under some degree of human control facilitates a powerful social shaping of disease and death. When humans control, it is their policies, their knowledge, and their behaviors that shape the consequences of bio-medical accomplishments and thereby extant patterns of disease and death. Biomedical knowledge and technology create circumstances that allow social inequalities to express themselves in health.

Social Shaping Paradigm

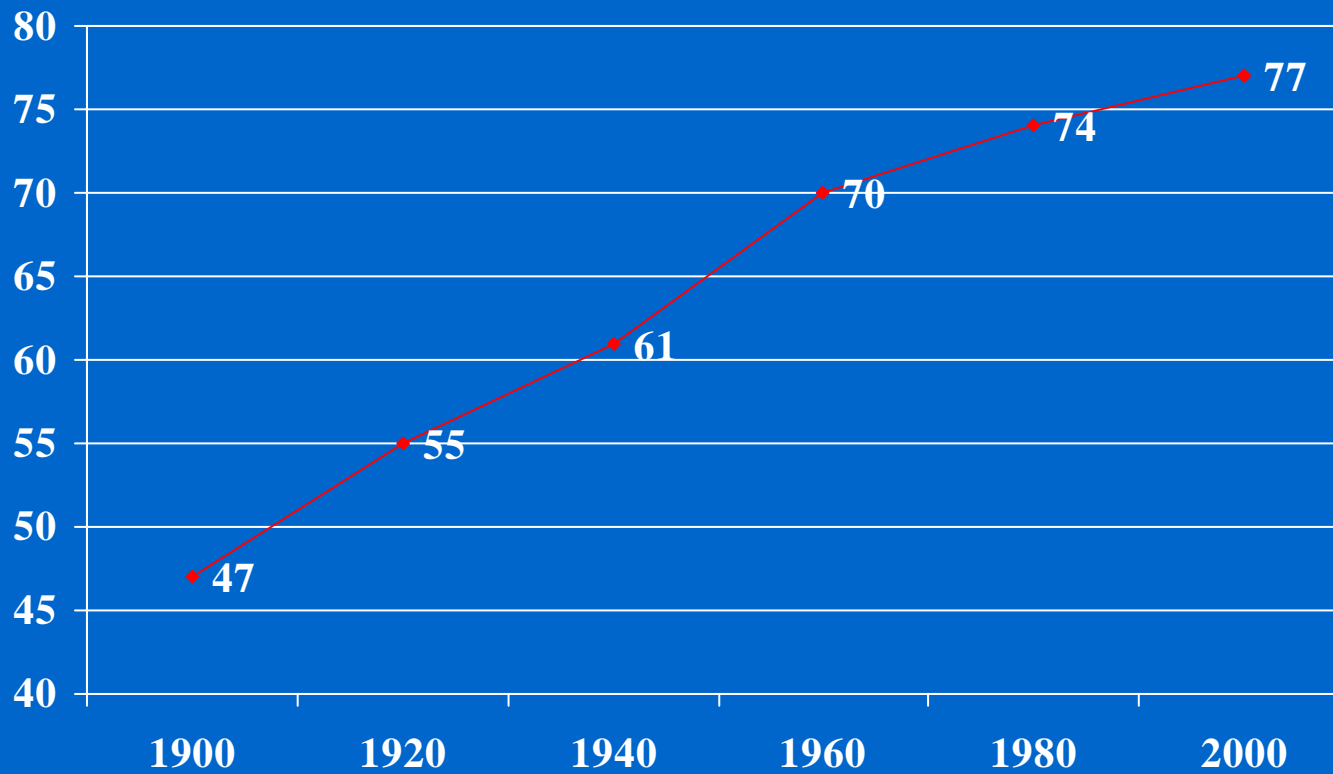
How is the production of biomedical knowledge and technology shaped by social factors and how are the fruits of what we learn distributed throughout the population?



Evidence Pertaining to the Social Shaping Paradigm

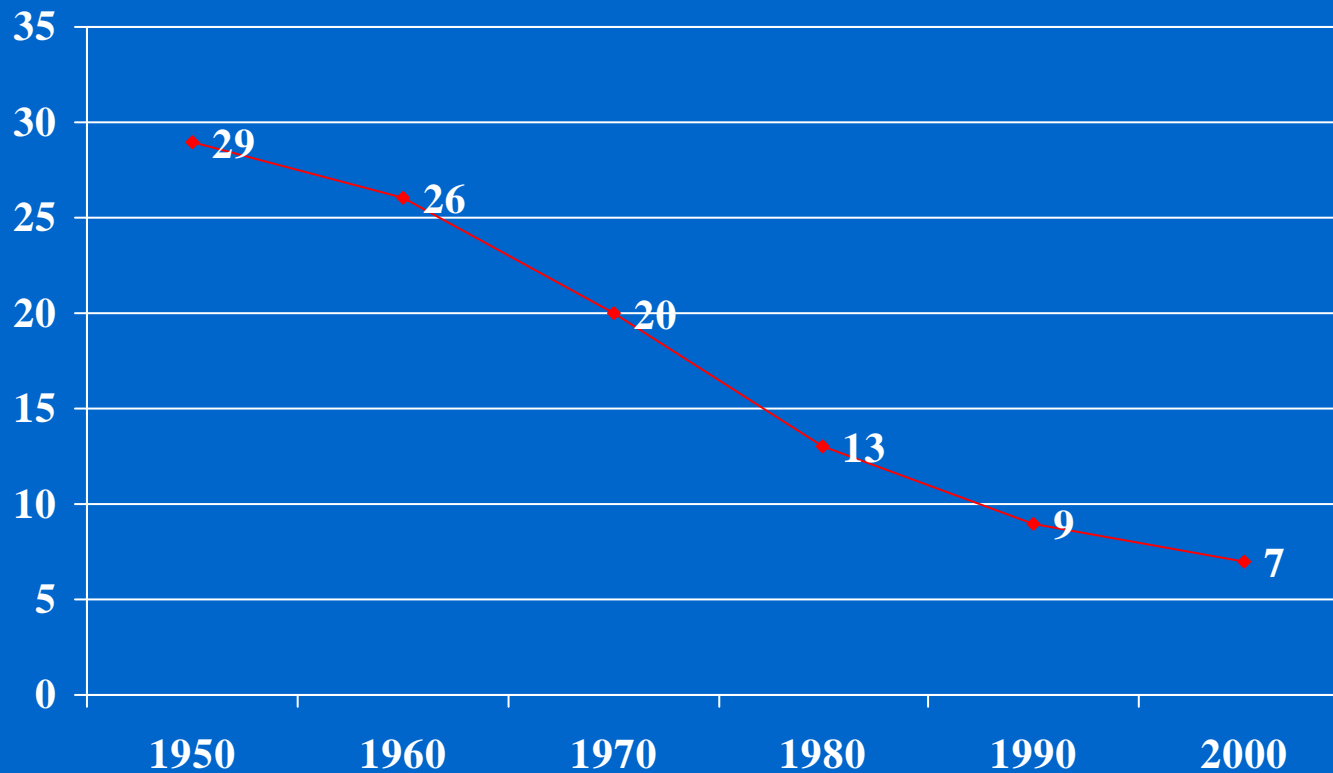
- If this approach is correct we would need evidence that societal level knowledge and technology has had a dramatic influence on health.
- If the approach is correct we should see the association between SES and specific health conditions and race and specific health conditions change as new knowledge and technology are developed such that disparities are created when humans gain control.

US Life Expectancy at Birth 1900-2000



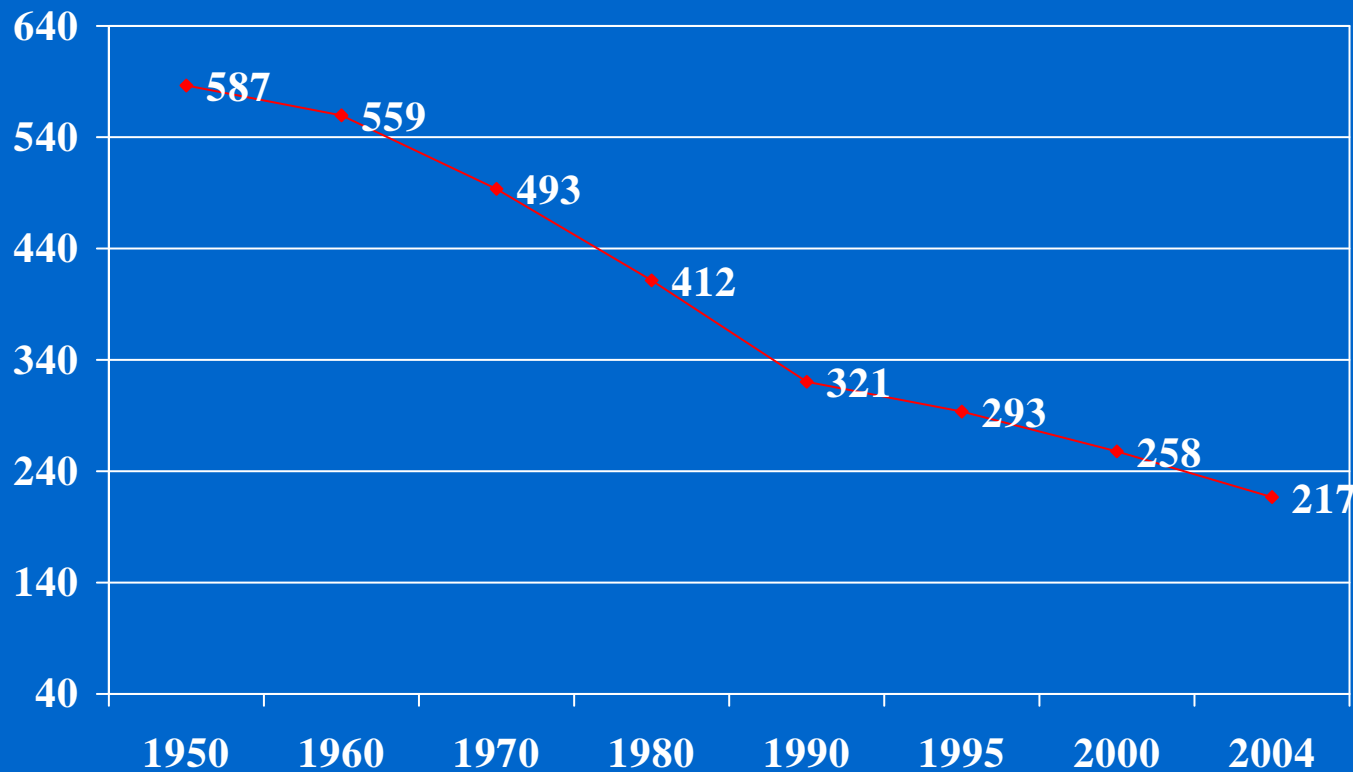
National Center for Health Statistics – Health United States 2006

Infant Mortality Death Rates Per 1,000 Live Births



National Center for Health Statistics – Health United States 2006

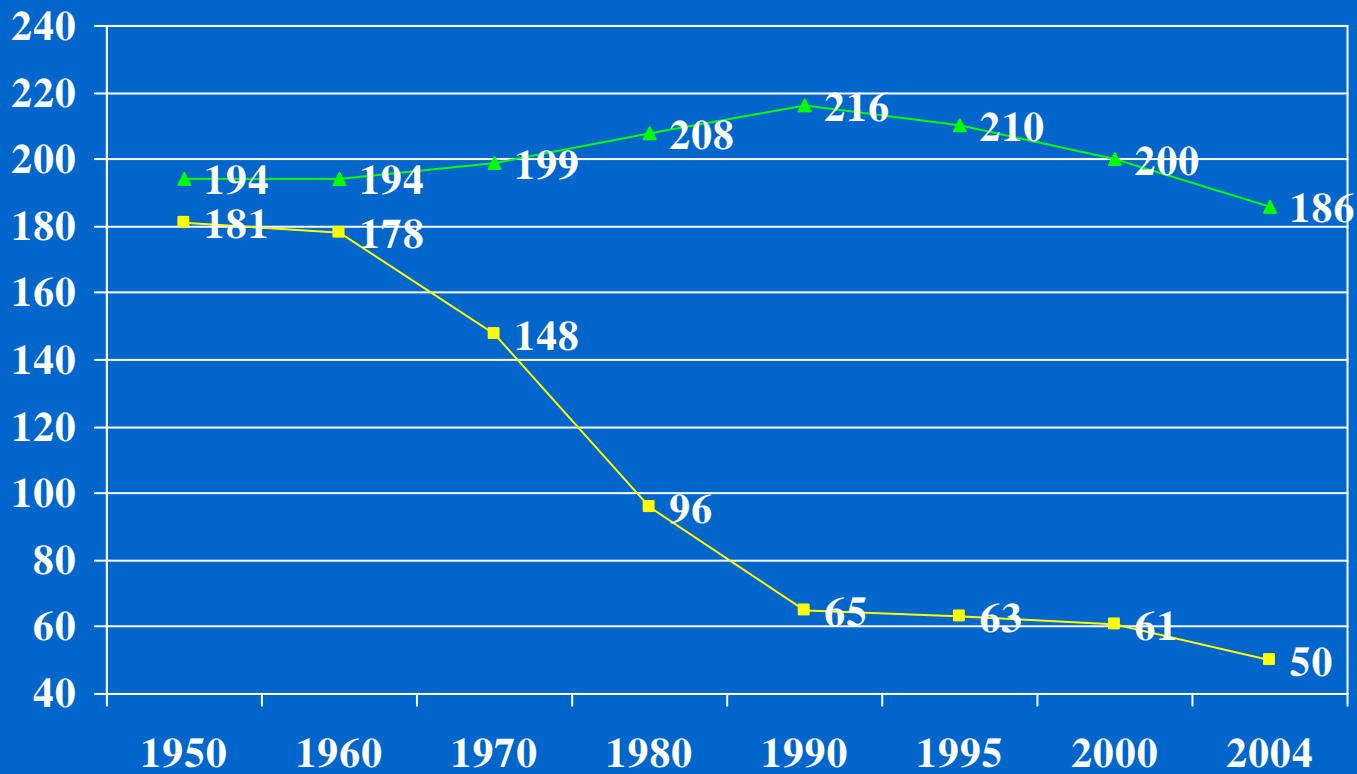
Heart Disease -- Age-adjusted Death Rates Per 100,000 People



National Center for Health Statistics – Health United States 2006

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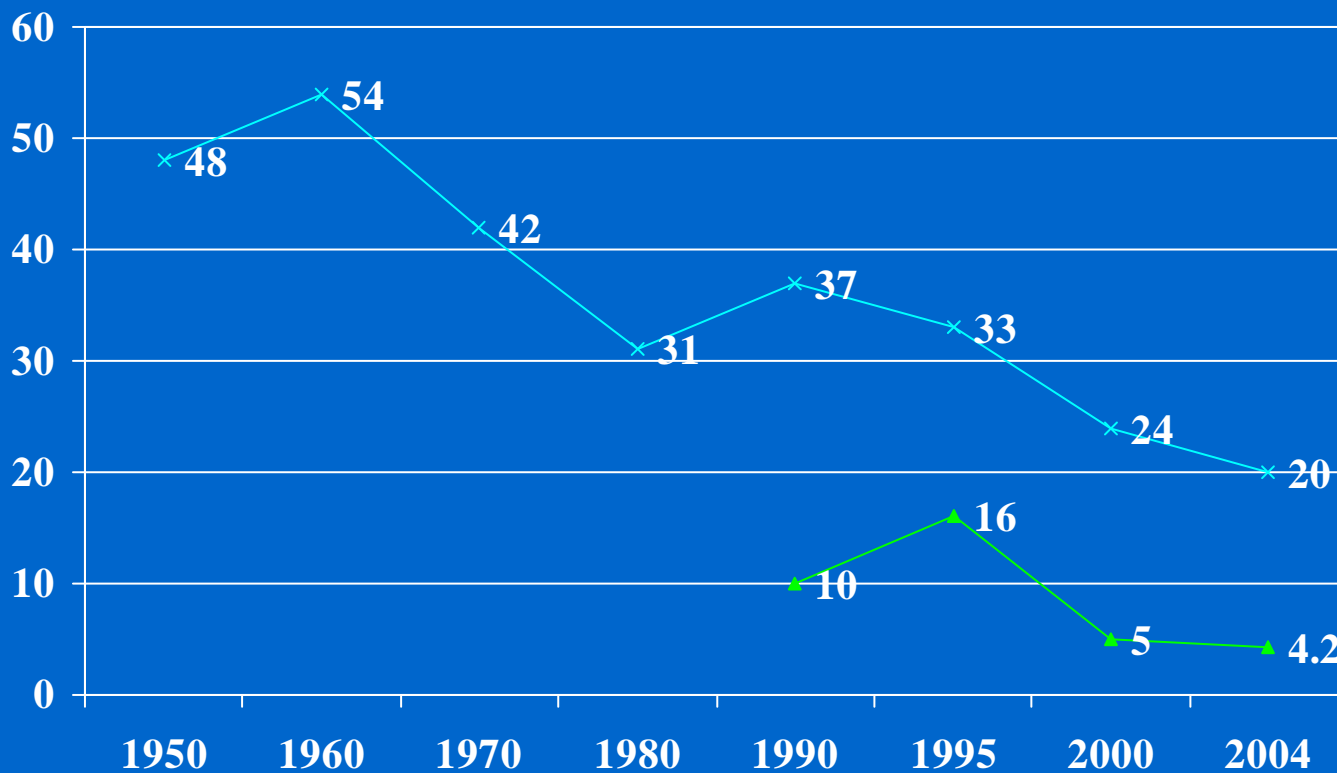
Cancer (green) and Stroke (Yellow) -- Age-adjusted Death Rates Per 100,000 People



National Center for Health Statistics – Health United States 2006

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Flu (blue) and HIV (green) -- Age-adjusted Death Rates Per 100,000 People

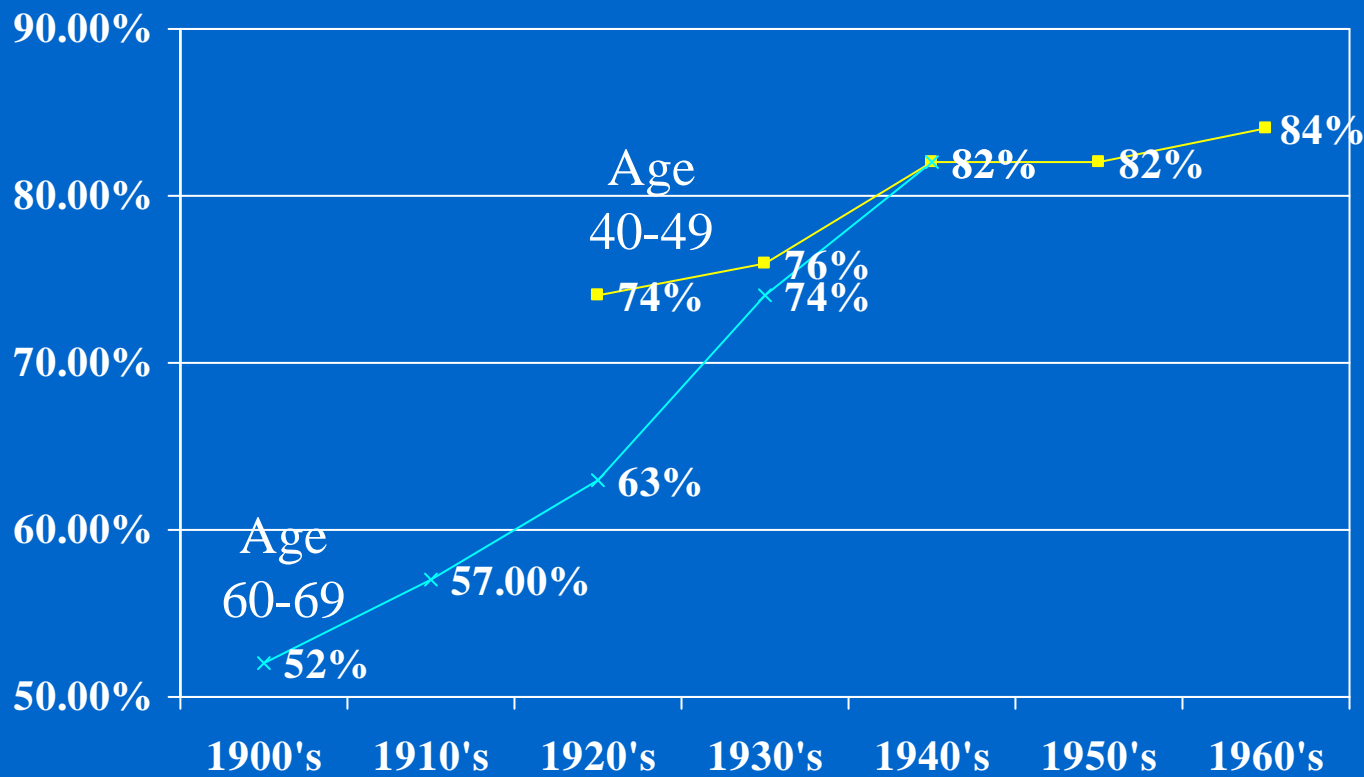


National Center for Health Statistics – Health United States 2006

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- Percentage Self Reporting Health as Excellent or Good by Age Group (40-49 yellow and 60-69 blue) and Decade of Birth using 1972 to 2004 General Social Surveys

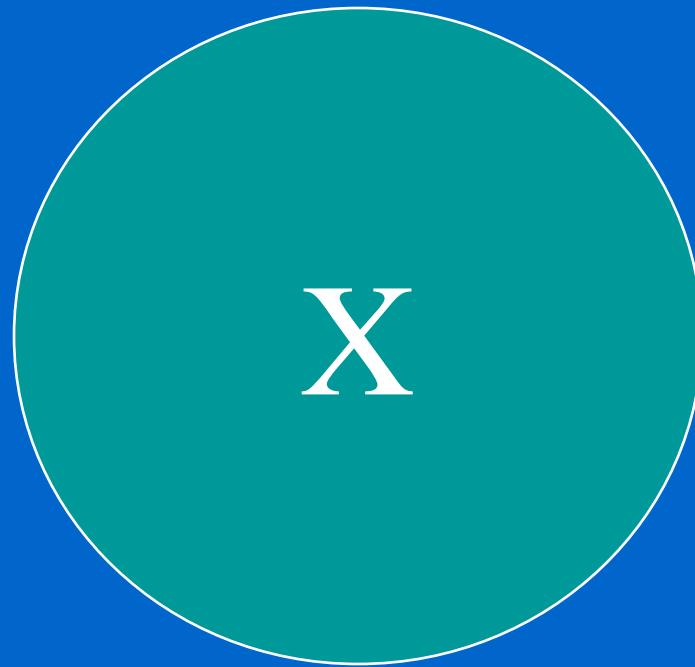
Social Surveys



Adapted from: Robert Warren and Elaine Hernandez (2008) Journal of Health and Social Behavior, Table 2

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Something is Driving these Dramatic Improvements in Health



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Shouldn't whatever "x" is be an important part of our explanations of health disparities?

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Do Key Explanatory Variables in Theories of Disparities Account for Trends Toward Improvement in Health Over Time?

- How about genetic factors?
- Stress?
- How about income inequality?

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Of course, X is not any one thing but many things

- The discovery of the germ theory is a strong candidate for declines in rates of infectious diseases in the first half of the 20th century.
- Recent declines in age adjusted rates of death from lung cancer are probably influenced by the lagged effects of declines in smoking rates in earlier decades.
- The rapid decline in HIV/AIDS mortality is probably related to the new anti-retroviral drugs that were developed and disseminated in the late 1990's
- And then screening for disease, public health efforts to increase the consumption of fruits and vegetables, promote exercise, eradicate smoking, and smog control, flu shots, seat belts, angioplasty, screening for early detection of cancer, etc. etc.

AND

- It is not just these things in themselves but their distribution and use throughout the population.
- From a social science perspective health enhancing knowledge and technology comes to have effects on population health through a thick distribution of social, psychological, political cultural and economic circumstances.

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- Is there evidence that the association between race/racism and specific health conditions and between SES and specific health conditions change as new knowledge and technology are developed? Is there evidence that health inequalities are created when humans gain control.

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- Reasoning from a Fundamental Cause Perspective Says Disparities Should Emerge According to a Core Proposition

- When we develop the ability to control disease and death, the benefits of this new found capacity are not distributed equally throughout the population, but are instead harnessed more securely by individuals and groups who are less likely to be exposed to discrimination and who have more knowledge, money, power, prestige and beneficial social connections.

How Social and Economic Resources Affect Health – The Importance of Contexts

- Resources operate at the individual level – people use their knowledge, money, power, prestige and beneficial social connections to obtain healthy outcomes. People don't always use their resources to garner healthy outcomes but health is an important objective.
- But resources also provide access to generally salutary contexts – neighborhoods, occupational conditions, marriages – access to health consequential circumstances comes with access to contexts in a sort of “package deal.”

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Test #1 --

SES Associations with More and Less Preventable Causes of Death

- We say that SES differences arise because people of higher SES use flexible resources both individually and collectively to avoid risks and adopt protective strategies.
- It follows that the SES gradient should be more pronounced for diseases that we can do something about... for which there are known and modifiable risk and protective factors...
- Our first test involves ratings of the preventability of death from specific causes

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US National Longitudinal Mortality Survey

- Very large study of a nationwide sample of over 350,000 people.
- Interviewed as part of the US Current Population Survey (assesses unemployment etc.) and followed for 9 years with National Death Index for mortality and cause of death

• Relative Risks of Death by Income -- National
• Longitudinal Mortality Study

Income (1980 \$)	Women 45-64	Men 45-64
< 5000	2.32	3.13
5000-9999	1.79	2.63
10000-14999	1.56	2.03
15000-19999	1.35	1.69
20000-24999	1.21	1.47
25000-49999	1.09	1.28
50000+ (reference category)	1.00	1.00

Sorlie et al. AJPH 1995

The Rating Task

- Thinking of both our ability to prevent a disease from occurring and to treat it once it occurs, to what degree was it possible during the period of the follow up to prevent death from this disease?
- Rated on a 5 point scale from “virtually impossible to prevent death” to “virtually all deaths preventable”
- Inter-rater reliability .85. Correlation with Rutstein independent ratings .57.

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Examples of Hi and Lo Preventability Diseases

- Low Preventability:

brain cancer, ovarian cancer, gallbladder cancer, multiple sclerosis, pancreatic cancer,

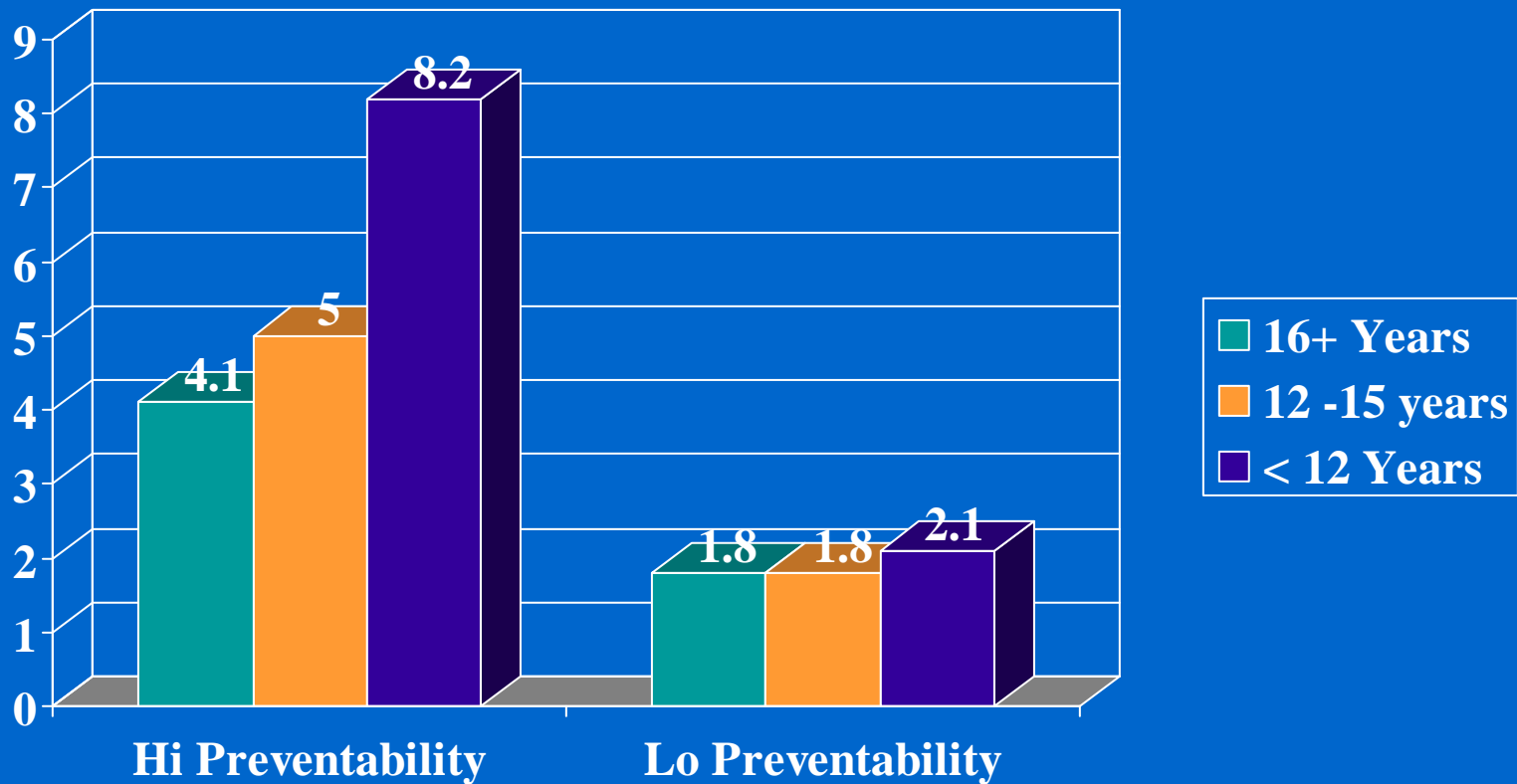
- High Preventability:

lung cancer, ischemic heart disease, colon cancer, pneumonia

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National Longitudinal Mortality Study

Percent Dying During 9 Year Follow-Up: Men and Women 45-64



Phelan, Link, Diez-Roux, Kawachi and Levin. 2004 JHSB

Test # 2 Evidence Bearing on the Hypothesis Trends Over Time

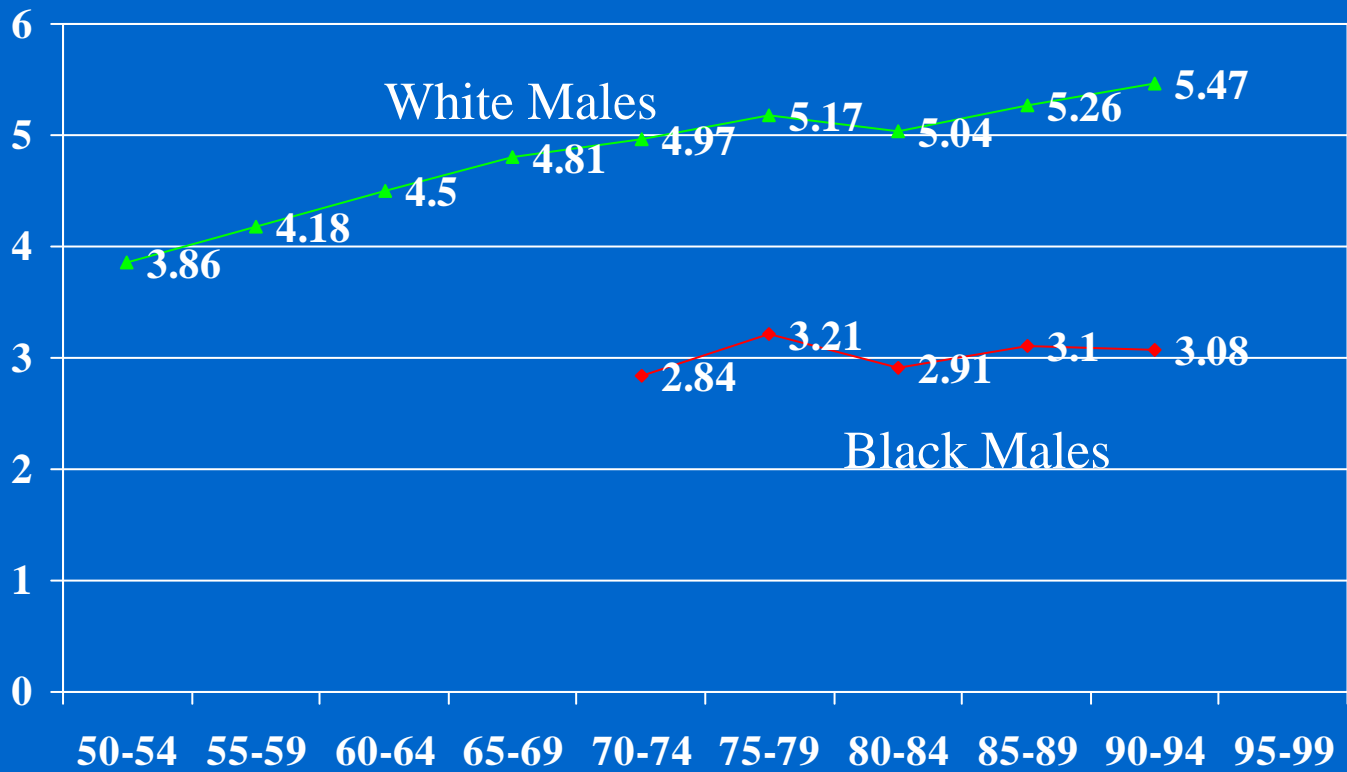
- If the core proposition is true we should find that disparities by SES and race emerge when new health enhancing information or technology is obtained:
 - E.g. Heart disease, HIV/AIDS, Colon Cancer
- If death from a disease remains unpreventable – disparities will not change dramatically with time
 - E.G. Brain cancer, Ovarian Cancer, Pancreatic Cancer

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Trends by Race as an Indicator of Exposure to Racism and Discrimination in the United States

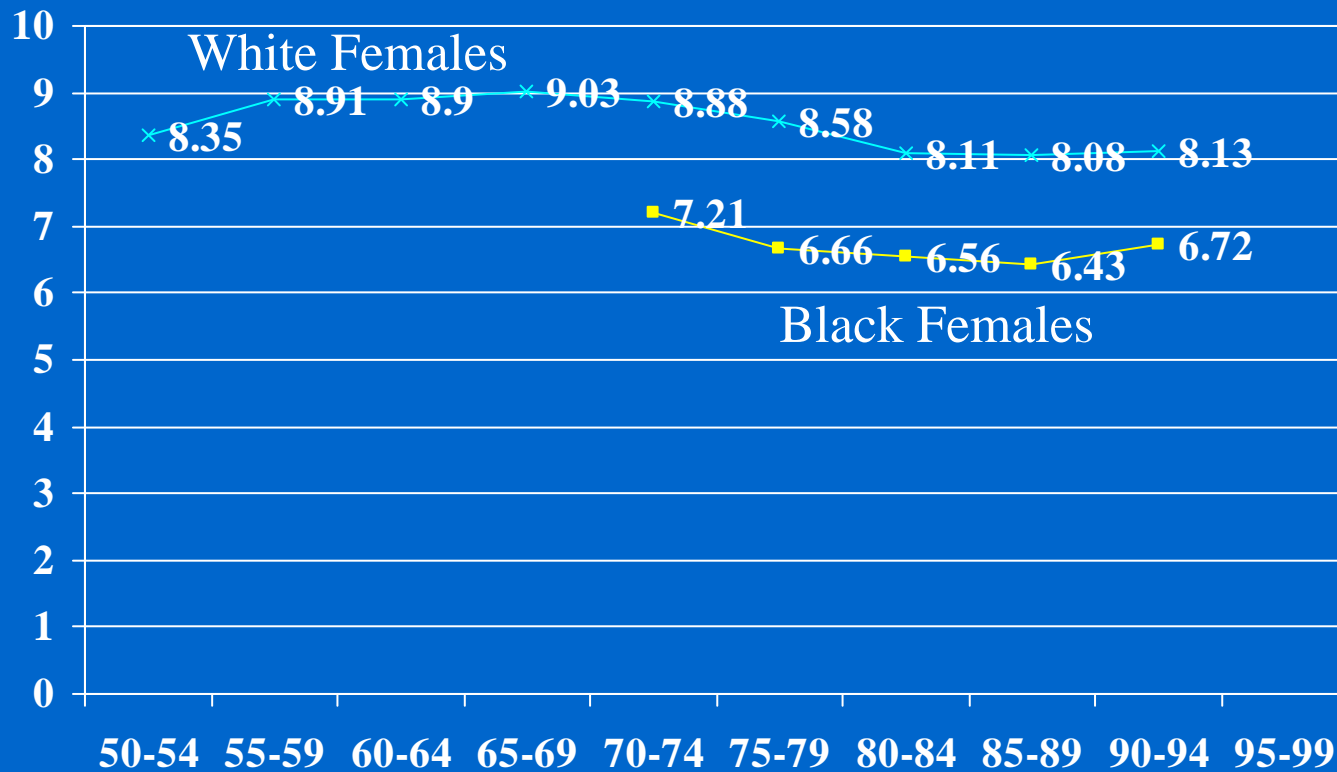
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Brain Cancer -- Age-adjusted Death Rates Per 100,000 1950-1999 (Males) US



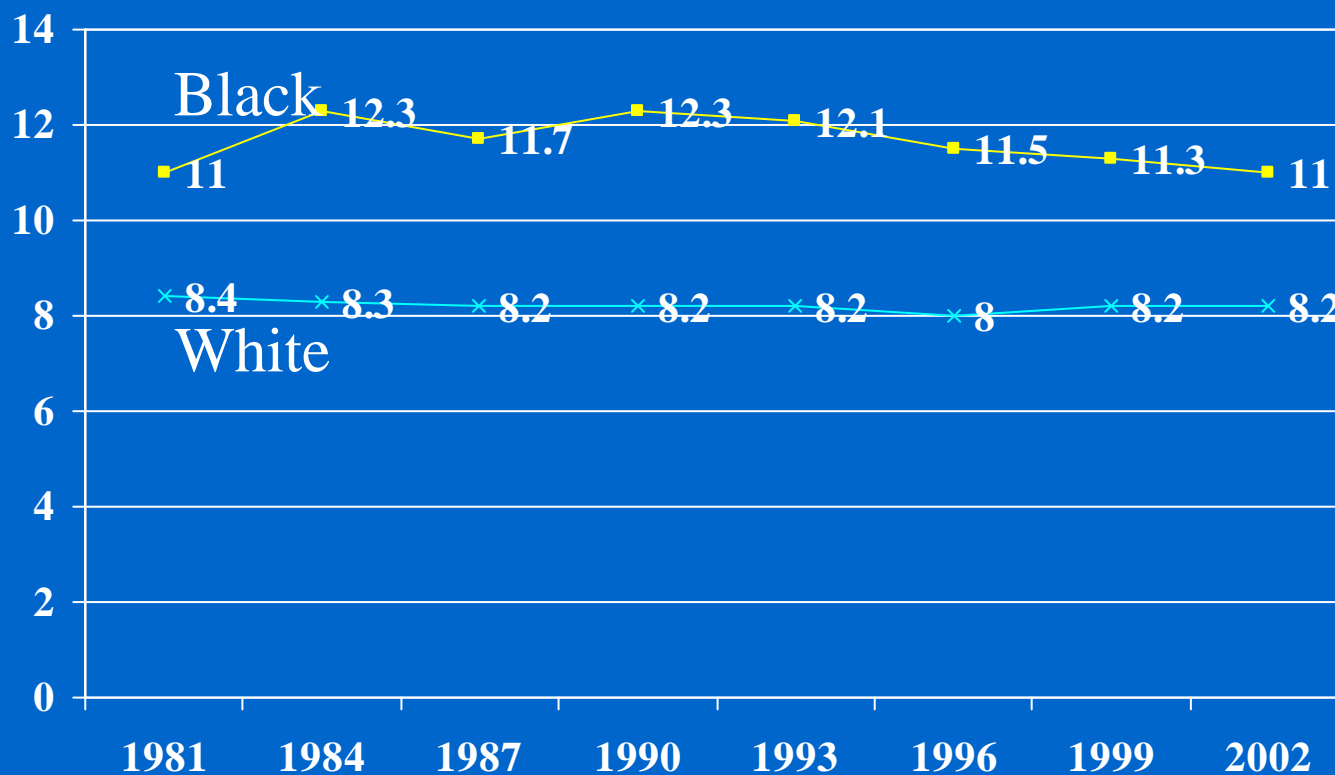
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Ovarian Cancer -- Age-adjusted Death Rates Per 100,000 1950-1999 (Females) US

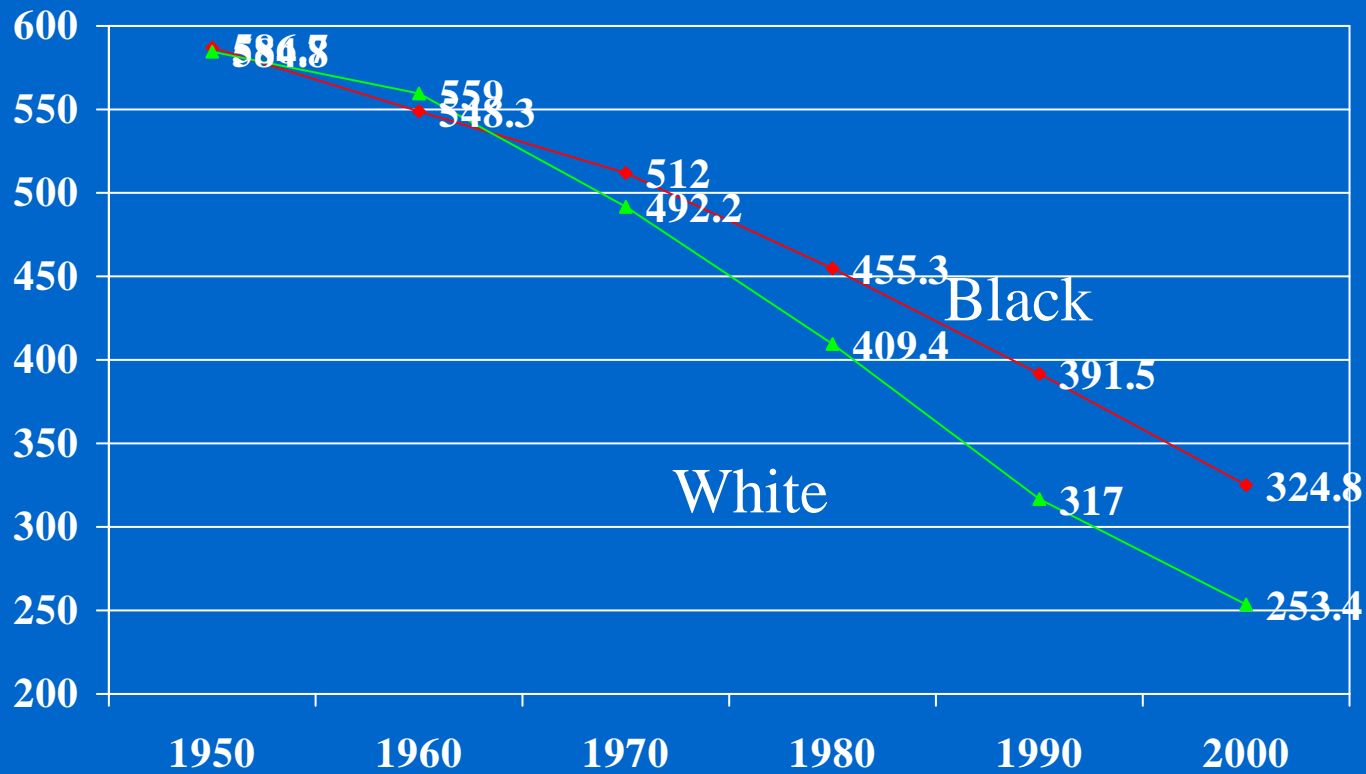


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Pancreatic Cancer -- Age-adjusted Death Rates Per 100,000 1981-2002 US

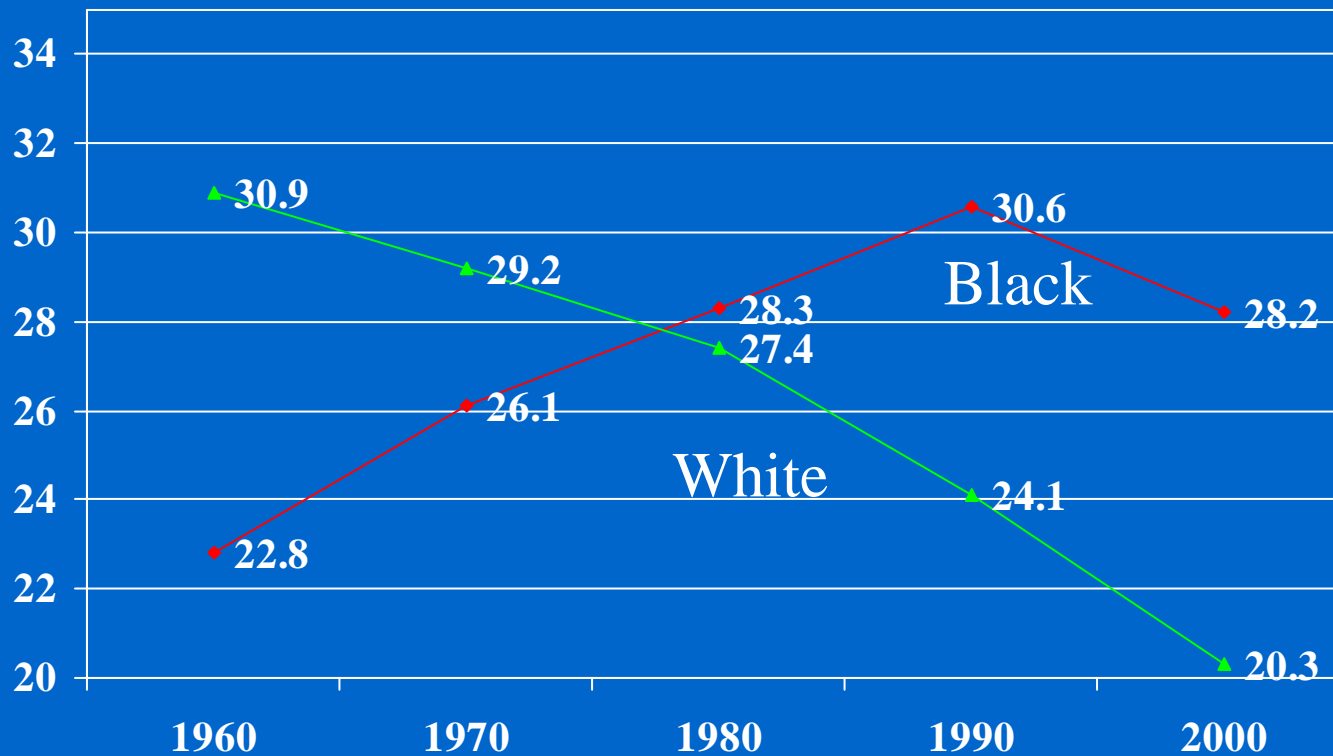


Heart Disease -- Age-adjusted Death Rates Per 100,000 1950-2000 US

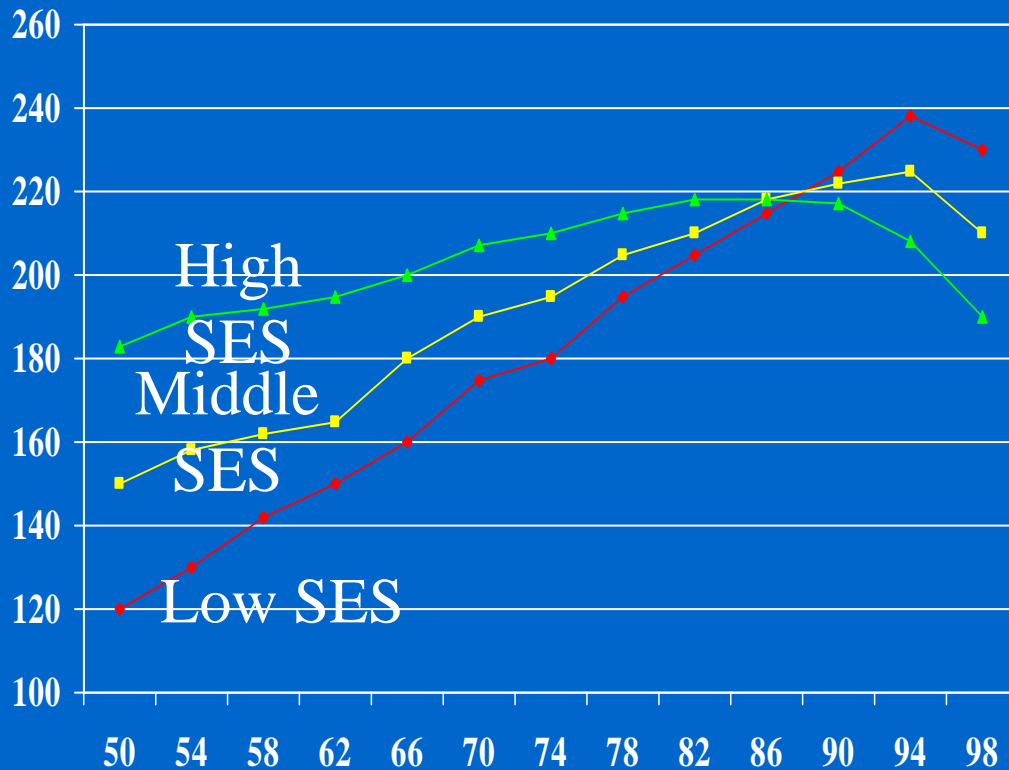


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Colon, Rectum and Anus -- Age-adjusted Death Rates Per 100,000 1960-2000 US



Age Adjusted Cancer Mortality (All Types) 1950-1998 by SES of County of Residence

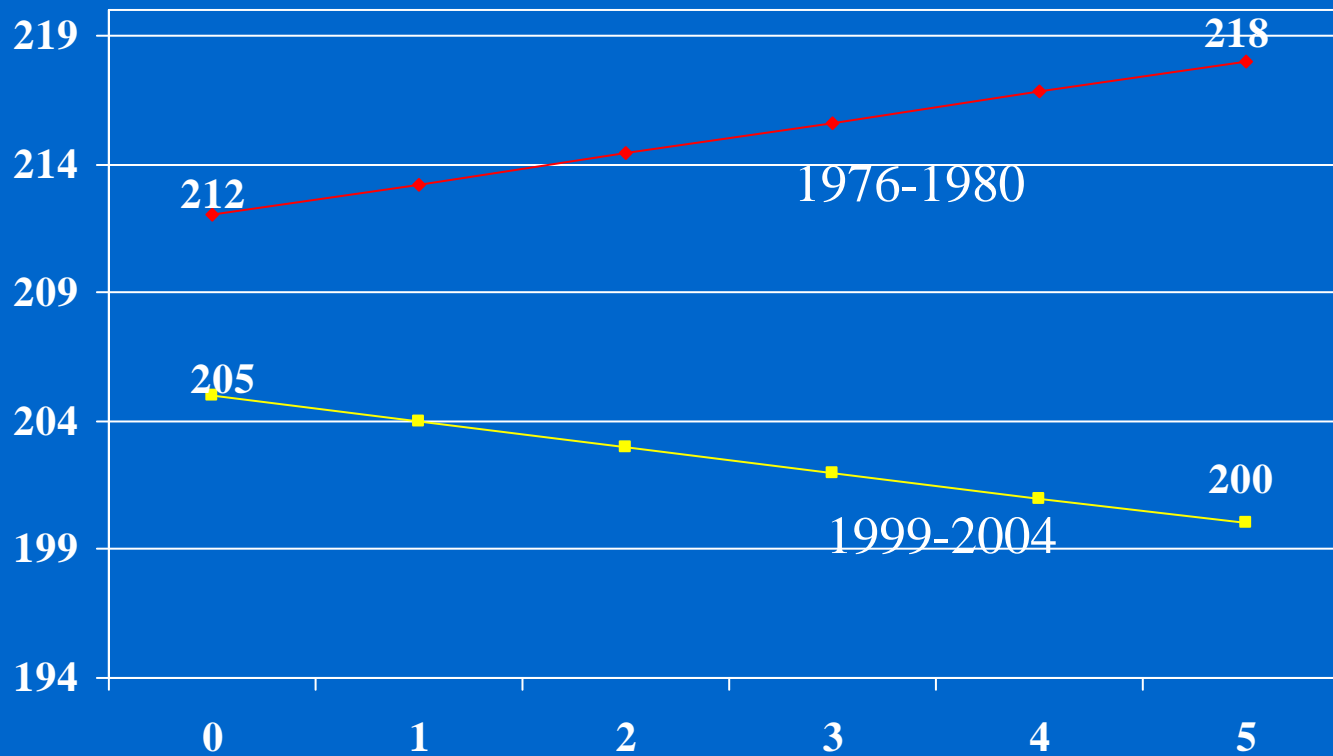


From Singh et al. 2002 Journal of the National Cancer Institute

Income Disparities in Cholesterol

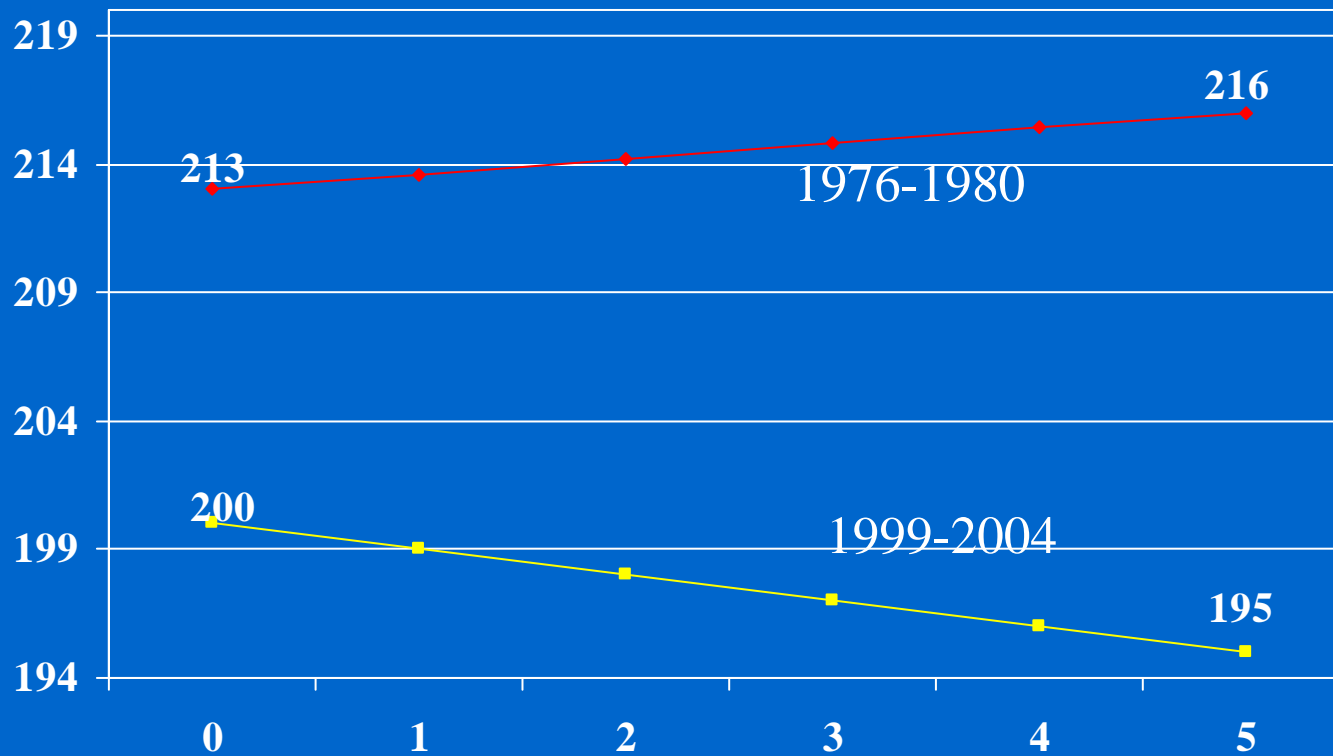
- Chang and Lauderdale use data on cholesterol levels from NHANES before (1976-1980) and after the introduction of highly effective statins (1999 -2004)
- Income is assessed as the poverty income ratio

Income Gradients for Total Cholesterol 1976-80 and 1999-2004: Predicted Lipid Levels from NHANES for Men



Chang, Virginia and Diane Lauderdale. 2009. Journal of Health and Social Behavior 50:245-260

Income Gradients for Total Cholesterol 1976-80 and 1999-2004: Predicted Lipid Levels from NHANES for Women

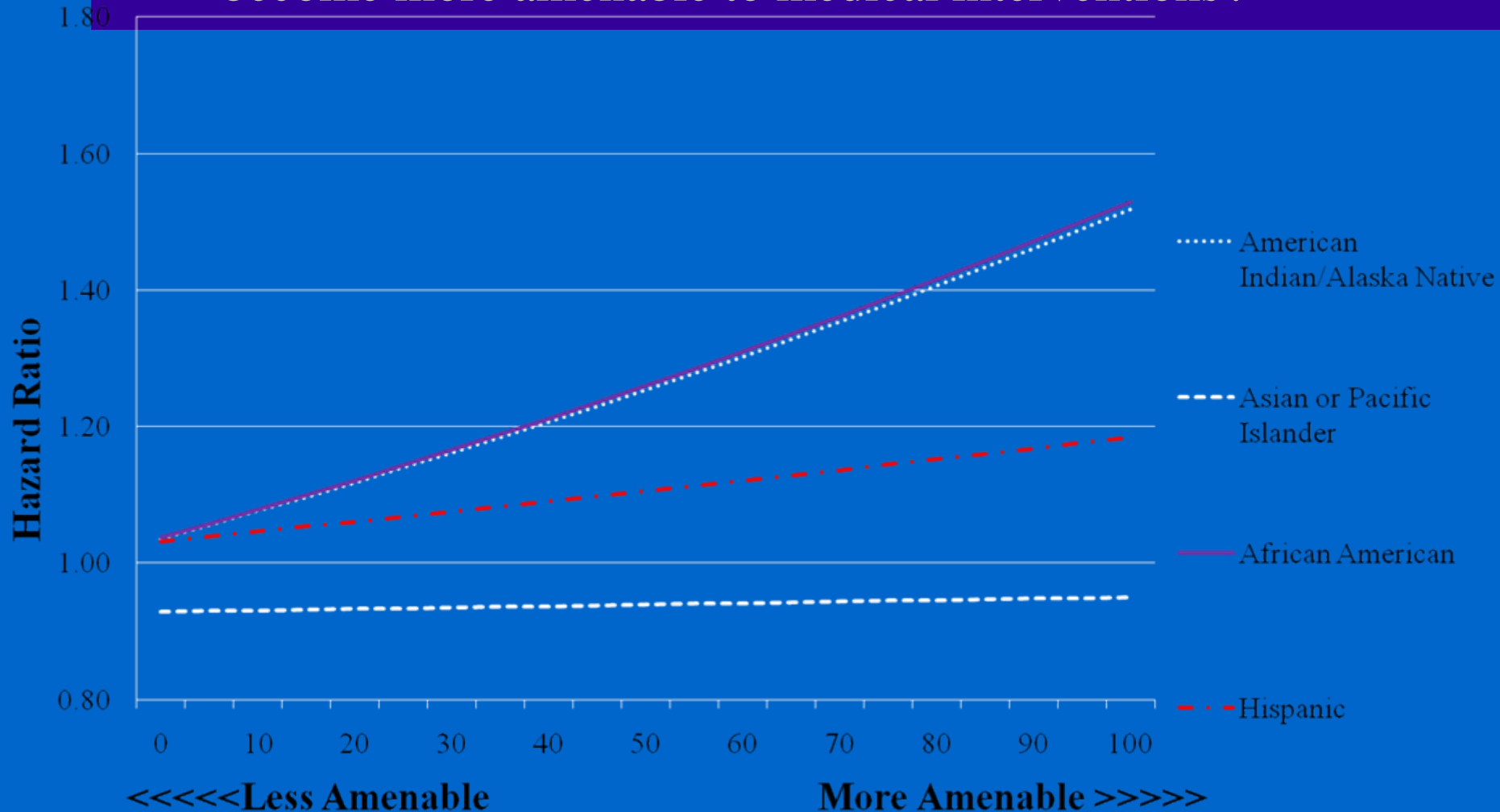


Chang, Virginia and Diane Lauderdale. 2009. Journal of Health and Social Behavior 50:245-260

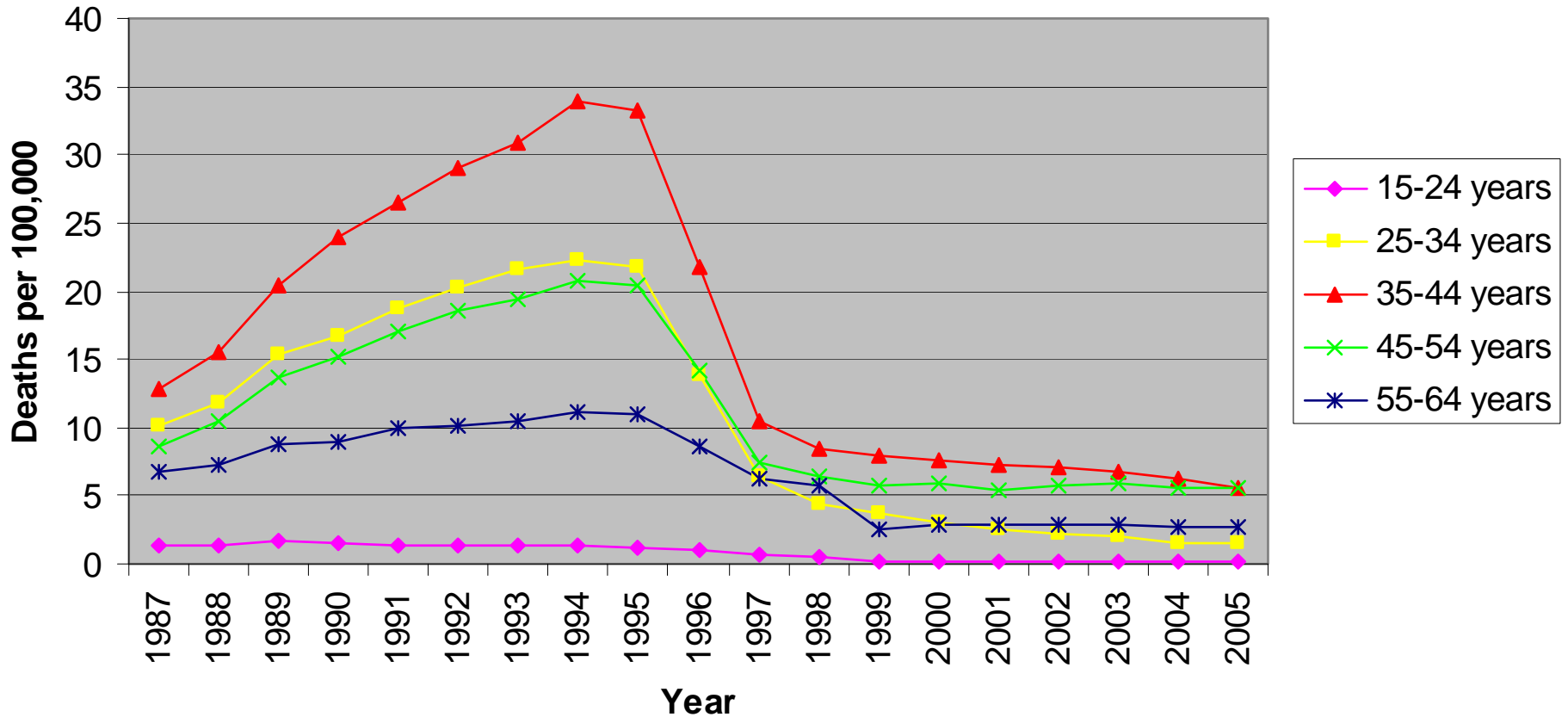
Medical Advances and Race/ Ethnic Disparities in Cancer Survival

- Tehranifar, Neugut, Phelan, Link, Liao, Desai and Terry. 2009. Cancer Epidemiology Biomarkers Prevention.
- Cancer cases (N=580,225) in SEER ages 20+ diagnosed with one invasive cancer in 1995-1999.
- Used 5-year relative survival rates to measure degree to which mortality from each cancer is amenable to medical interventions (early detection and treatment) – ranged from 5% for pancreatic cancer to 99% for prostate cancer.
- Cox proportional hazards models predicting survival in months from date of diagnosis controlling for age and disease stage at diagnosis, gender and percent below poverty in county of residence.

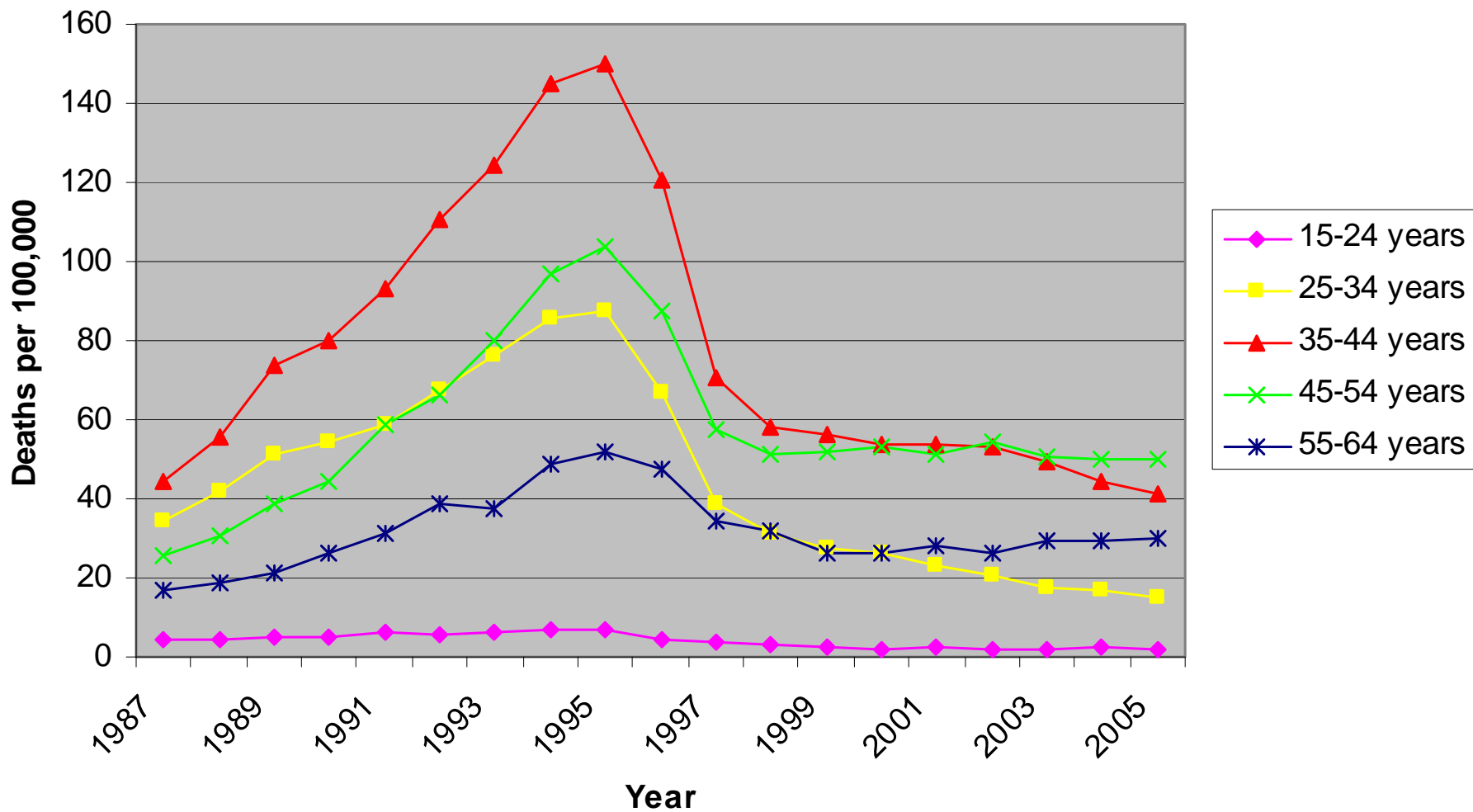
Do Racial/Ethnic Differences in Survival Increase as Cancers become more amenable to medical interventions?



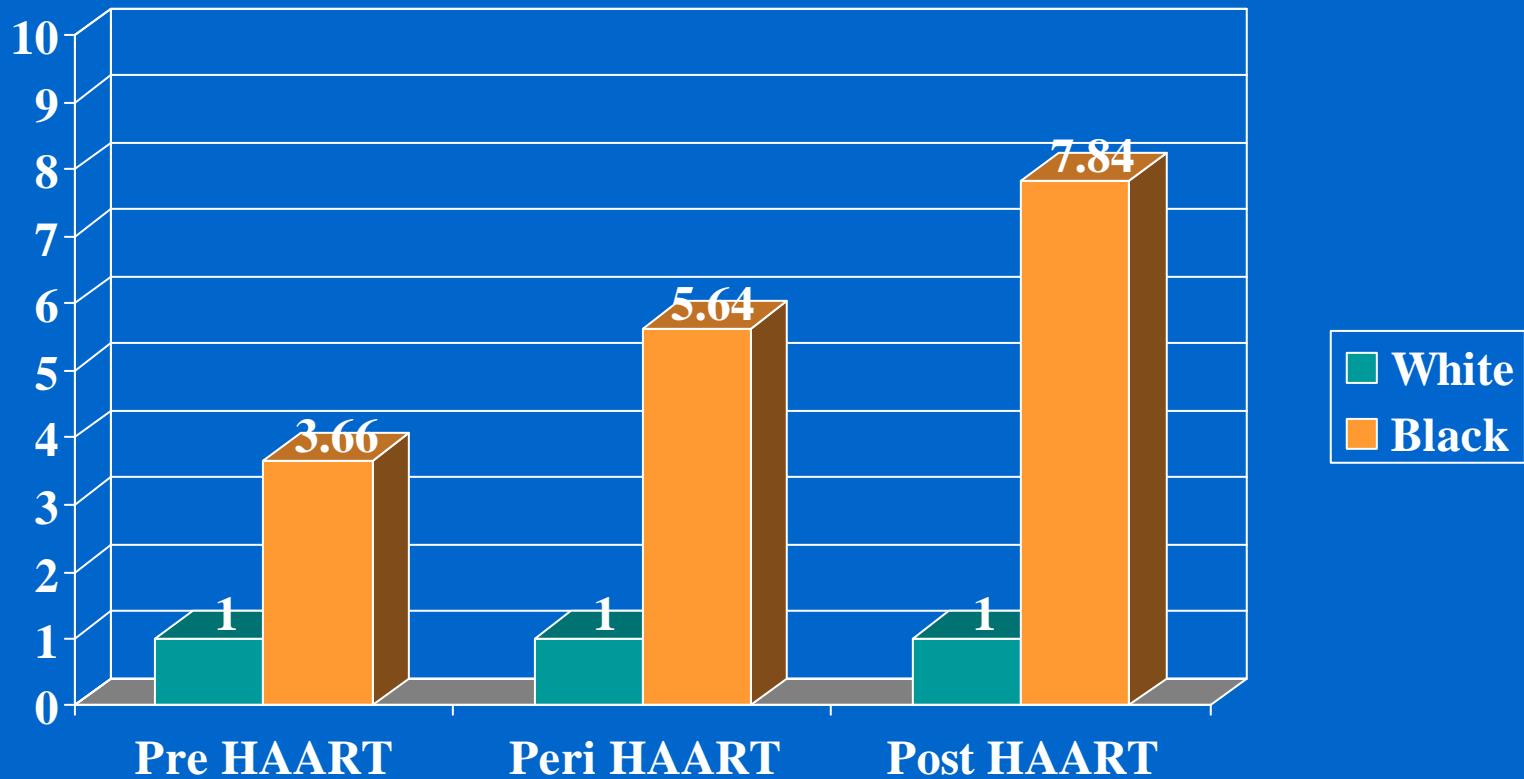
HIV Deaths among Whites per 100,000 by Age



HIV Deaths among Blacks per 100,000 by Age

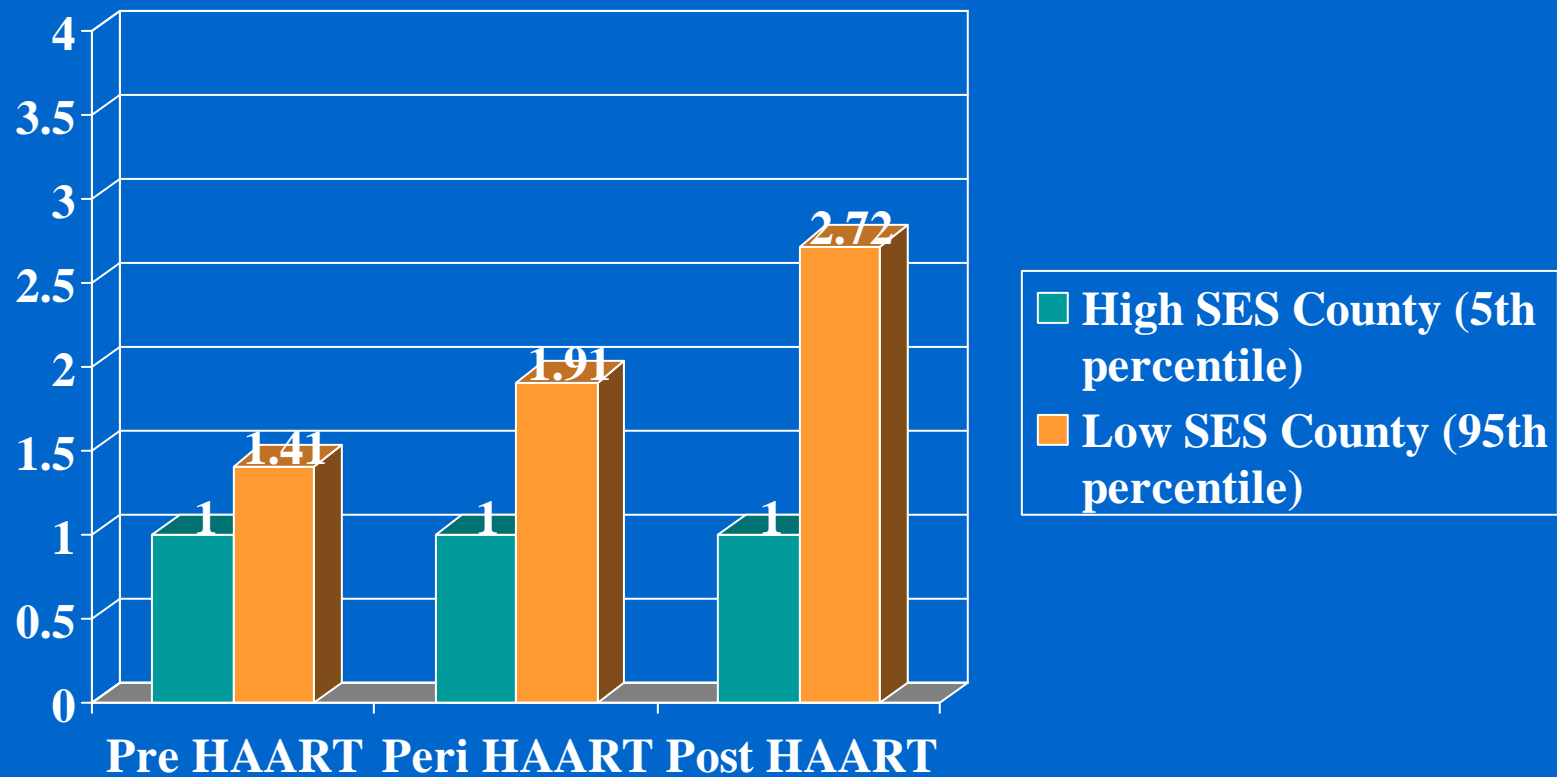


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Incidence Rate Ratios – Blacks Versus Whites Before (Pre),
During (Peri) and After (Post) the Introduction of Highly
Active Anti-Retroviral Therapy in the United States

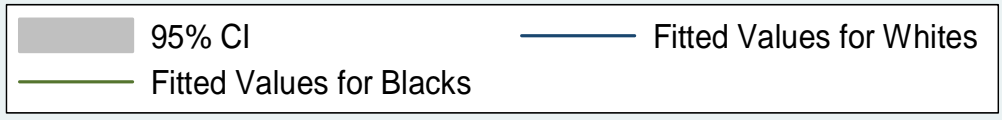
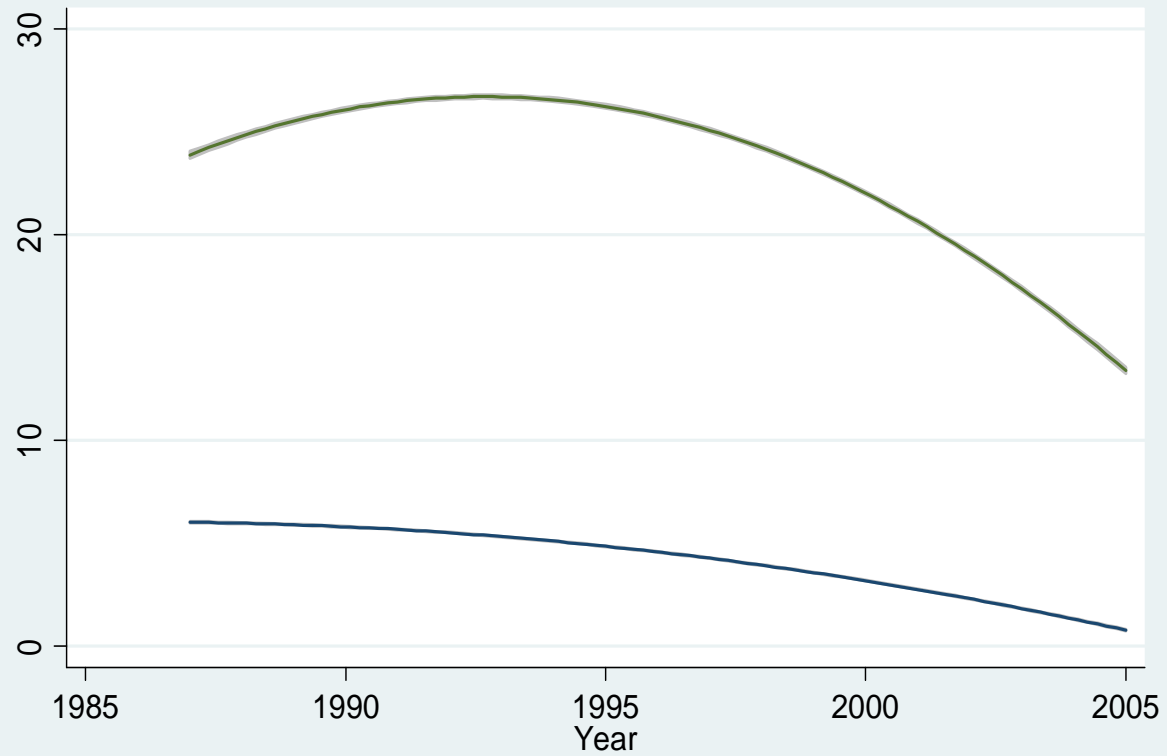


IRRs adjusted for age, sex, and SES and urbanicity of county of residence.

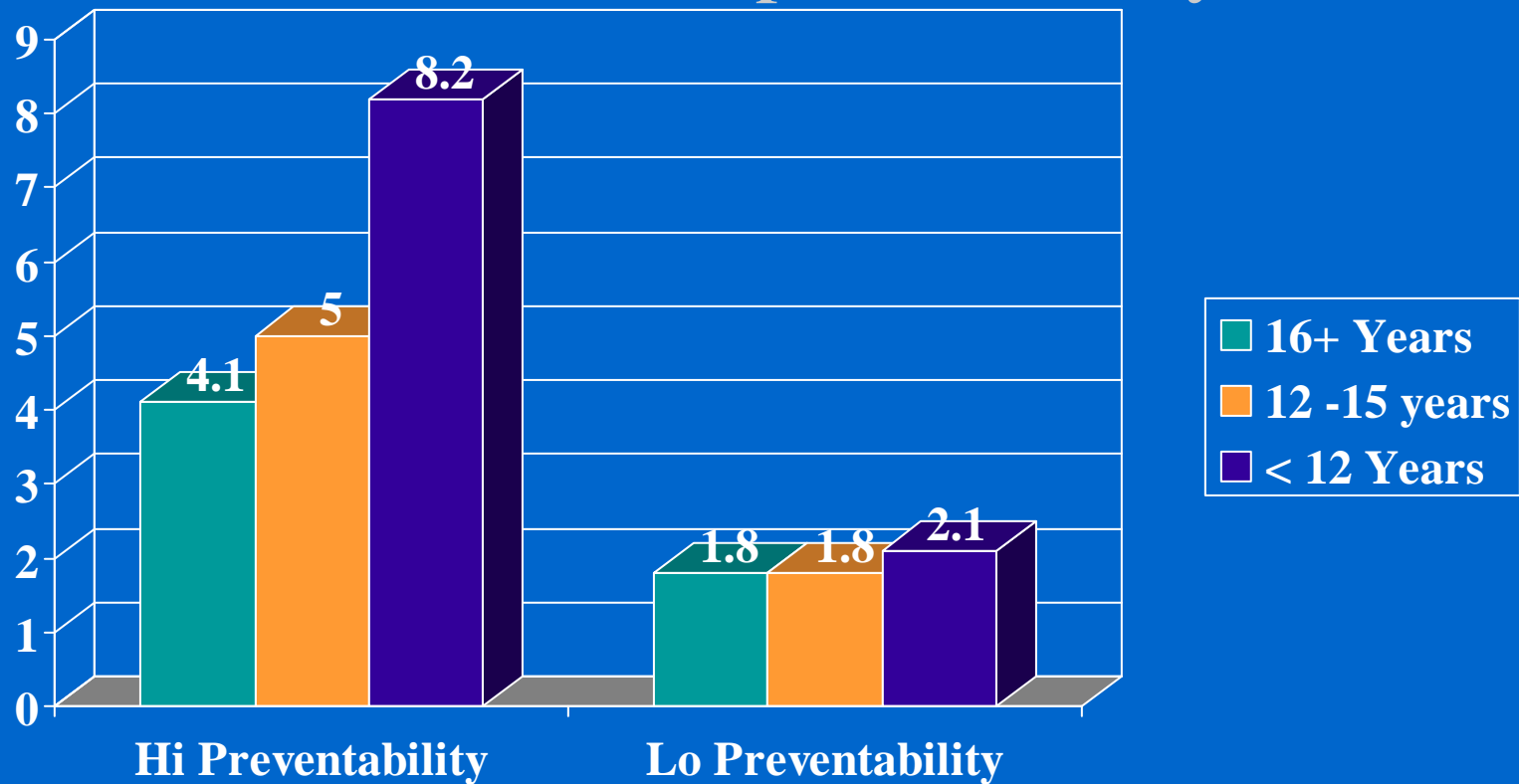
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Incidence Rate Ratios – Comparing a County at the 95th Percentile of SES to a County at the 5th Percentile of SES Pre, Peri and Post the Introduction of Highly Active Anti-Retroviral Therapy (HAART) in the United States



IRRs adjusted for age, sex, race, and urbanicity of county of residence

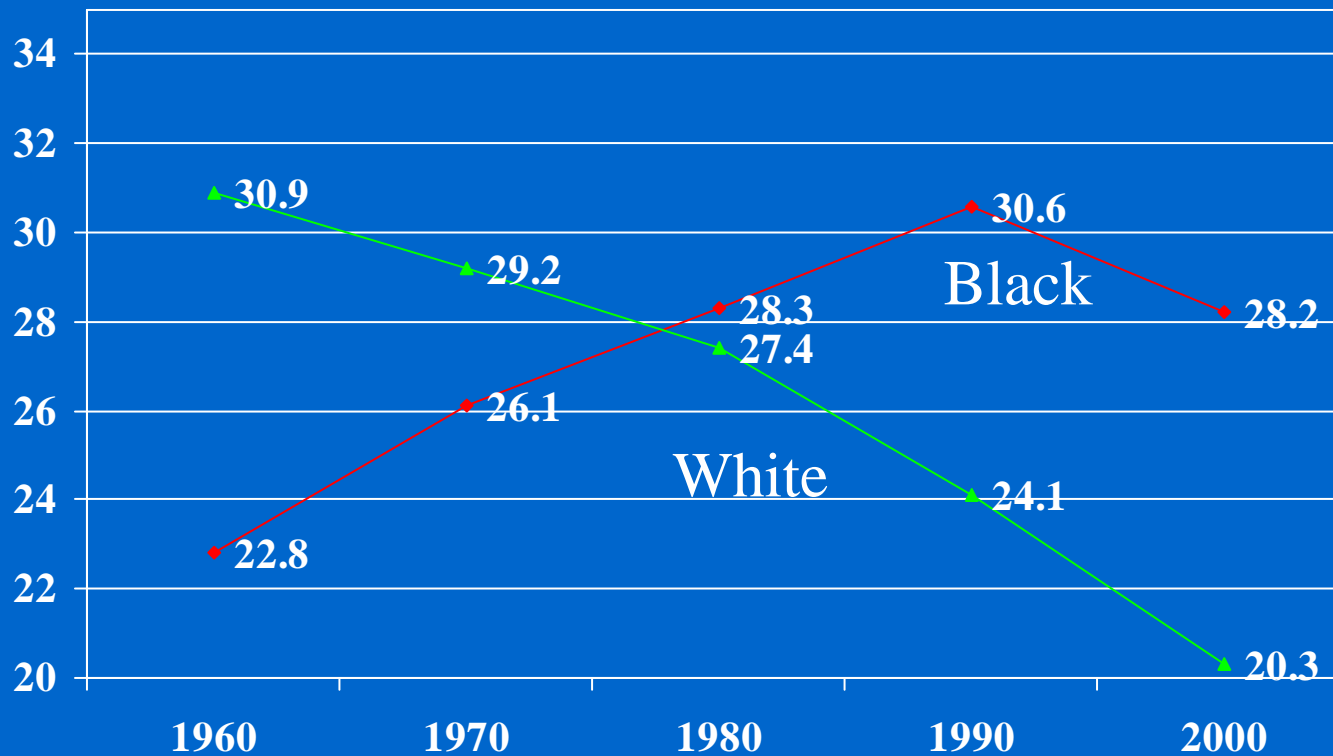


Stress? If stress is the key mechanism why would we expect this result. Why would stress effect mainly hi preventability causes of death and not lo preventability?

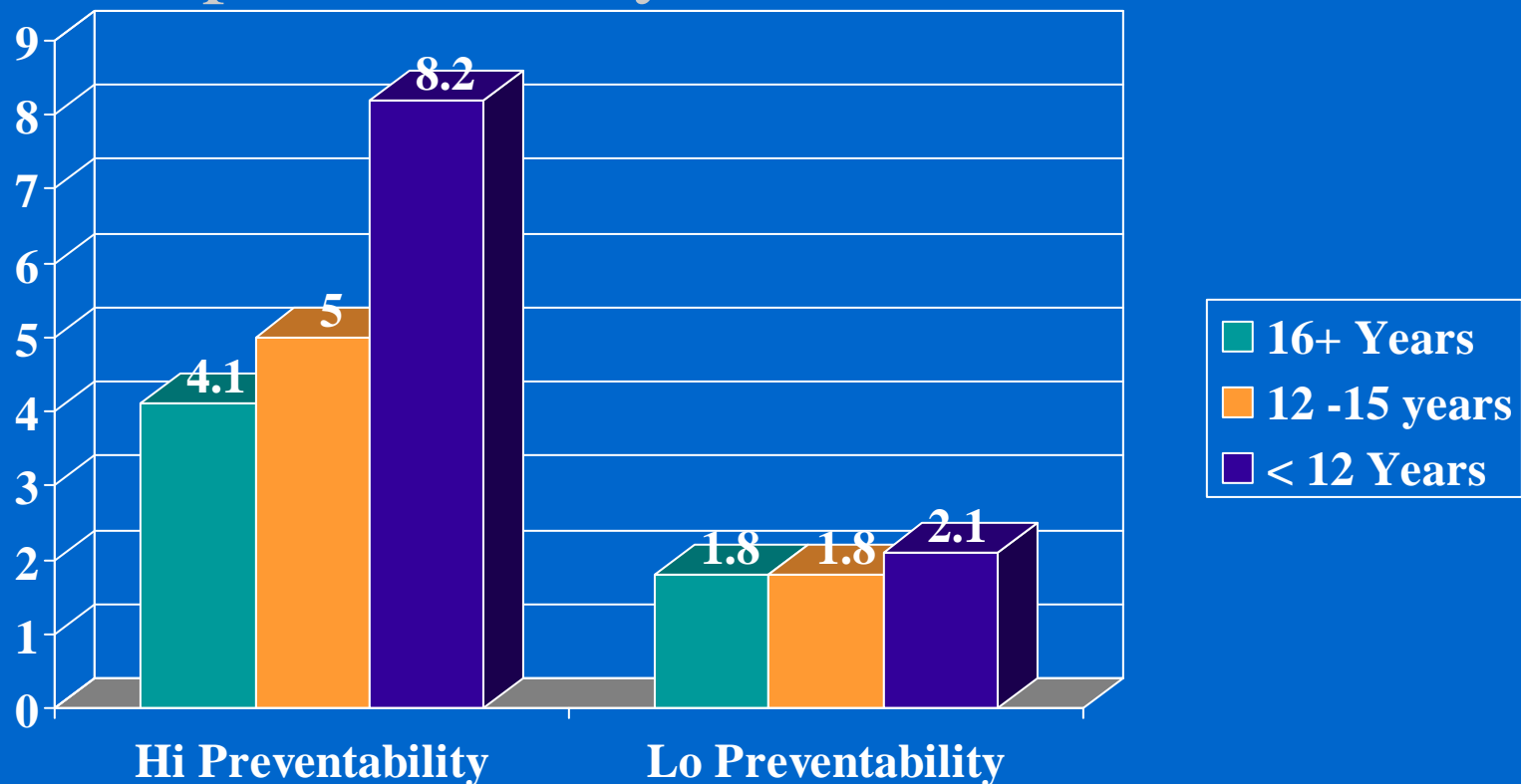


Phelan, Link, Diez-Roux, Kawachi and Levin. 2004 JHSB

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- Stress? If stress is generating higher rates for blacks in the current era? Why didn't it generate higher rates in the 1950's? Has discrimination associated stress increased over that time?

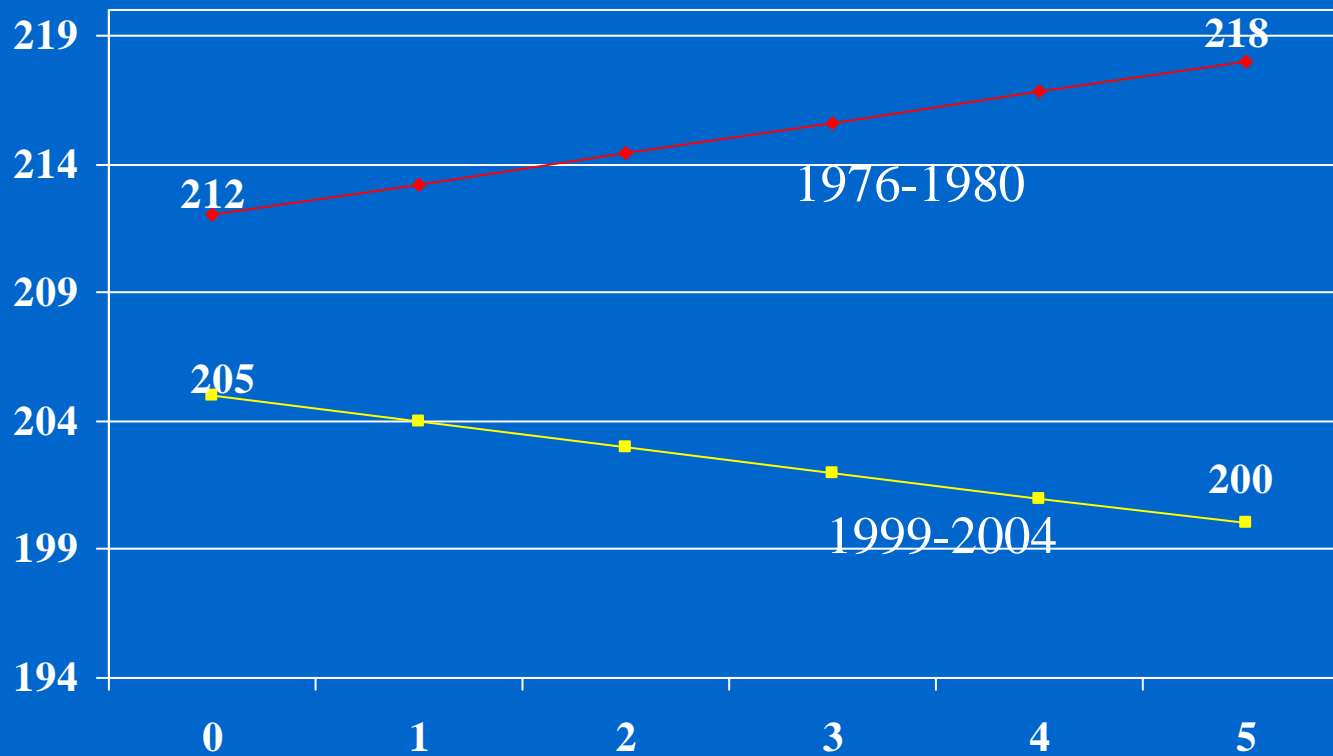


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• Health Selection? If health selection is the key mechanism why would selection be less potent for the low preventability than hi pr preventability causes of death?



Phelan, Link, Diez-Roux, Kawachi and Levin. 2004 JHSB

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: Health selection? Why would any selection factors associated with high cholesterol lead to more income in the late 1970's and less income in the early 2000's?



Chang, Virginia and Diane Lauderdale. 2009. Journal of Health and Social Behavior 50:245-260

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- These pictures do not fit the stress or selection explanations well.
- Other pictures might and certainly stress and health selection do operate.
- But these are pictures about general mortality in the case of hi and low preventability causes of death, major killers like heart disease and colon cancer and major risk factors like cholesterol.
- To the extent that the pictures support the social shaping paradigm as an explanation for disparities they do so with respect to major risk factors and major killers.
- Disparities are a human creation... they are our disparities.
-