Social Conditions as Fundamental Causes of Health Disparities

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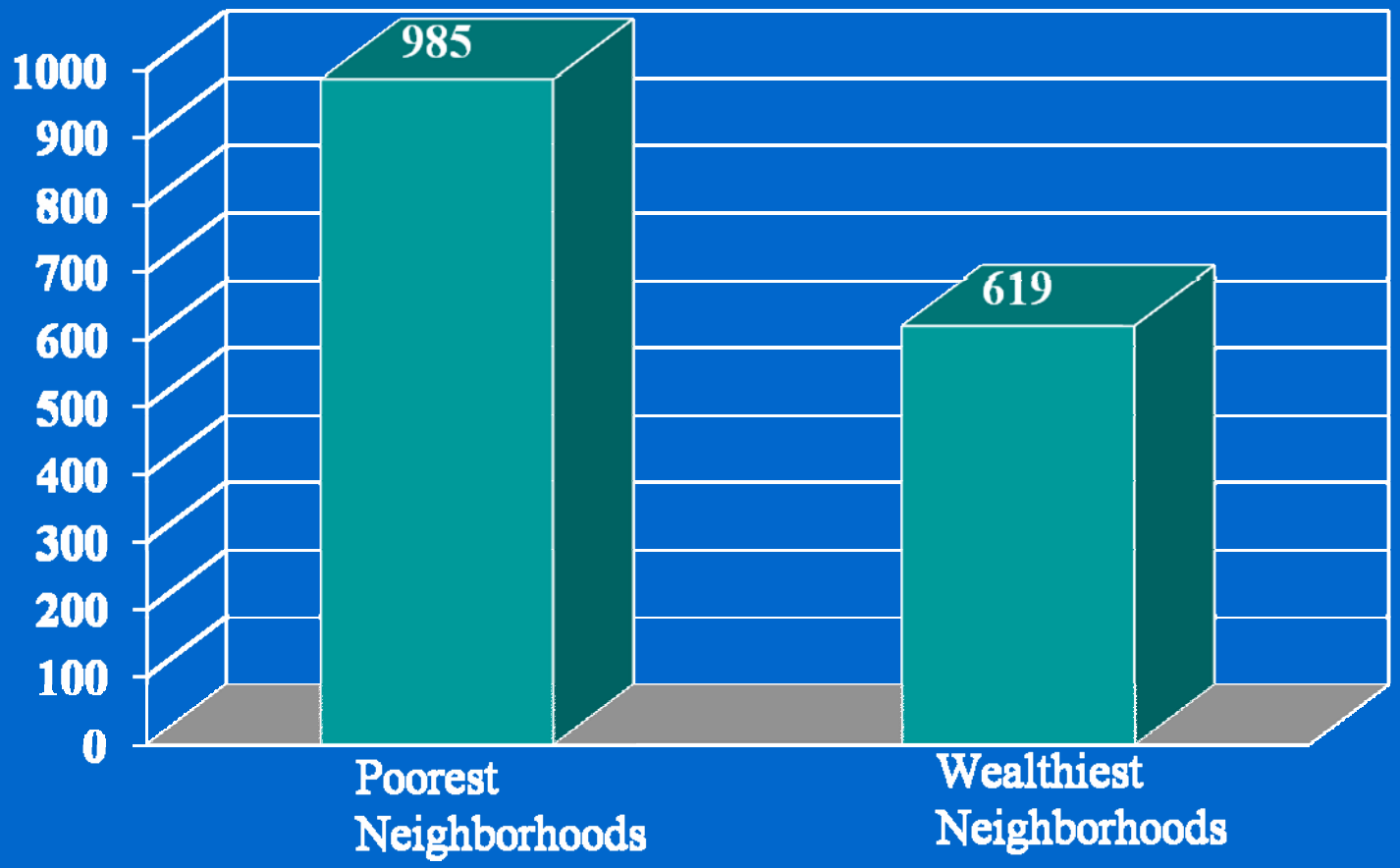
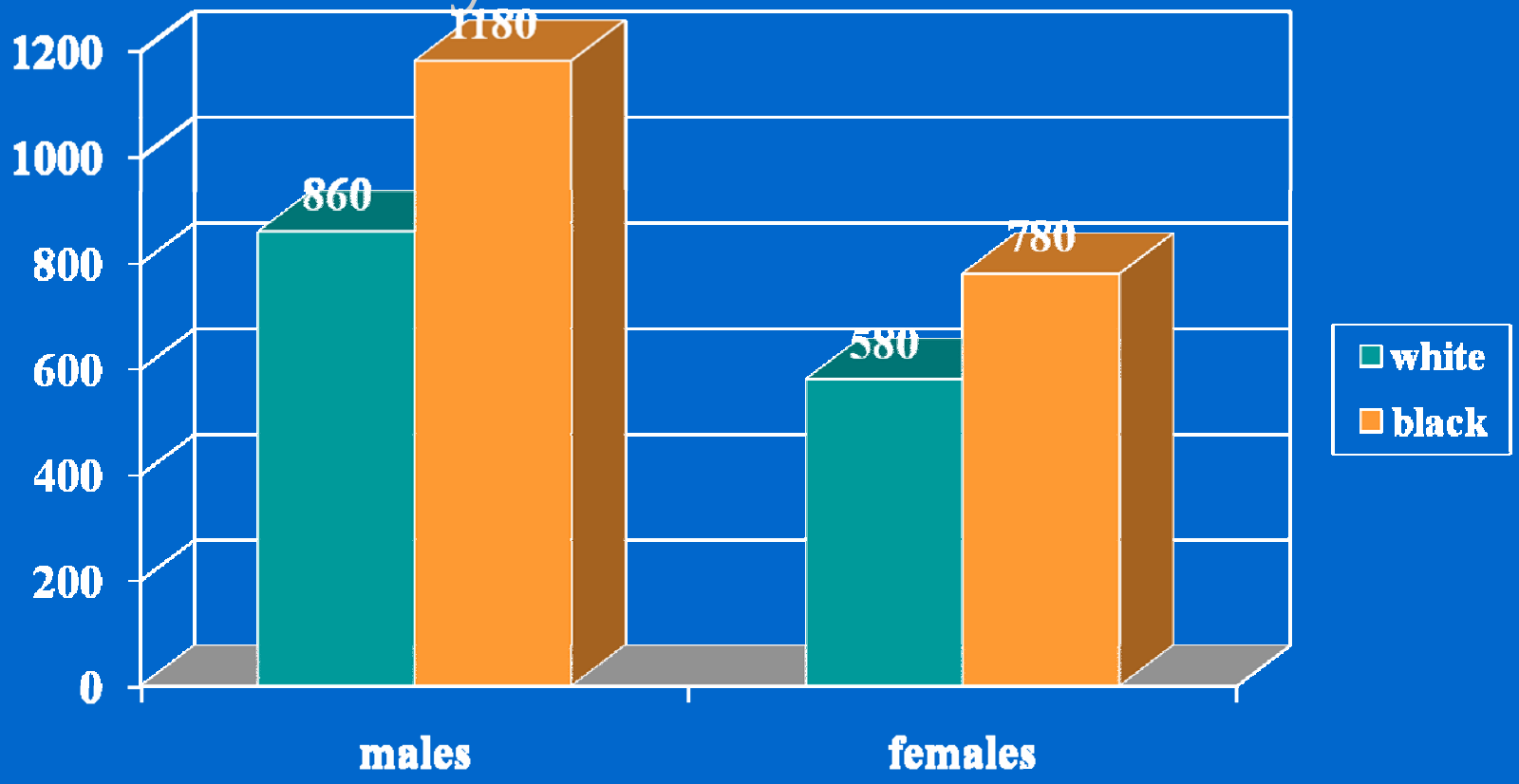
Glasgow Scotland

December 11, 2007

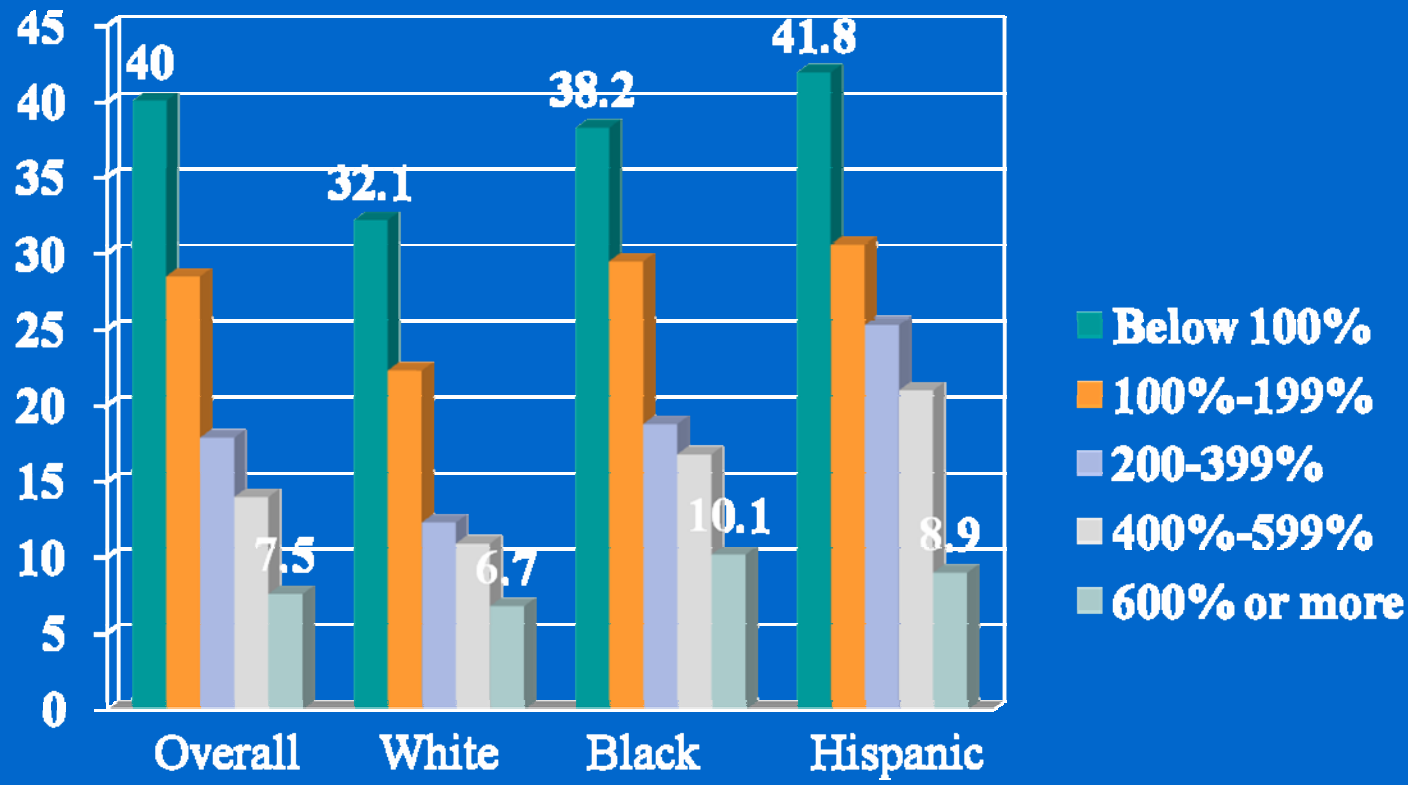
New York City All Cause Age-adjusted Death Rates In Lowest Versus Highest Income Neighborhoods 2001



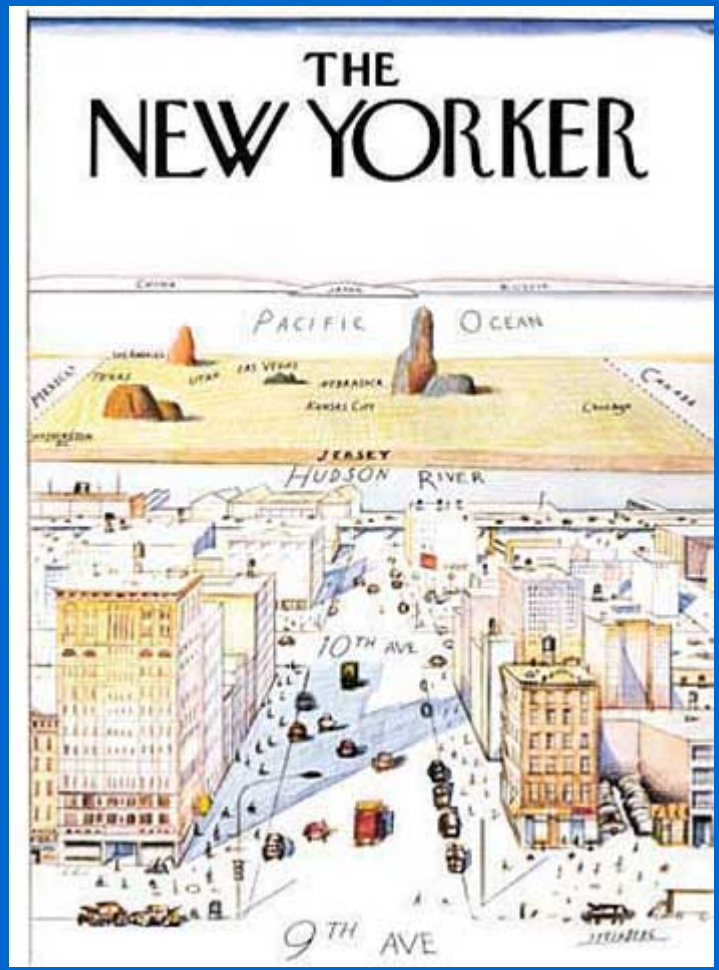
New York City All Cause Age-adjusted Death Rates Per 100,000 by Race – 2004



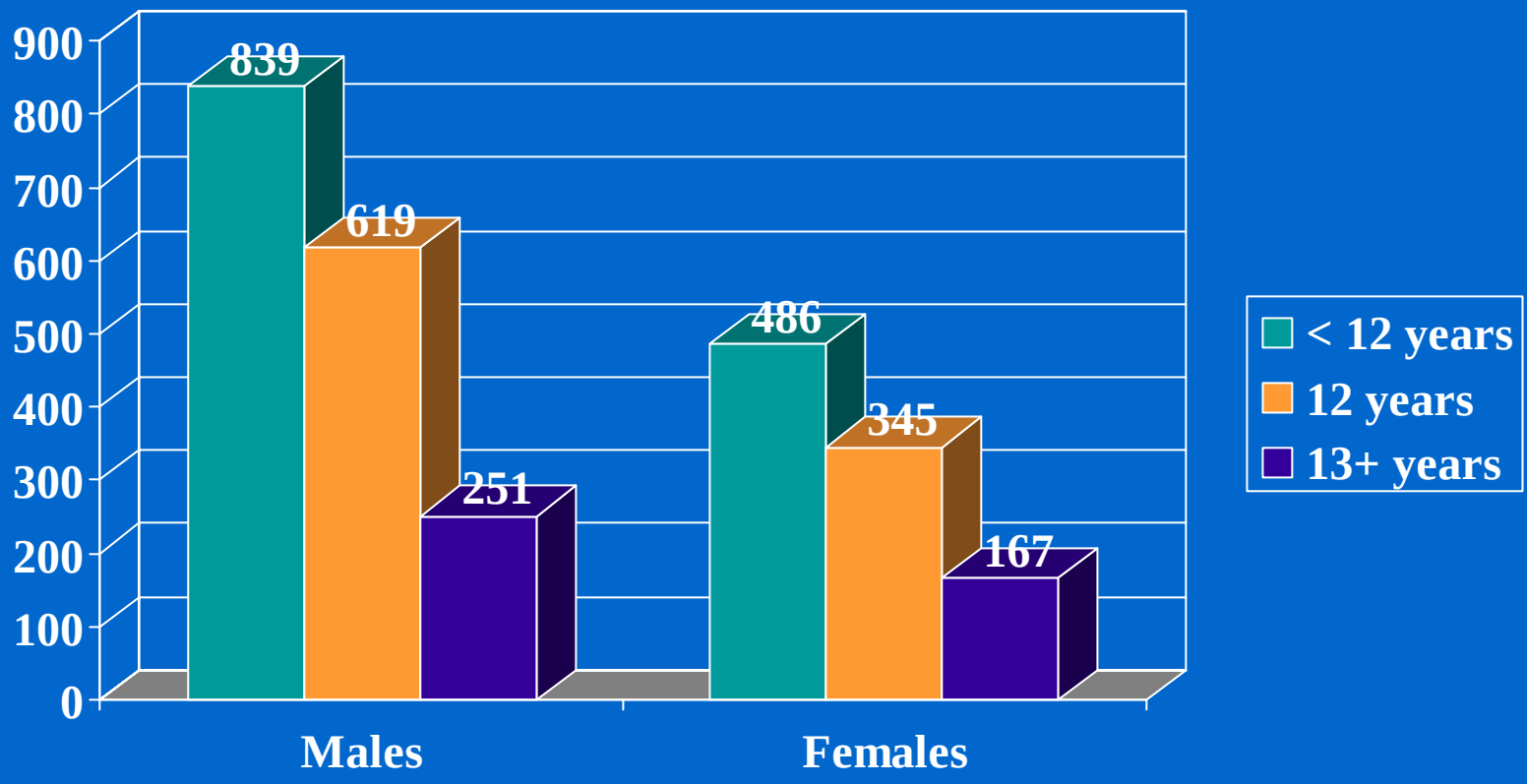
New York City Percent Fair or Poor Self-Reported Health by Income Level (% Poverty Level) and Race/Ethnicity



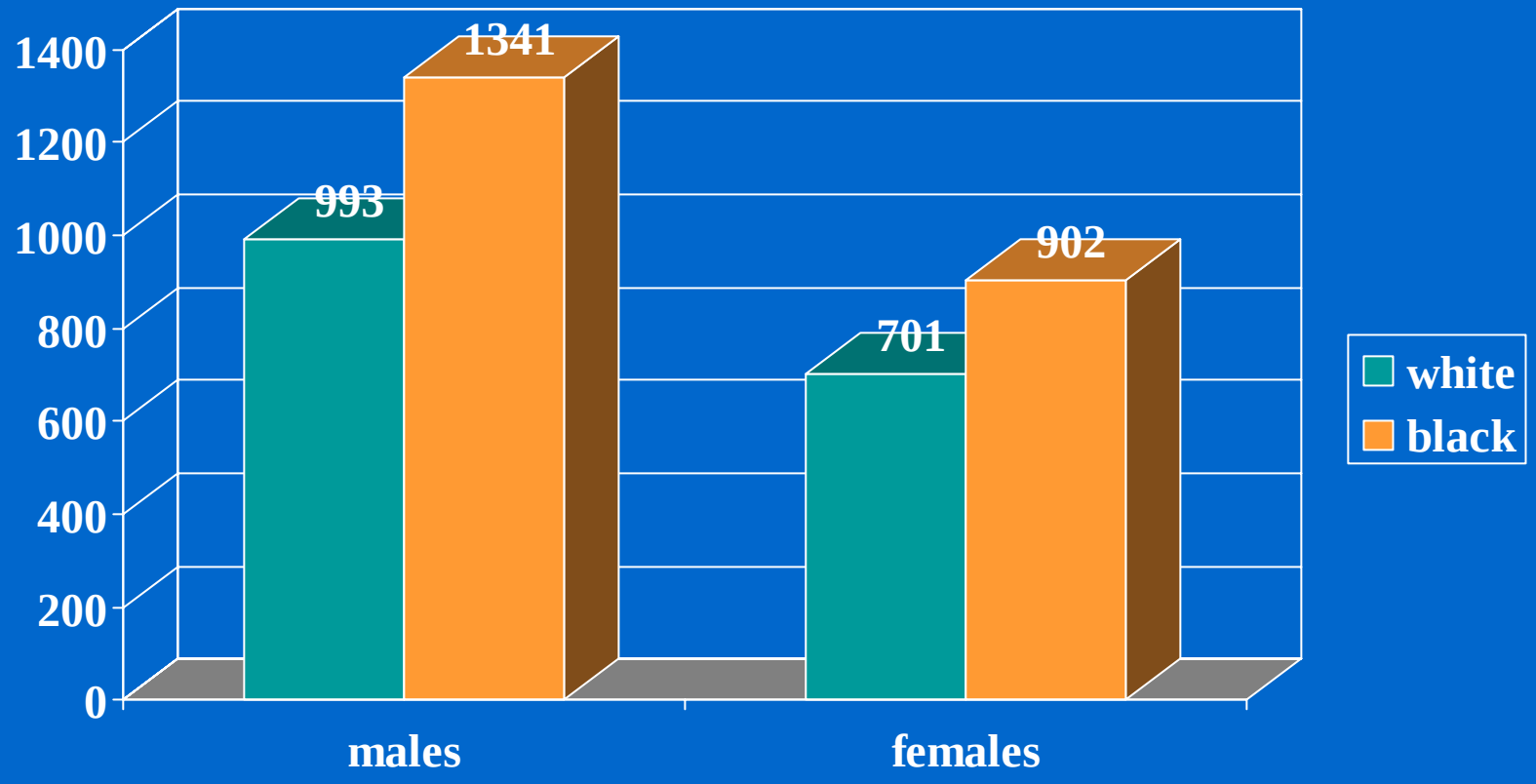
New York Centric View



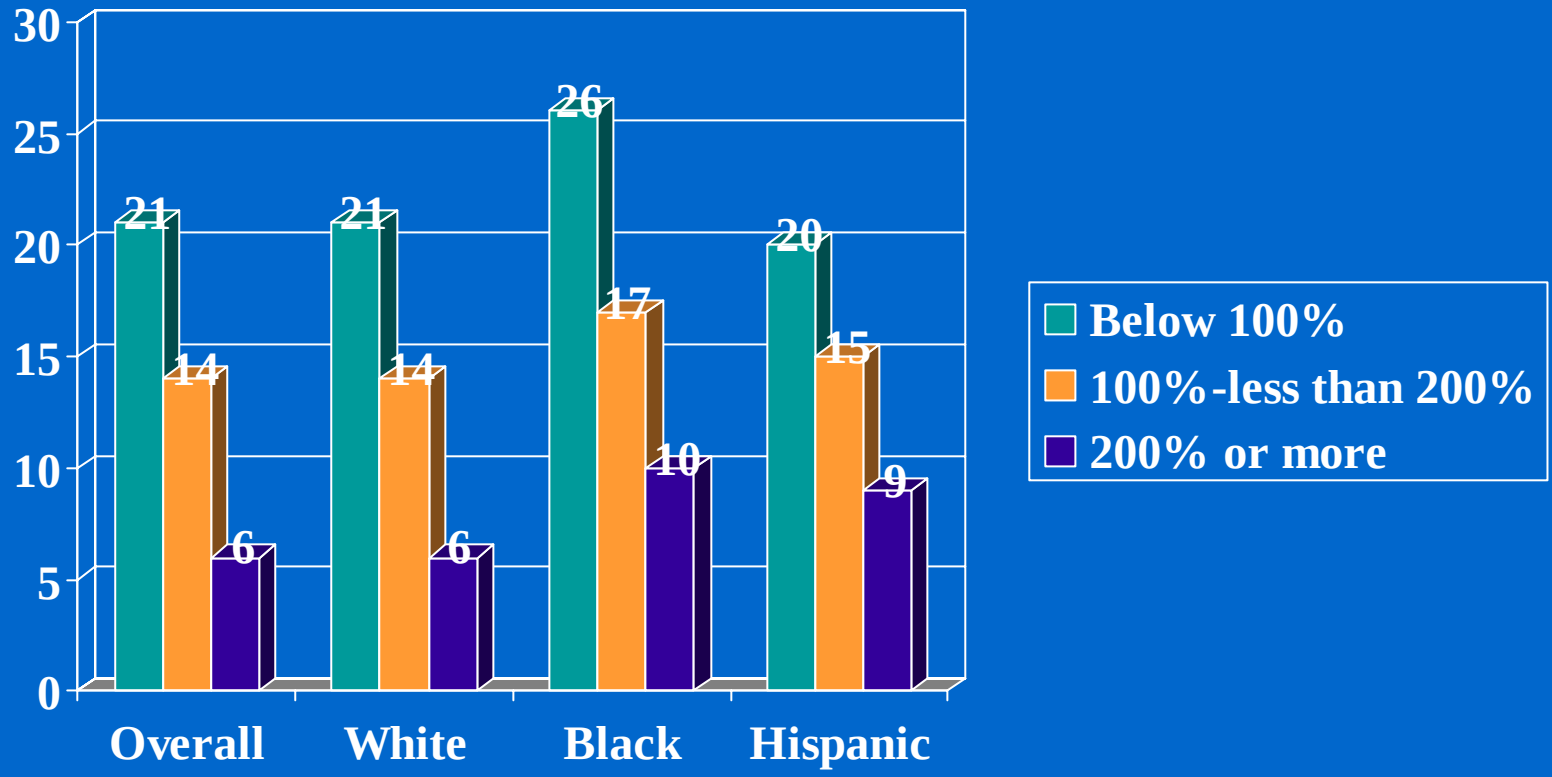
All Cause Age-adjusted Death Rates Per 100,000 People Ages 25-64 by Education -- 2004



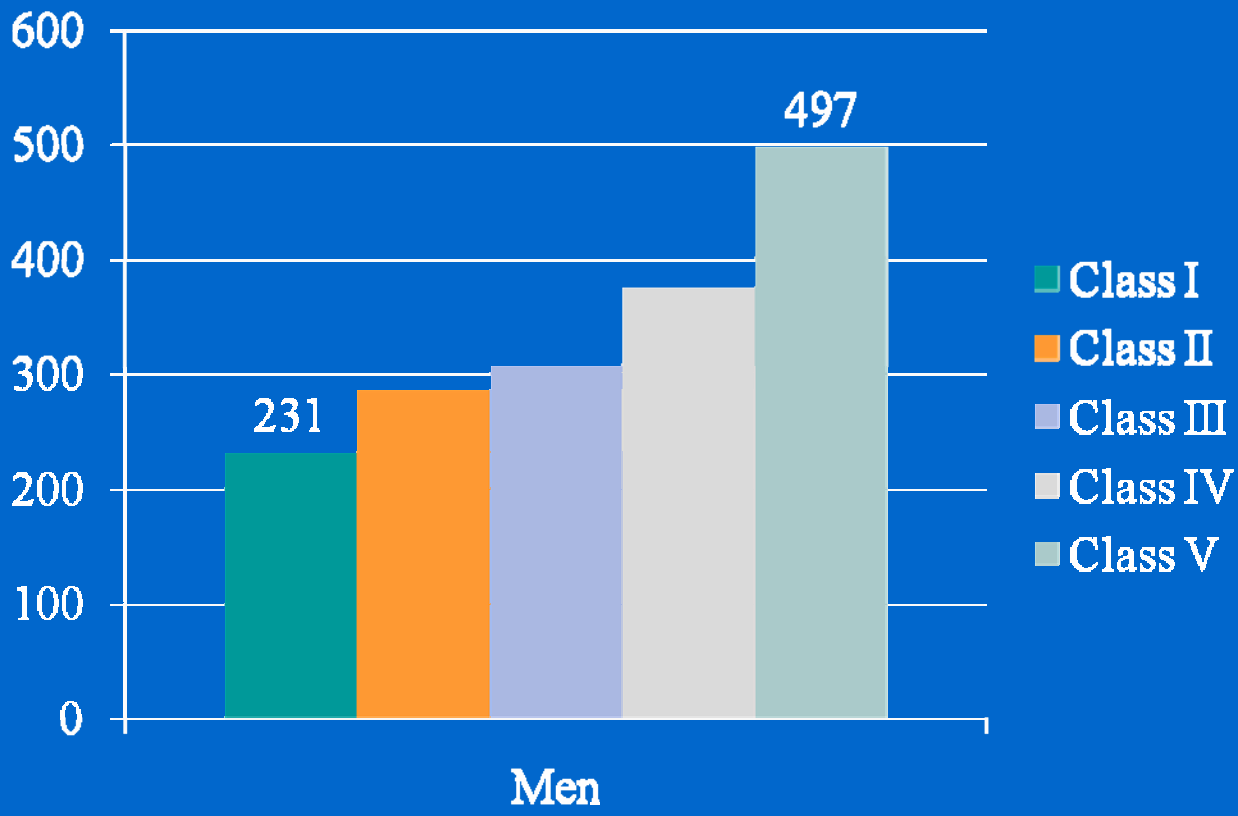
US All Cause Age-adjusted Death Rates Per 100,000 by Race – 2002



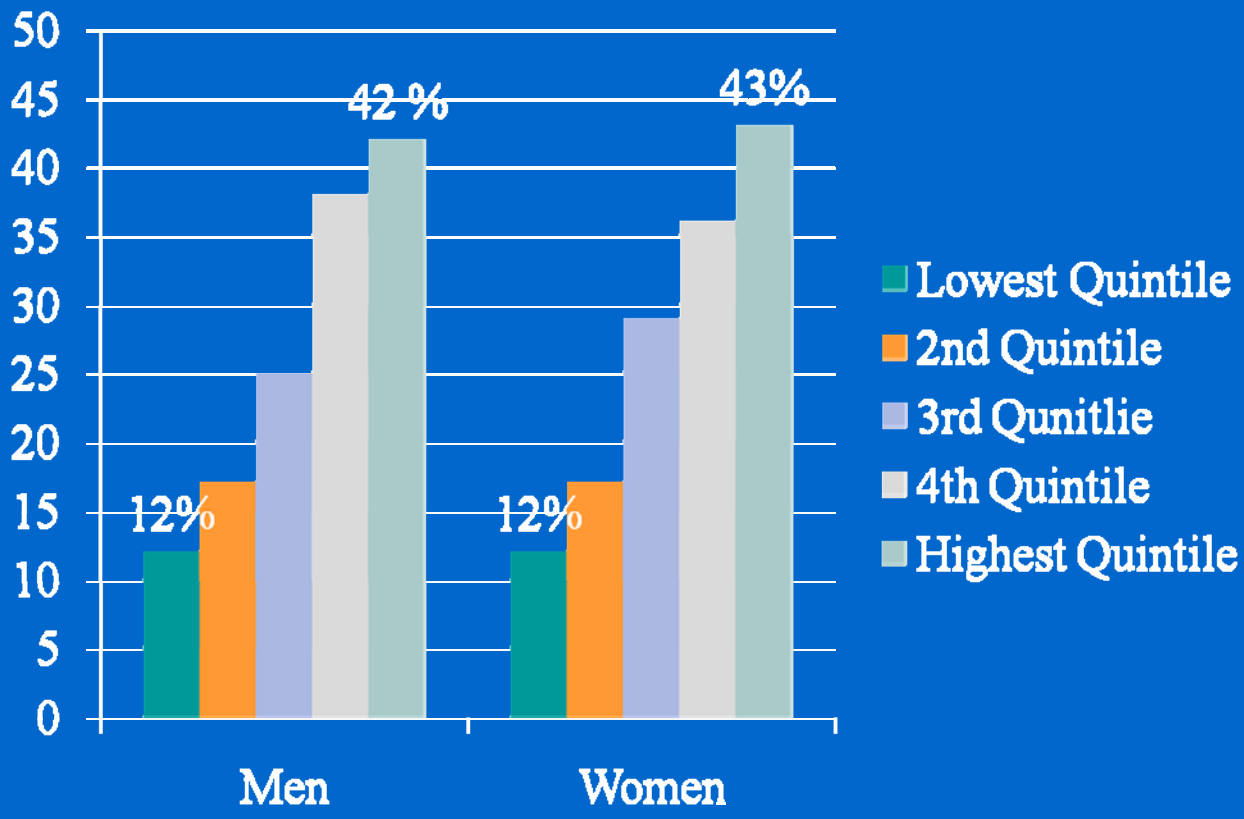
US Percent Fair or Poor Self-Reported Health by Poverty Level and Race/Ethnicity (age adjusted)



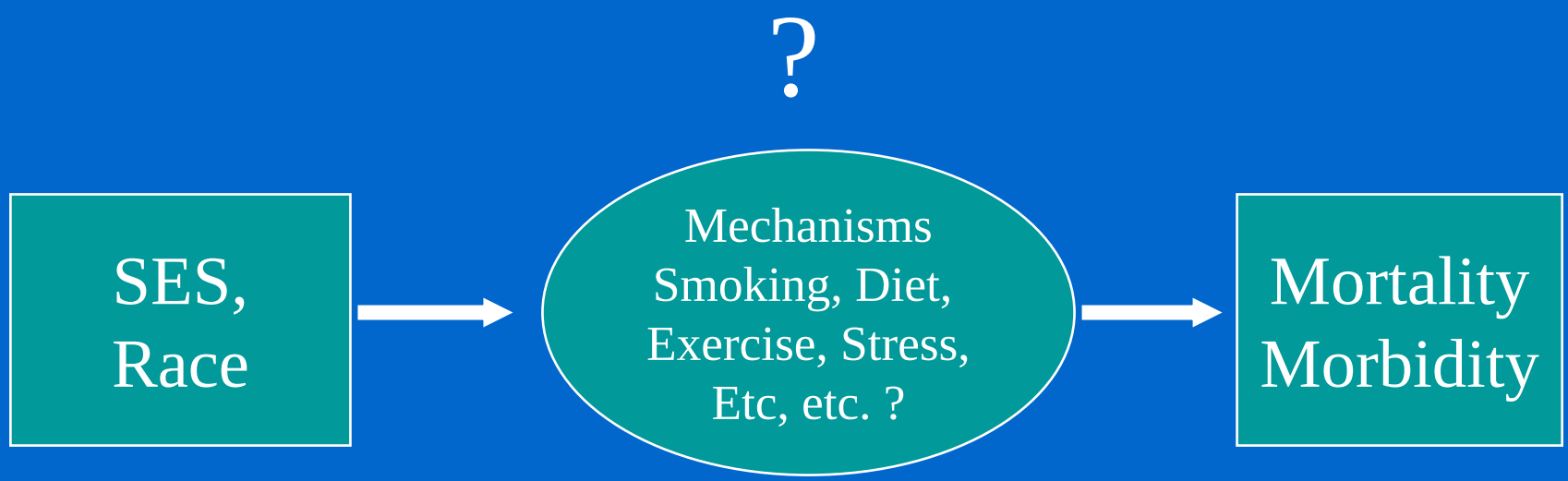
Age Adjusted Death Rates 100,000 (Men) 25-64 England and Wales



Scottish National Survey 2003 -- Percent Reporting Fair/Bad/Very Bad Health (Age Adjusted)



What Are the Mechanisms that Account for the Association?



Deaths Per 1000 Among Taxpayers and Non-Taxpayers in Rhode Island 1865

Age Categories (examples)	Taxpayers	Non-Taxpayers
Under 1	93.4	189.8
30-39	4.5	15.5
60-69	15.1	39.5

Chapin AJPH 1924

Deaths per 1000 (age adjusted) by SES of Census Tract -- Chicago 1930

SES	Males	Females
1--Lowest	15.1	12.3
2	11.6	10.2
3	10.2	9.0
4	9.2	7.9
5--Highest	8.7	6.8

Coombs, Medical Care, 1941

What is the point?

- Imagine yourself back in Rhode island in 1865 and doing what we just did for the current data – we might have asked what were the mechanisms involved?
- Contaminated water, poor sanitation, crowded substandard housing – the diseases were cholera, TB, small pox…
- We did something about the risk factors, we developed vaccines, and people don't die of TB, small pox and cholera in Rhode Island any more.
- But the SES association is resilient.

The Concept of Fundamental Social Causes

Fundamental social causes involve resources such as knowledge, money, power, prestige and beneficial social connections that determine the extent to which people are able to avoid risks and adopt protective strategies so as to reduce morbidity and mortality.

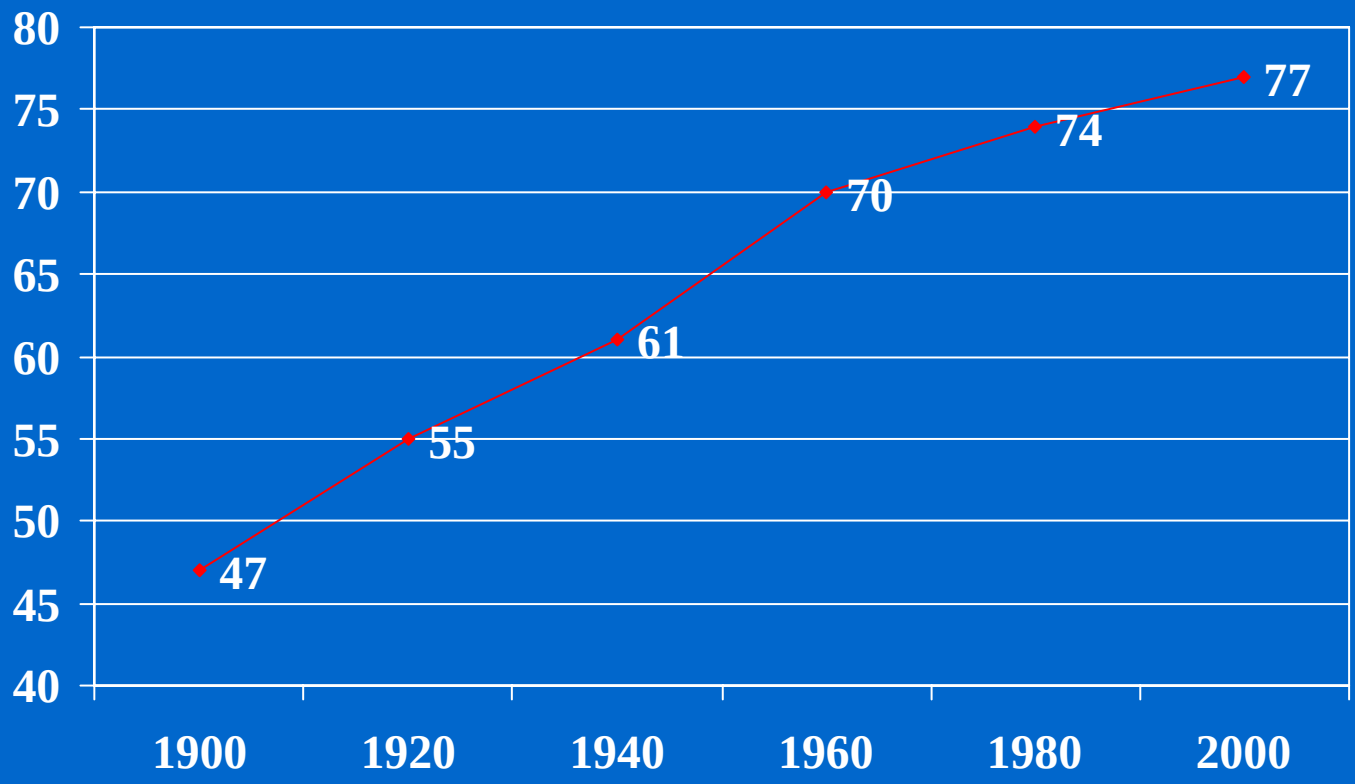
Because such resources can be used in different ways in different situations, fundamental causes have effects on disease even when the profile of risk and protective factors and diseases changes radically.

It is their persistent effect on health in the face of dramatic changes in mechanisms that leads us to call them "fundamental."

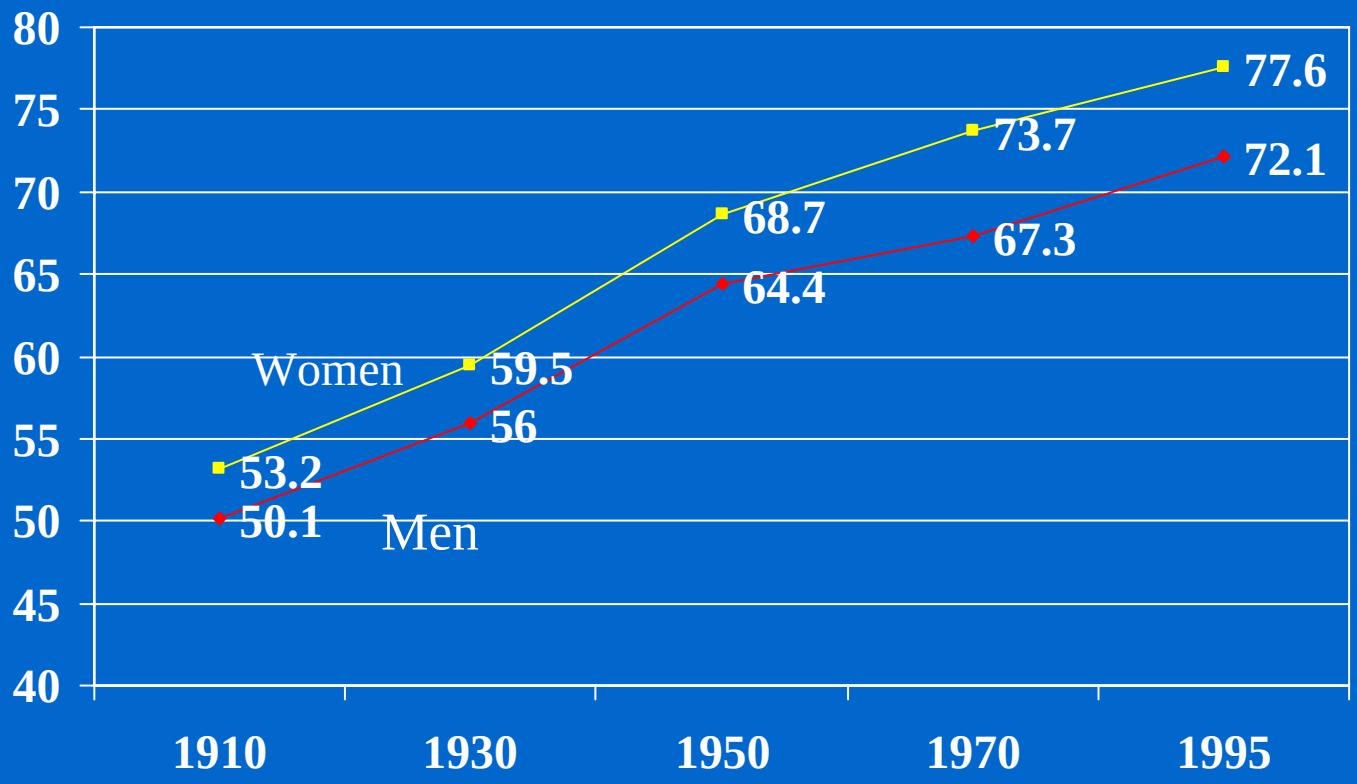
How Social and Economic Resources Affect Health – The Importance of Contexts

- Resources operate at the individual level – people use their knowledge, money, power, prestige and beneficial social connections to obtain healthy outcomes.
- 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.”

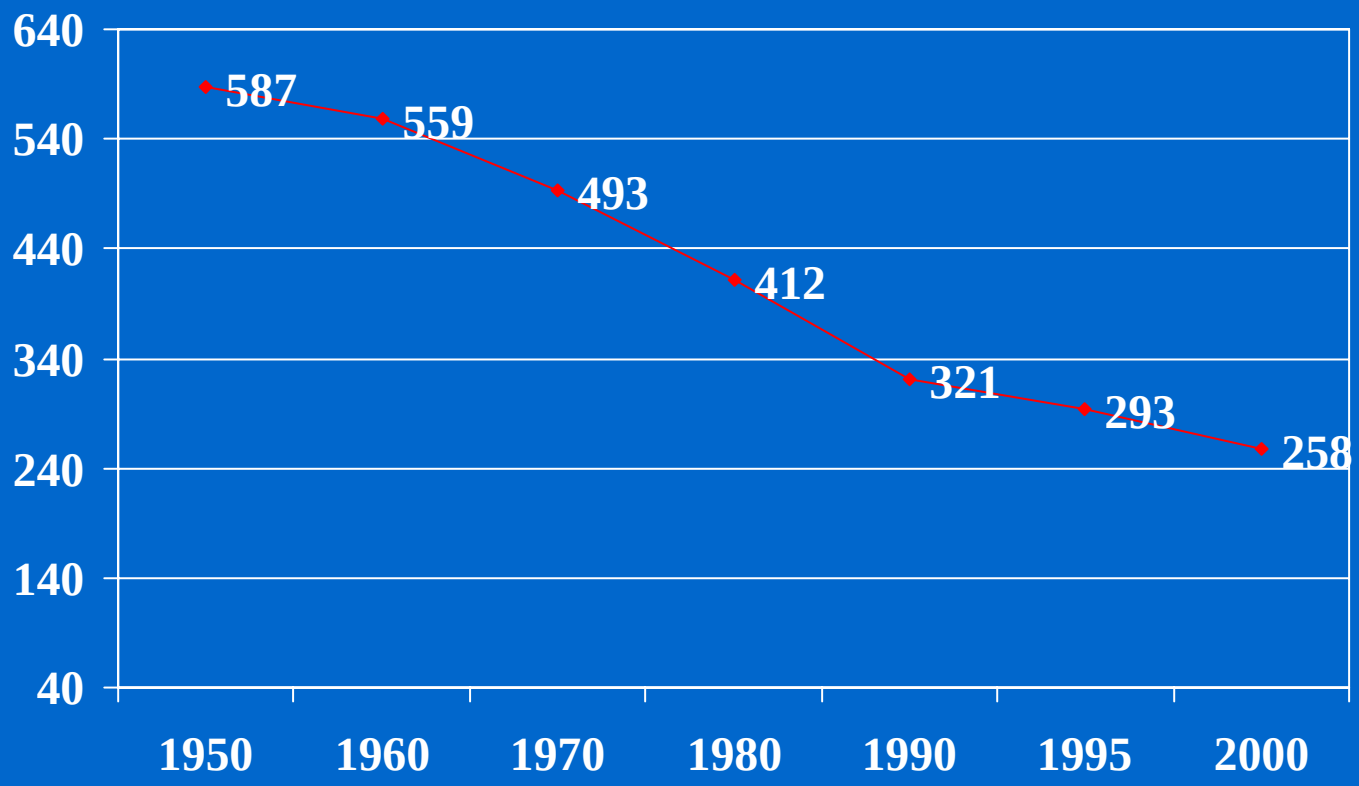
US Life Expectancy at Birth 1900-2000



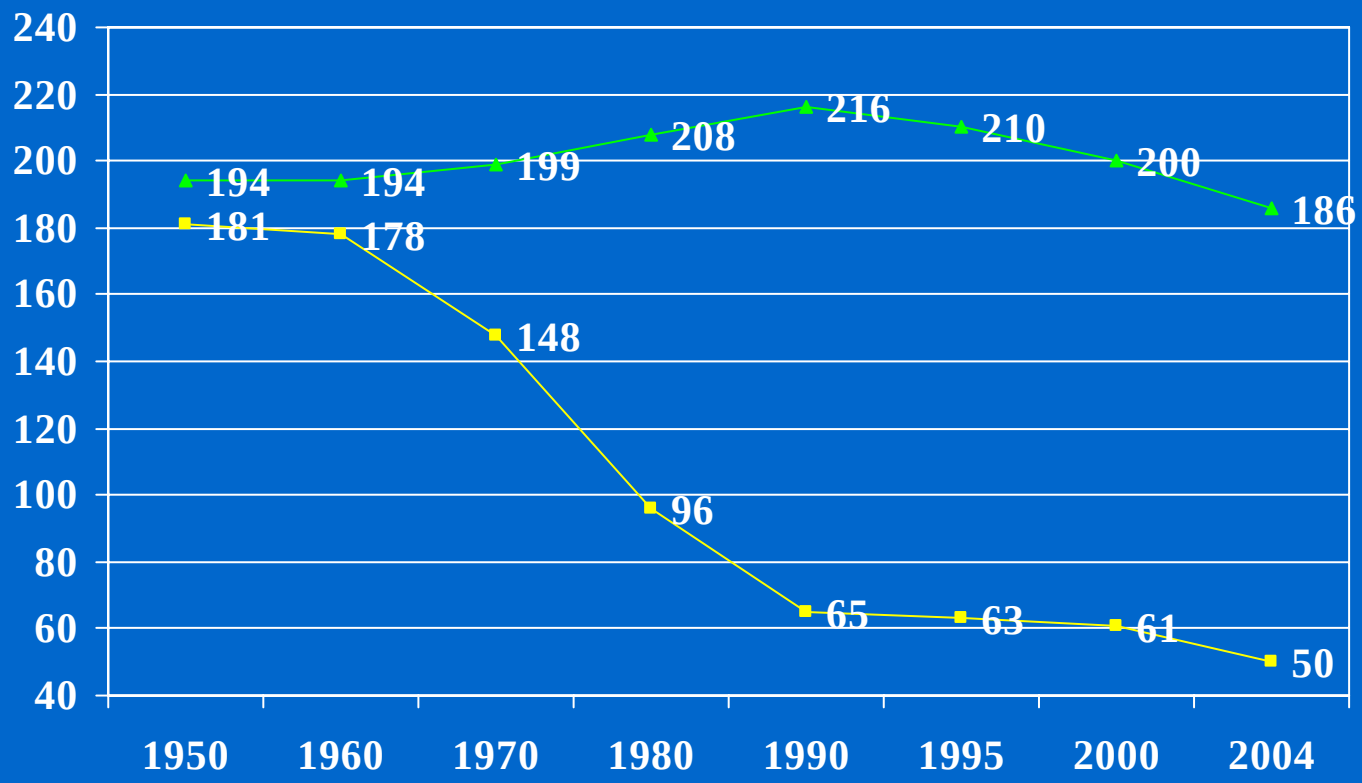
Scottish Life Expectancy at Birth 1910-2000



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

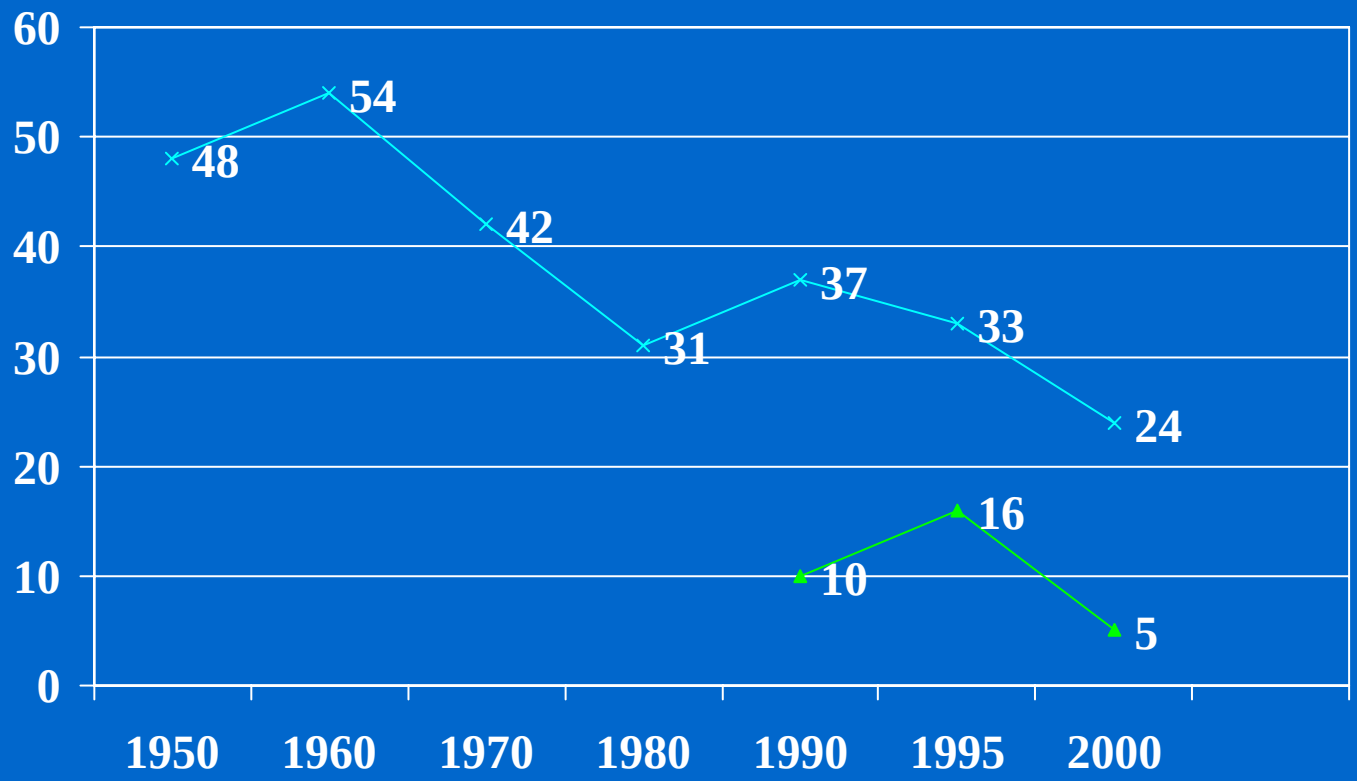


Cancer (green) and Stroke (Yellow) -- Age-adjusted Death Rates Per 100,000 People

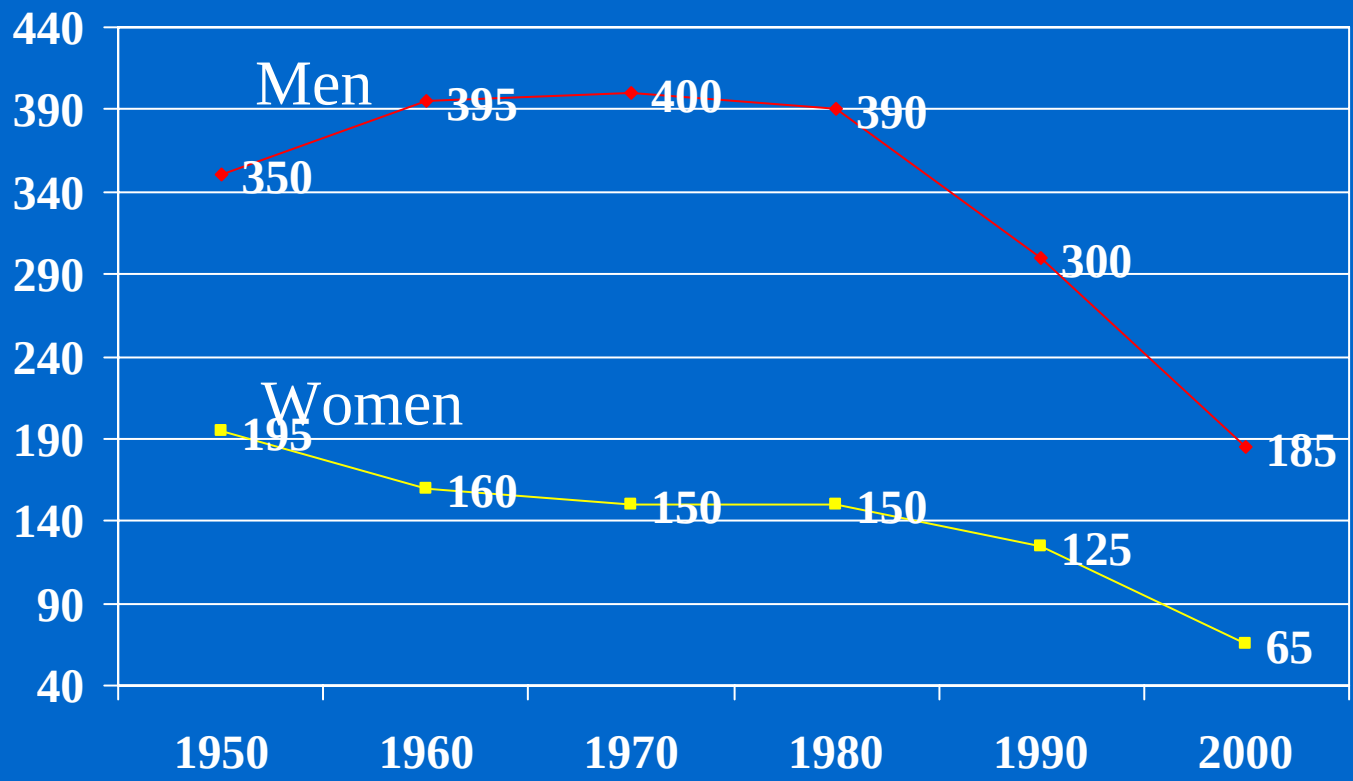


National Center for Health Statistics – Health United States 2006

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

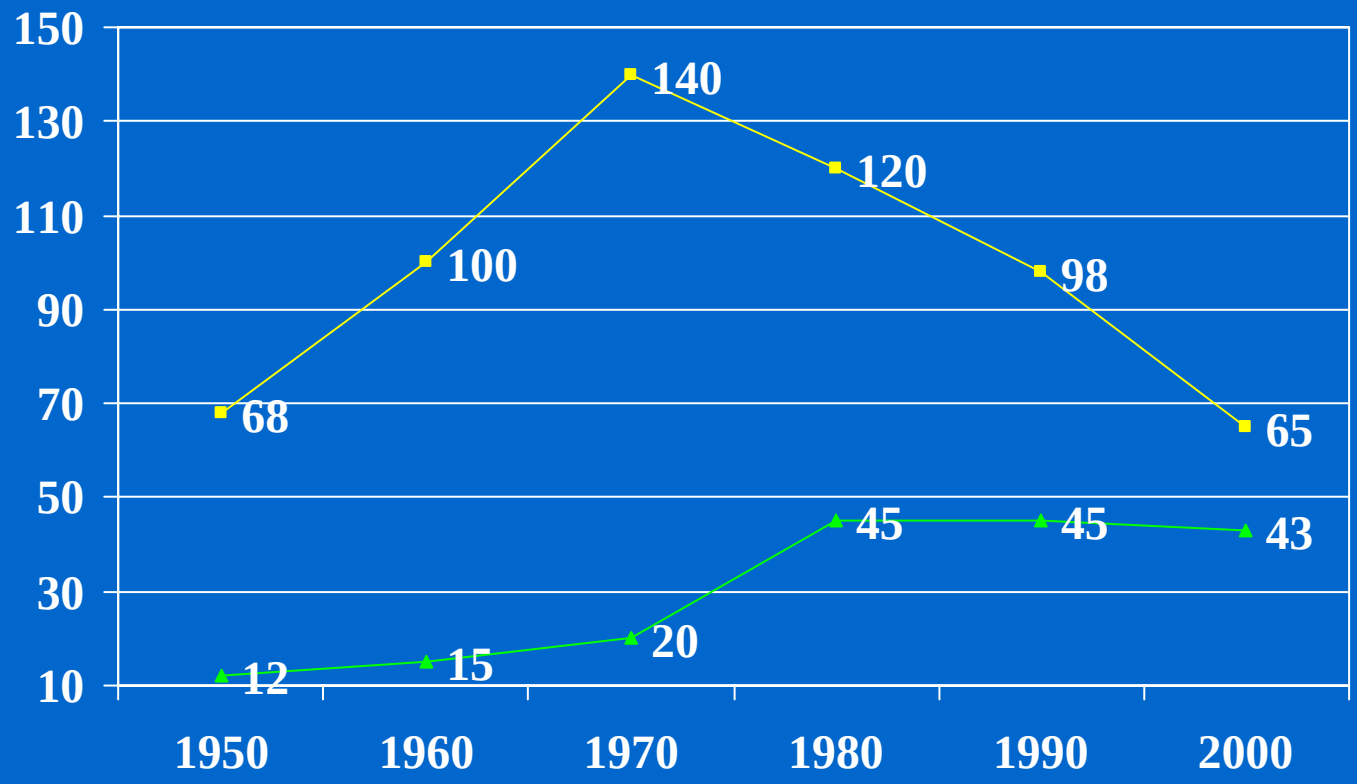


Scotland Ischamemic Heart Disease -- Age-adjusted Death Rates Per 100,000 People 15-74



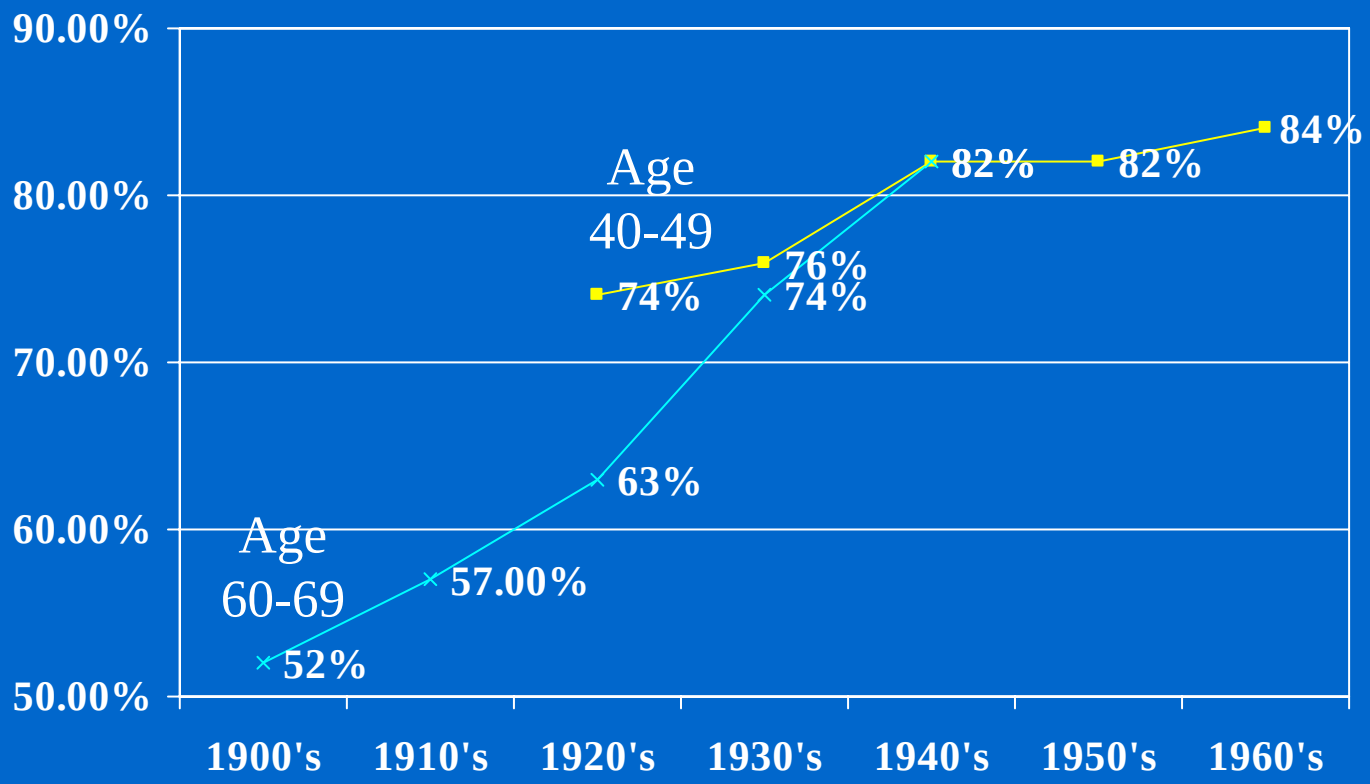
Leon et al: Understanding the Health of Scotland in and International Context 2003

Scotland Lung Cancer -- Women (green) and Men (Yellow) -- Age-adjusted Death Rates Per 100,000 People Ages15-74



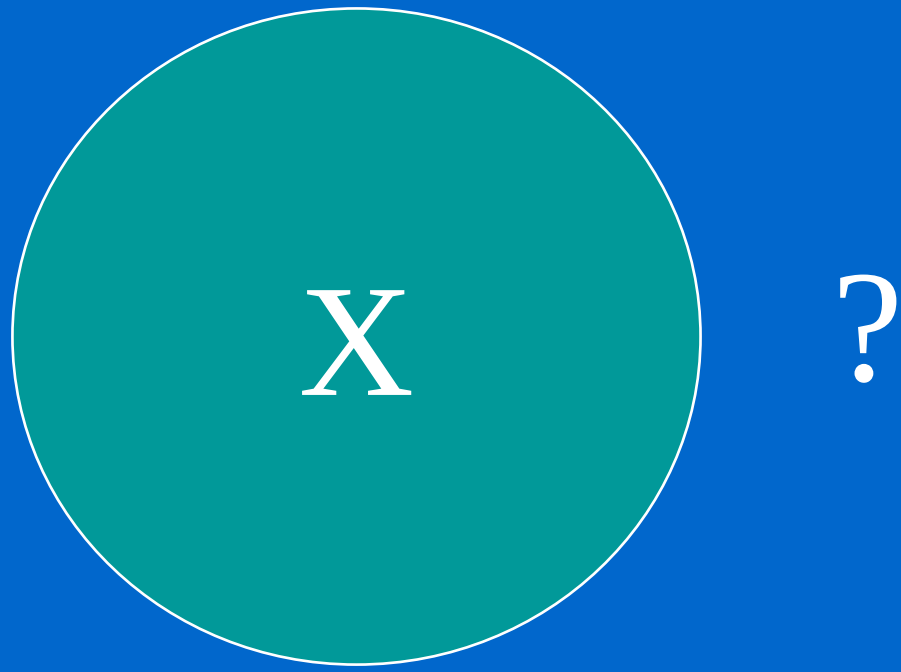
Leon et al: Understanding the Health of Scotland in and International Context 2003

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



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

Something is Driving these Dramatic Improvements in Health



Shouldn’t whatever “x” is be an important part of our explanations of health disparities?

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

- How about genetic factors?
- Stress?
- Social involvement and participation?
- How about income inequality?

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.

- So X is clearly not just one thing and is likely different things for different diseases…and probably different things at different times….But the confluence of all of these things has clearly had an enormously positive impact on population health.
- Clearly human beings have dramatically increased their capacity to control disease and death.

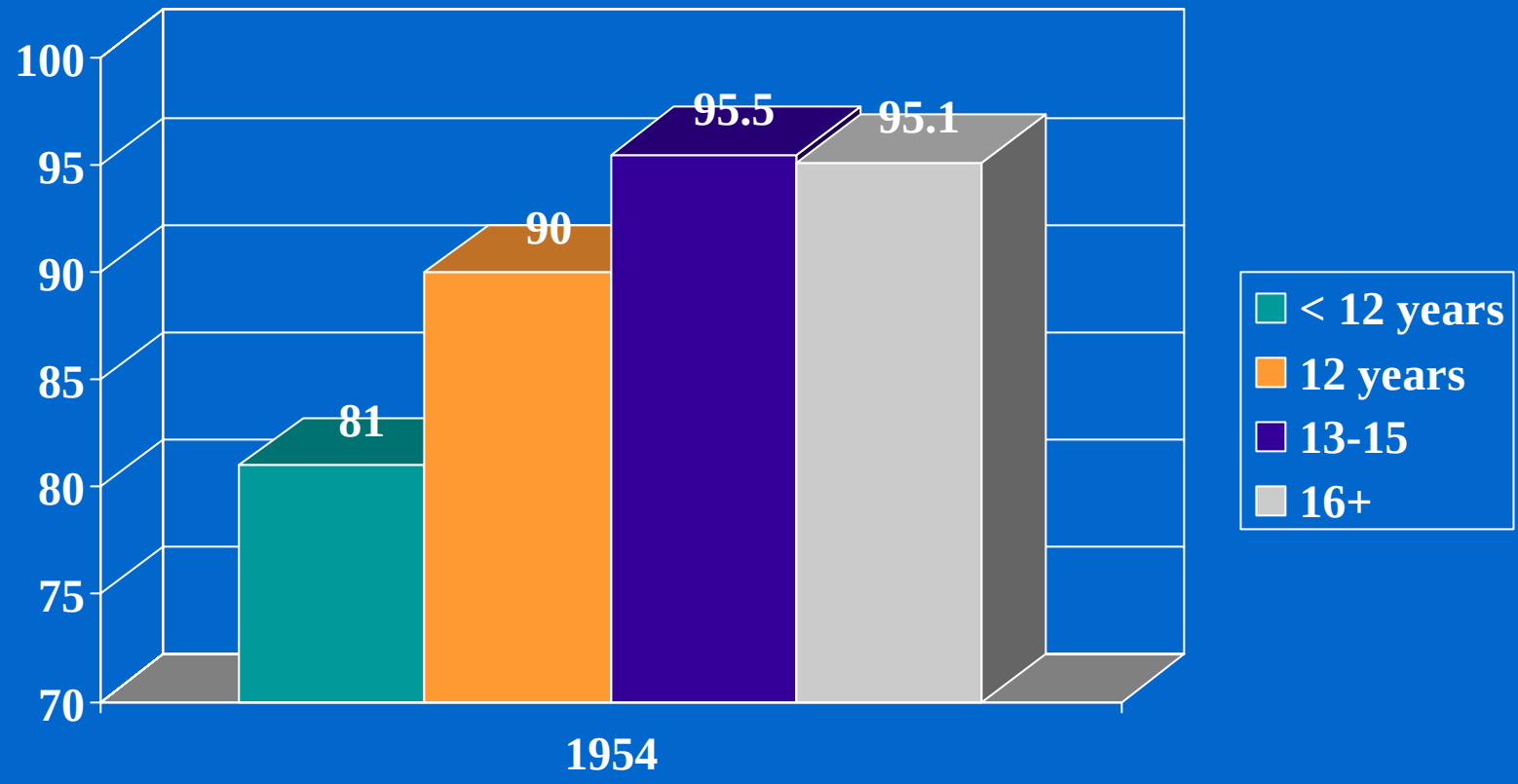
Fundamental Cause Reasoning Concerning the Sources of Disparities: The Core Proposition

- Our enormous capacity to control disease and death combined with social and economic inequality creates health disparities.
- It does so because of a very basic principle – 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.
- People who are more advantaged with respect to resources such as these and who are less likely to be held back by discrimination benefit more and have lower death rates as a consequence. Disparities are the result.

How Does Happen -- Examples

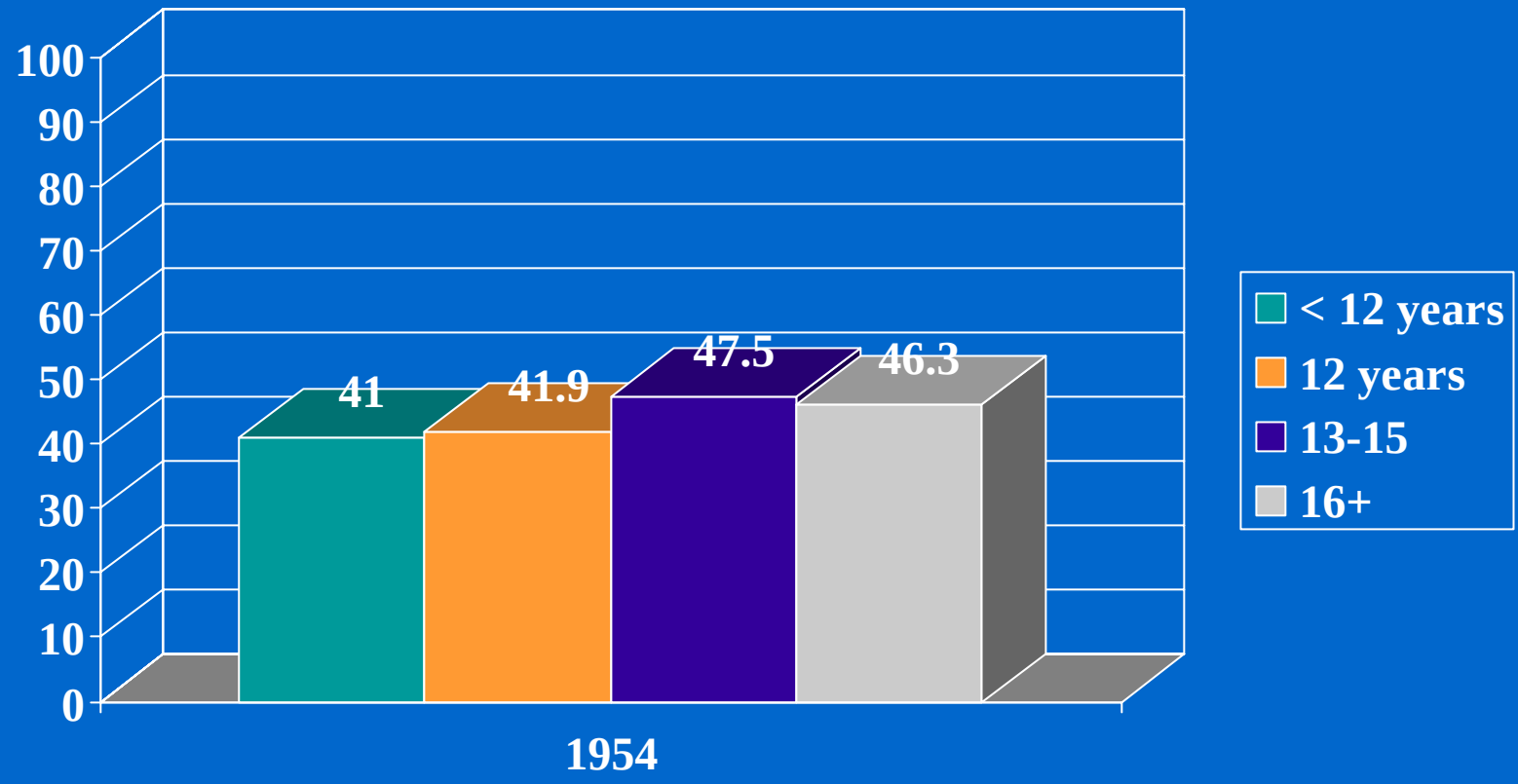
- When Bad things happen --
  - Titanic, WTC, Katrina
  - All the quotidian tragedies of life
- When Good things happen --
  - Discovery that smoking is harmful to health
  - New technology -- cancer screens

1954 Percent Answering that they had Recently Read or Heard Anything Saying that Cigarette Smoking May be a Cause of Cancer



Nationwide Gallup Surveys Jan and June 1954

Percent Responding “Yes” to a Question asking whether Smoking is a Cause of Lung Cancer by Education 1954



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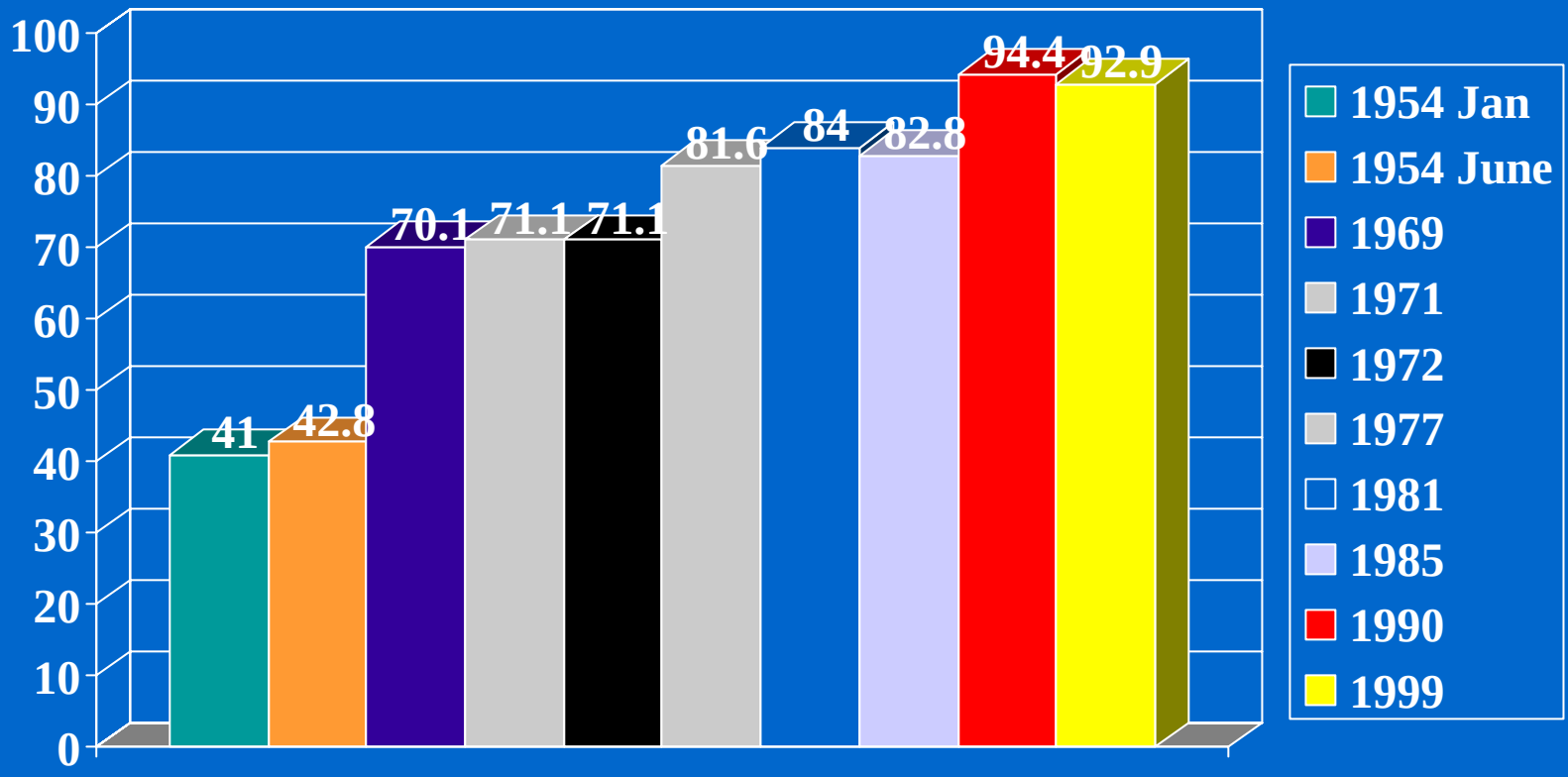
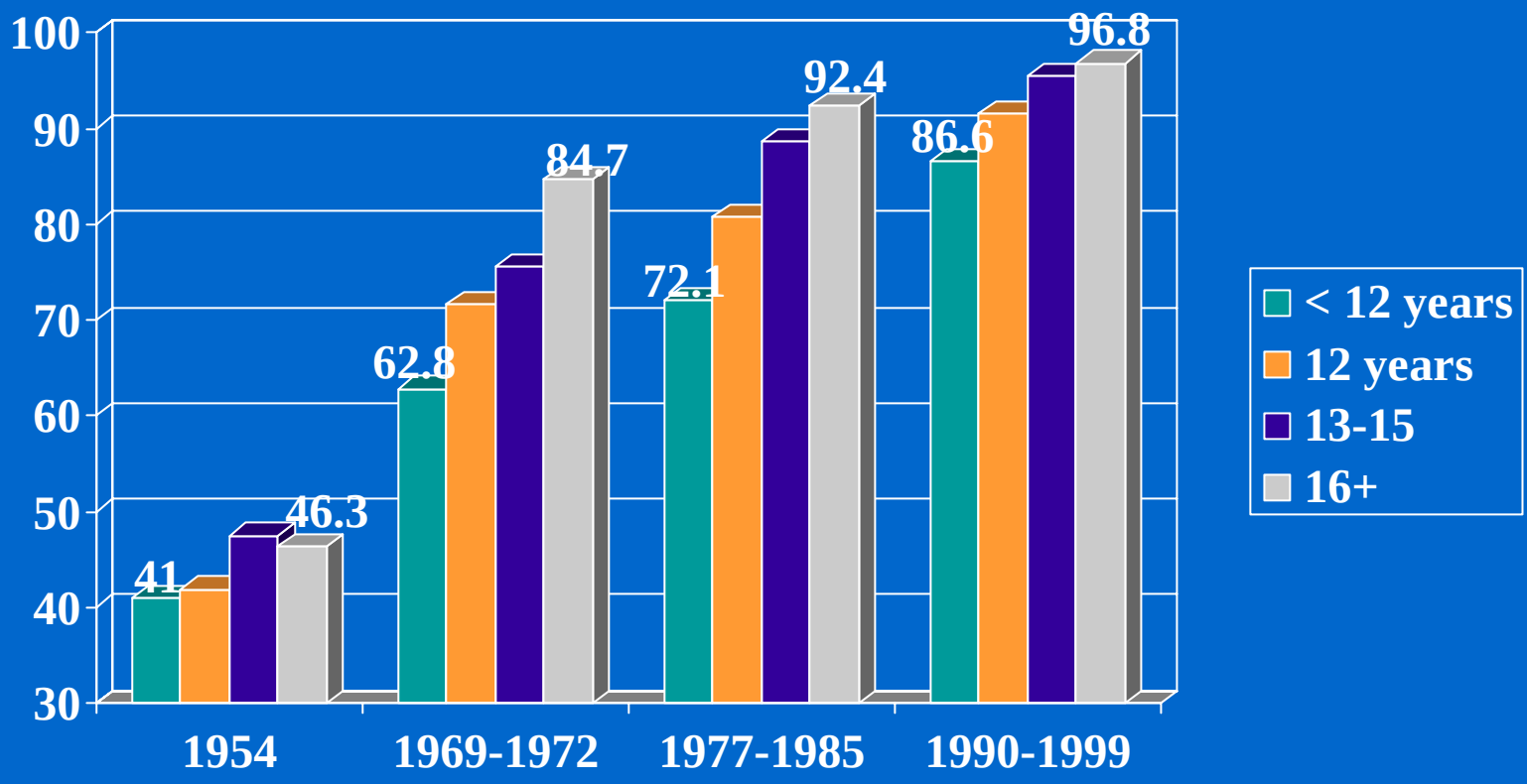


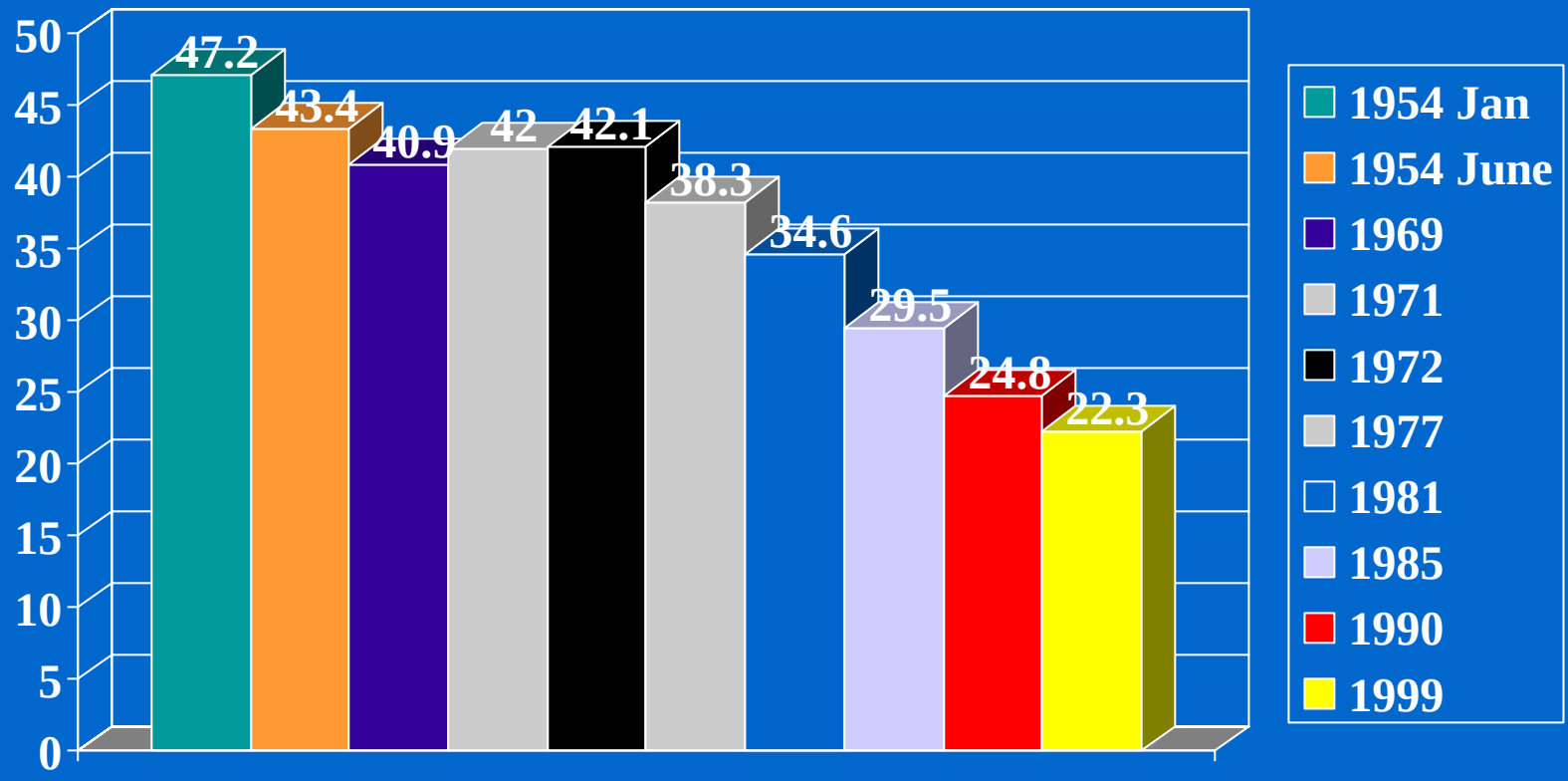
Multiple National Public Opinion Surveys

Percent Responding "Yes" to a Question asking whether Smoking is a Cause of Lung Cancer by Education 1954 thru 1999



Nationwide Surveys 1954 -1999

Percent Current Smokers 1954-1999



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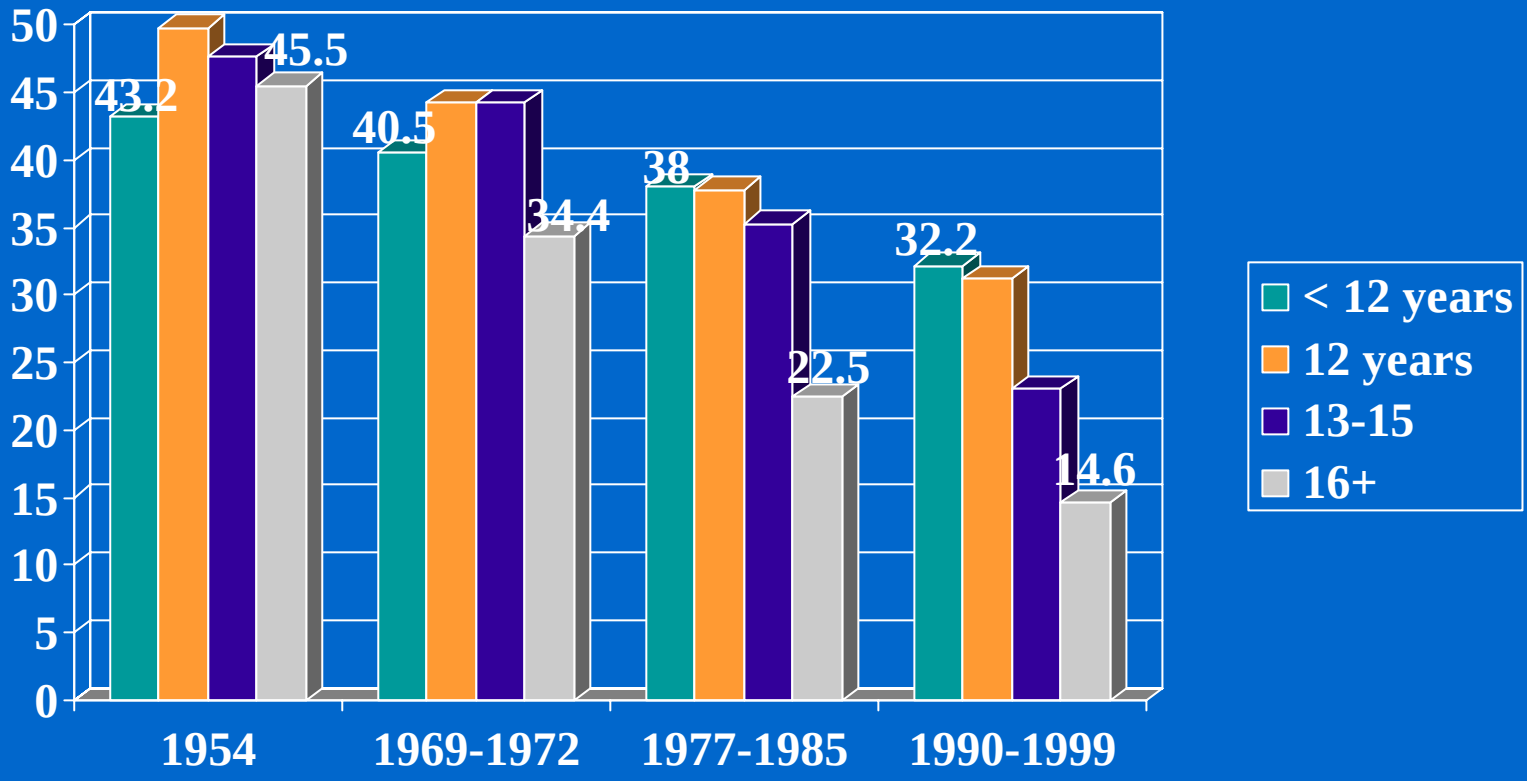
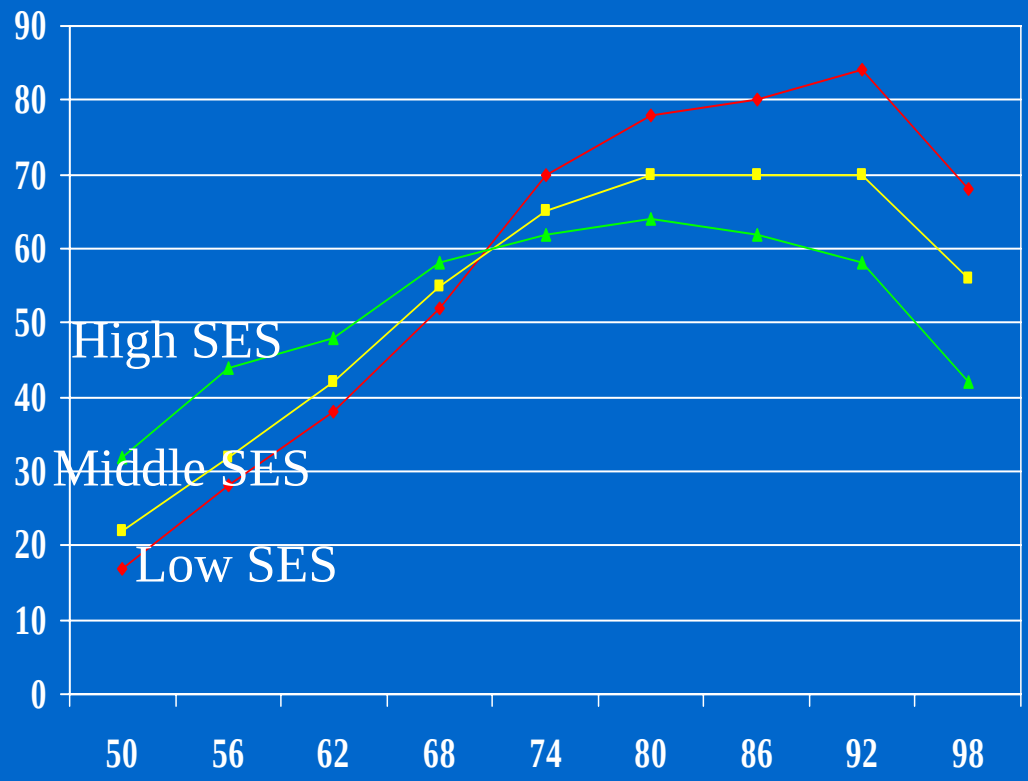
Percent Current Smokers by Education 1954 thru 1999



Nationwide Surveys 1954 -1999

Age Adjusted Lung Cancer Mortality (Men 25-64) 1950-1998 by SES of County of Residence



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

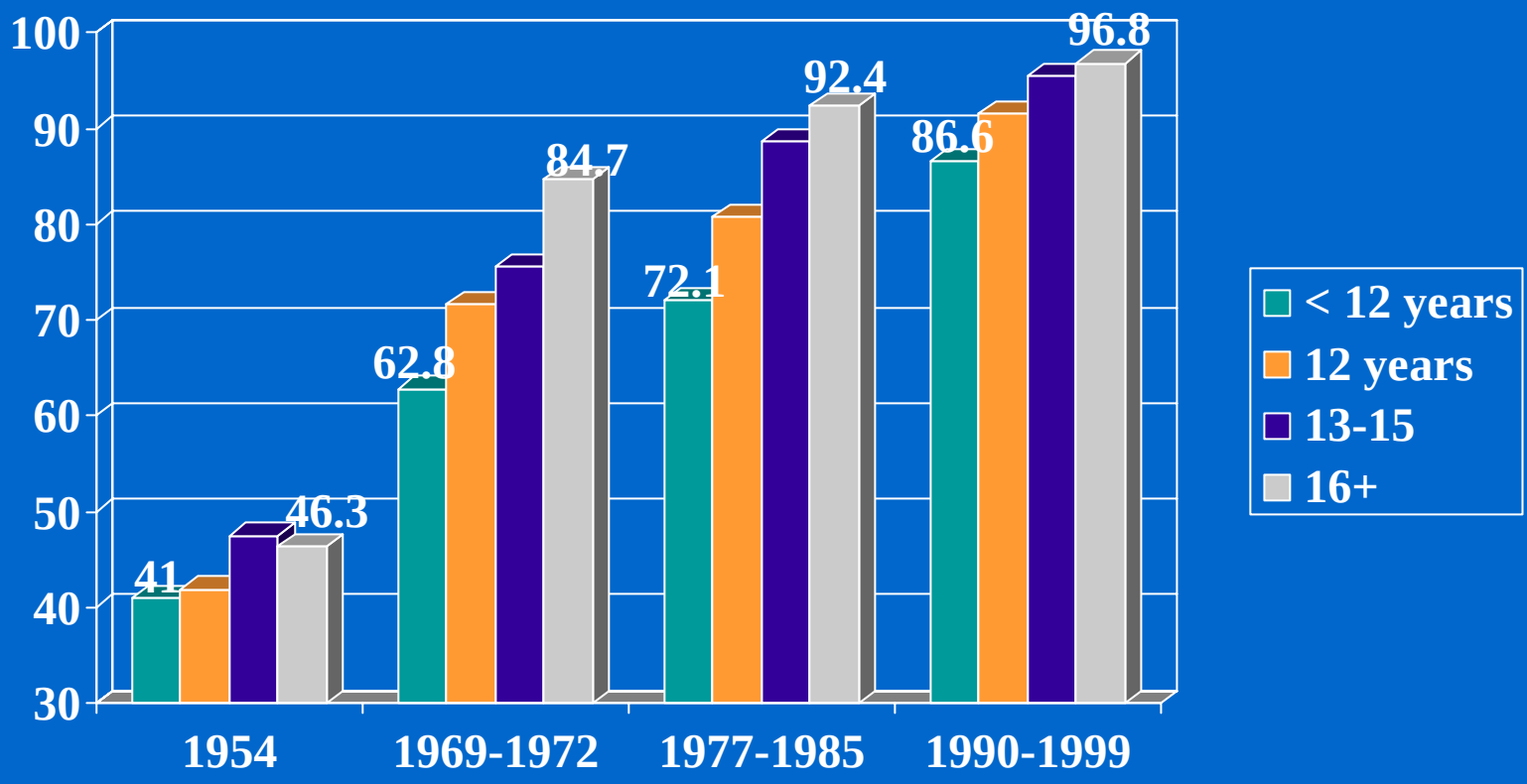
Points to be Made From the Very Familiar Smoking Story

- It exemplifies the process specified by the fundamental causes theory – there is a social shaping of new knowledge and this social shaping creates health disparities by socioeconomic status.

- The story sensitizes us to the fact that many other forms of health knowledge and technology are shaped in this way – e.g. the same states in the US that were quick to adopt the use of beta blockers had been rapid in their deployment of hybrid corn 30 to 50 years earlier.

- The length of time it takes for knowledge and behavior change to spread is instructive. It is not simply a matter of being smart enough to know the evidence and act. It is again likely deeply social. And this tells me an important story about disparities.

Percent Responding "Yes" to a Question asking whether Smoking is a Cause of Lung Cancer by Education 1954 thru 1999



Nationwide Surveys 1954 -1999

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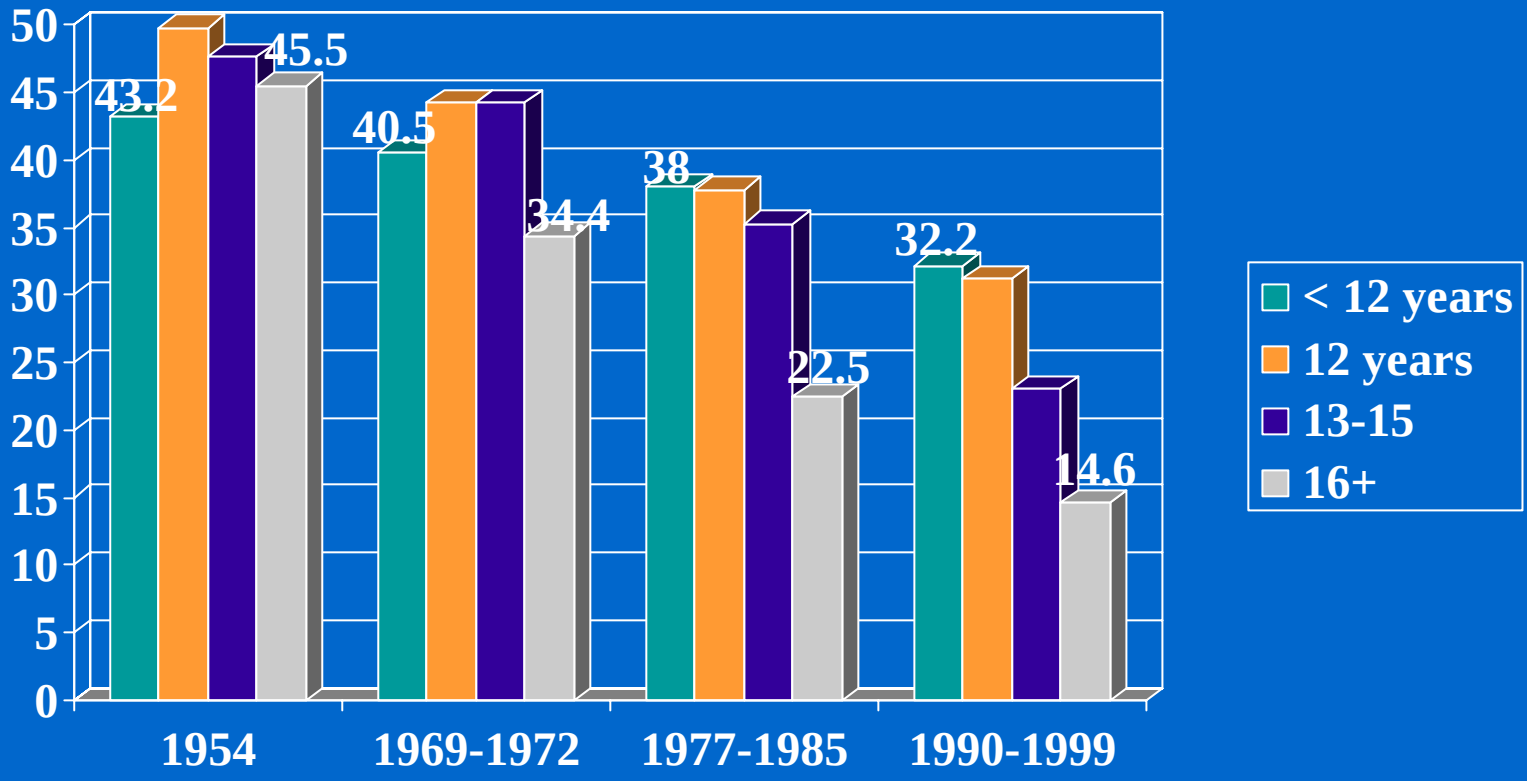
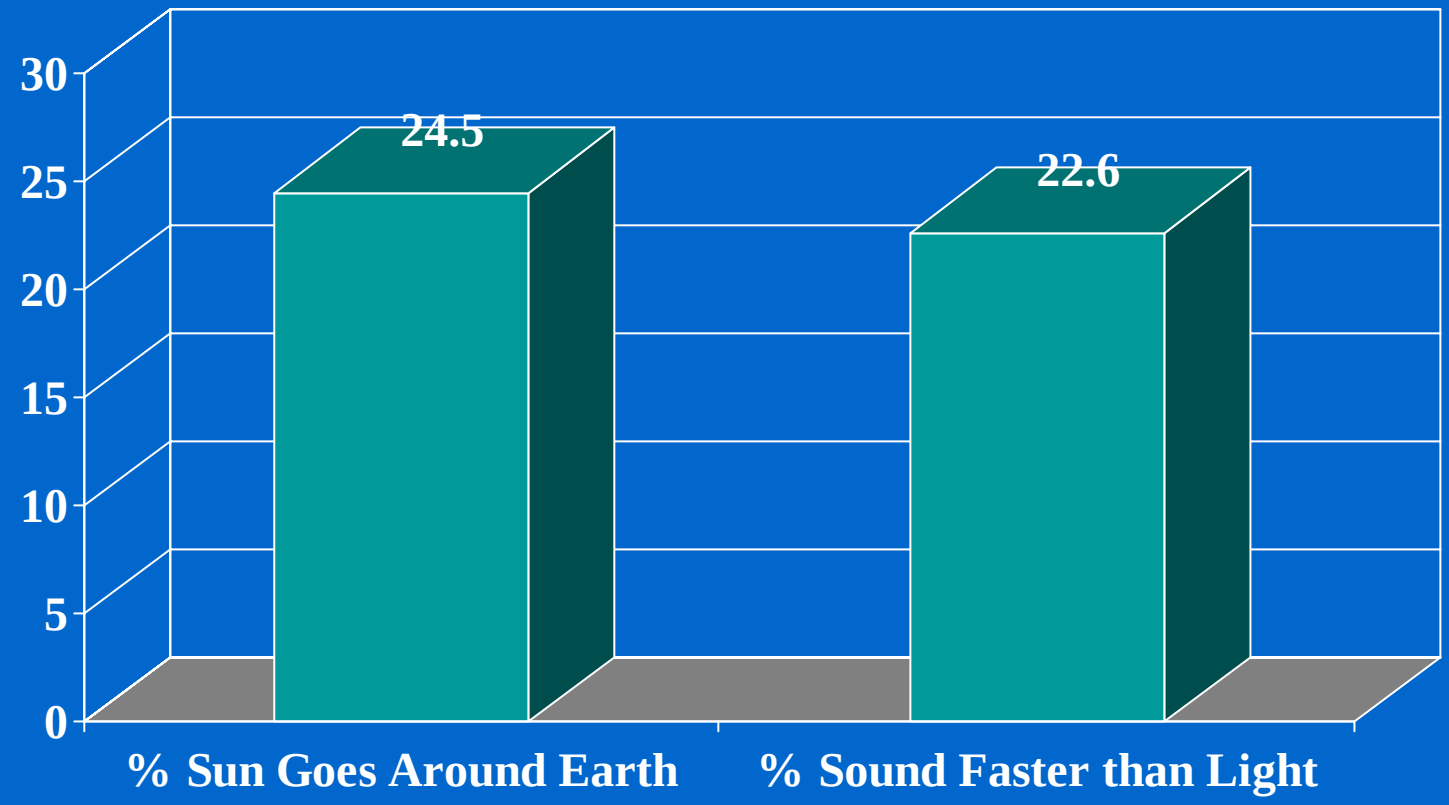


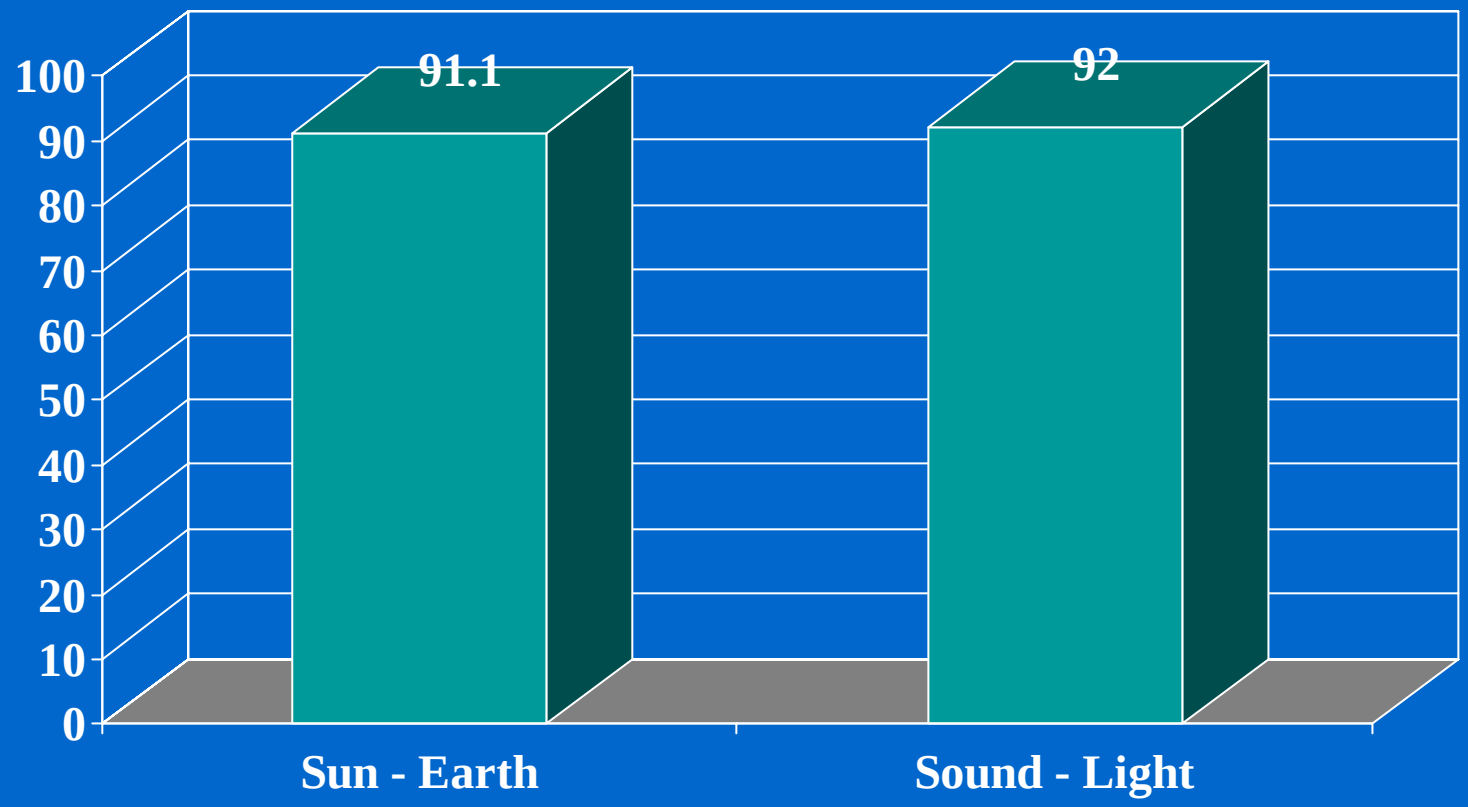
Nationwide Surveys 1954 -1999

Percent Believing that Sun Goes Around Earth and that Sound Travels Faster than Light – US Population 1999



NSF Survey of Public Understanding of Science and Technology 1999

Among People Who Believe that Sun Goes Around Earth and that Sound Travels Faster than Light -- % Who Think Smoking Causes Cancer



NSF Survey of Public Understanding of Science and Technology 1999

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 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

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, in the early 1990's 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.

Examples of Hi and Lo Preventability Diseases

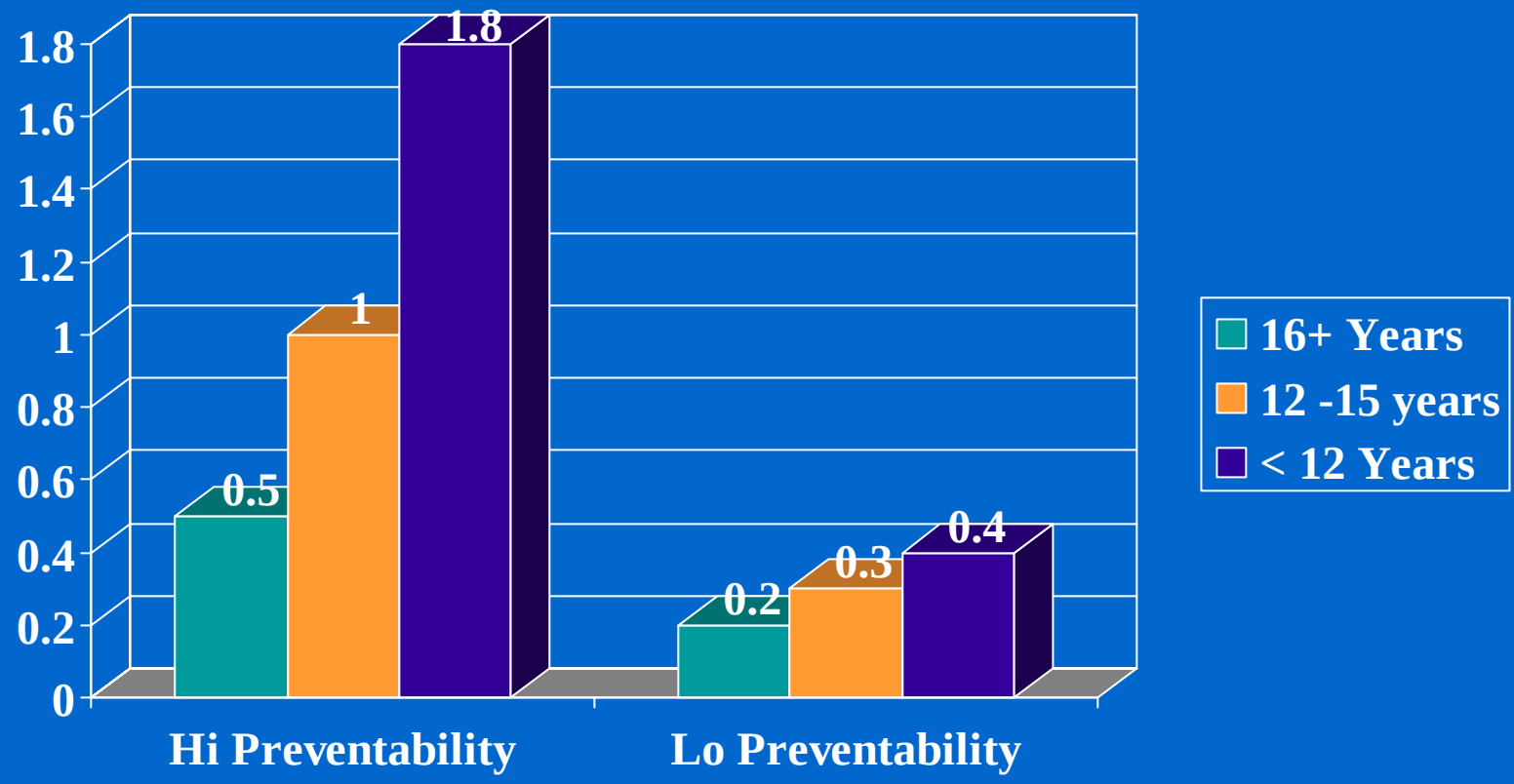
- Low Preventability:

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

- High Preventability:

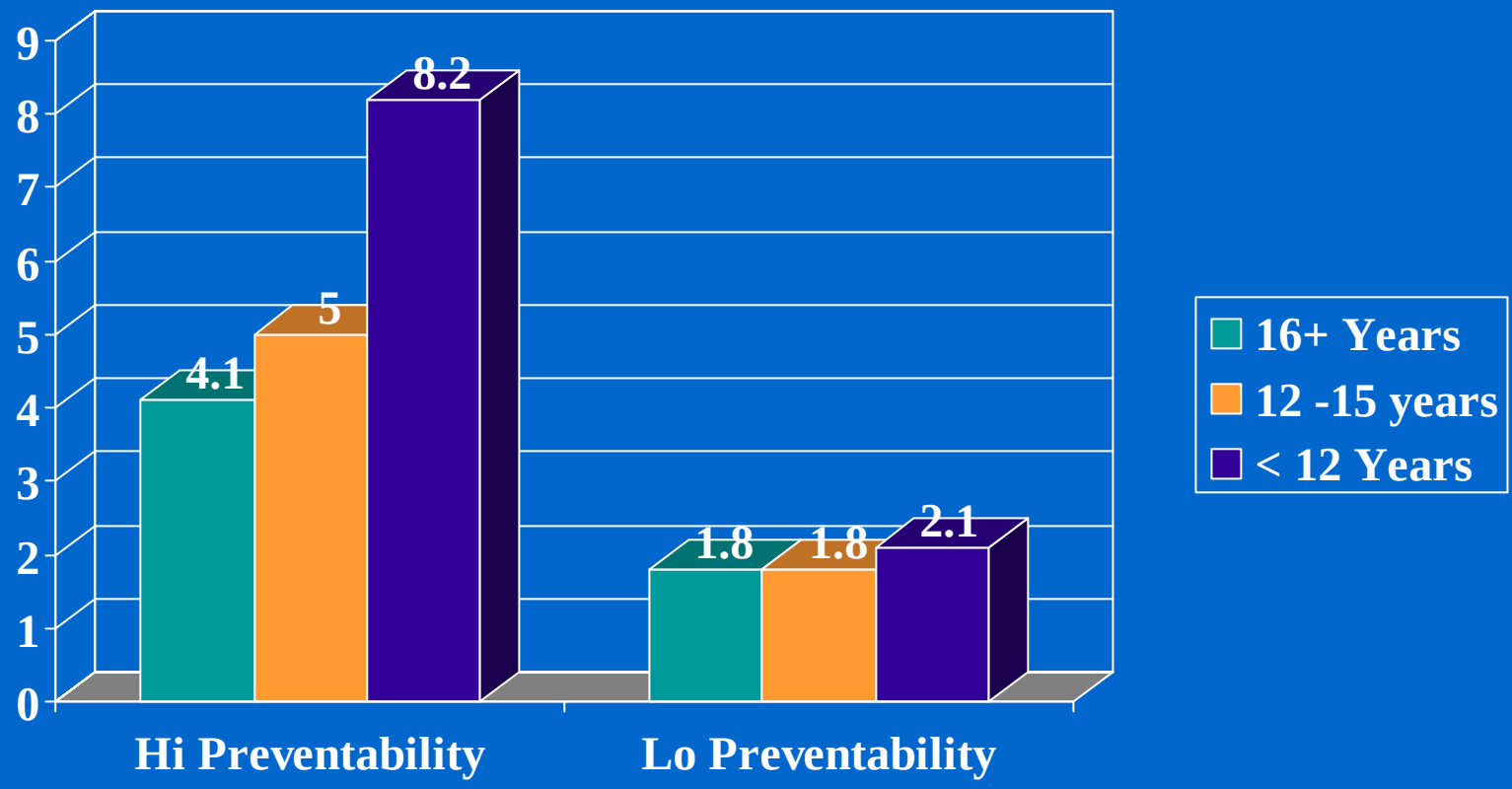
  lung cancer, ischemic heart disease, colon cancer, pneumonia

National Longitudinal Mortality Study
Percent Dying During 9 Year Follow-Up: Men and Women 25-44



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

National Longitudinal Mortality Study
Percent Dying During 9 Year Follow-Up: Men and Women 45-64



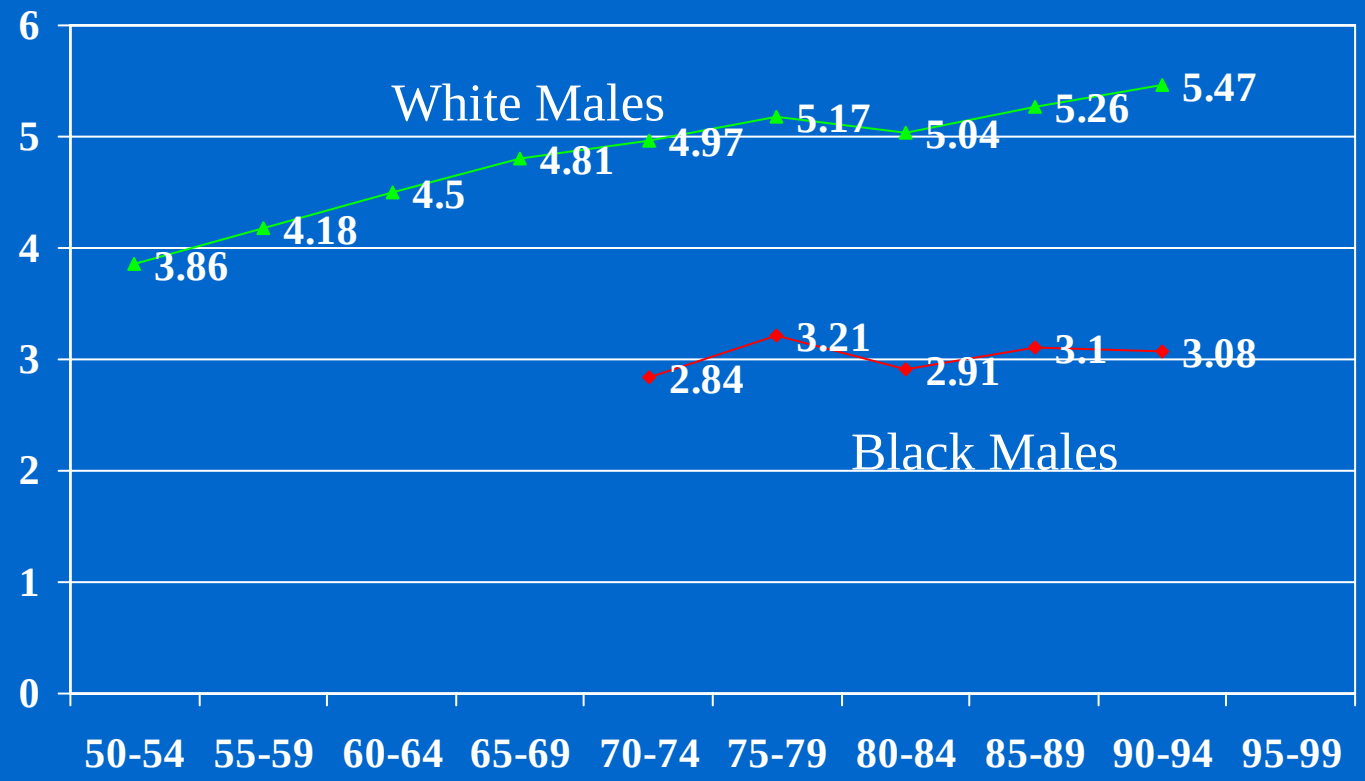
Phelan, Link, Diez-Roux, Kawachi and Levin. 2004 JHSB

Test # 2 Evidence Bearing on the Hypothesis Trends Over Time

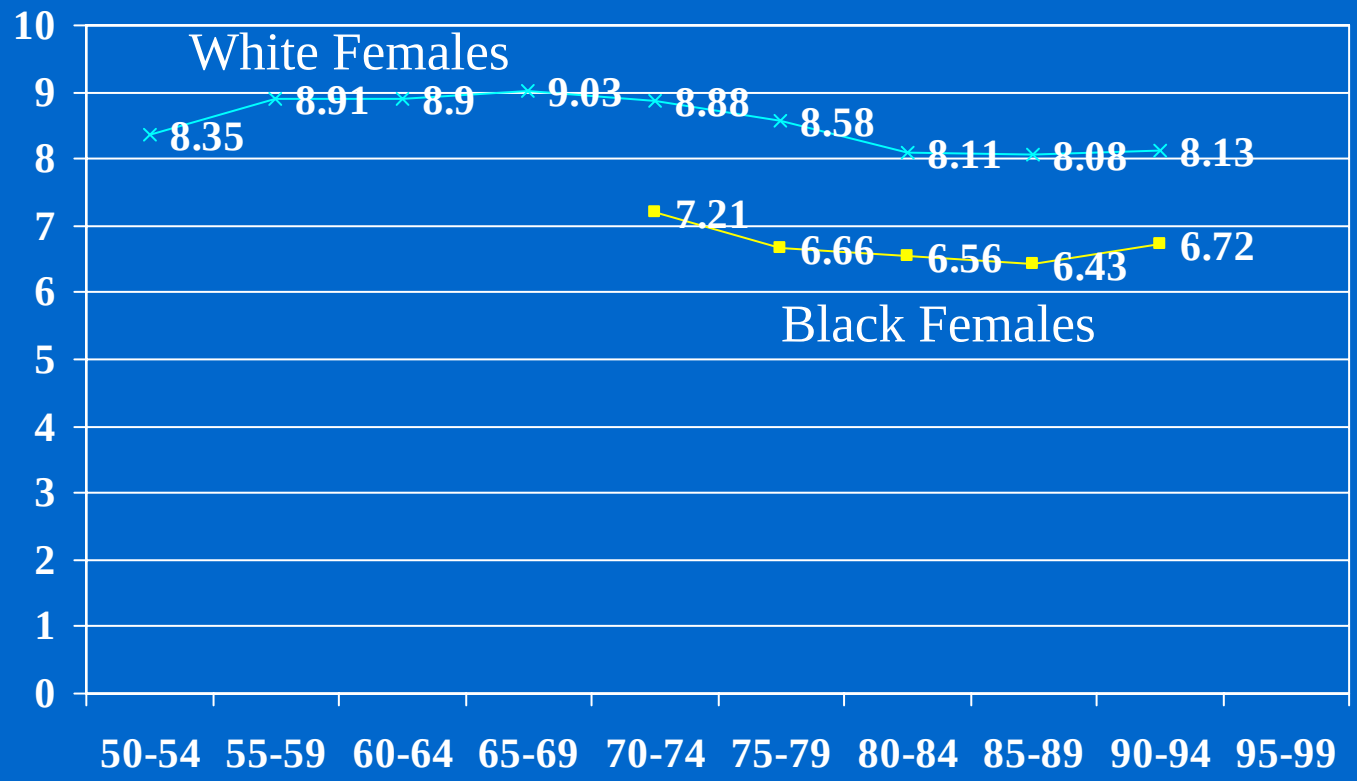
- If the core proposition is true we should find that disparities by SES and race emerge when new health enhancing information or technology is obtained:
  - E.g. Heart disease, Hodgkins Disease, Colon Cancer
- If death from a disease remains unpreventable – disparities will not change dramatically with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

Trends by Race

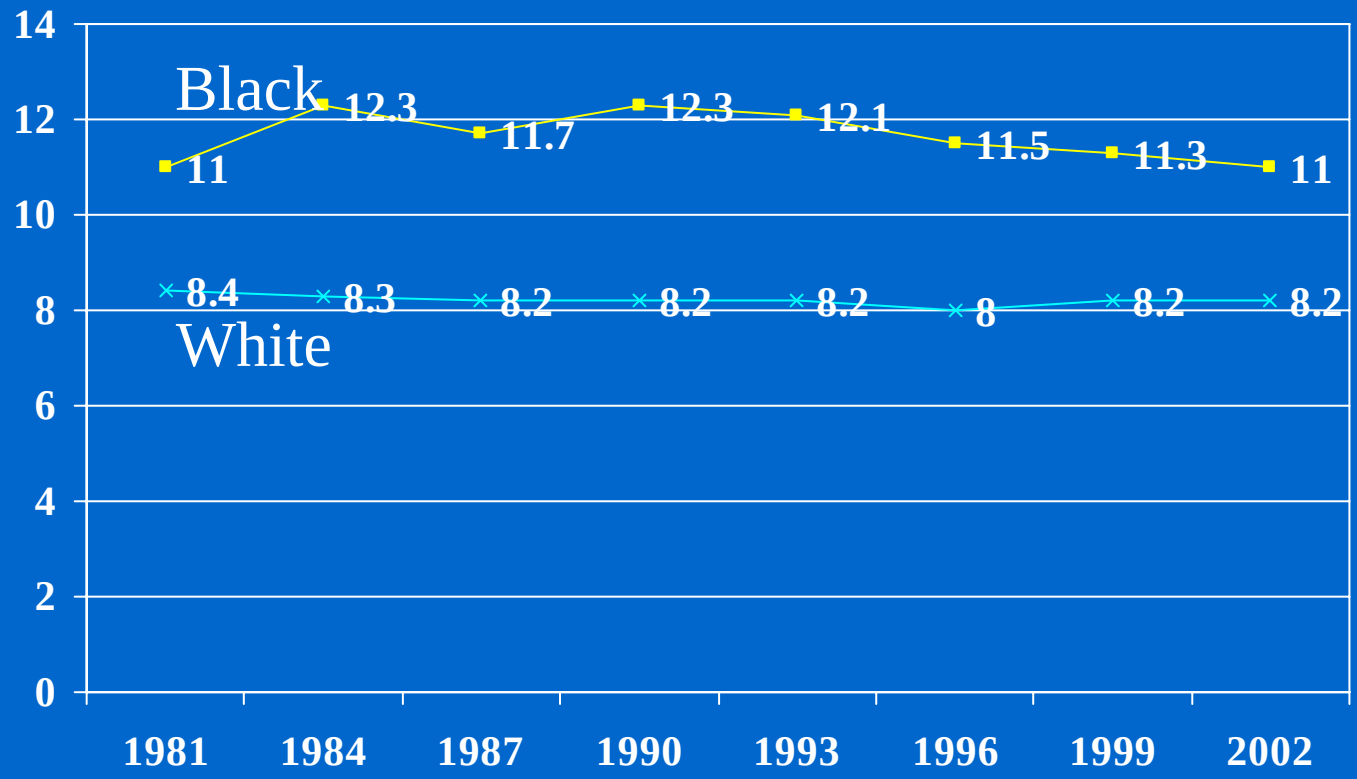
Brain Cancer -- Age-adjusted Death Rates Per 100,000 1950-1999 (Males)



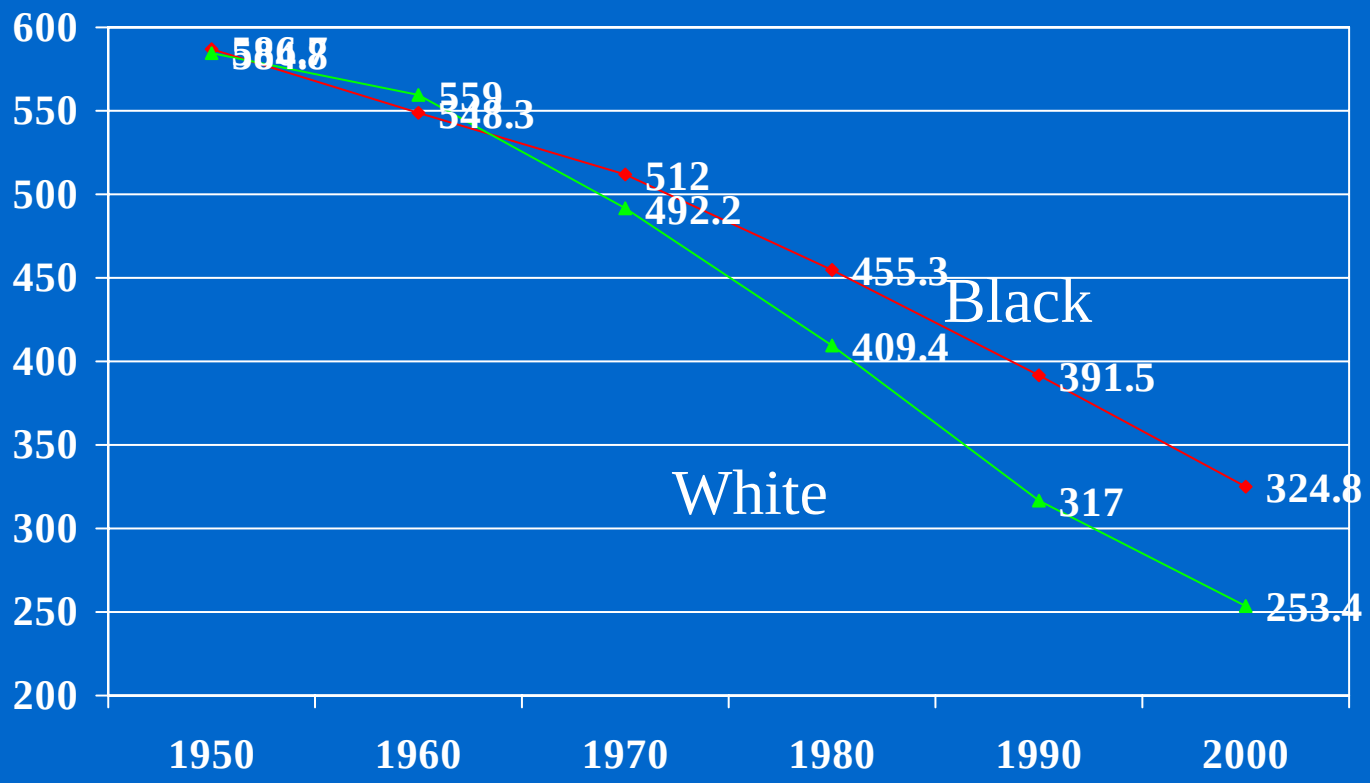
Ovarian Cancer -- Age-adjusted Death Rates Per 100,000 1950-1999 (Females)



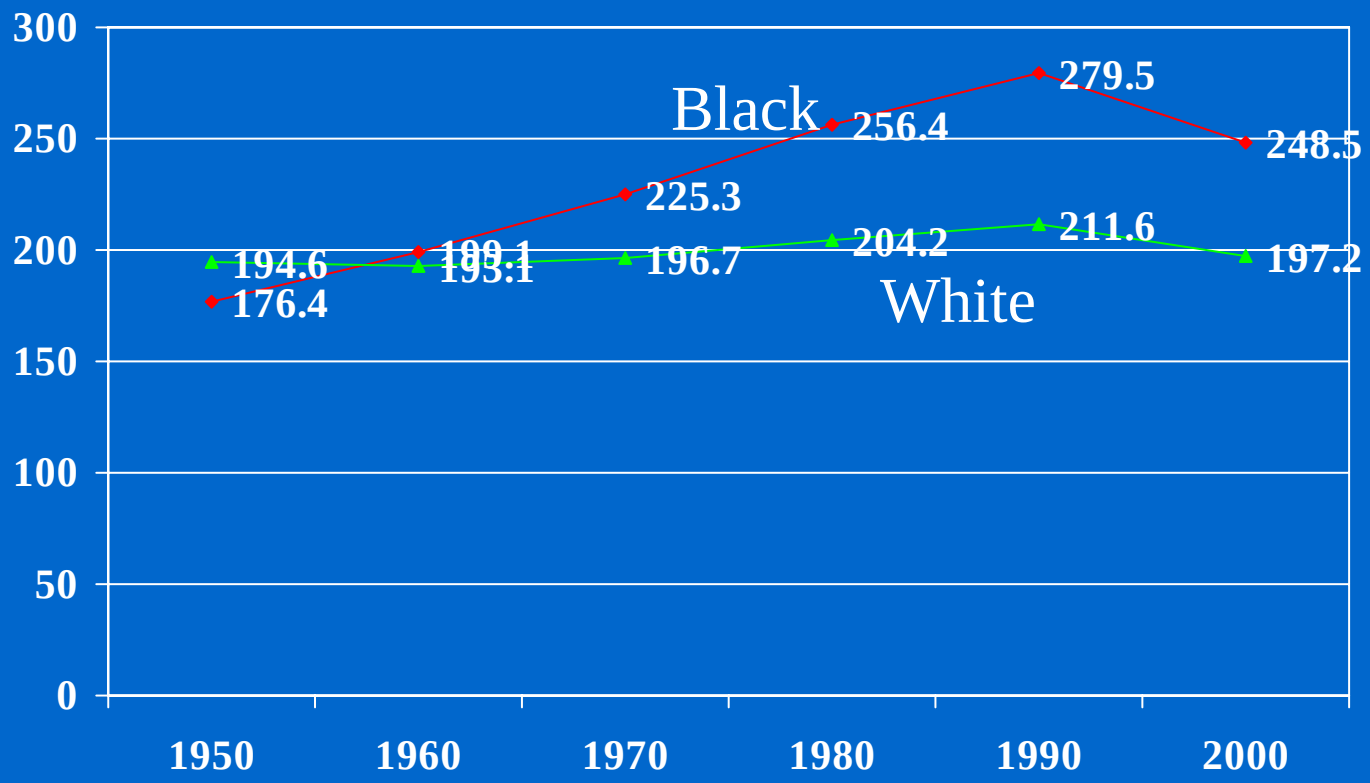
Pancreatic Cancer -- Age-adjusted Death Rates Per 100,000 1981-2002



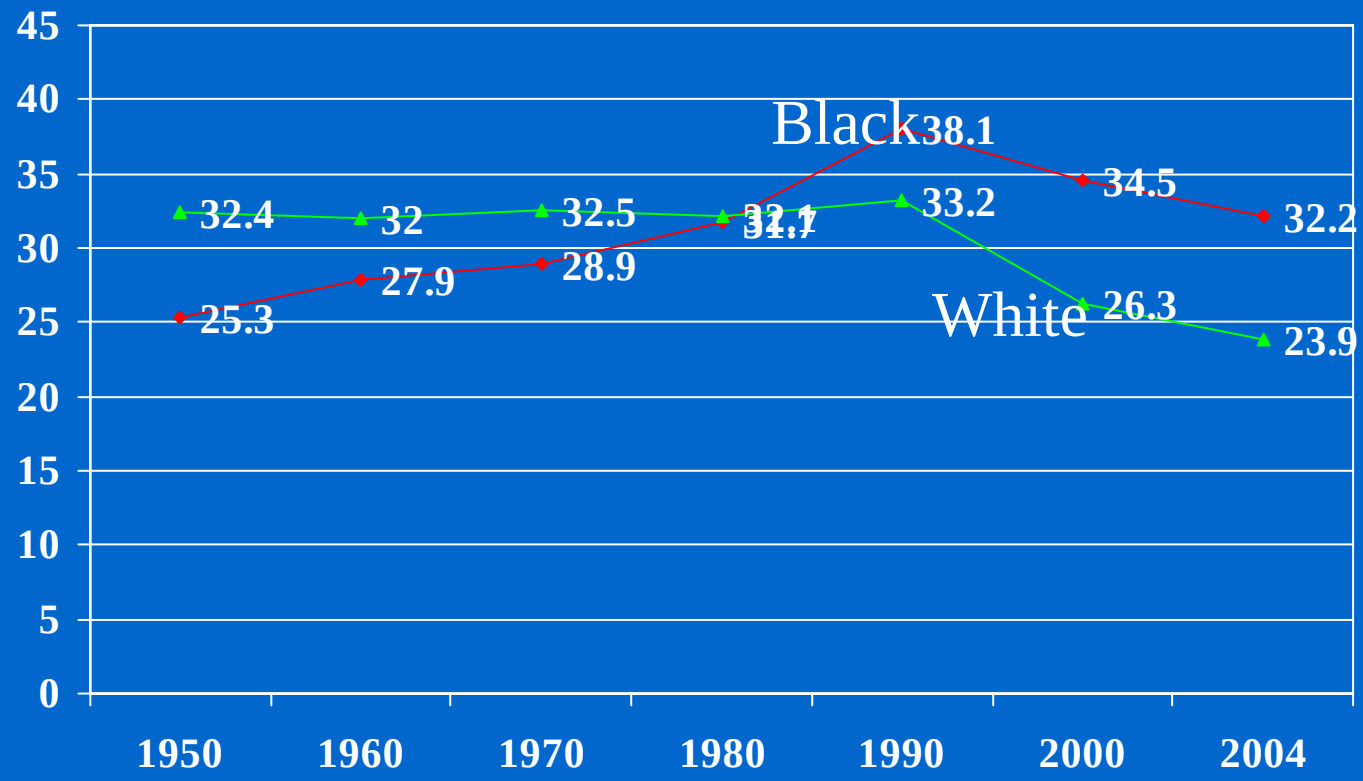
Heart Disease -- Age-adjusted Death Rates Per 100,000 1950-2000



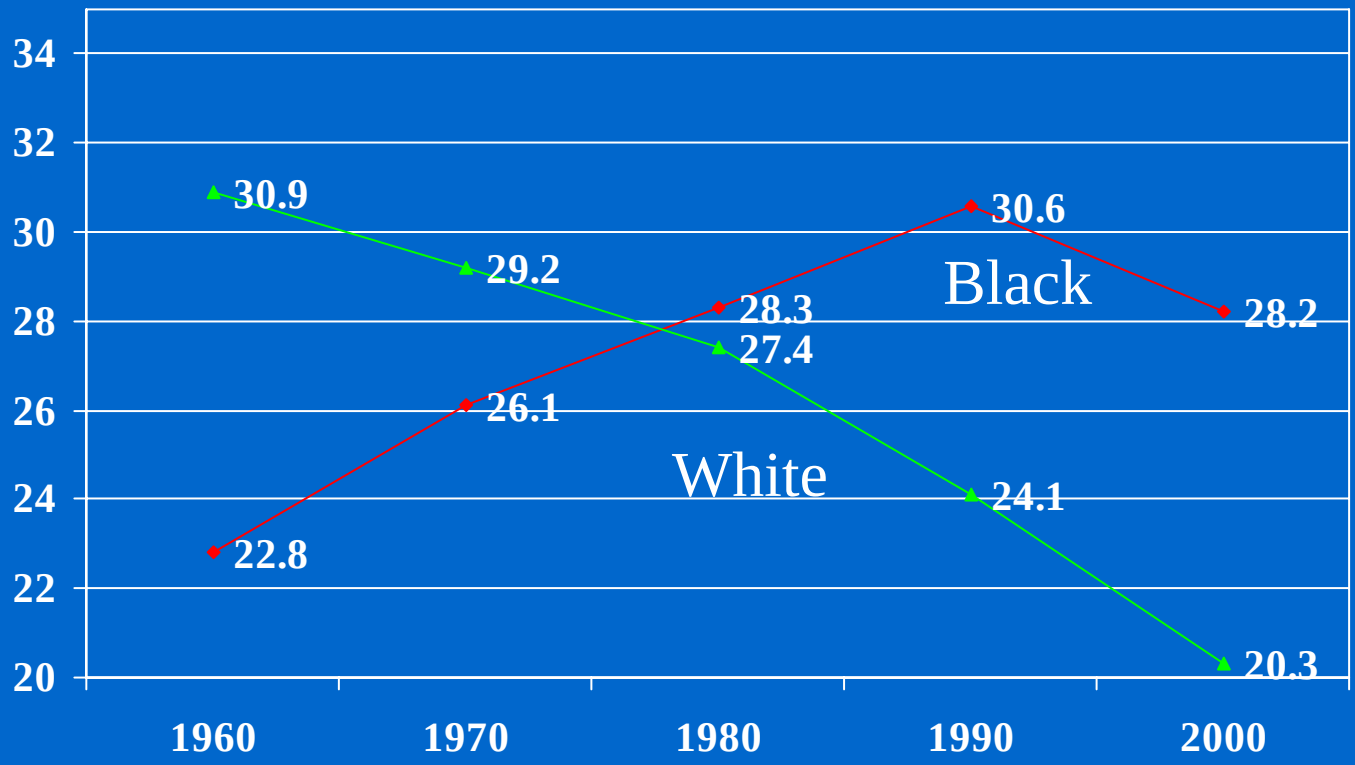
All Cancers Combined-- Age-adjusted Death Rates Per 100,000 1950-2000



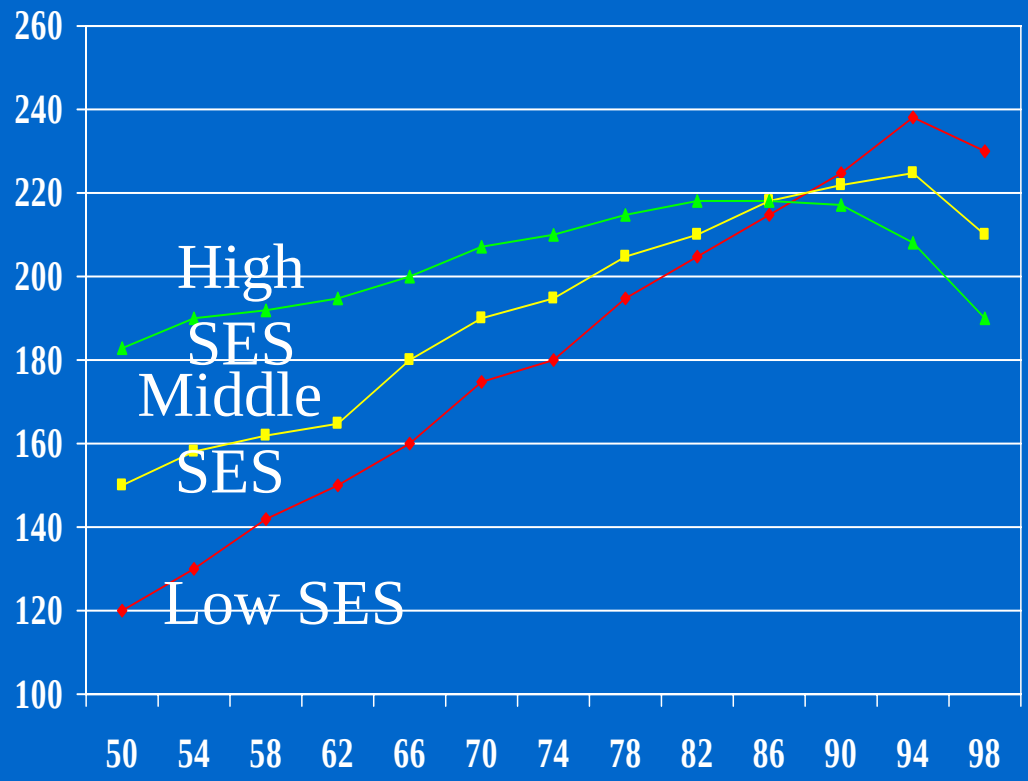
Breast Cancer-- Age-adjusted Death Rates Per 100,000 1950-2000



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

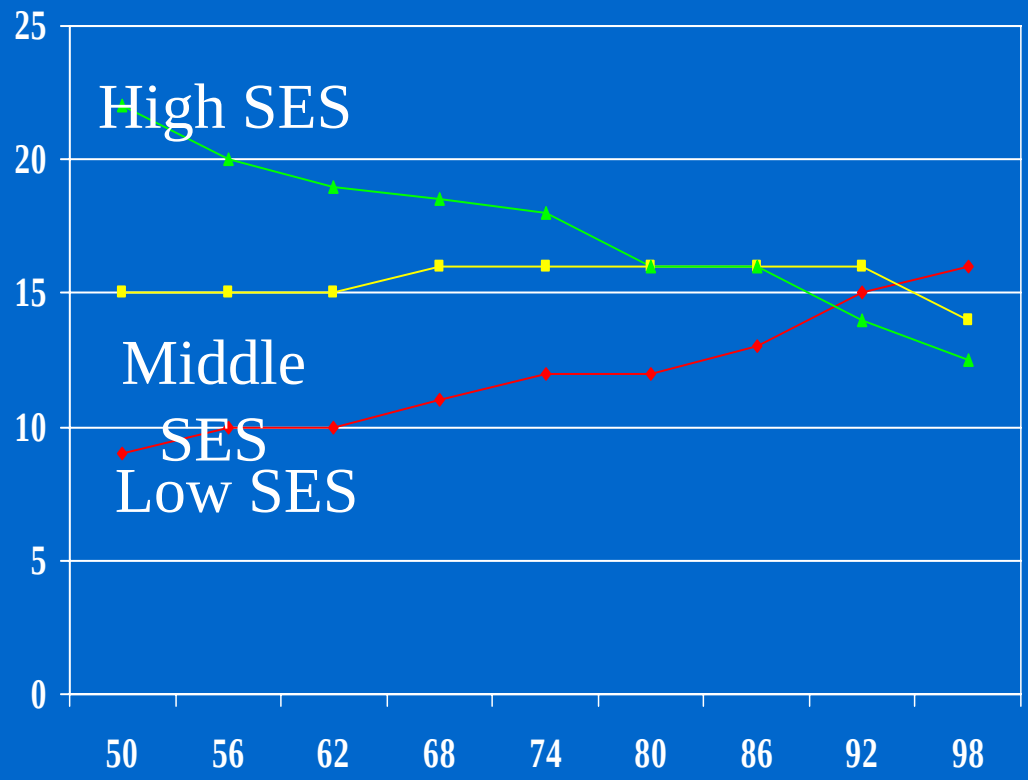


Age Adjusted Cancer Mortality (All Types) 1950-1998 by SES of County of Residence



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

Age Adjusted Colon Cancer Mortality (Men 25-64) 1950-1998 by SES of County of Residence



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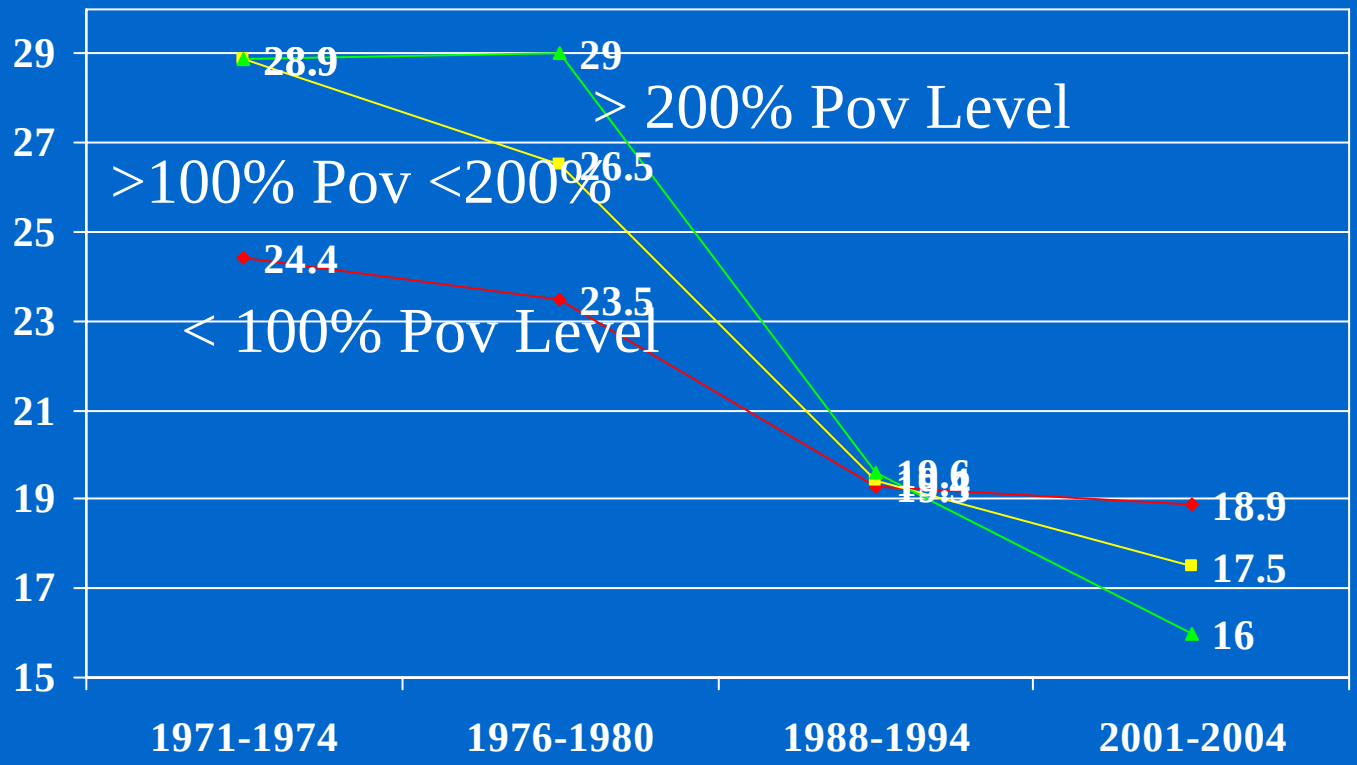
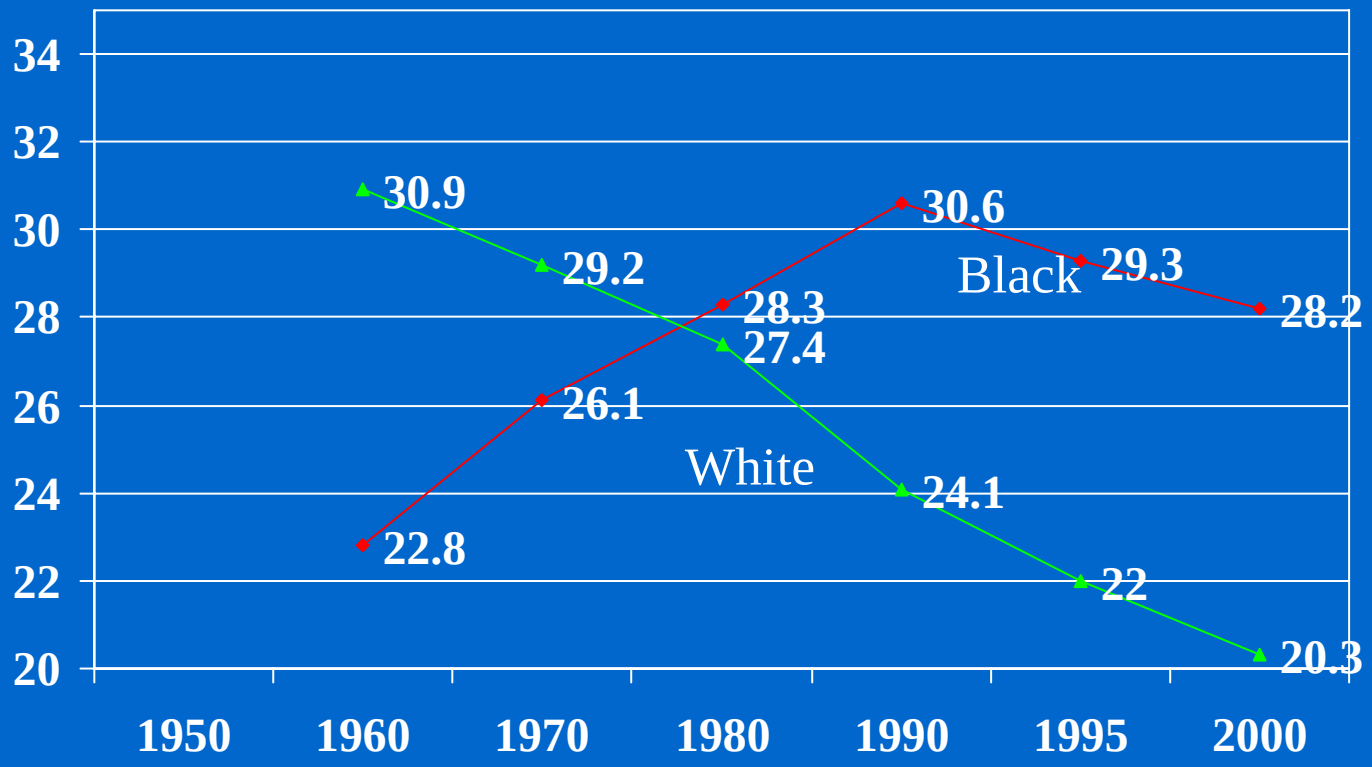
Percent with Total Cholesterol Above 240 mg/dL -- Age-adjusted



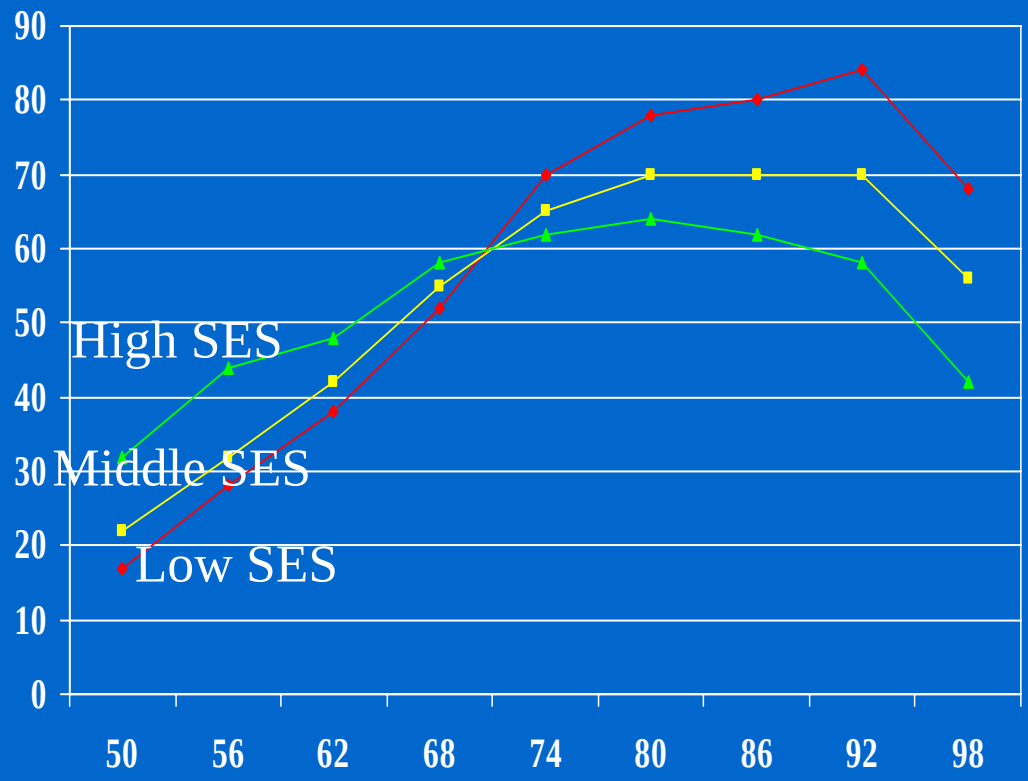
Conclusions

- When we examine Race and SES disparities in mortality by particular diseases we find dramatic evidence that such disparities are created over time.
- Groups with more resources and who face less discrimination benefit more greatly from our new found capacity and disparities emerge
- This means that explanations that propose relatively unchanging causes of disparities like genes, relative deprivation, social participation etc. cannot be the main reasons for health disparities.

Colon, Rectum and Anus -- Age-adjusted Death Rates Per 100,000 1950-2000



Age Adjusted Lung Cancer Mortality (Men 25-64) 1950-1998 by SES of County of Residence

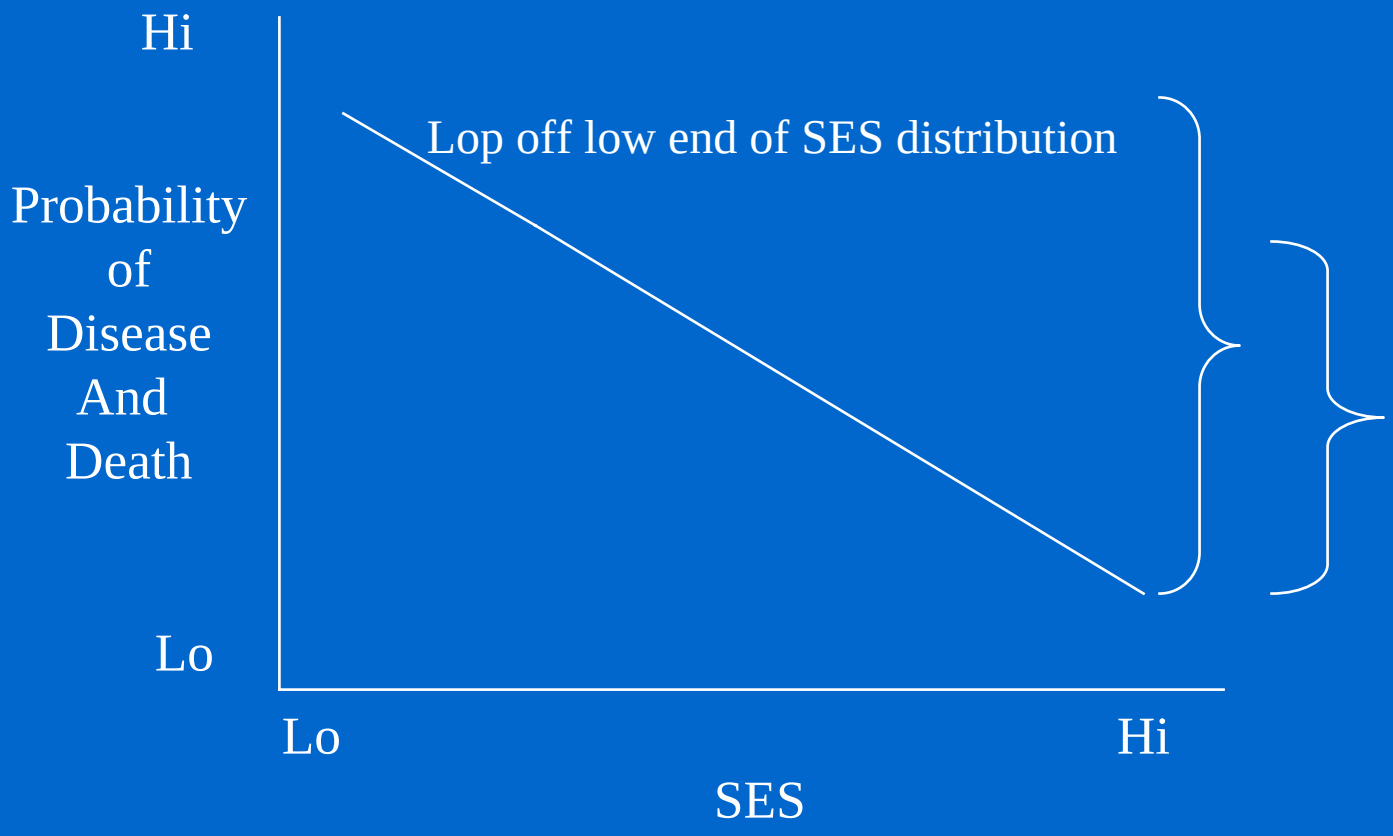


From Singh et al. 2002 Journal of the National Cancer Institute

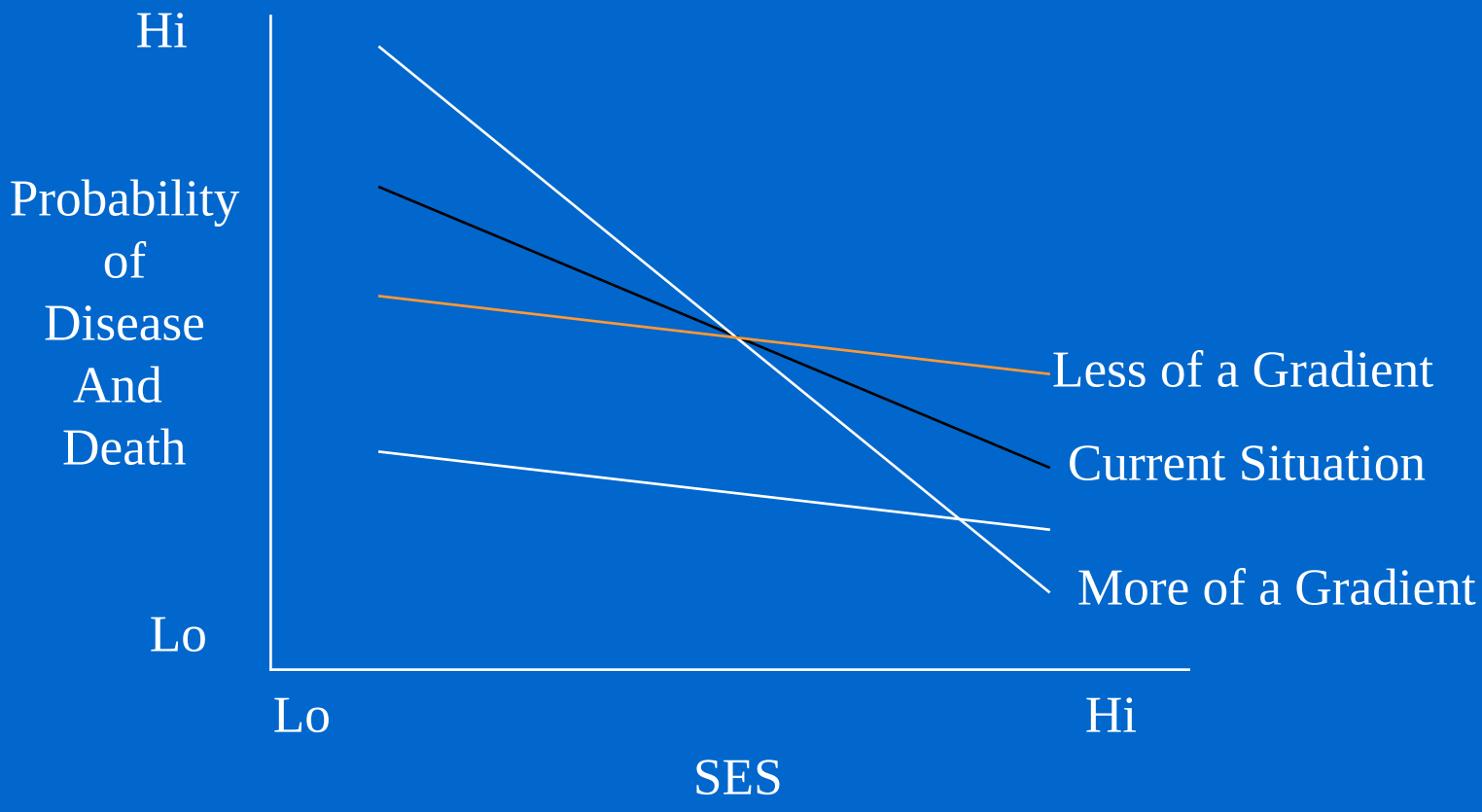
Policy Issues

- Social policies that provide resources to the resource poor
- Population health policy that focuses on changing contextual factors that affect everyone in a context regardless of resources
- Population health policies that “contextualize” individual risk

Social Policies that Provide Resources to the Resource Poor



Policies That Affect How Steep the SES Gradient Becomes



- Create interventions that affect entire contexts rather than interventions that require individual action
  - Fluoridation versus flossing
  - Air bags versus seat belts
  - Cleaning up lead paint versus instructing parents how to keep their children from ingesting paint chips
  - Meat inspection versus information to carefully wash cutting boards

- If interventions require individual action “contextualize” risk factors – that is find out what puts people at risk of risk – then intervene broadly and comprehensively to remove existing barriers to individual action directed towards health.

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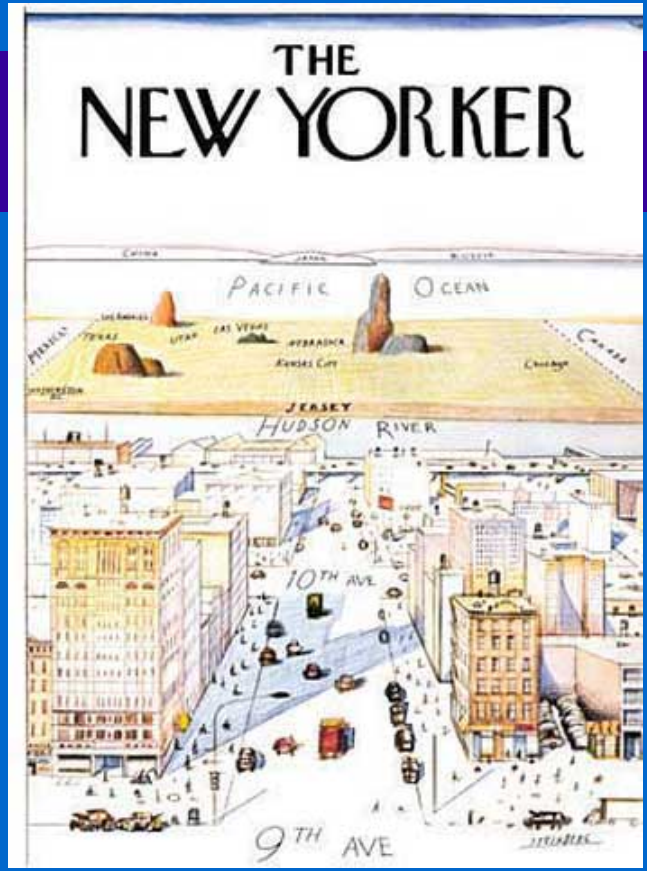

Thank you for your Attention!