

*Population Health and Health Disparities -  
A Social Epidemiology Perspective*

Health Disparities Symposium 2003, University of Washington

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“ The goal of the 2003 Health Disparities Symposium: Social Determinants: Methods and Practice is to expose faculty and students to research on health disparities and the social determinants of health. ”

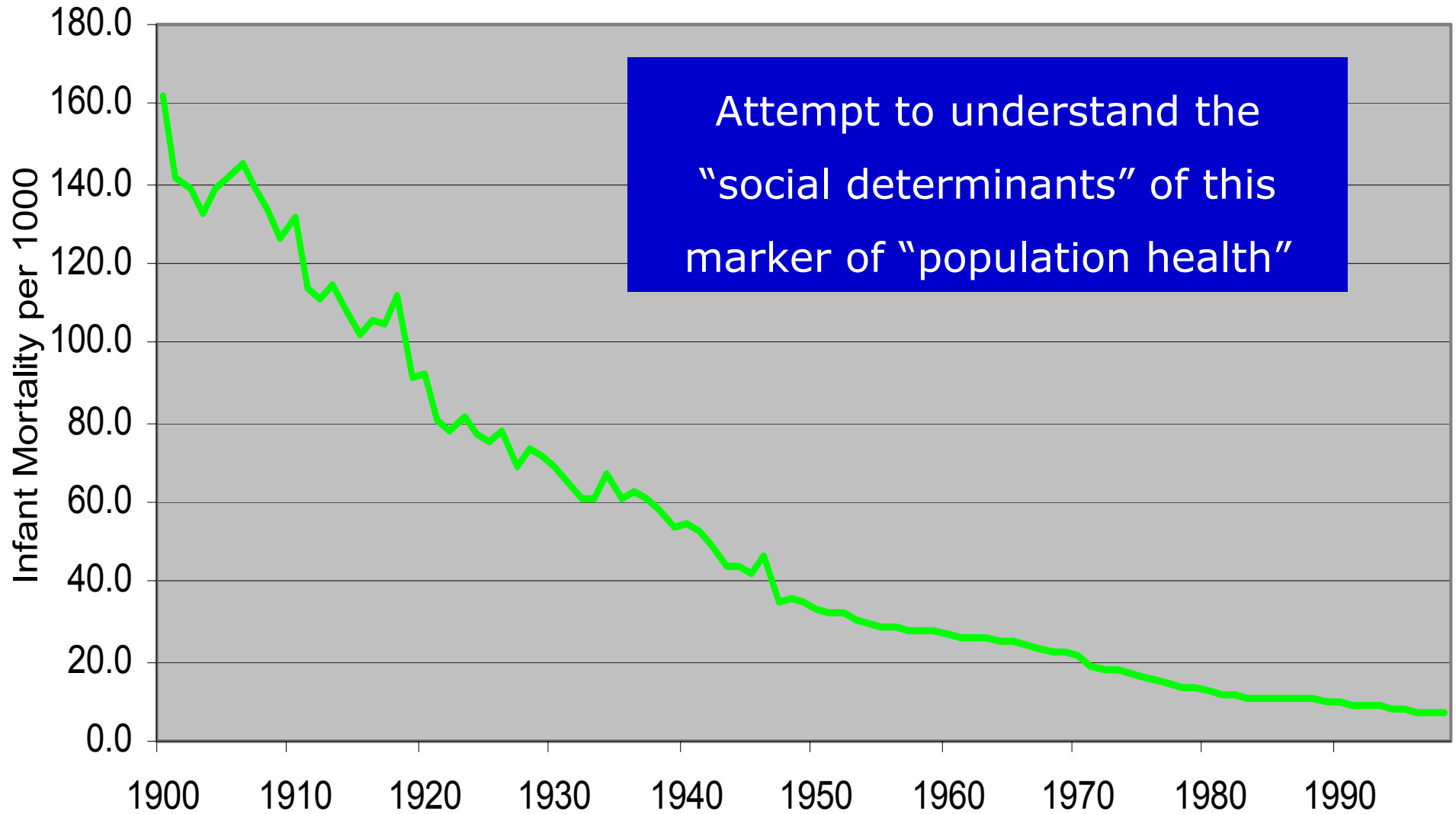
“social determinants”

“population health”

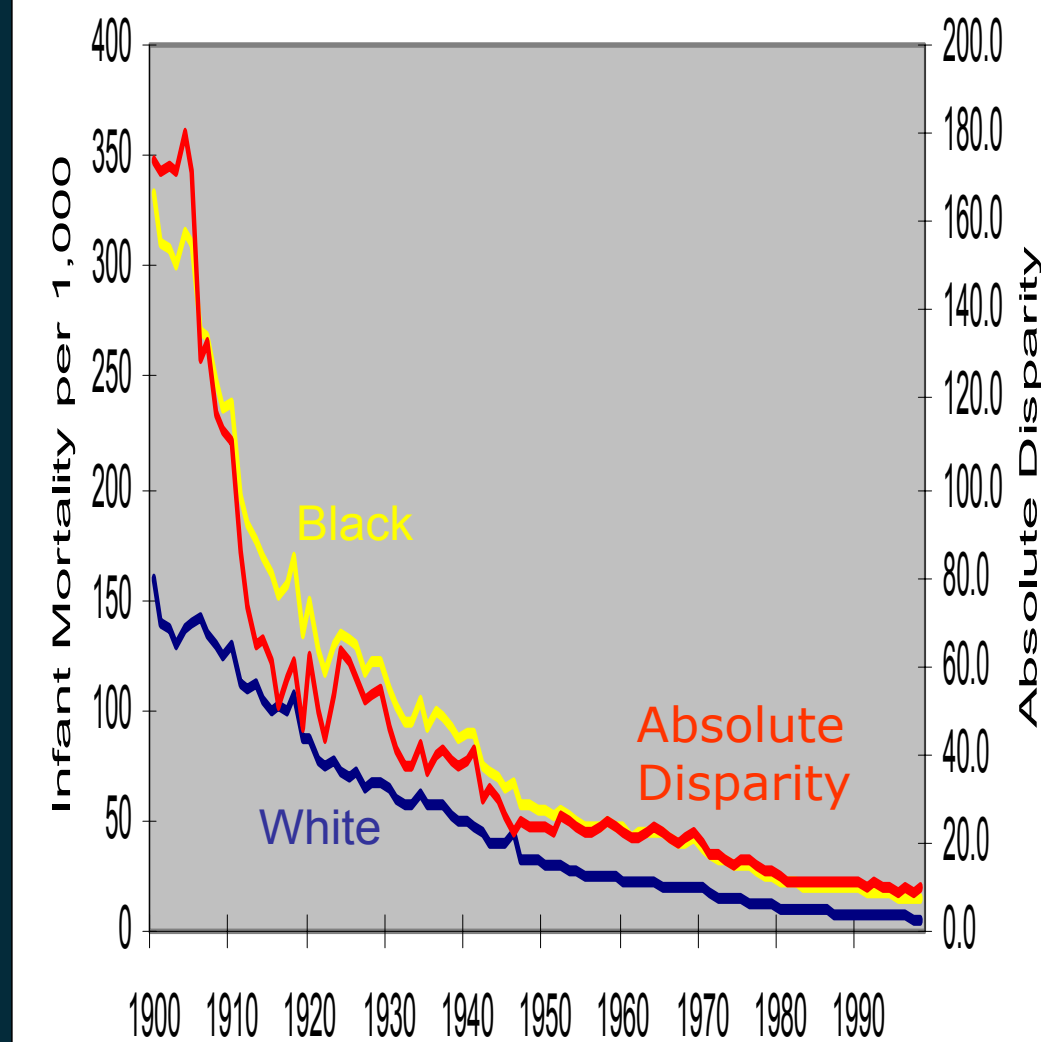
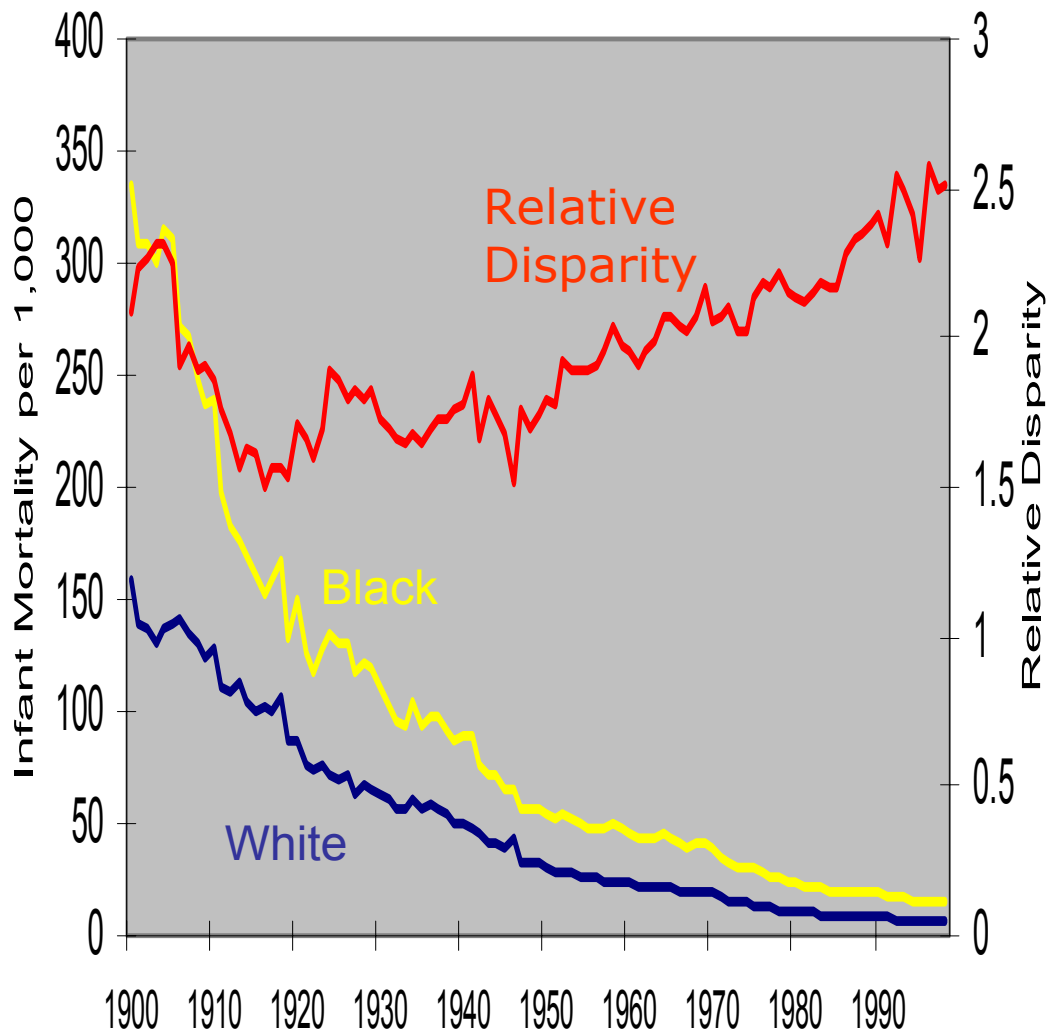
and

“health disparities”

## US Infant Mortality over the 20<sup>th</sup> Century



# Black – White Disparity in Infant Mortality over the 20<sup>th</sup> Century



## *Infant Mortality*

- “Population Health”
  - → Improved in all race/ethnic groups
- “Absolute Health Disparity” → Reduced
- “Relative Health Disparity” → Increased

With thanks to:

George Davey Smith, Bristol

Steve Kunitz, Rochester

Yoav Ben-Shlomo, Bristol

Chris Power, UCL, London

Vladimir Shkolnikov, Rostock

Johan Hallqvist, Karolinska, Stockholm

Pernille Due, Copenhagen

Nancy Ross, McGill, Canada

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Di Kuh, UCL, London

David Blane, London

Tony McMichael, Canberra

Juan Merlo, Lund, Malmo

Finn Diderichsen, Copenhagen

Michael Wolfson, Stat. Canada

George Kaplan, Michigan

Richard Cooper, Loyola

**Part 1.** A brief overview of social epidemiology

**Part 2.** Does an appreciation of social factors actually improve our understanding of population health?

- *A "social" epidemiology of the Russian Mortality Crisis*

**Part 3.** What are some of the lessons for understanding the social determinants of population health?

- *Considering specificity of links between social factors and health*

**Part 4.** What are some of the lessons for understanding social disparities in health?

- *Considering heterogeneity of links between social factors and health*



## Part 1. A brief overview of social epidemiology

- *One person's view*

You will find examples of studies of social factors and health  
in many disciplines

Psychology

Sociology

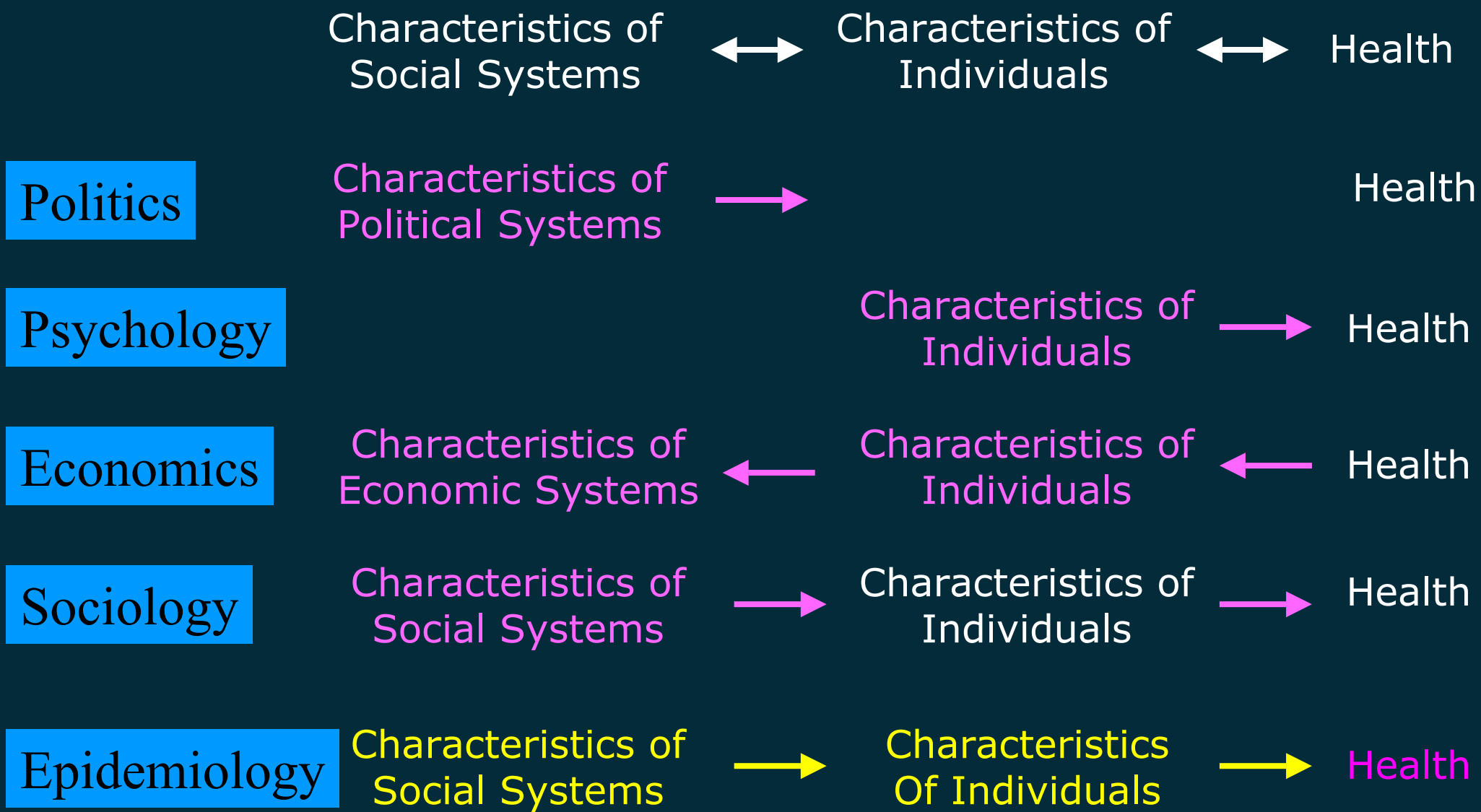
Demography

Economics

Politics - Public Policy

Urban Planning

*Disciplinary Perspectives on Health and Health Inequalities*



Distal

Proximal

Political  
Economy

Psychology  
Sociology

Behaviour

Genetics  
Biology

< "Social" Epidemiology > < "Risk Factor" Epidemiology >

"Structural"  
Epidemiology

"Psychosocial"  
Epidemiology

"Behavioral"  
Epidemiology

"Modern"  
Epidemiology

Causes



Causes



Causes



Causes



"Disease"



*The Scope of  
Social Epidemiology*

Why are we  
interested?

**Social  
Structure**

**Individual Social  
Position**

**Psychosocial  
Behavioral  
Factors**

**Biological  
Factors**

**Morbidity  
Mortality**

Adapted from Diderichsen (1997)

# *Epidemiological Footprint of different Social Structures*

*Geoffrey Rose*

Determinants of  
individual cases

vs

Determinants of  
population rate

Marmot, *Lancet* (1998)

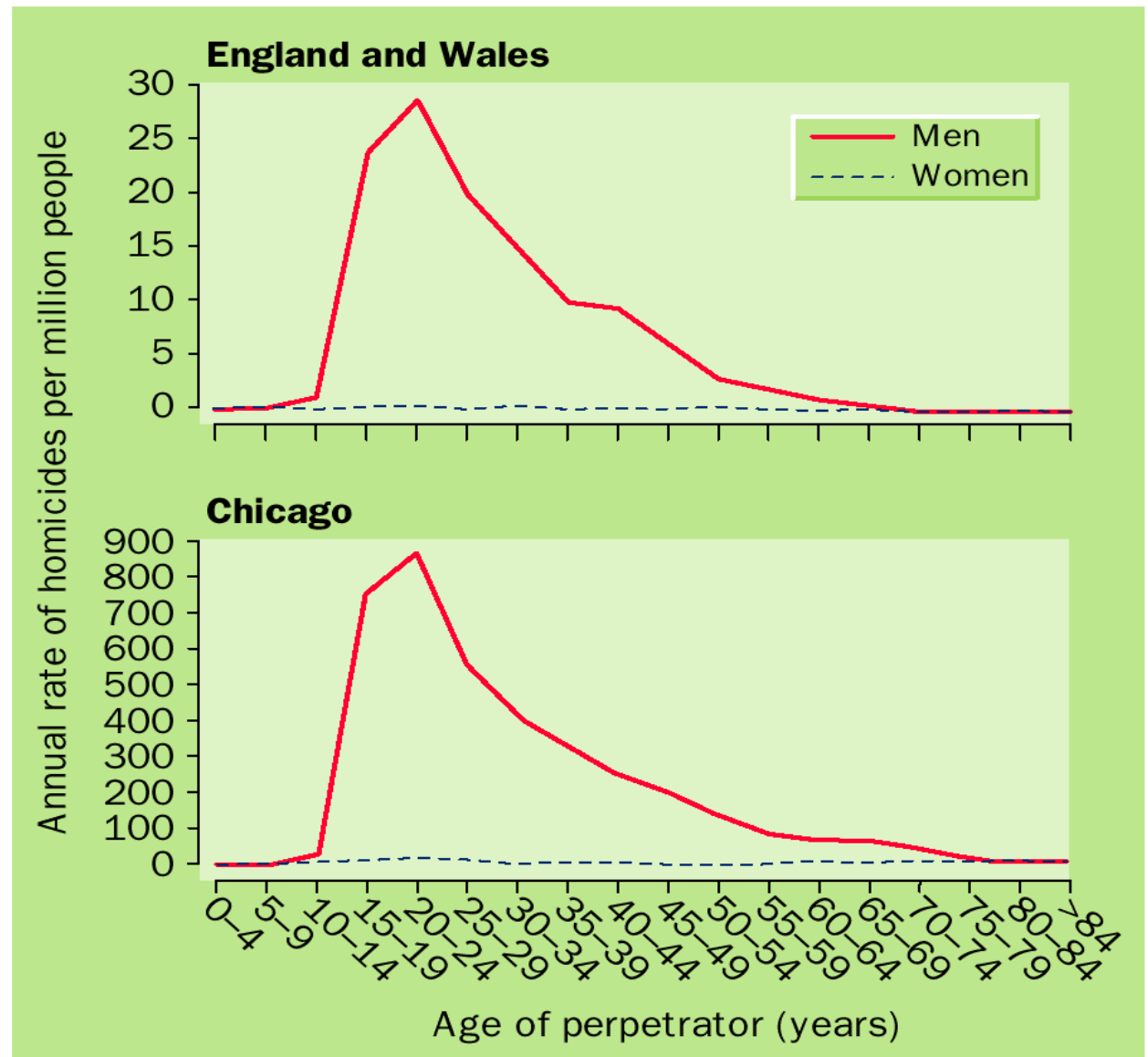
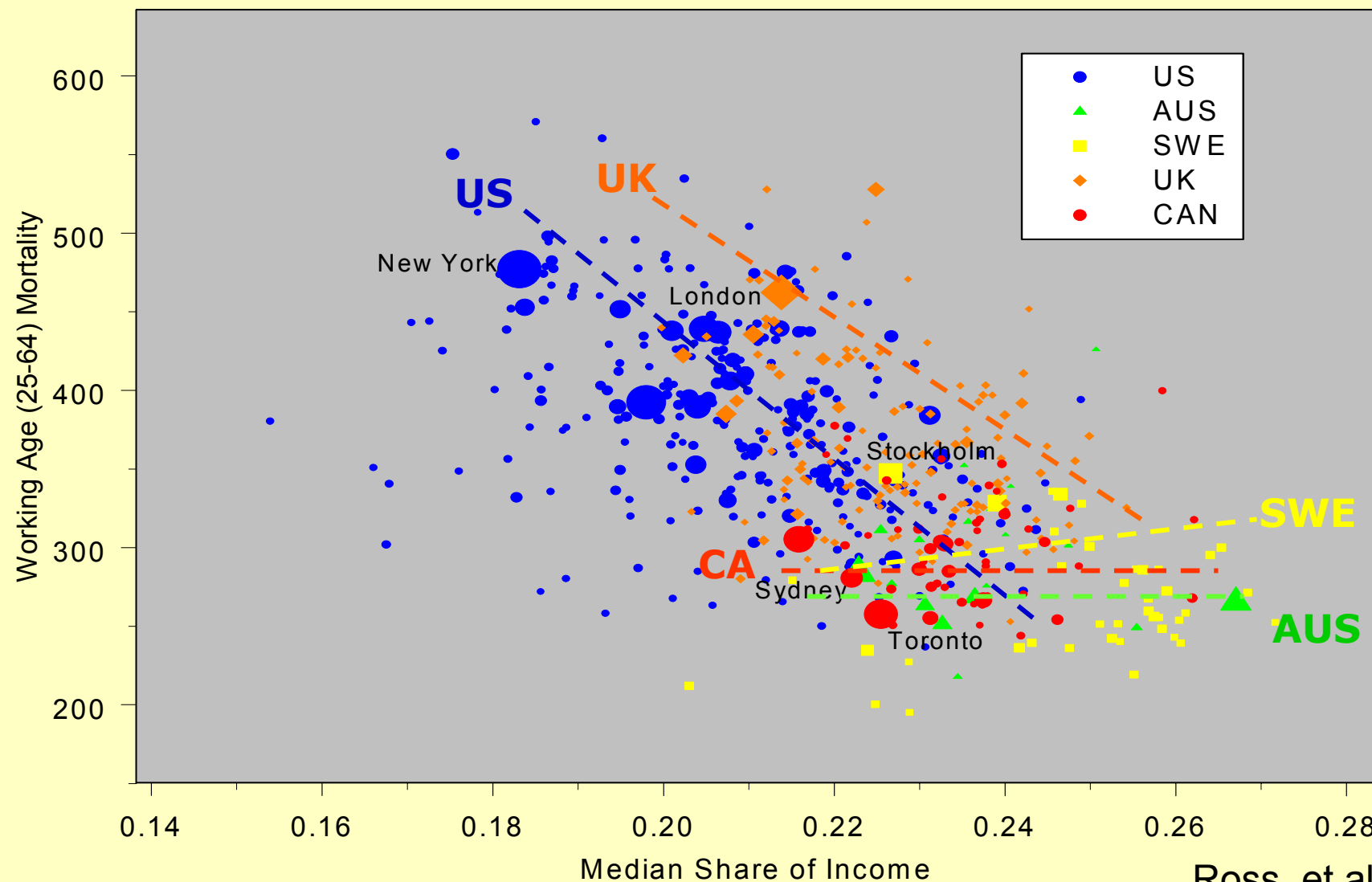


Figure 1: **Rates of homicide in Chicago and England and Wales by age and sex of perpetrator**

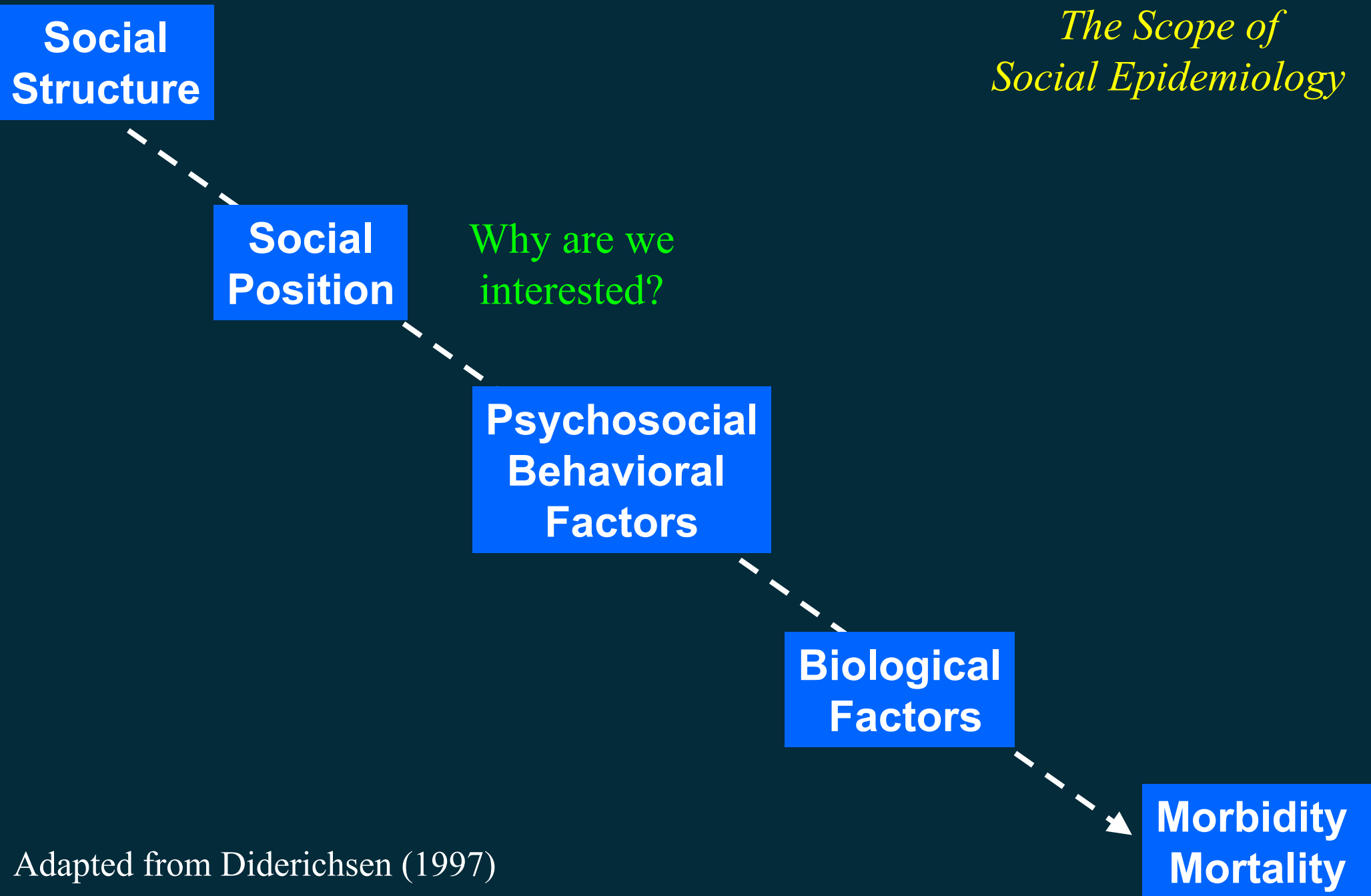
# Income Inequality and Working-Age Mortality

## 528 Metropolitan Areas in Five Countries, 1990/91



Ross, et al (in press)

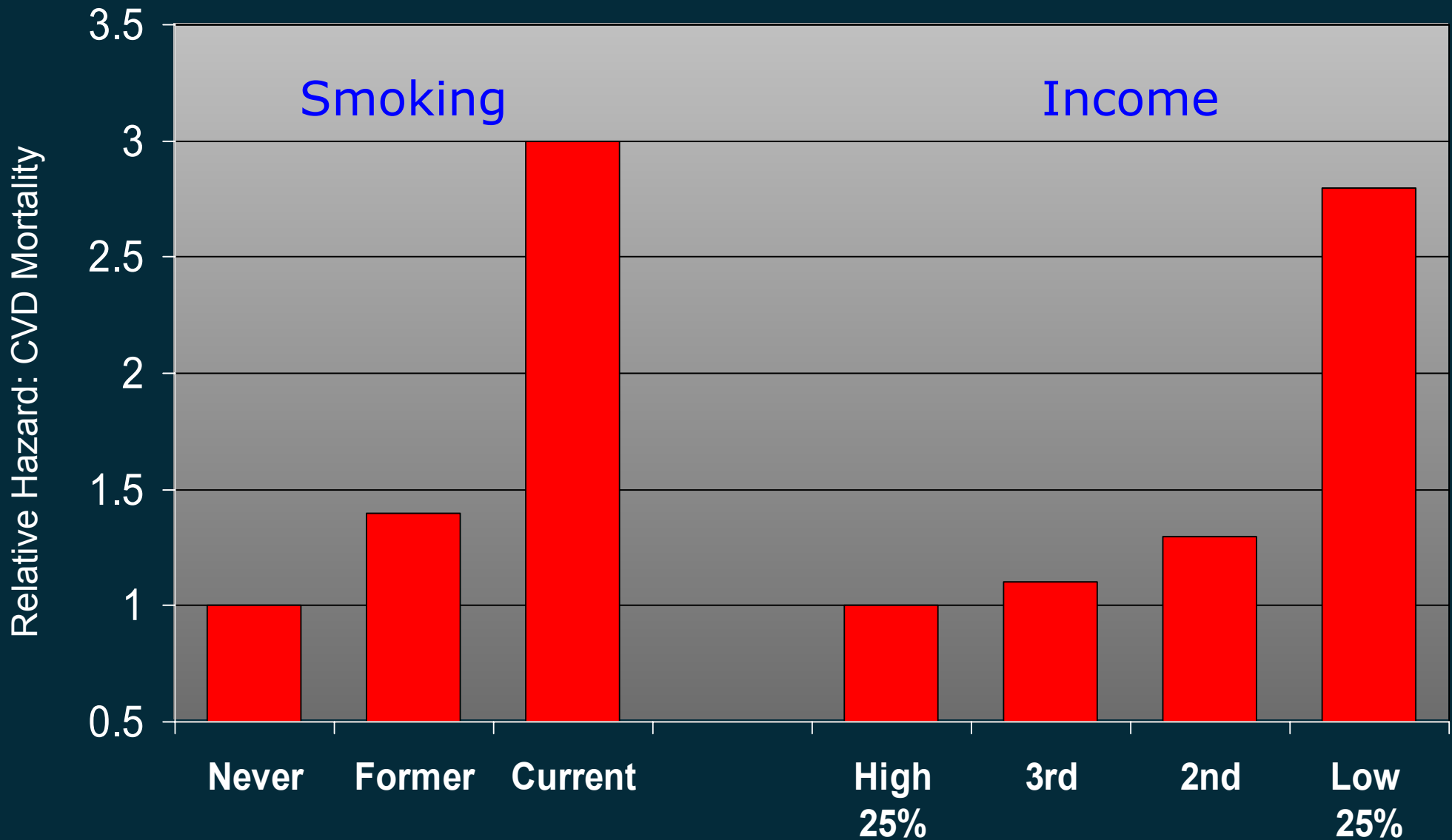
*The Scope of  
Social Epidemiology*



Adapted from Diderichsen (1997)



# Socioeconomic Position is a Powerful Risk Factor



KIHD Study, 1984-1996

*The Scope of  
Social Epidemiology*

**Social  
Structure**

**Social  
Position**

Why are we  
interested?

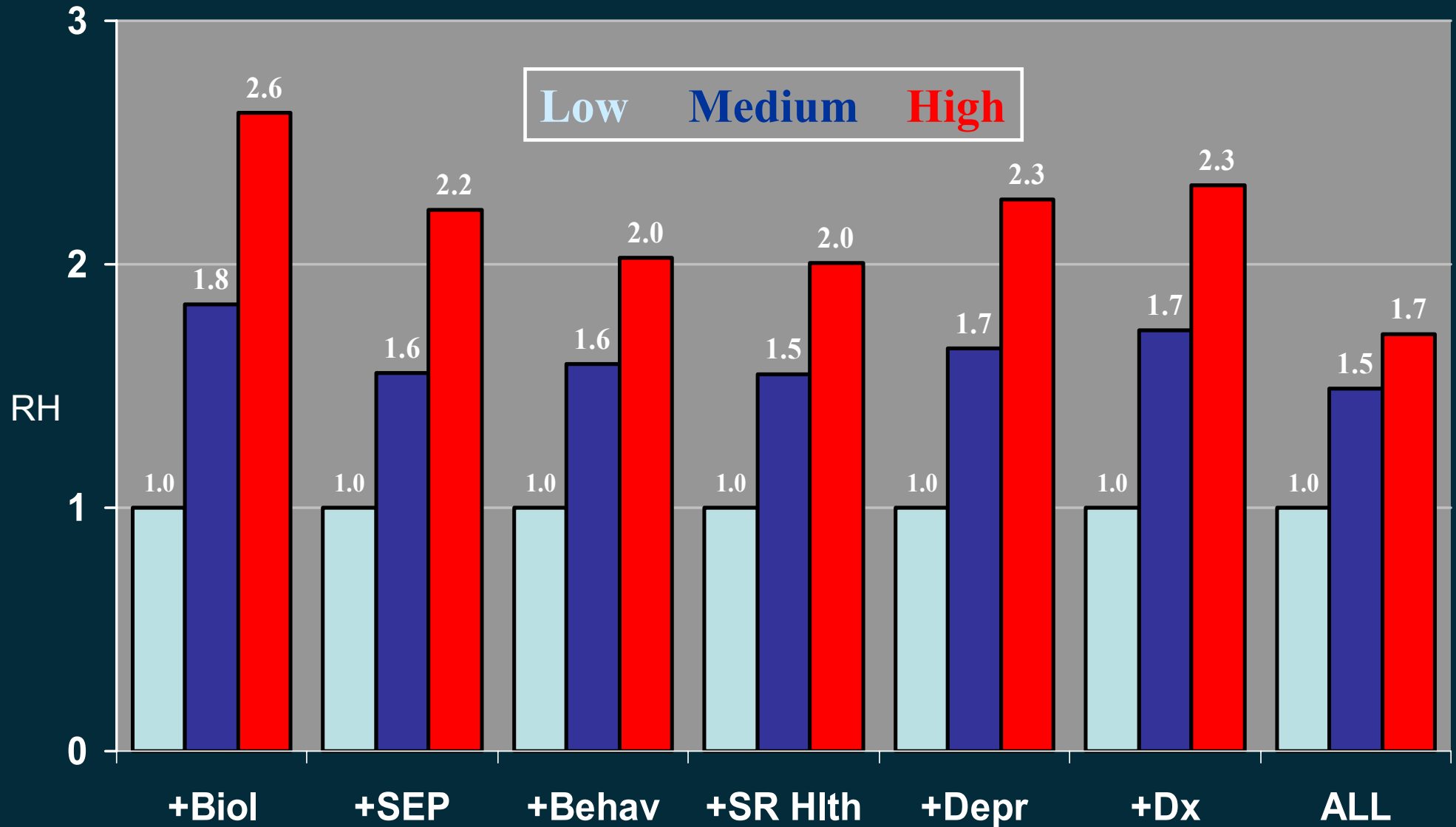
**Psychosocial  
Behavioral  
Factors**

**Biological  
Factors**

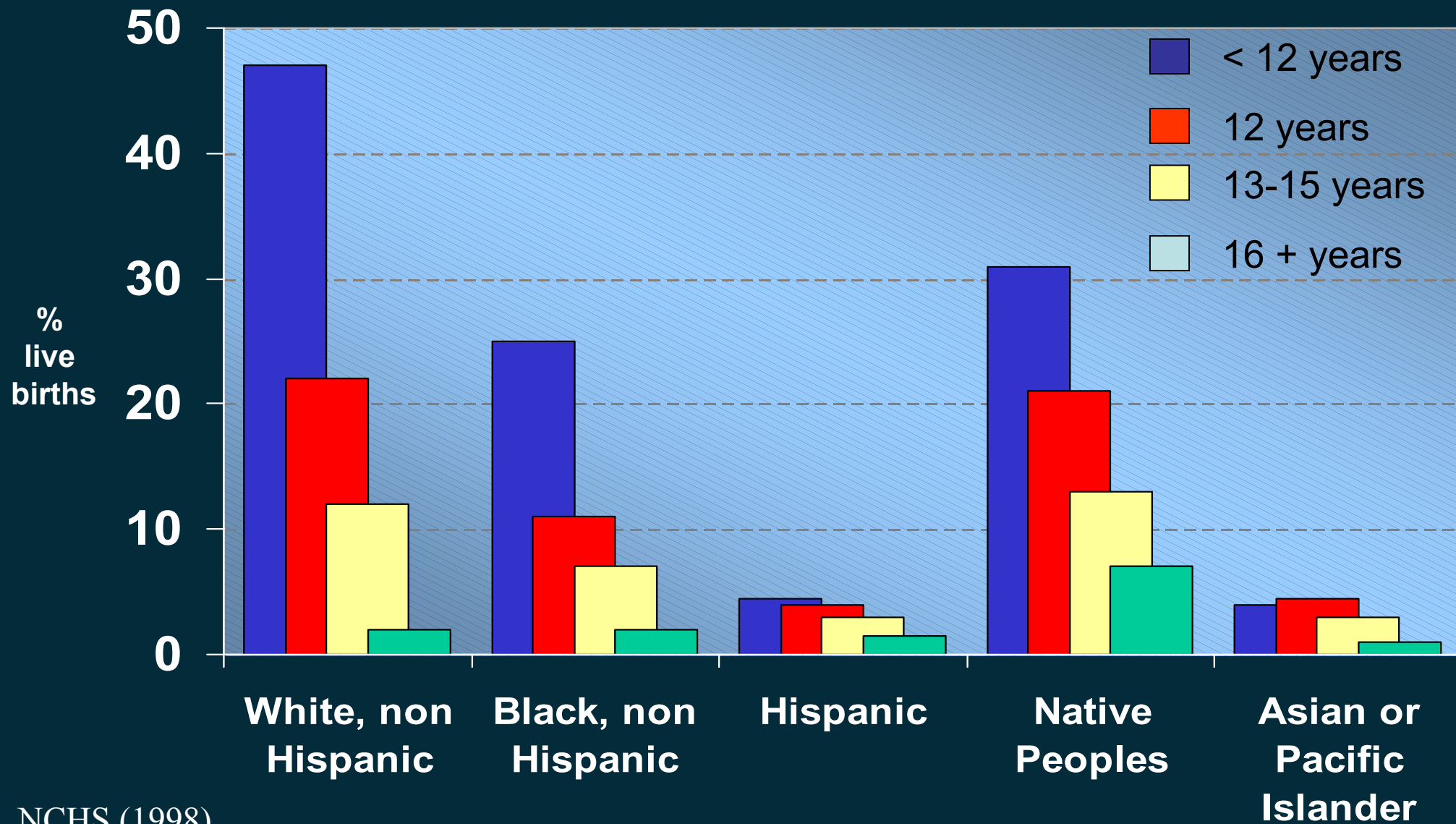
**Morbidity  
Mortality**

Adapted from Diderichsen (1997)

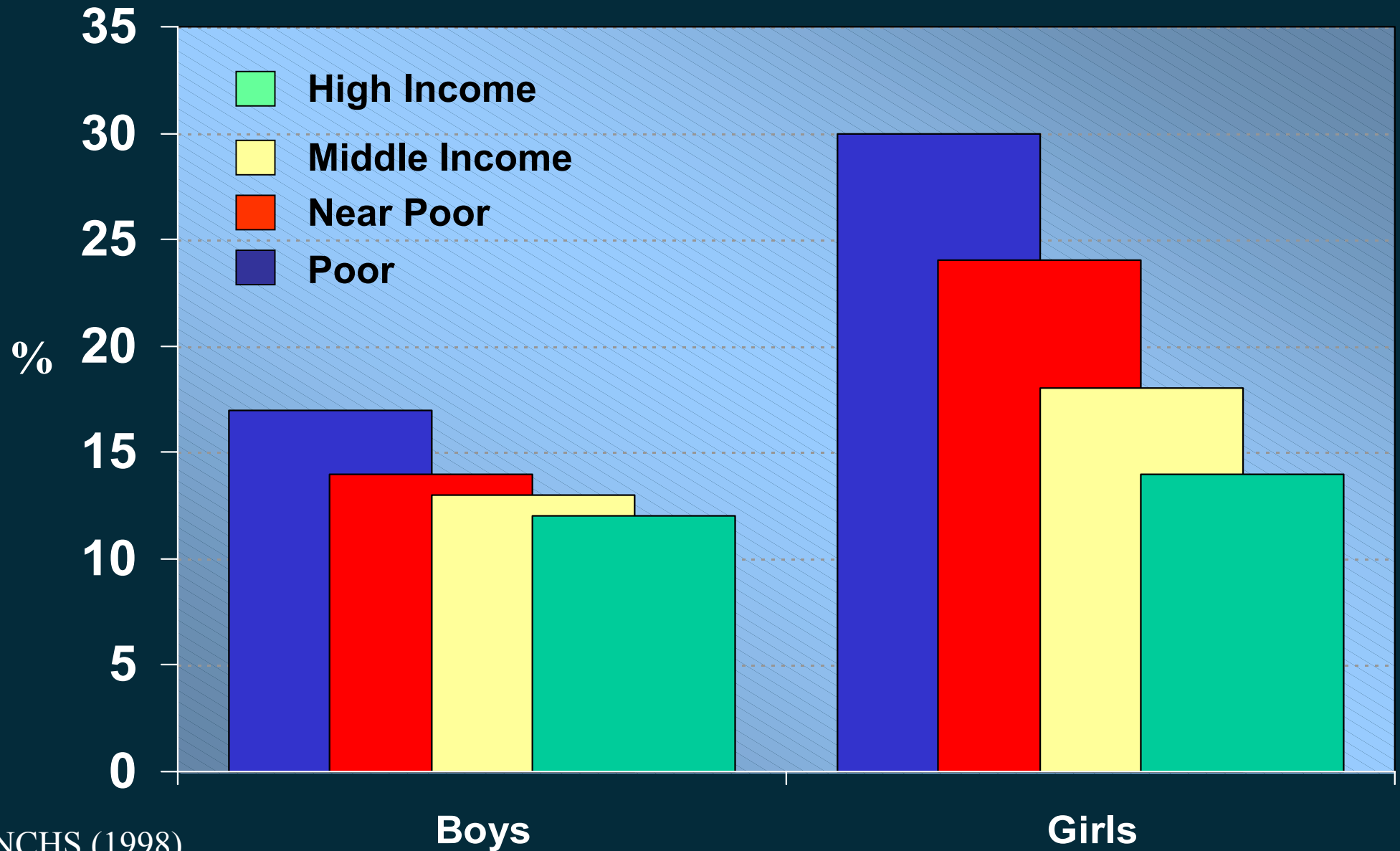
# Hopelessness and CVD Mortality



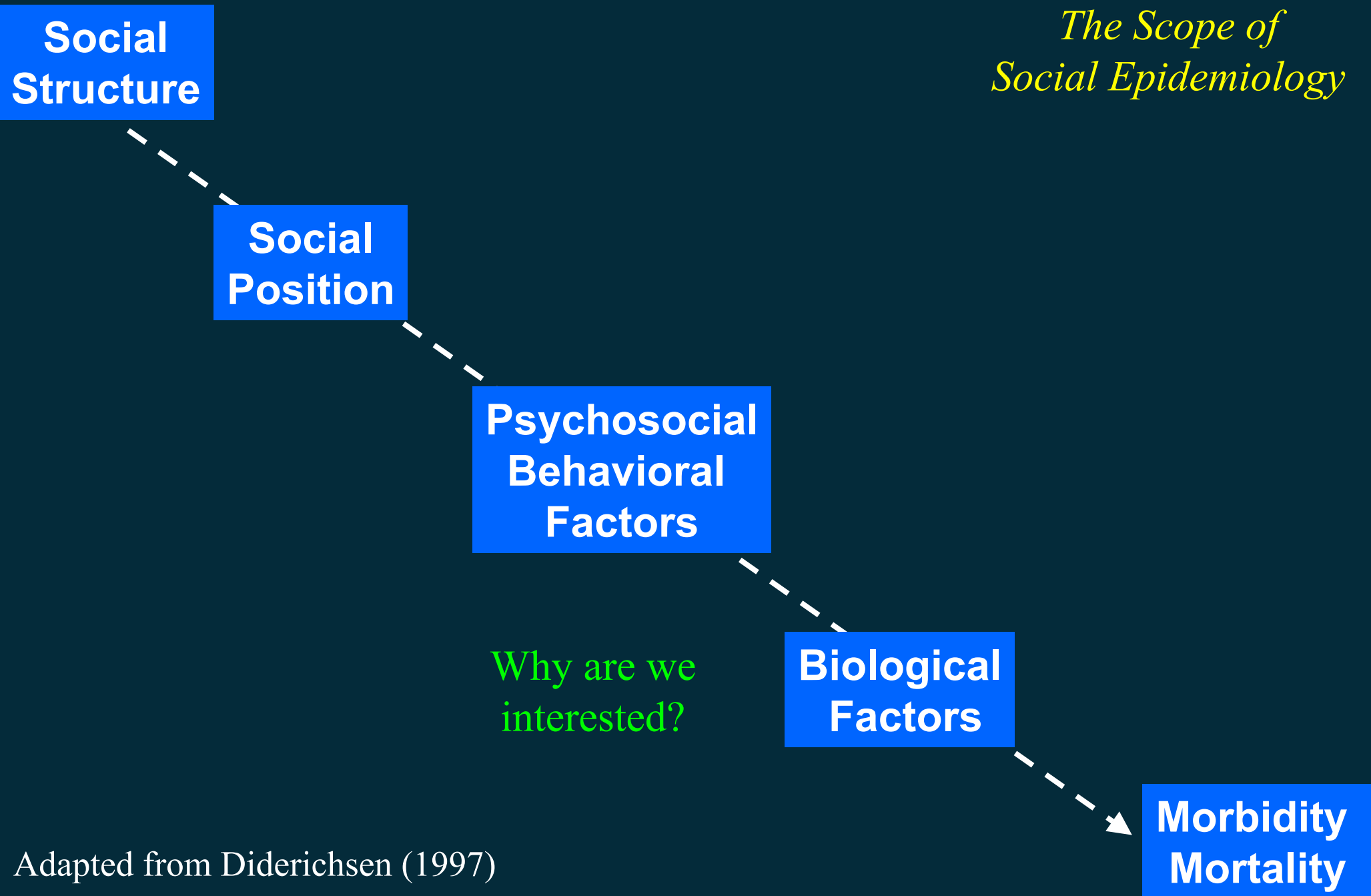
# Education and Smoking During Pregnancy Among Mothers Aged 20 or Older - USA 1996



# Income and Sedentary Behavior in Adolescents - USA 1995

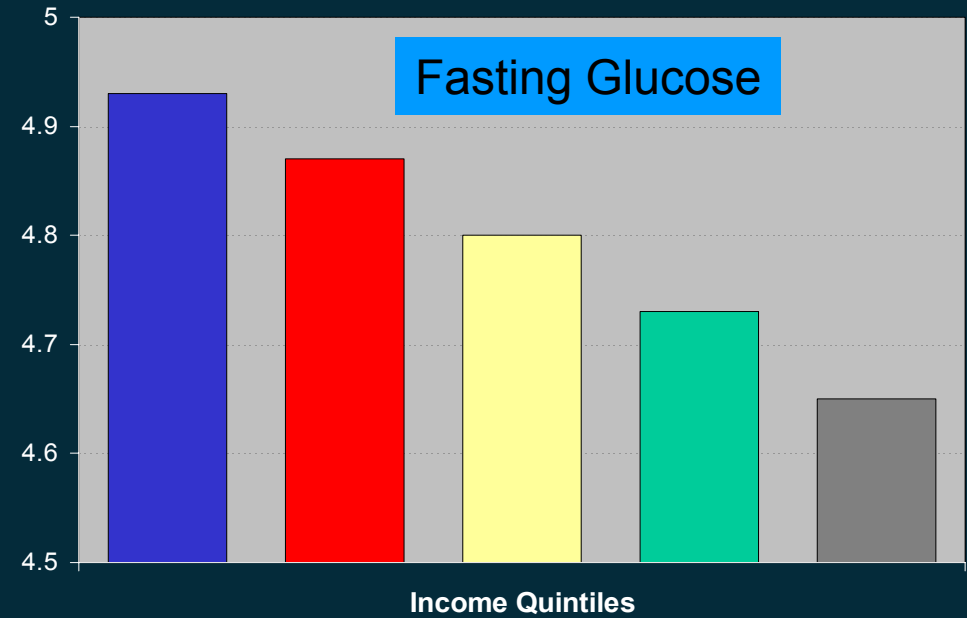
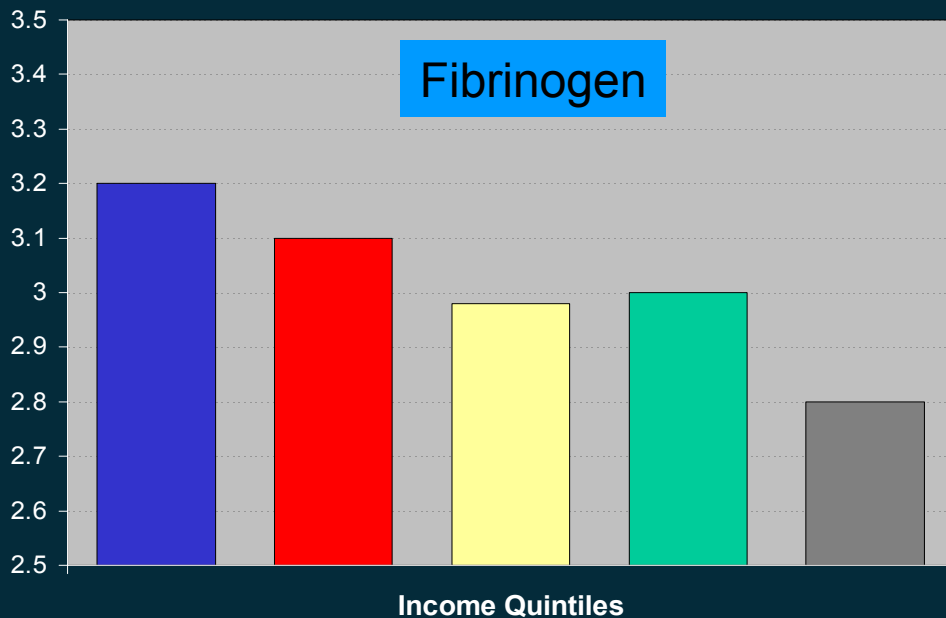
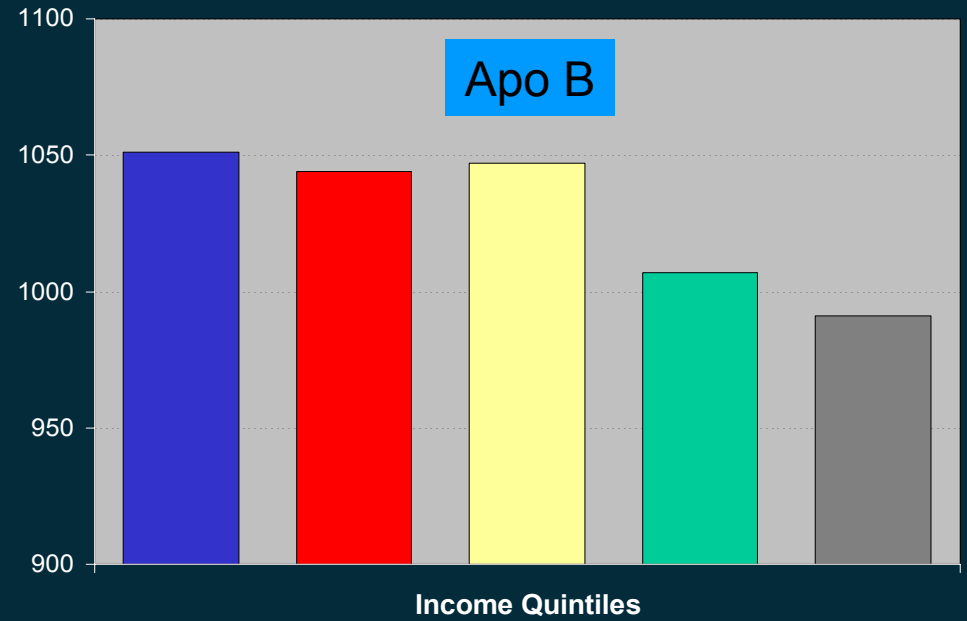
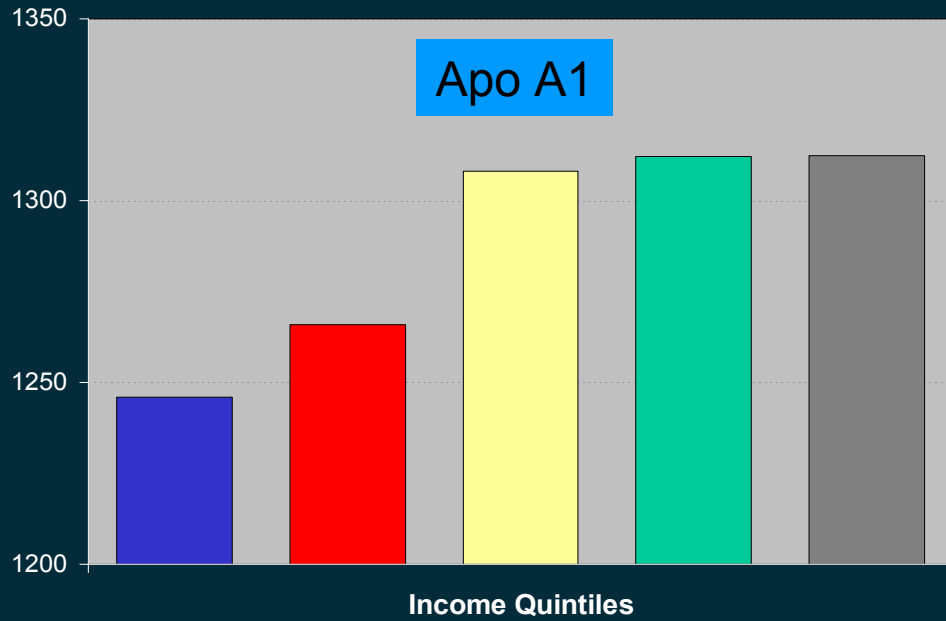


*The Scope of  
Social Epidemiology*

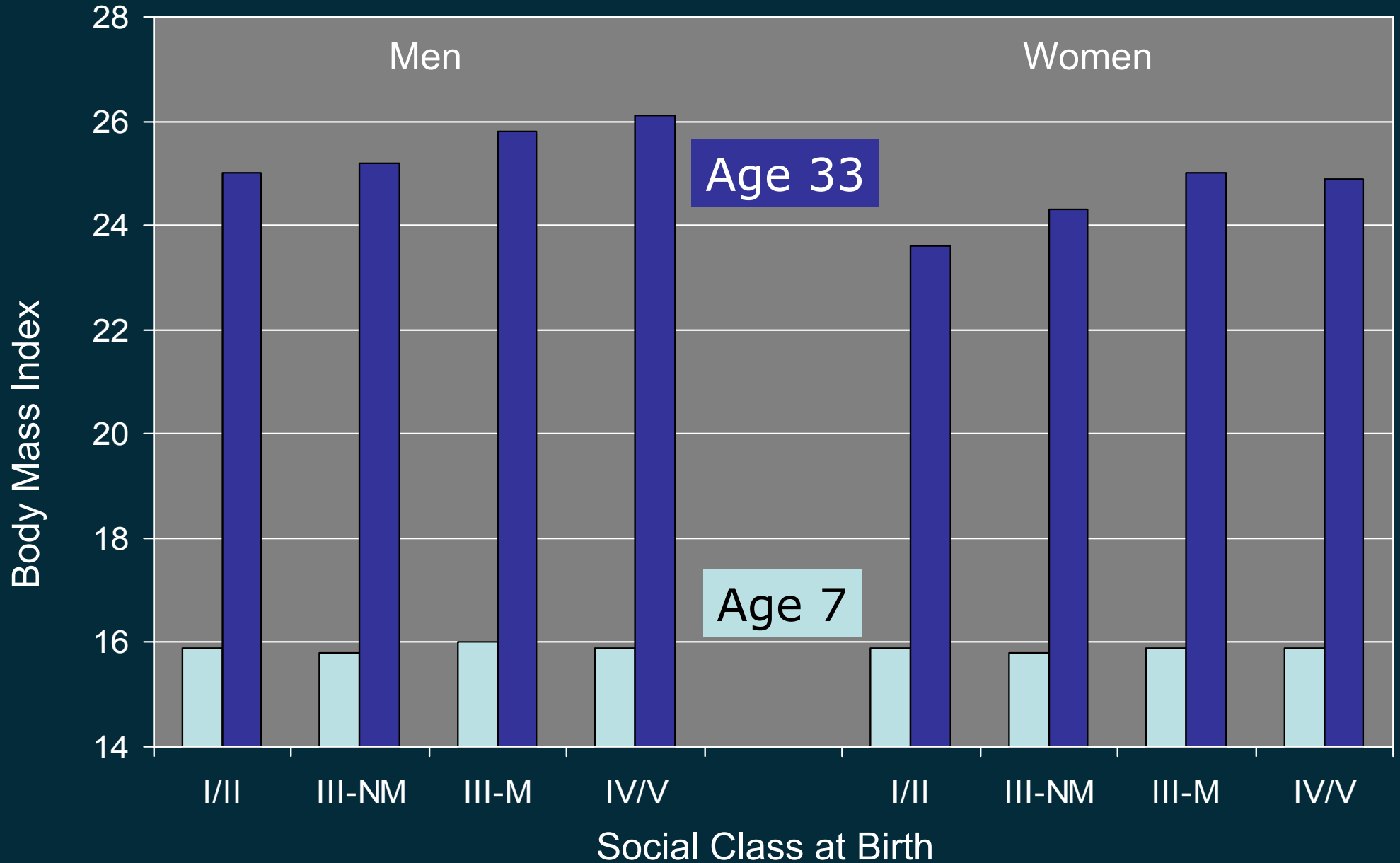


Adapted from Diderichsen (1997)

# Income and Biological Risk Factors (KIHD 1990)



# Body Mass Index by Social Class at Birth





# *The Landscape of Social Epidemiology*

**Social Structure**

Income inequality  
Residential segregation  
Social capital

**Social Position**

Class  
Race  
Gender

**Psychosocial Behavioral Factors**

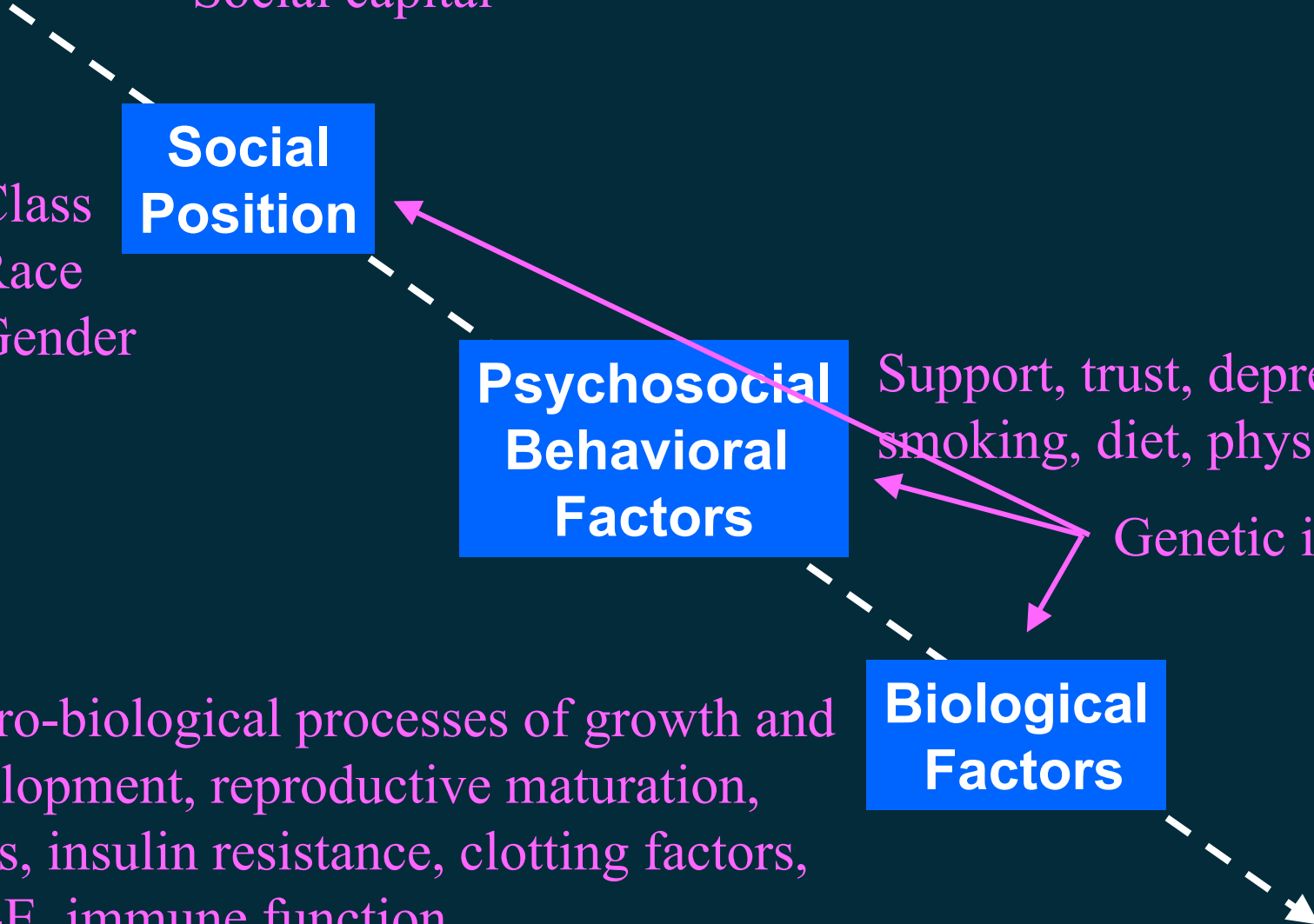
Support, trust, depression, smoking, diet, physical activity

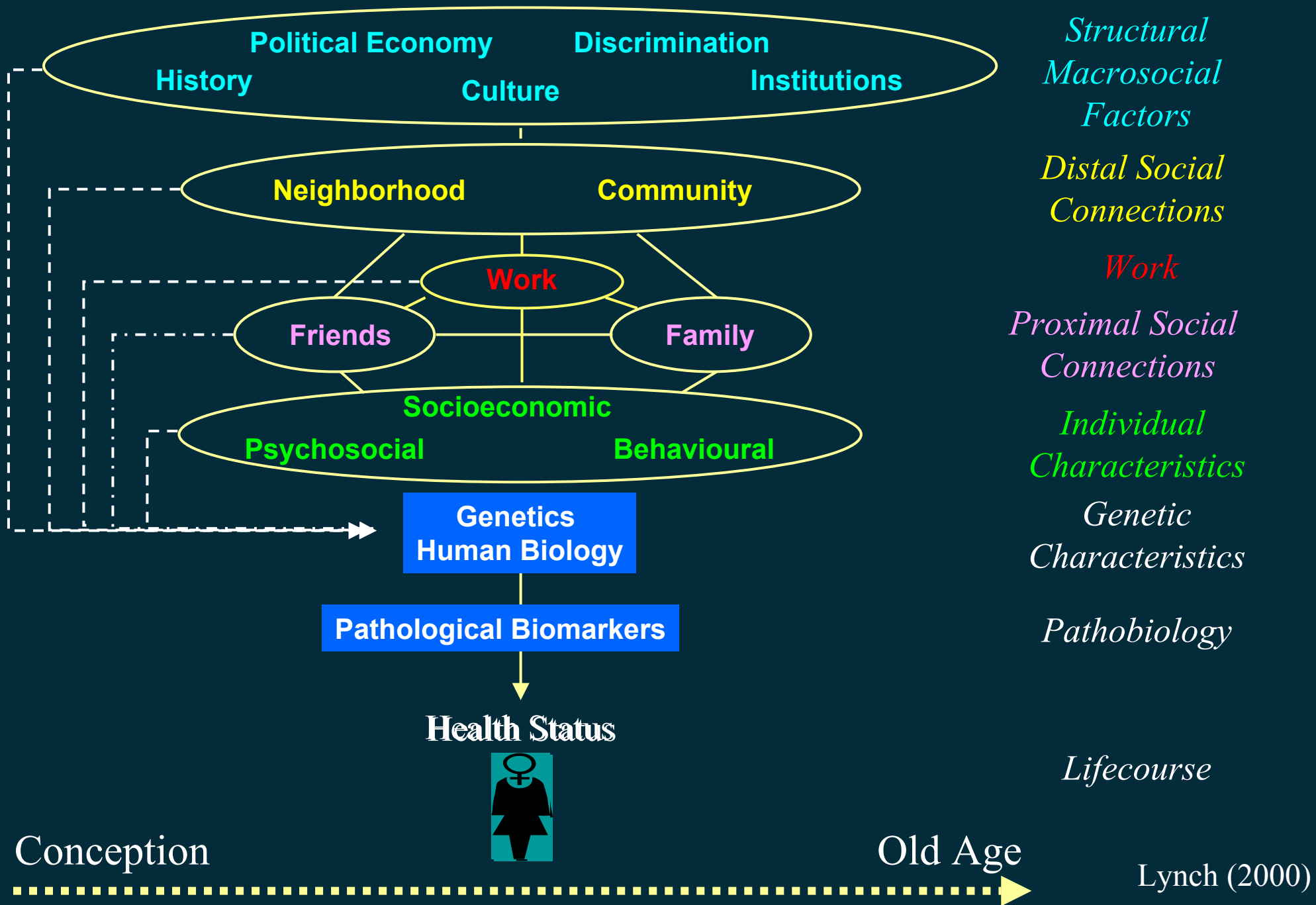
Genetic influences

**Biological Factors**

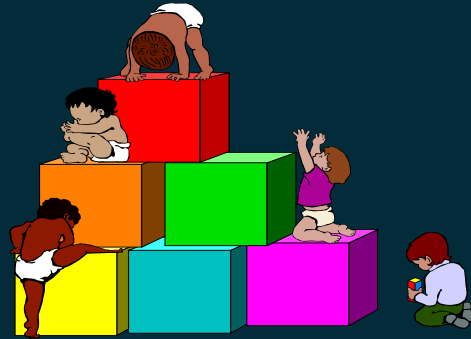
Macro-biological processes of growth and development, reproductive maturation, lipids, insulin resistance, clotting factors, P-N-E, immune function

**Morbidity Mortality**





Lifecourse



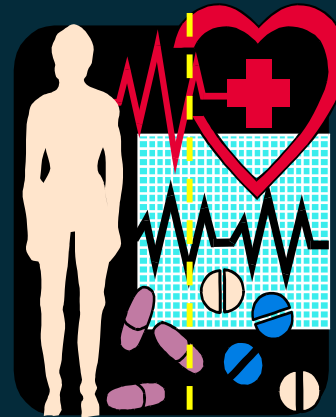
multi-time point  
exposures

Context



multi-level  
exposures

Mechanisms



biological,  
behavioral,  
psychological  
translation

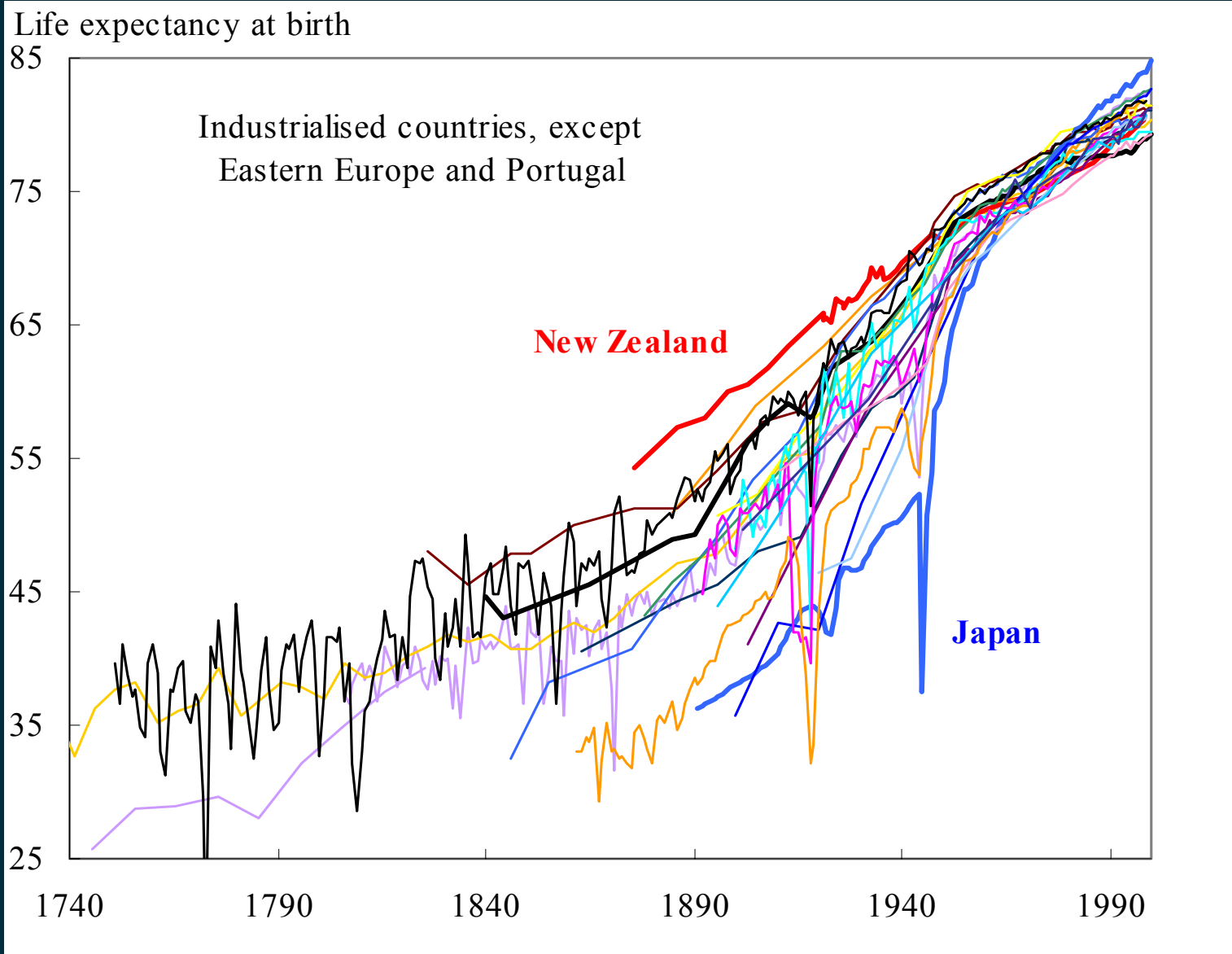
Health and Health Inequalities  
at the Individual and Population Levels

**Part 2.** Does an appreciation of social factors actually improve our understanding of population health?

*A "social" epidemiology of the Russian Mortality Crisis*

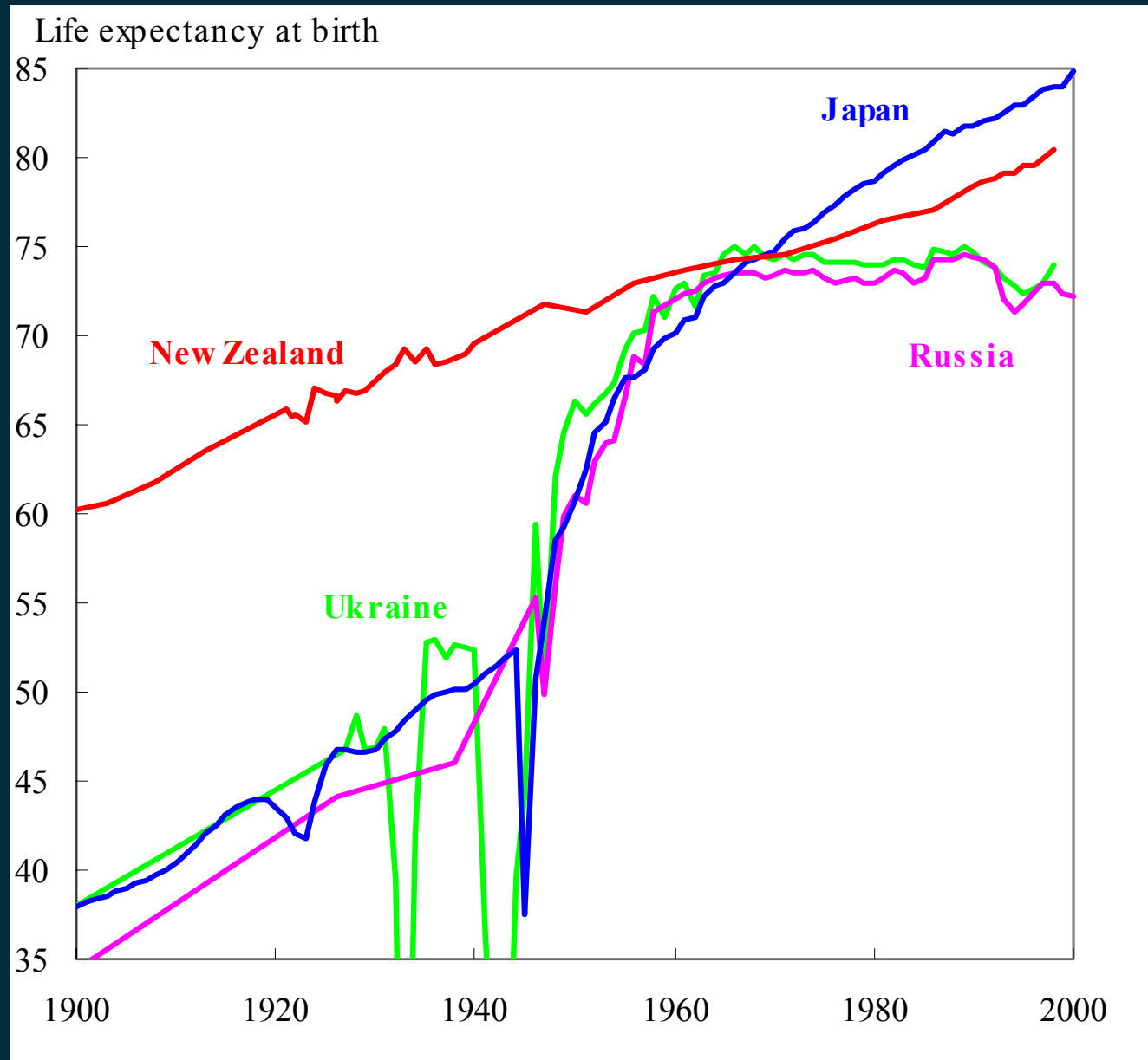
A. What are the overall population patterns?

# Convergence of Life Expectancy at Birth in Industrialized Countries



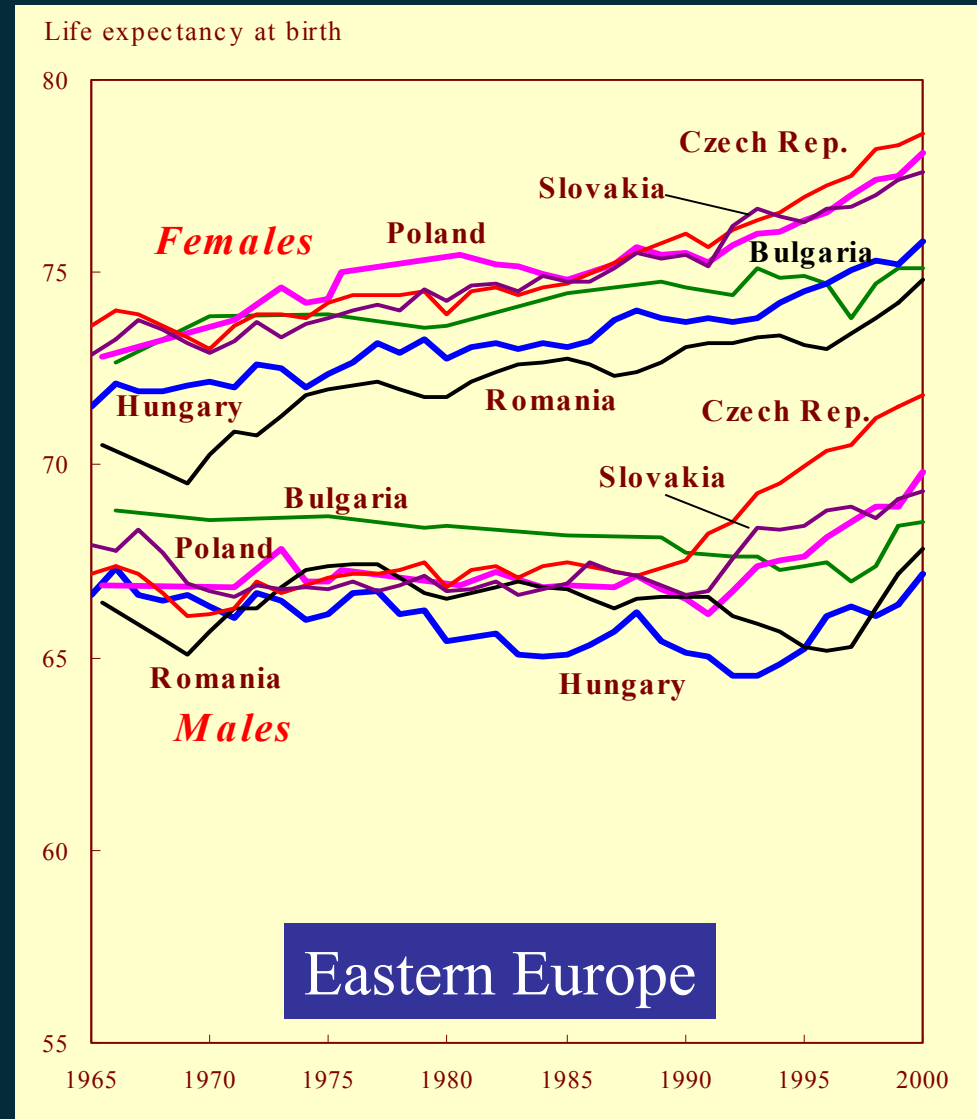
Caselli  
(2002)

# Recent divergence between industrialized countries



Caselli  
(2002)

# Contrasting Trends in Life Expectancy





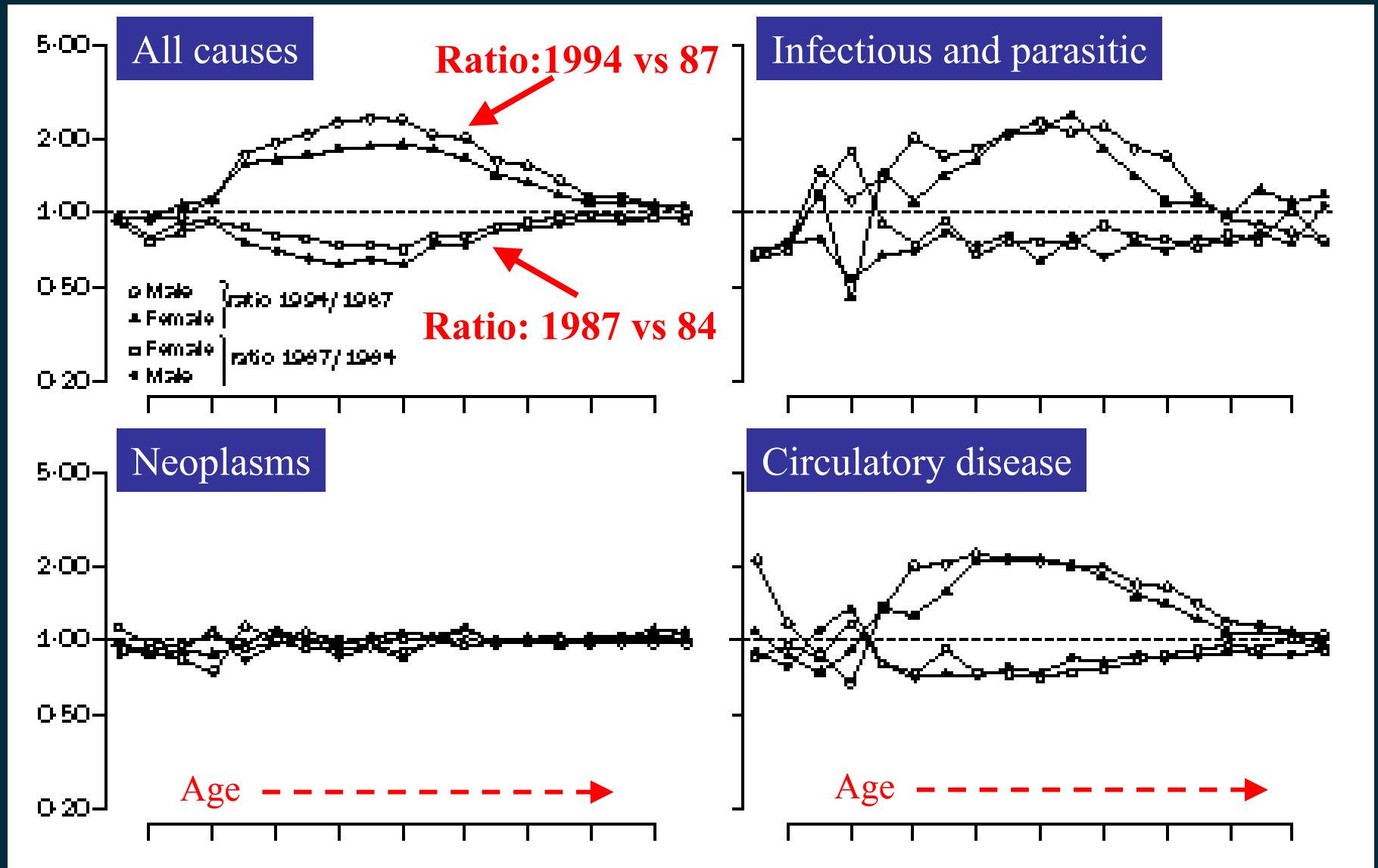
B. Does the pattern differ by age?

# Age Contribution to Russian Life Expectancy Decline

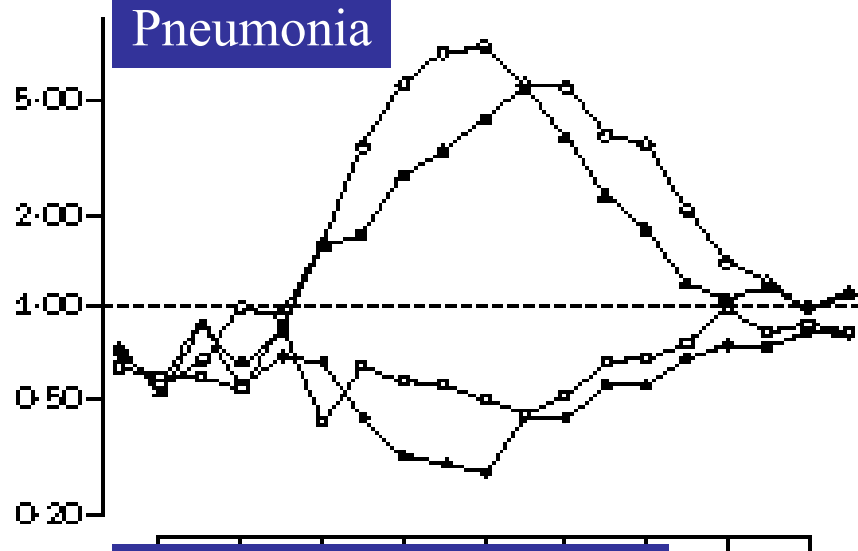
Age, y	Total		Male		Female	
	Years	Percent	Years	Percent	Years	Percent
All ages	-5.16	100.0	-6.05	100.0	-3.16	100.0
0	-0.09	1.7	-0.09	1.4	-0.09	2.7
1-4	-0.02	0.4	-0.02	0.3	-0.03	0.9
5-14	-0.01	0.3	0.00	0.0	-0.03	0.9
15-24	-0.27	5.1	-0.36	5.9	-0.12	3.8
25-34	-0.59	~ 65% 11.4	-0.80	13.2	-0.25	7.9
35-44	-1.01	19.5	-1.32	21.8	-0.46	14.7
45-54	-1.26	24.5	-1.55	25.6	-0.70	22.0
55-64	-1.03	19.9	-1.17	19.4	-0.65	20.4
65-74	-0.58	11.2	-0.57	9.5	-0.43	13.7
75-84	-0.24	4.6	-0.16	2.7	-0.30	9.5
≥85	-0.07	1.4	-0.02	0.3	-0.11	3.5

C. Does the pattern differ by cause?

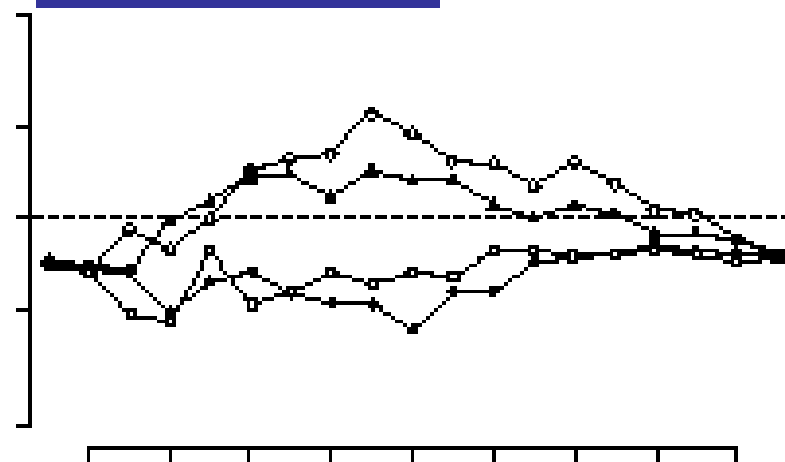
# Cause-specific Mortality: Russia 1984-1994



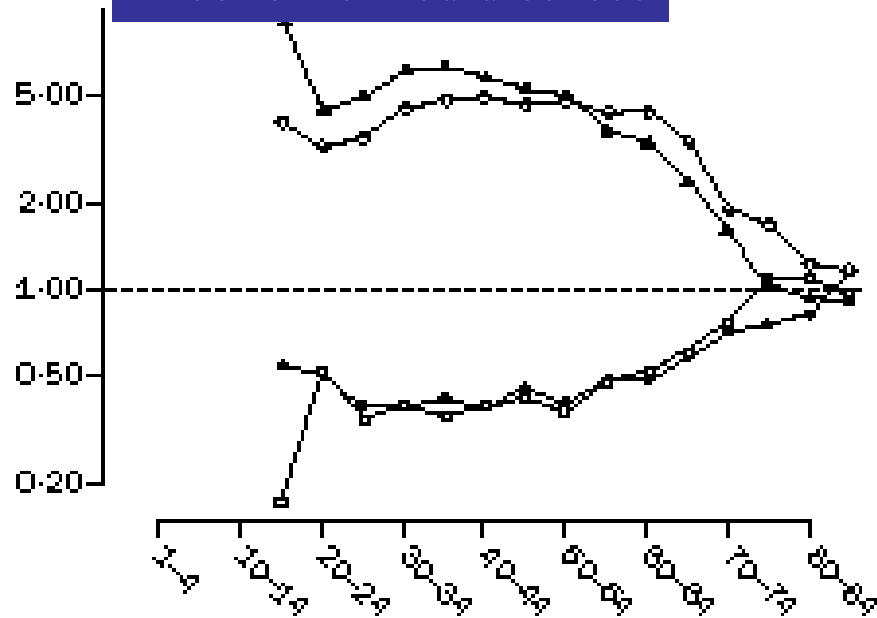
Pneumonia



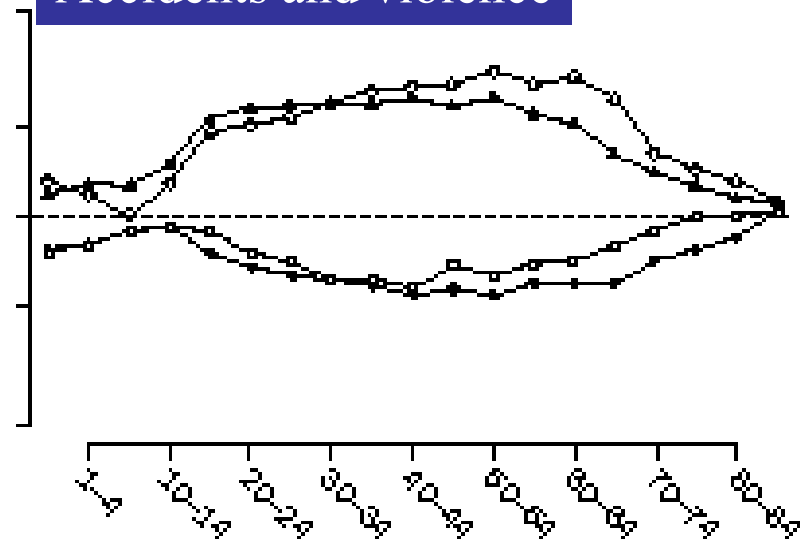
Other respiratory



Alcohol related diseases



Accidents and violence



Age at death (years)

# Causes of Death Contributing to Russian Life Expectancy Decline

Cause	Total		Male		Female	
	Years	Percent	Years	Percent	Years	Percent
All causes	-5.16	100.0	-6.05	100.0	-3.16	100.0
Infectious diseases	-0.12	2.4	-0.17	2.8	0.02	-0.5
Diseases of the heart	-1.35	26.1	-1.56	25.9	-0.85	26.9
Cerebrovascular diseases	-0.49	9.6	-0.45	7.5	-0.46	14.7
Malignant neoplasms	-0.04	0.7	-0.00	0.0	-0.02	0.8
Pneumonia and influenza	-0.17	3.4	-0.24	3.9	-0.06	2.0
Chronic obstructive pulmonary disease	-0.17	1.2	-0.09	1.5	-0.01	0.3
Chronic liver diseases and cirrhosis	-0.13	2.4	-0.13	2.1	-0.10	3.3
Other alcohol-related causes	-0.61	9.6	-0.61	10.2	-0.27	8.4
Motor vehicle crashes	-0.01	0.1	0.00	-0.1	-0.01	0.3
Other injuries	-0.92	17.8	-1.17	19.3	-0.46	14.7
Suicide	-0.27	5.2	-0.40	6.7	-0.05	1.6
Homicide and legal intervention	-0.33	6.3	-0.42	6.9	-0.17	5.2
Remainder	-0.79	15.2	-0.80	13.2	-0.70	22.3

~ 70%  
CVD  
Accidents  
Injury  
Violence

D. What does our knowledge of the individual level risk factors tell us?

# What could cause a big rise in CVD mortality?

Artifact of death registration

Collapse of health care

Hypertension

Smoking

Obesity

Lipids – Diet

Physical activity

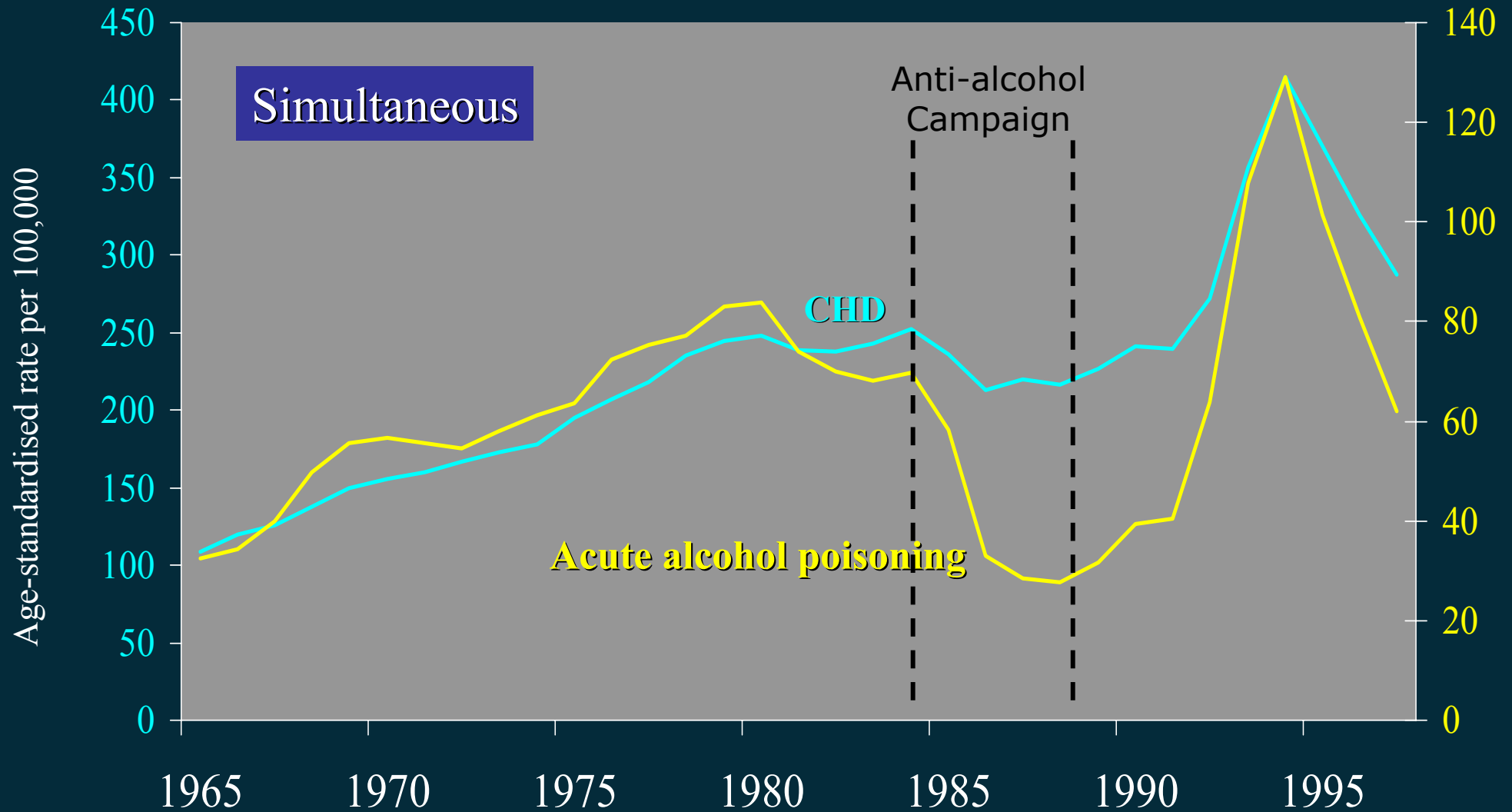
Alcohol



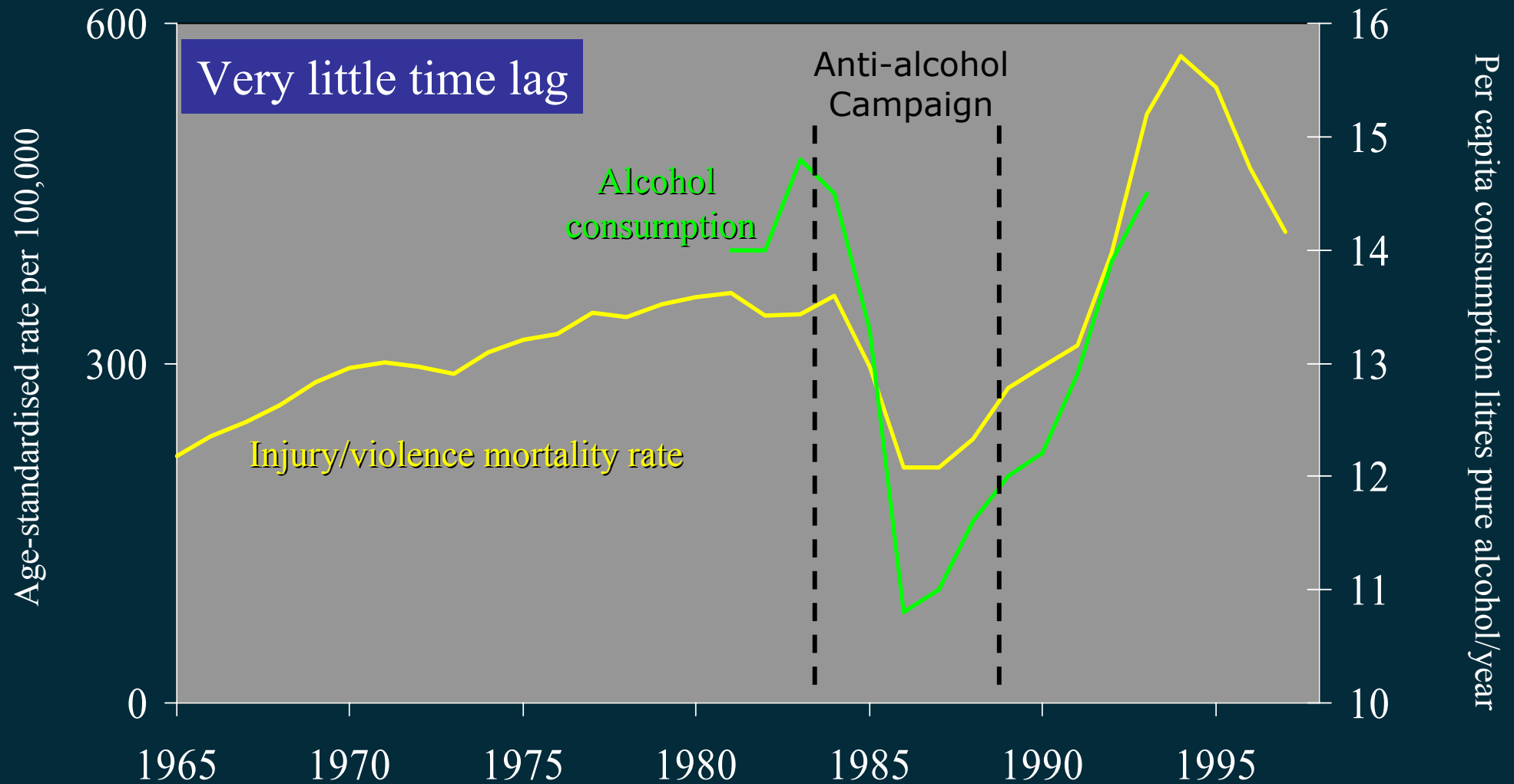
“Although factors such as nutrition and health services may be involved, the evidence is that substantial changes in alcohol consumption over the period could plausibly explain the main features of the mortality fluctuations observed.”

Leon, et al. *Lancet* (1997)

# Coronary heart disease and acute alcohol poisoning mortality in Russia, Men 30-59



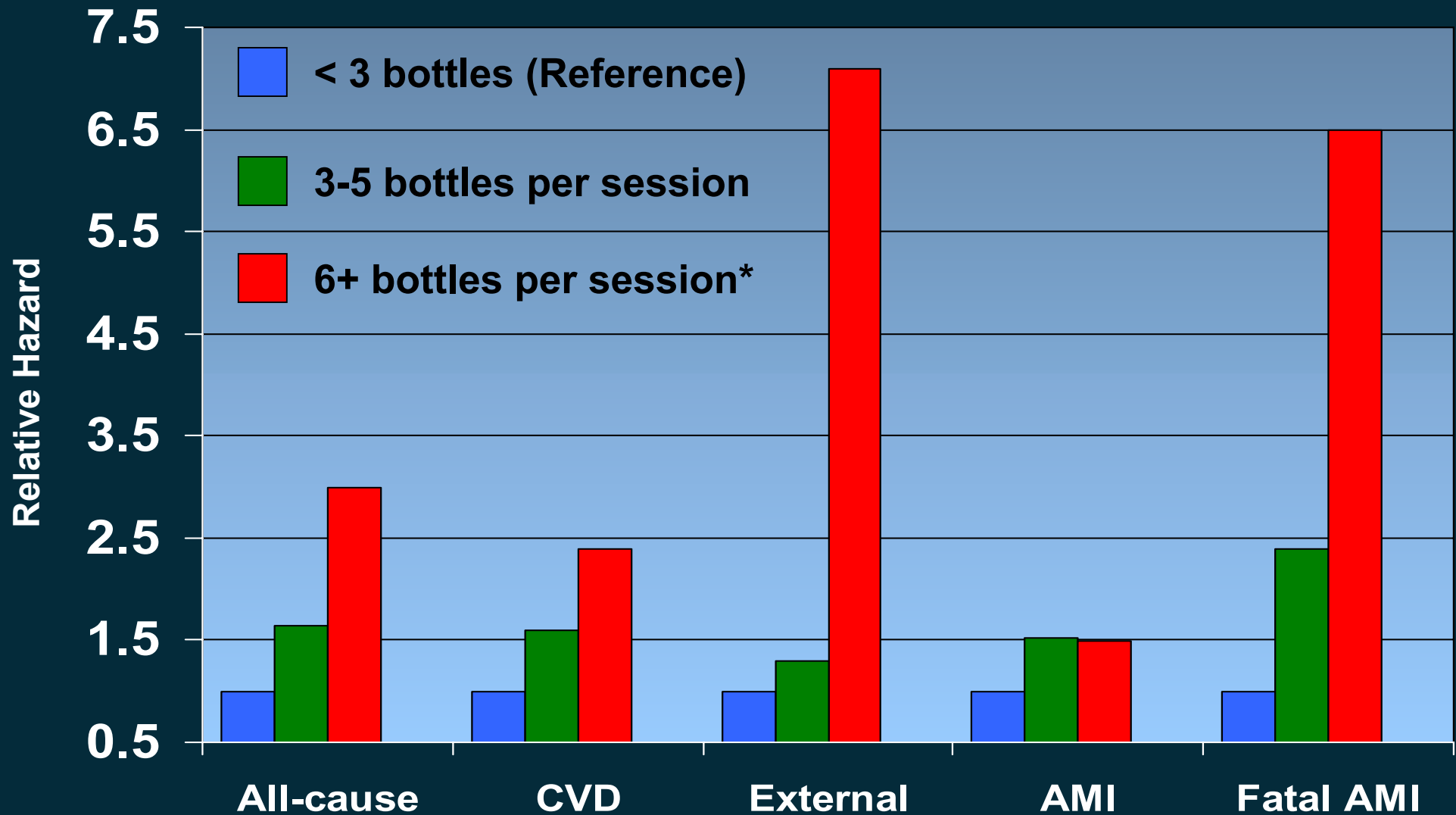
# Injuries, poisoning and violence mortality, Men aged 30-59 (excluding acute alcohol poisoning)



But ...

Isn't alcohol protective for heart disease?

# Beer Bingeing and Mortality - Finland



\* Adjusted for average consumption

Kauhanen, et al. *BMJ* (1997)

# Correlates of Alcohol Bingeing in Finnish Men - KIID

- poor childhood
- low education
- blue-collar job
- low income
- smoking
- poor lipid profile
- higher blood pressure
- low physical activity
- hopelessness
- depression
- cynical hostility

E. How does all this fit with our knowledge of the pathophysiology of the particular outcome?

# Coronary heart disease mortality in Russia

- **CHRONIC** component :  
classic atherosclerotic/thrombotic pathology  
associated with known coronary risk factors
- **ACUTE** component :  
alcohol induced arrhythmias/cardiomyopathies  
associated with binge drinking



F. Putting together a plausible population health story  
that incorporates the social to the biological

“These findings paint a picture of societies in which young and middle aged men face social and economic disruption on a large scale, for which they are poorly prepared. For many, their options are constrained by low levels of education, and the societies of which they are a part have few systems of social support.

Poor nutrition and high rates of smoking have already reduced their chances of a long life. The availability of cheap alcohol, however, provides a pathway not only to oblivion but often to premature death.”

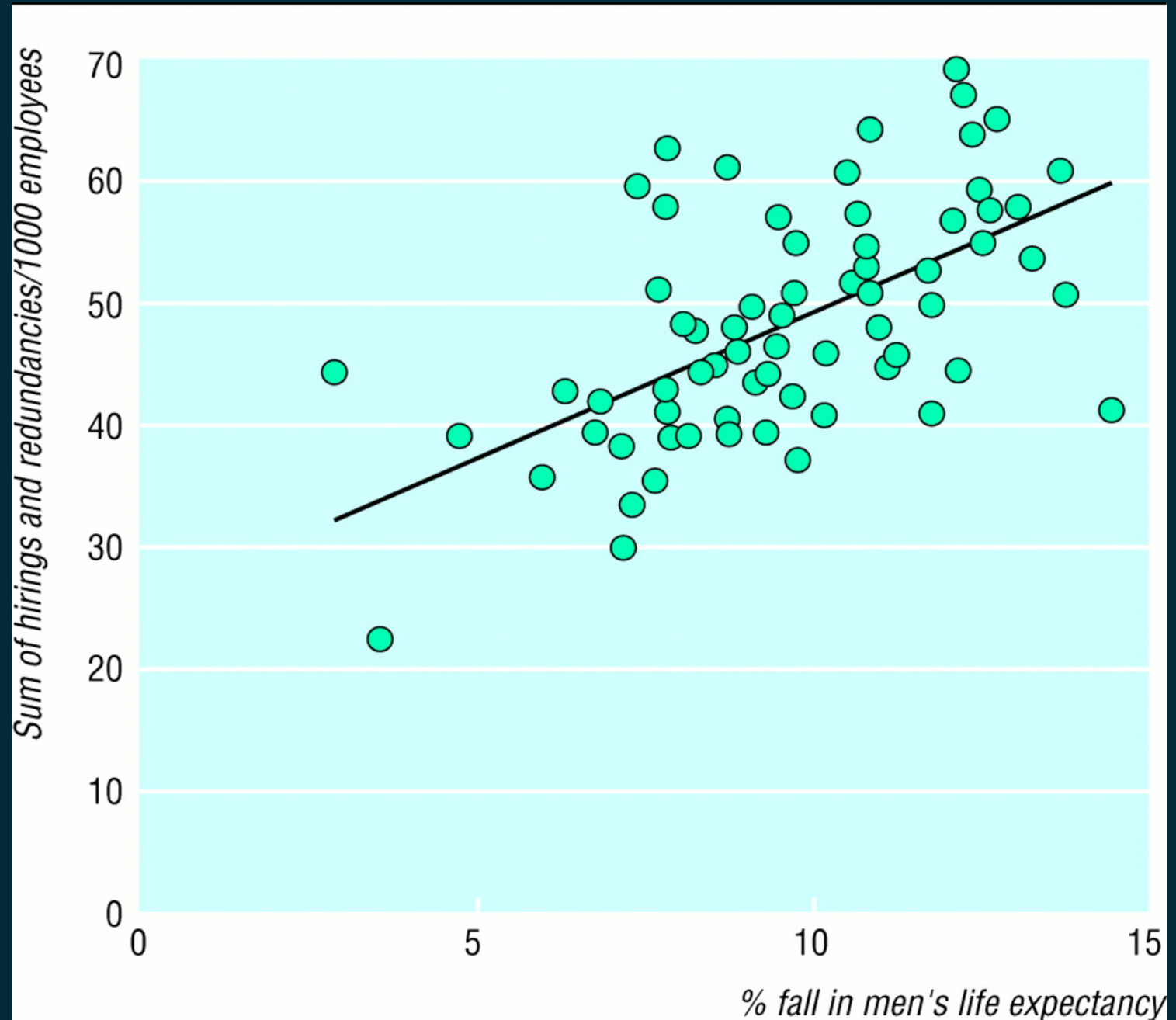
McKee and Shkolnikov BMJ (2001)

## *Social Stress*

% Fall in Male  
Life Expectancy  
and Labor Market  
Turnover

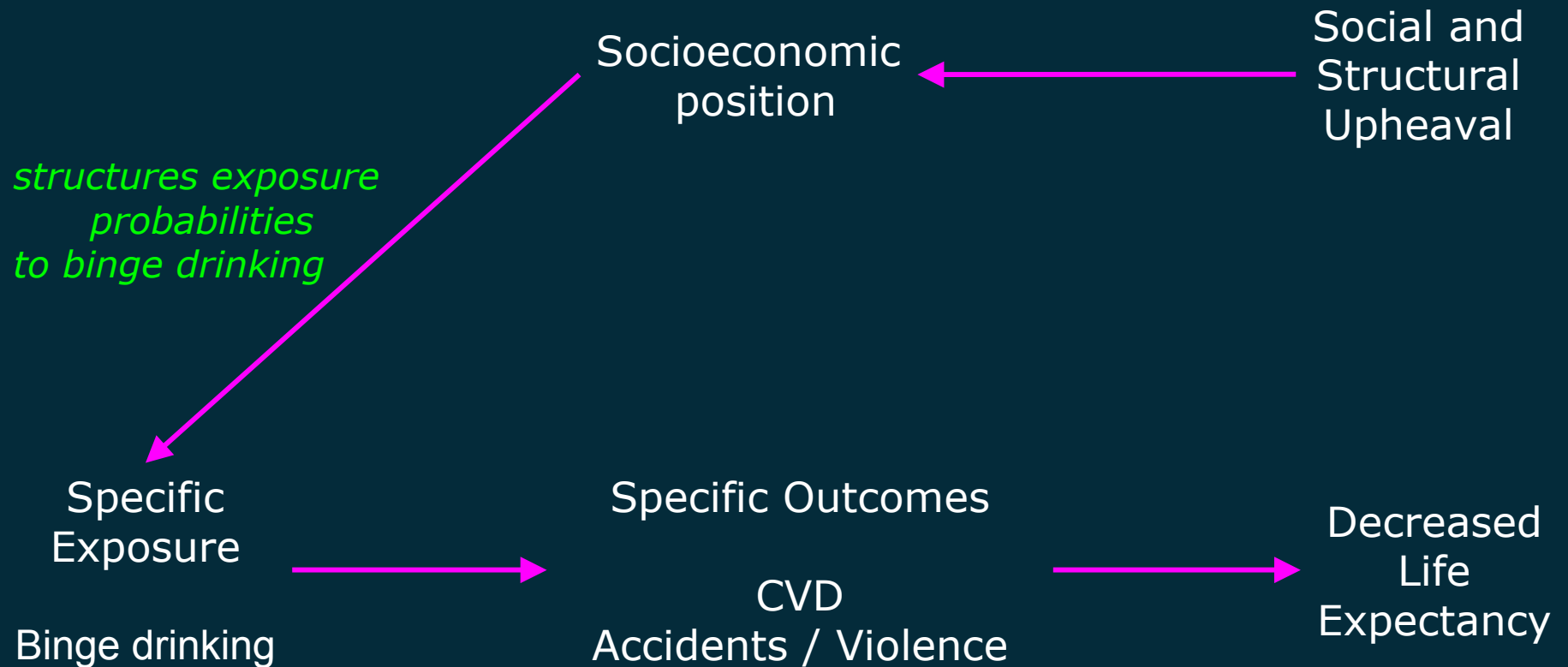
Russia  
1990-94

Walberg, et al.  
*BMJ* 1998



# A Model for Social Epidemiology

Culturally contextualized - specific exposures - susceptibilities - outcomes

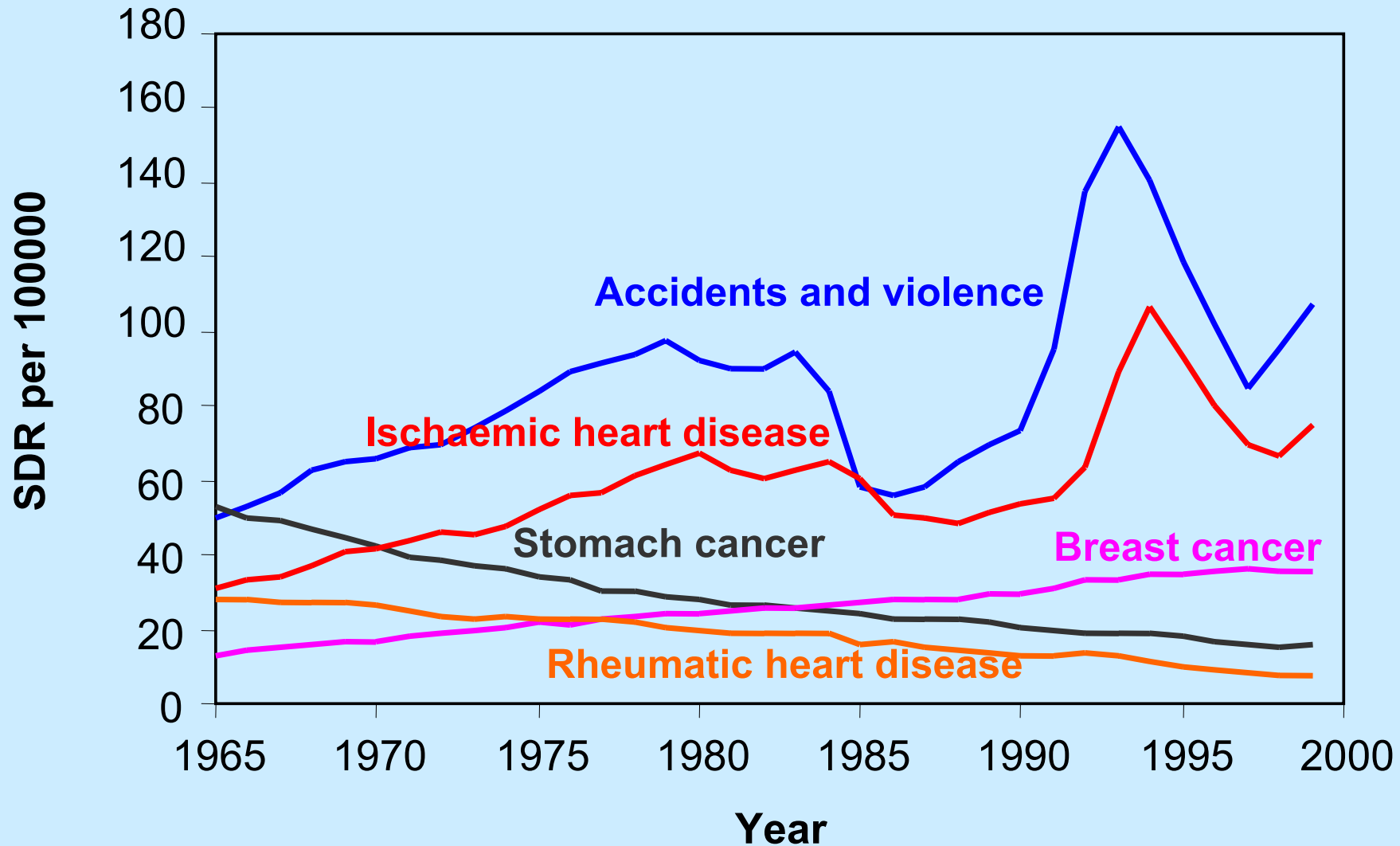


Cultural Component – role of alcohol in “vodka belt” culture

**Part 3.** What are some of the lessons for better understanding the social determinants of population health?

- *Considering specificity in our explanations*

# Trends in selected causes of death for women aged 30-59, Russia 1965-1999



## *Reinstate Specificity*

“No, some of our epidemiologic forefathers did not get the notion of ‘specificity’ quite right. But I suggest that a modified version of that notion has a useful place, after all, as we seek to sort out causal from non-causal associations.” p. 7

- Specificity of Exposure – an outcome associated with 1 exposure, not another
- Specificity of Outcome – an exposure associated with 1 outcome, not another
- Specificity of Susceptibility – association only in those susceptible to the effect

## Why might specificity of outcome-exposure links be useful in understanding the social causation of disease?

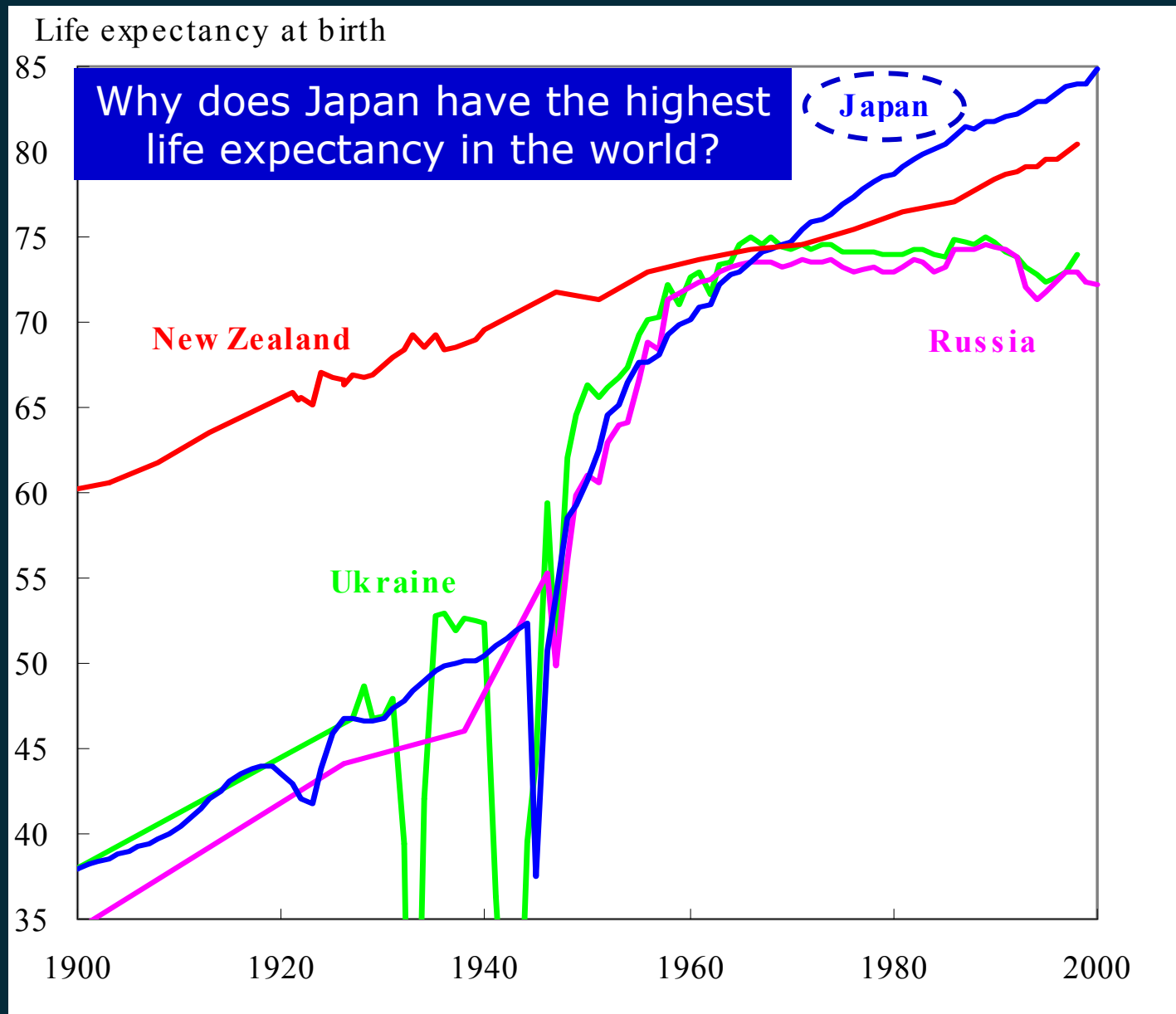
- It may give greater flexibility and explanatory power because it helps shift our focus toward an understanding of population health and health disparities, as rooted in the social and structural distribution of more specific exposures that affect specific susceptibility to particular outcomes.



## Why might specificity of outcome-exposure links be useful in understanding the social causation of disease?

- This means understanding that the social and structural distribution of relevant risk factors is often contextualized in regard to time, space, culture and population subgroup.

# Recent divergence between industrialized countries



Caselli  
(2002)

Some have used this remarkable growth in life expectancy as evidence for the importance of social cohesion / social capital and related psychosocial processes

Lower inequality (income) blunts perceptions of relative disadvantage → greater social cohesion → less stress mediated disease

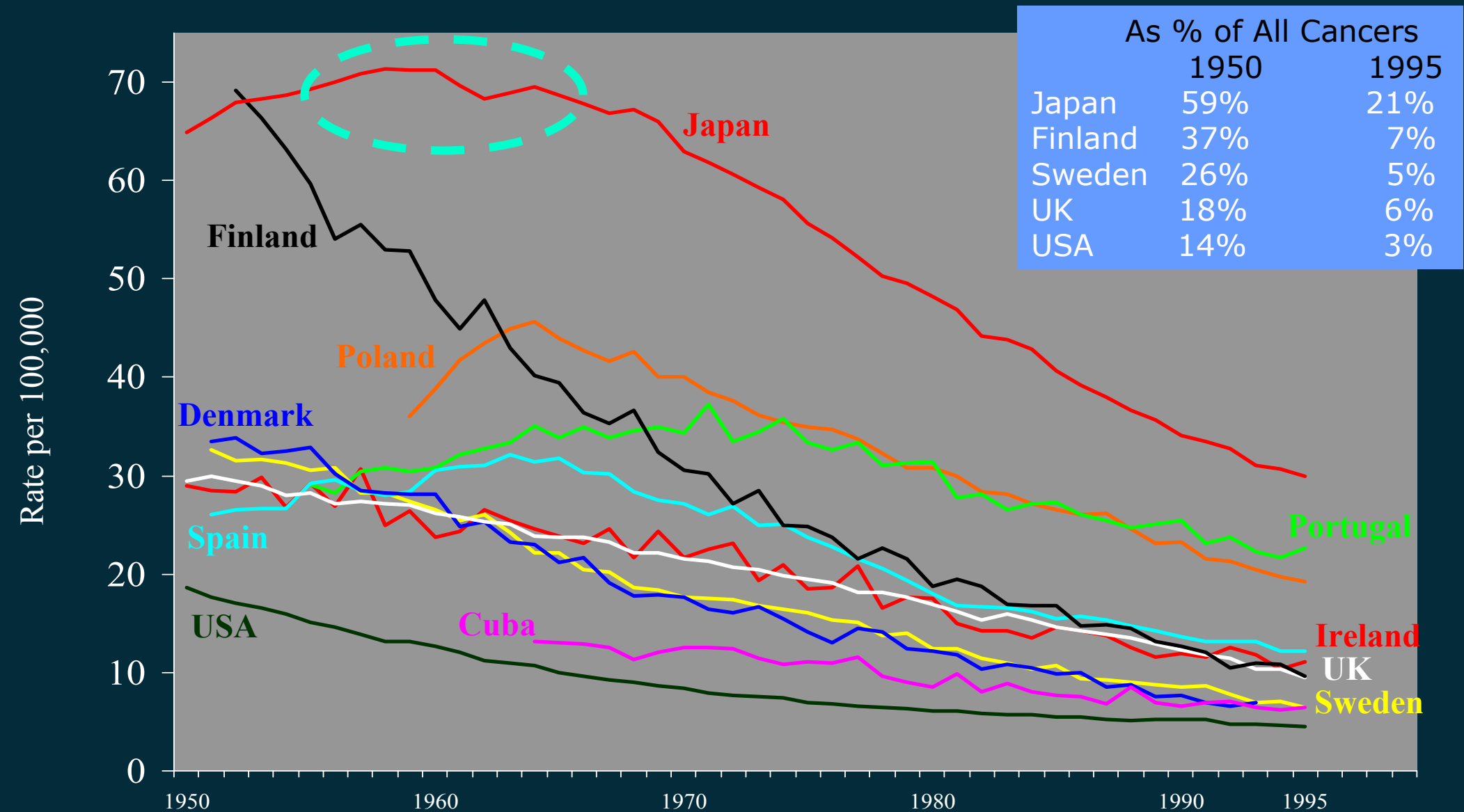
## *Why does Japan have the highest life expectancy in the world?*

“... these improvements cannot be explained in terms of changes in nutrition, health care, preventive health policies, or any of the obvious factors, ...” p. 18

“What is important about the Japanese example is . . . the association of a narrow income distribution with a public sphere of life which has a real social content. Instead of a moral and social vacuum mediated only by market relationships, life beyond the family has a well-developed social structure.” p. 133

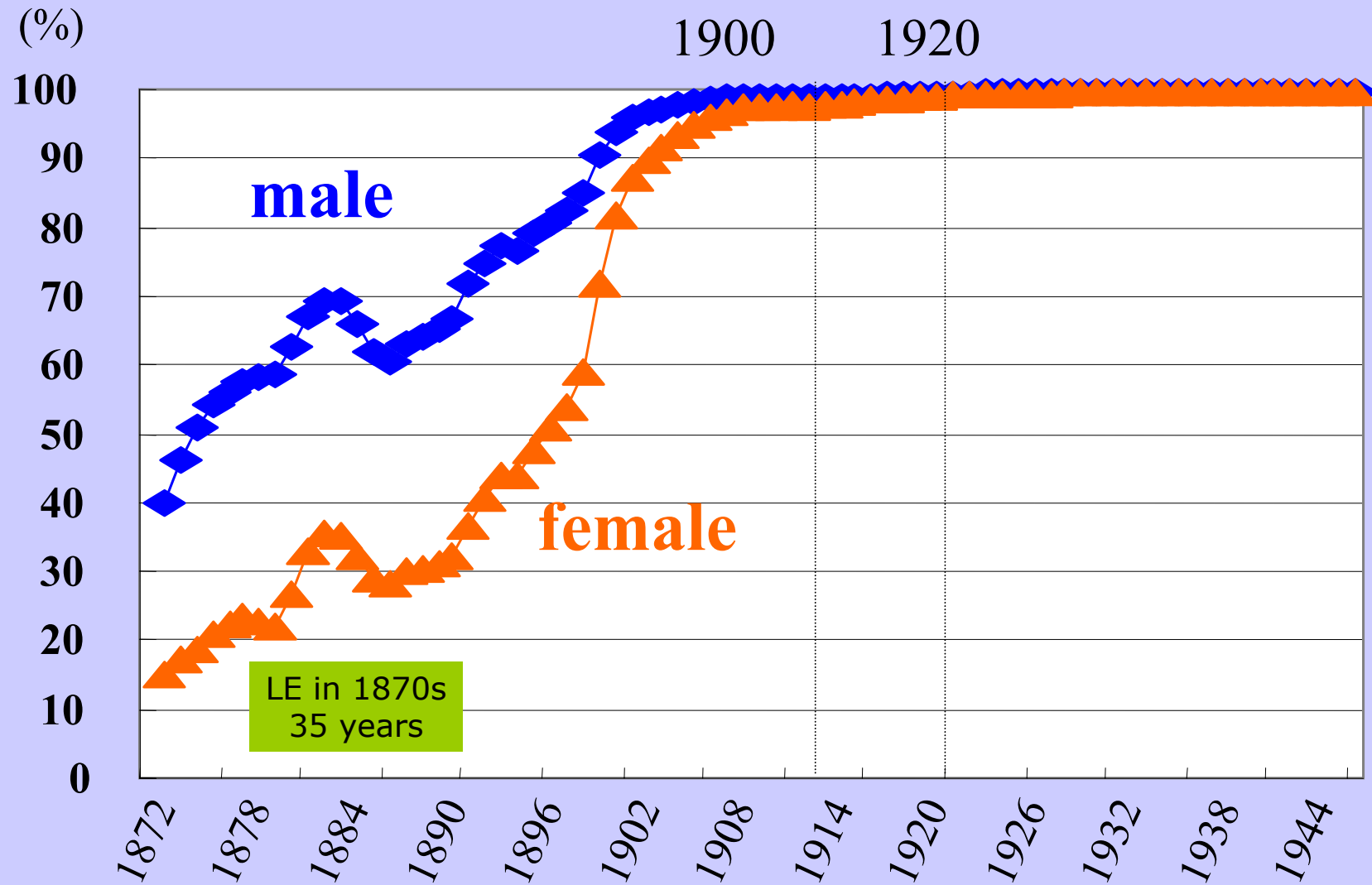
What if we consider the specific components of the  
rise in Japanese life expectancy?

# Trends in Stomach Cancer, 1950-1995

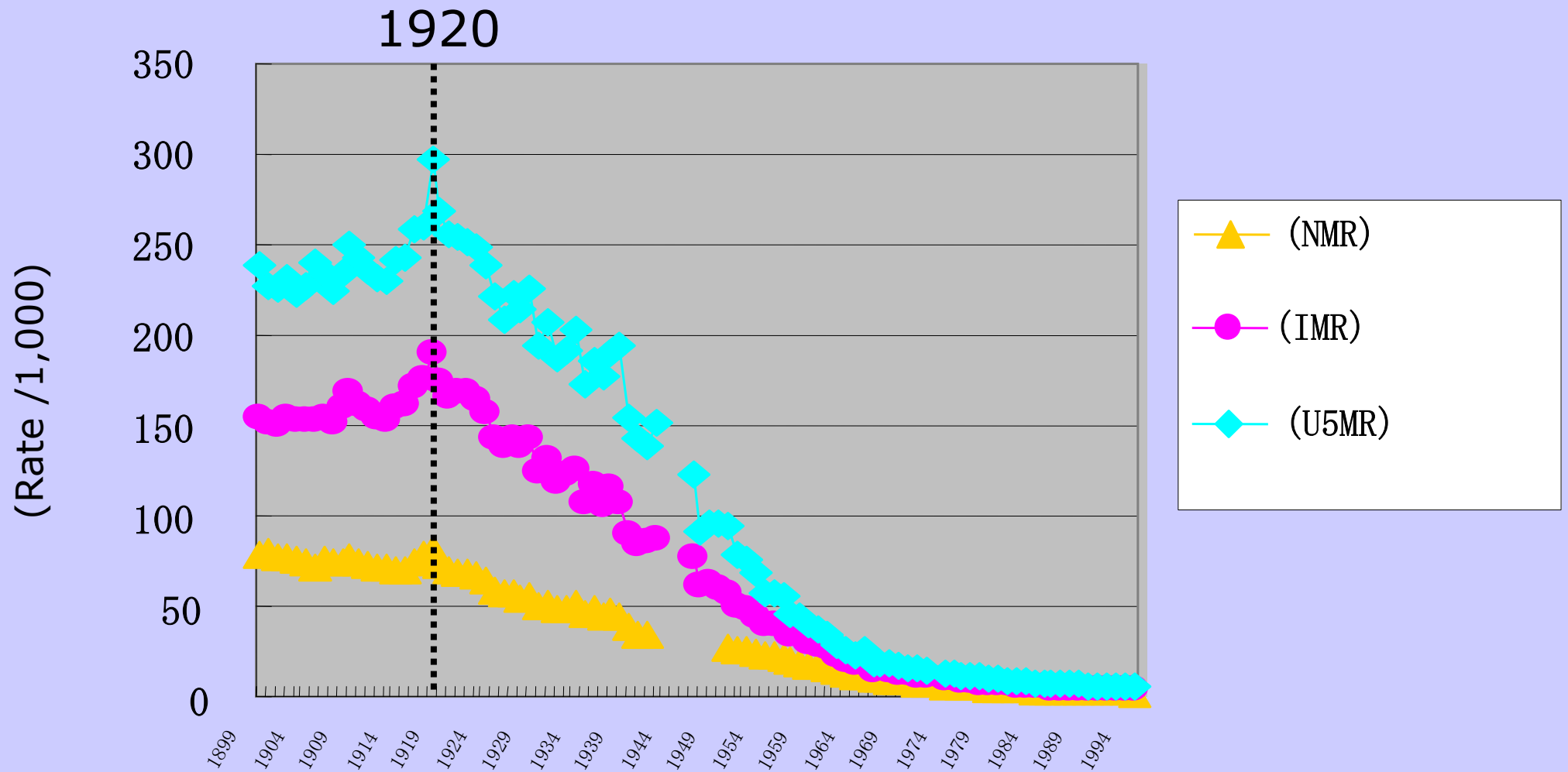


\* Stomach cancer was the leading single cause of cancer mortality in all these countries in 1950

# Primary School Attendance Rate



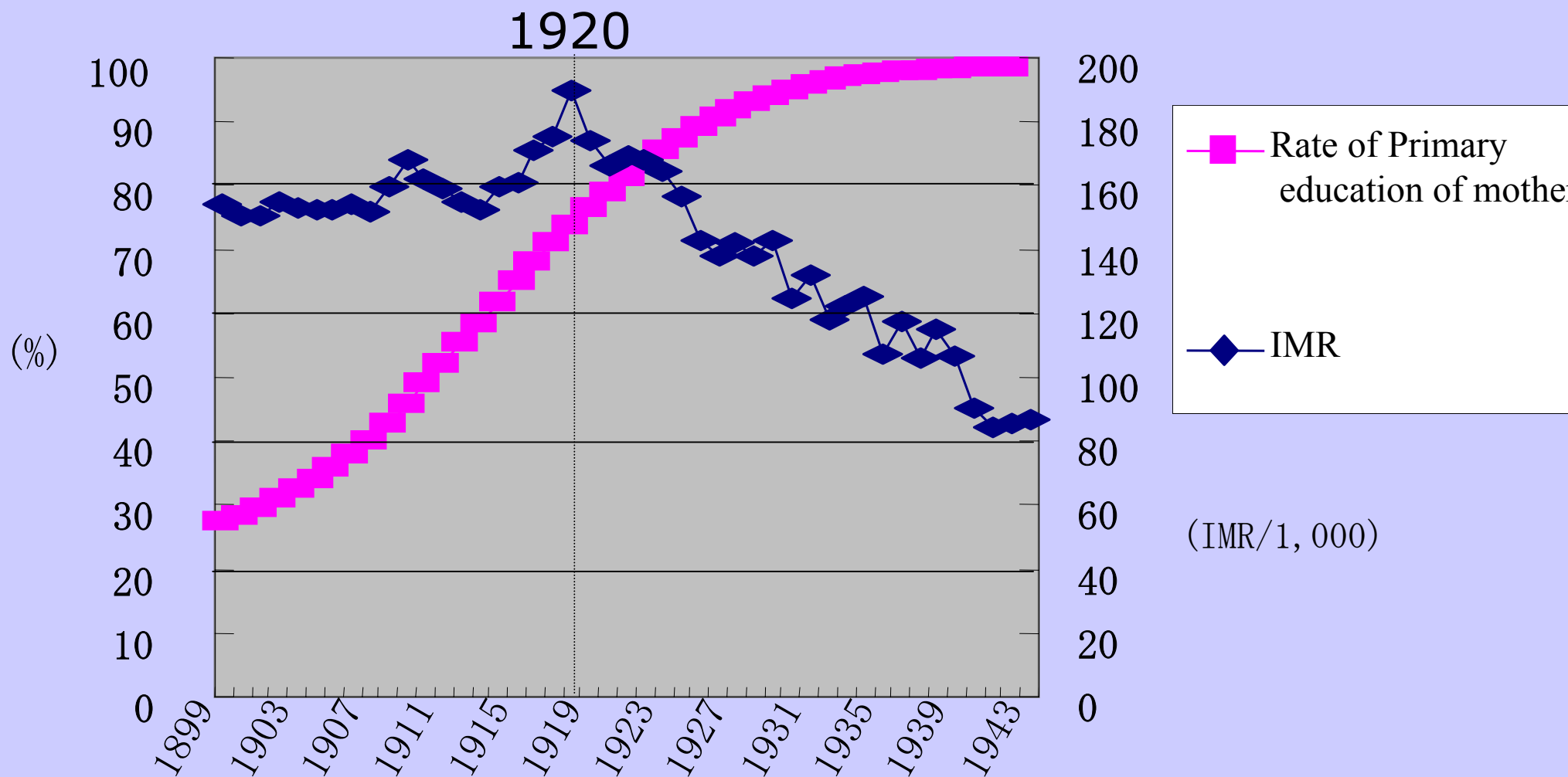
# 20<sup>th</sup> Century Trends in Infant, Neonatal and Under 5 Mortality, Japan



Vital Statistics

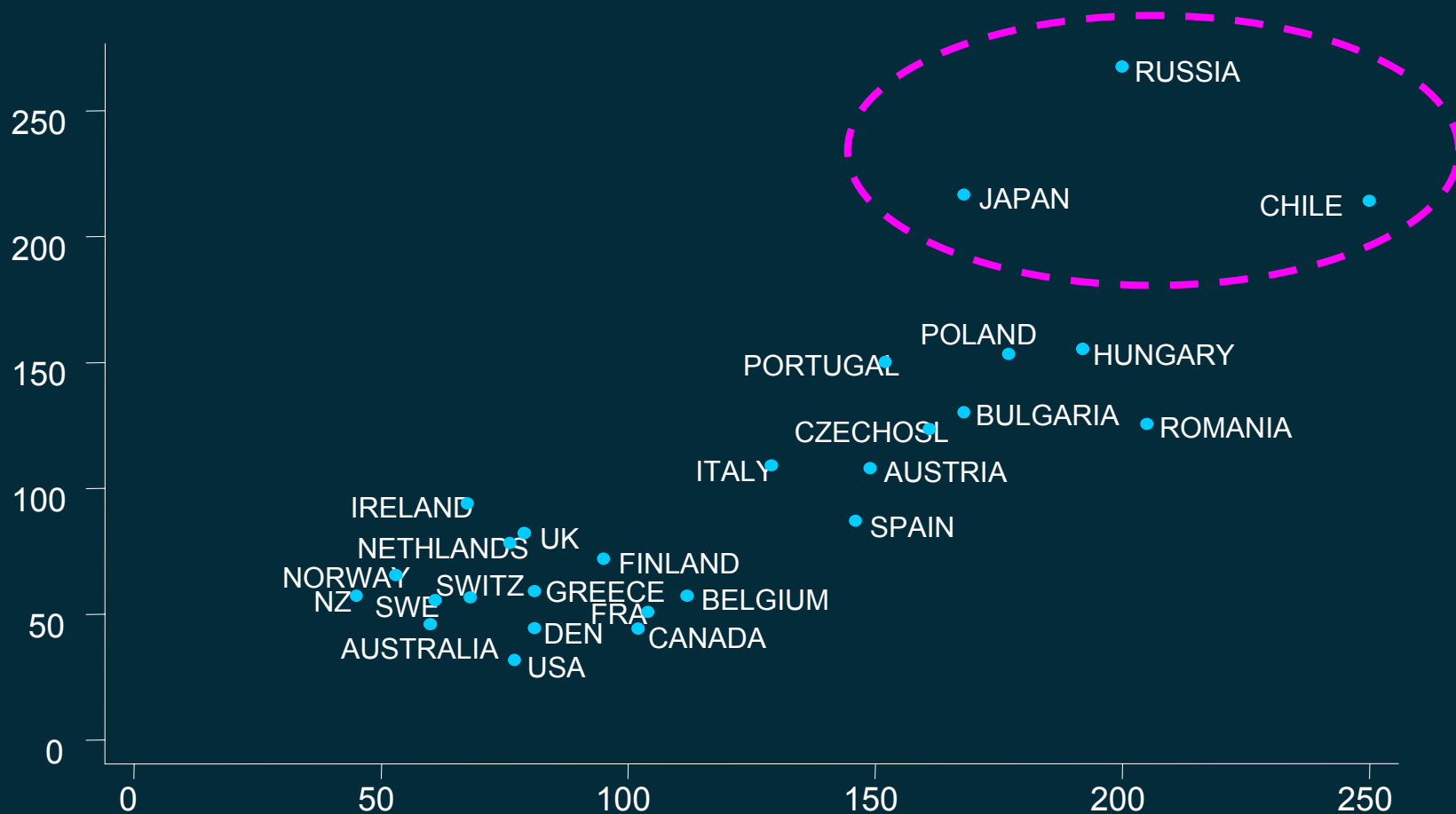


# Infant Mortality and Education of Women, Japan 1899-1943



# Infant mortality 1921-23 against stomach cancer mortality 1991-93 for men aged 65-74 in 27 countries

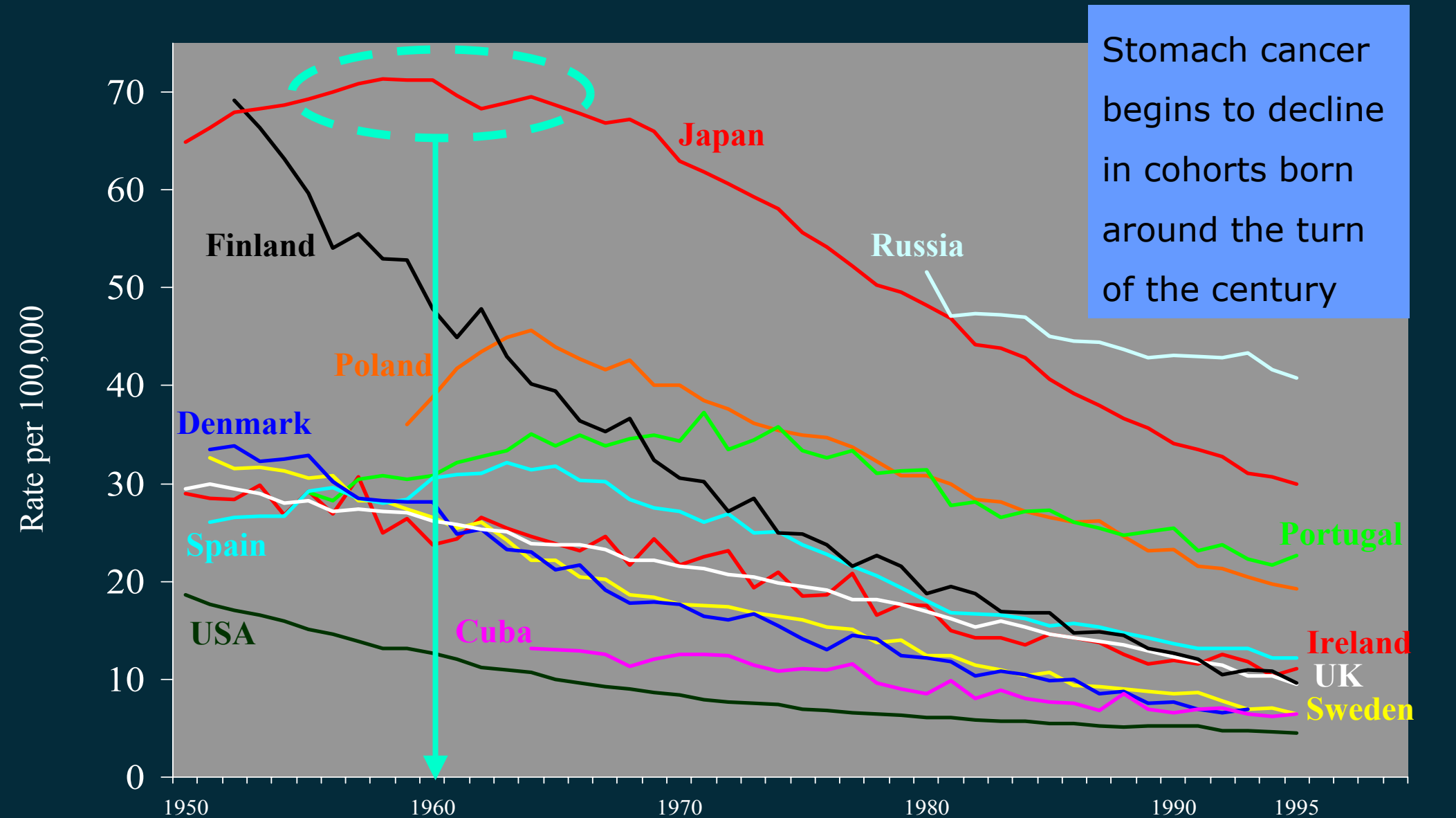
Stomach cancer mortality rate per 100K, 1991-93



Infant mortality rate per 1000 1921-23

Leon and Davey Smith,  
BMJ (2000)

# Trends in Stomach Cancer, 1950-1995



\* Stomach cancer was the leading single cause of cancer mortality in all these countries in 1950

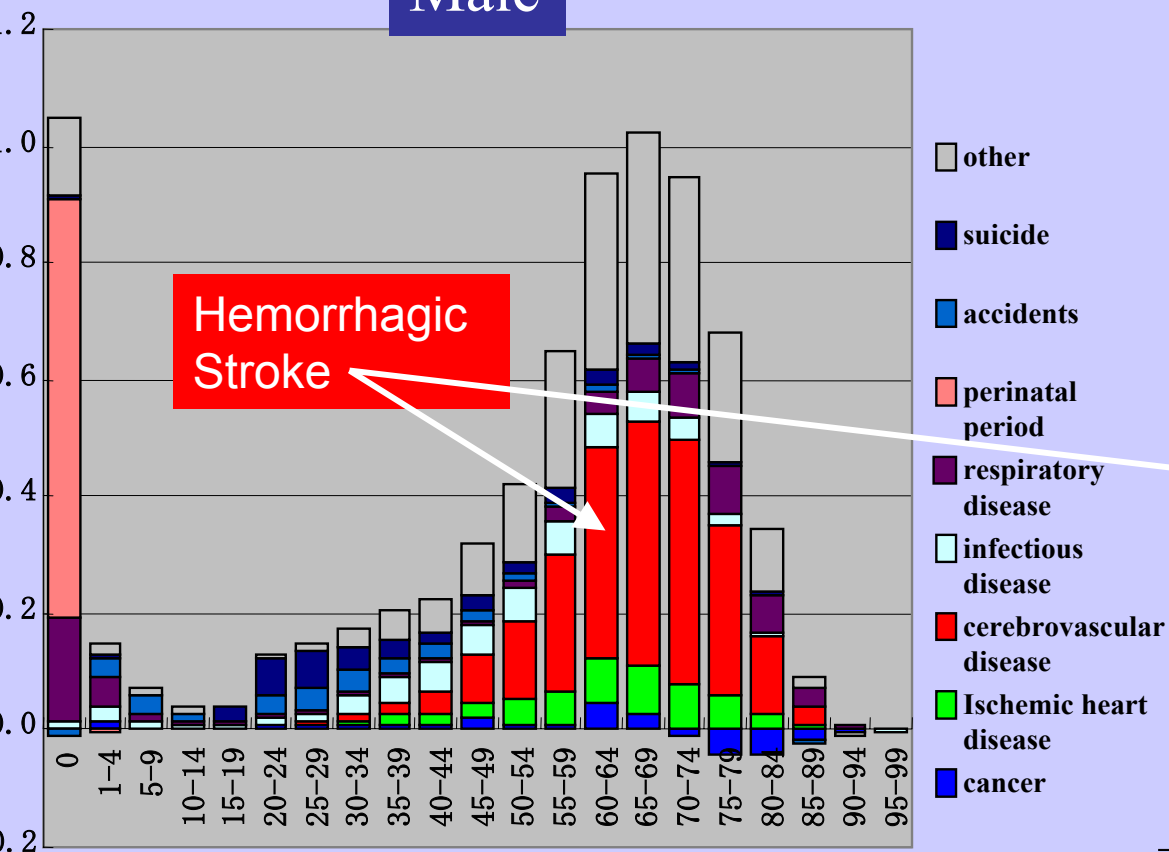
## *Japanese Life Expectancy - The Real Story?*

- By 1900 - Systematic investments in education of women, improvements in urban living, sanitary conditions especially for children → less infectious burden
  -
- 1920s - The children of those women were the first generations to experience lower infant mortality – a marker for the health generating potential of early life environment
- Stomach cancer and hemorrhagic stroke - both causes dependent on early life conditions / infection - decline enormously after WW2

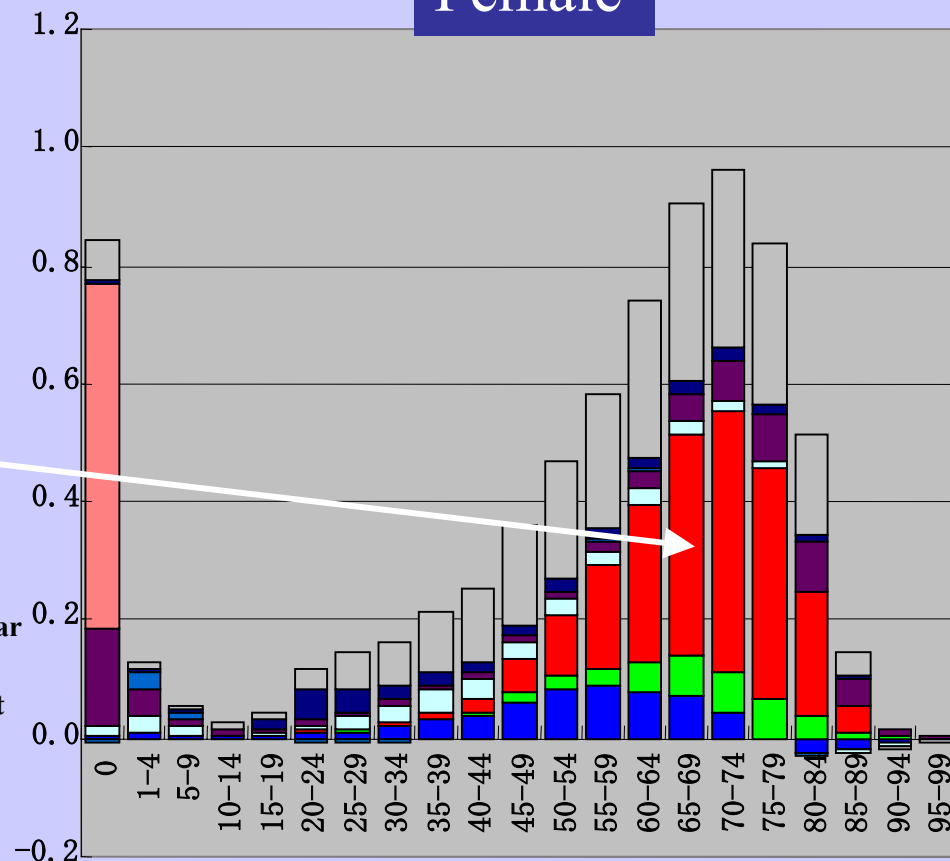
# Prolongation of Life Expectancy 1965-1985

## Age & Disease Group by Polard's Method

Male



Female



## *Japanese Life Expectancy - The Real Story?*

- Enormous declines in hemorrhagic stroke and stomach cancer, but Japan also avoids the “epidemic” of CHD experienced in the West and Soviet Union
- The huge economic advances post WW2 are NOT converted into increases in CHD as in the West – despite high smoking rates post WW2 – low fat diet?
- But the future looks less bright as LE will likely stall or may actually decline as lung cancer rates climb rapidly – 40 to 50 years after smoking taken up in great numbers

- Levels of social cohesion may well have been important in facilitating these massive social changes but they were not directly responsible for these unprecedented improvements in population health in Japan - due to ↓ stomach cancer and hemorrhagic stroke
- There were more specific social investments in the health of women and children and urban sanitation
- Nor is it likely that these investments were rooted in ideas about improving social equity

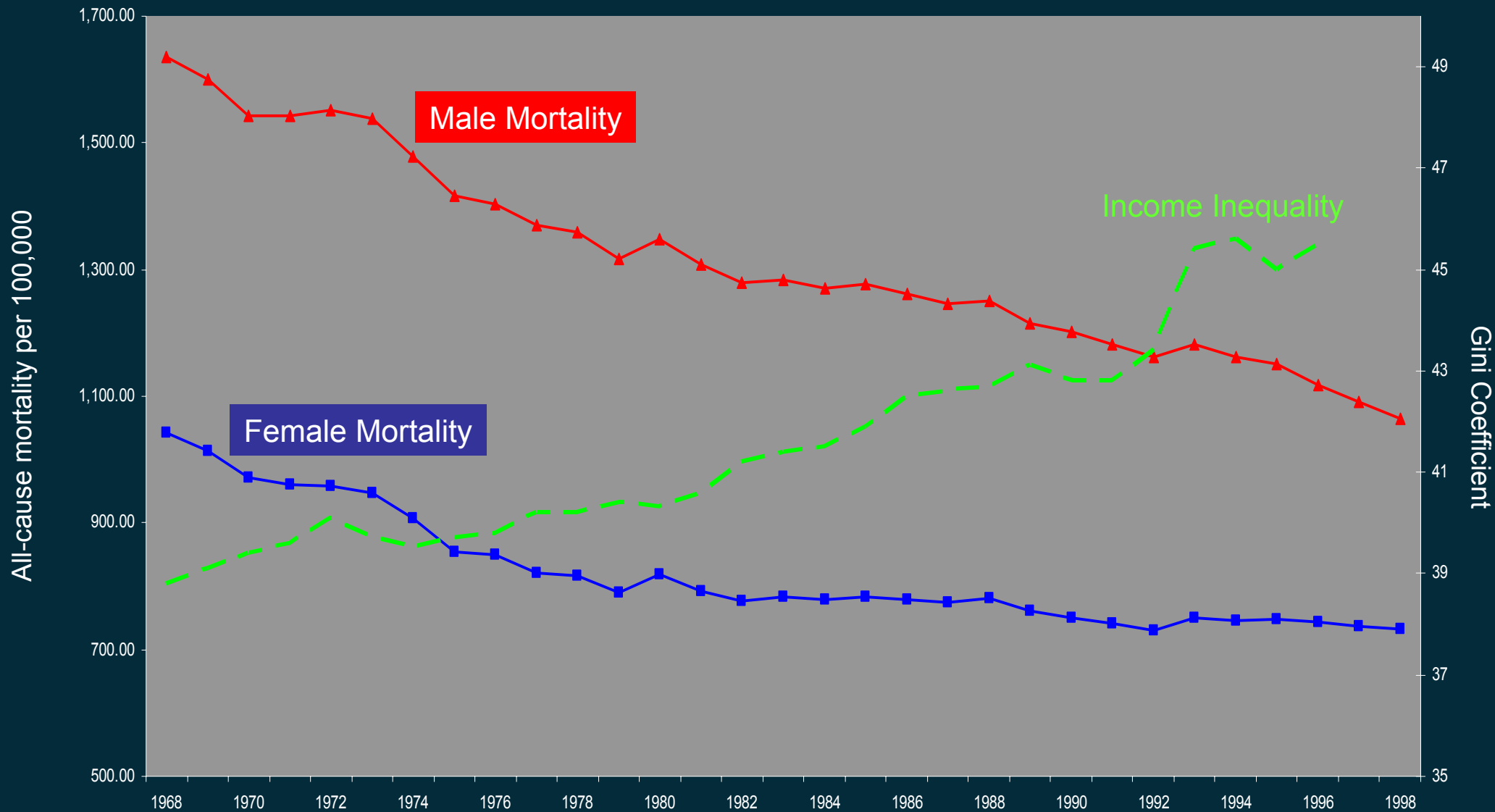
- More likely based on paternalistic views of the importance of good maternal-child health conditions to future generations and how that would feed into the aspirations of the Japanese imperial state
- Whatever the motivation, the specific social investments in women and children have helped deliver the highest life expectancy on the planet, despite on-going gender inequities in Japan
- No universal pathway to good population health?
- Should good population health trump other social values?



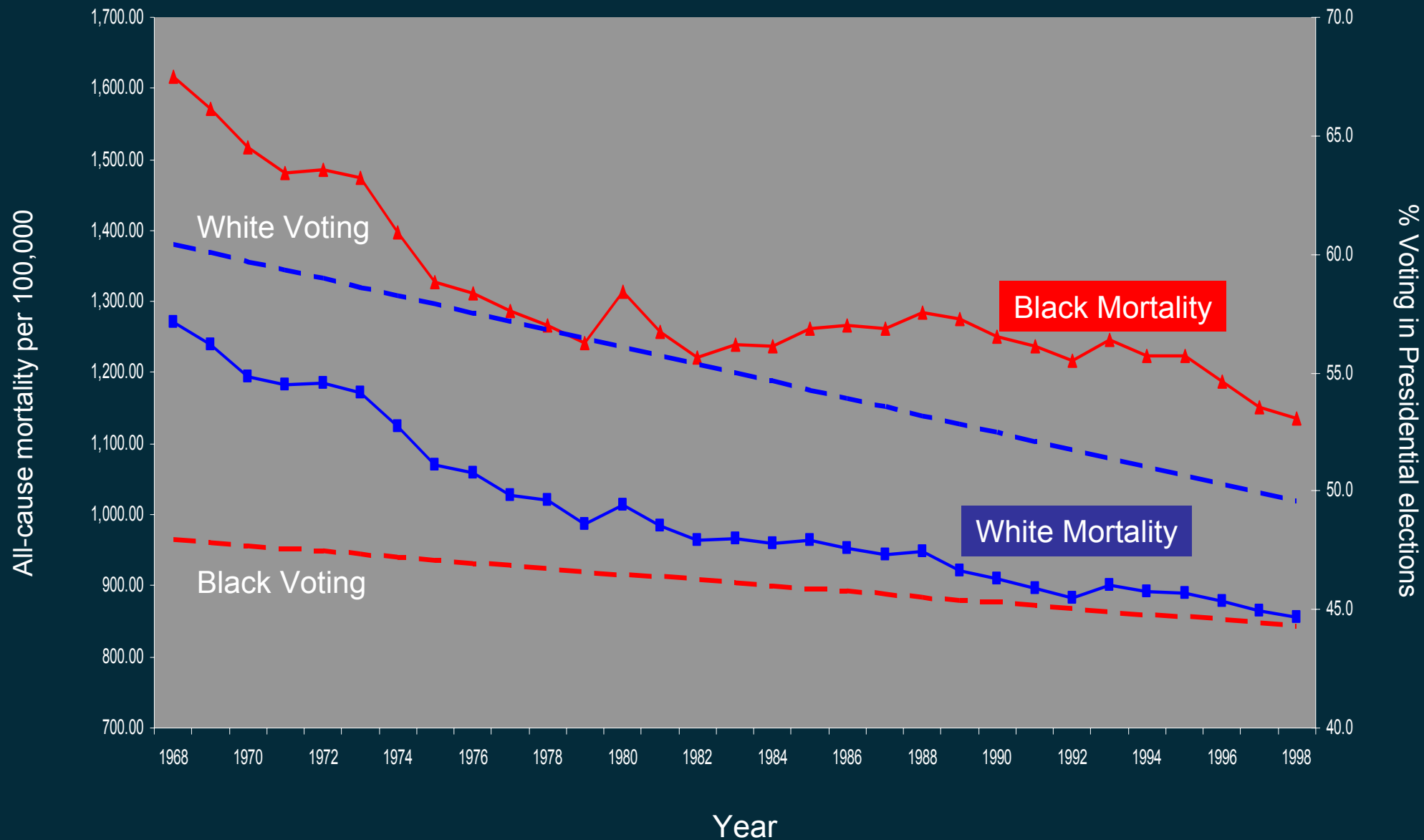
Factors - like social capital/cohesion and stress - that may seem plausible (both biologically and socially) in the cross-section sometimes fail to generate less support

a) when longer term trends in exposures and outcomes are studied

# Income inequality (gini) and sex-specific age-adjusted all-cause mortality USA, 1968 - 1998



# Race-specific Voting Participation in Presidential Elections and age-adjusted, all-cause mortality, USA, 1968 - 1998



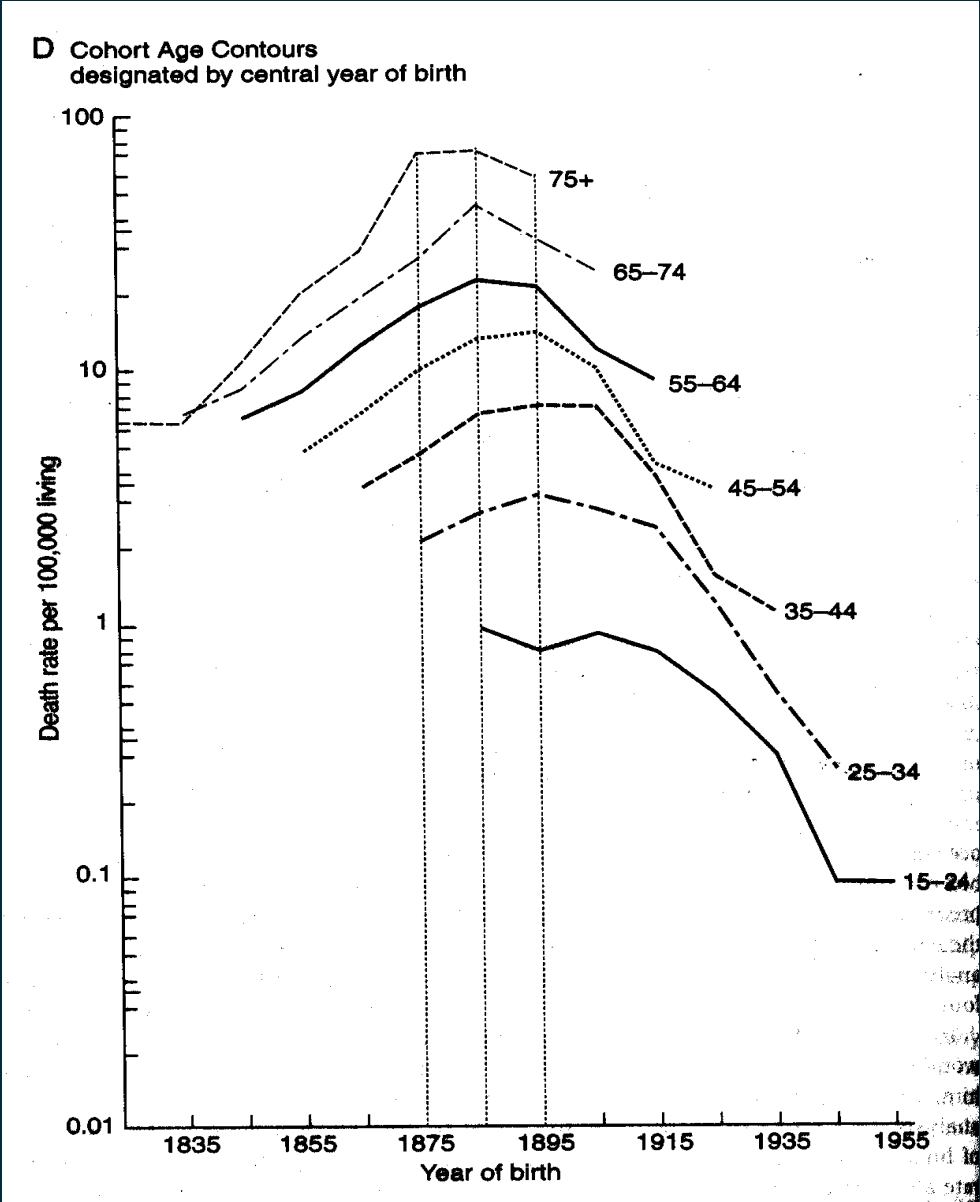
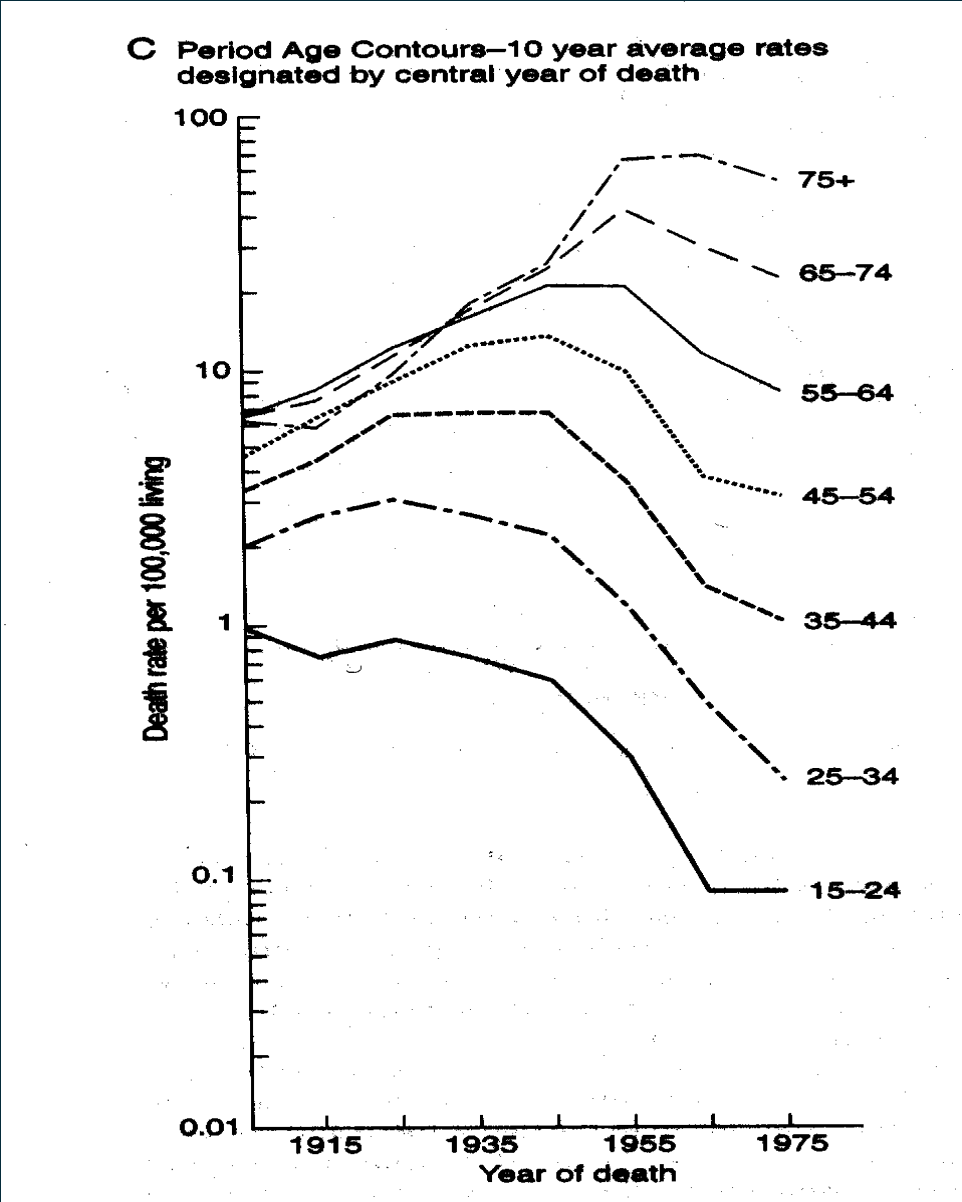
and/or

b) when the specific patho-physiology of the disease in question is more fully understood.

# Disease that have historically been linked to stress processes

- Cholera
- Pellagra
- Beri Beri
- Down's syndrome
- Scurvy
- Yellow fever
- Typhoid
- Asthma
- Peptic ulcer

# The mid-20<sup>th</sup> Century Epidemic of Peptic Ulcer



# Peptic Ulcer and Stressful Life Events

## Men

Any stressful events, OR = 20.3

## Women

Any stressful events, OR = 21.5

Davies and Wilson. *Lancet*, Dec 11<sup>th</sup> 1937.

“During convalescence the patient should be given a simple exposition of peptic ulcer. A clear understanding of the need for maintaining a calm outlook on life, and of the necessity for not exceeding his natural “tempo” by accepting too much work or responsibility, will be much more valuable than routine medication. The patient has got to live with his ulcer-forming tendency and it is essential to give him all the information at our disposal.”

F. Avery Jones. *Progress in Clinical Medicine*, 1948



“The diet should be served in as colourful and attractive a way as possible. A bland insipid colourless diet may cause less psychic flow of gastric juice, but it makes the patient depressed and irritable. The sustained resentment is more harmful than the increased psychic secretion.”

F. Avery Jones. In: *Progress in Clinical Medicine*, 1948

“That there has been a true decline in incidence is the most interesting possibility. This would suggest to anyone in sympathy with ‘psychosomatic’ theories ... that the type of personality disposed to the disease is less common – unfortunately not a testable proposition; [or] that the environment is less of a strain – which is scarcely conceivable”.

Jerry Morris. *Uses of Epidemiology*, 3<sup>rd</sup> Edition, 1975.

## *What causes peptic ulcer?*

“ ... despite the common folk knowledge about the emotional causes of ulcer, a major textbook of pathology currently concludes that the origins of peptic ulcers are ‘enigmas wrapped in mystery’ ”.

Sterling and Eyer. Biological basis of stress related mortality.

*Soc Sci Med* 1981; 15E: 3-42.

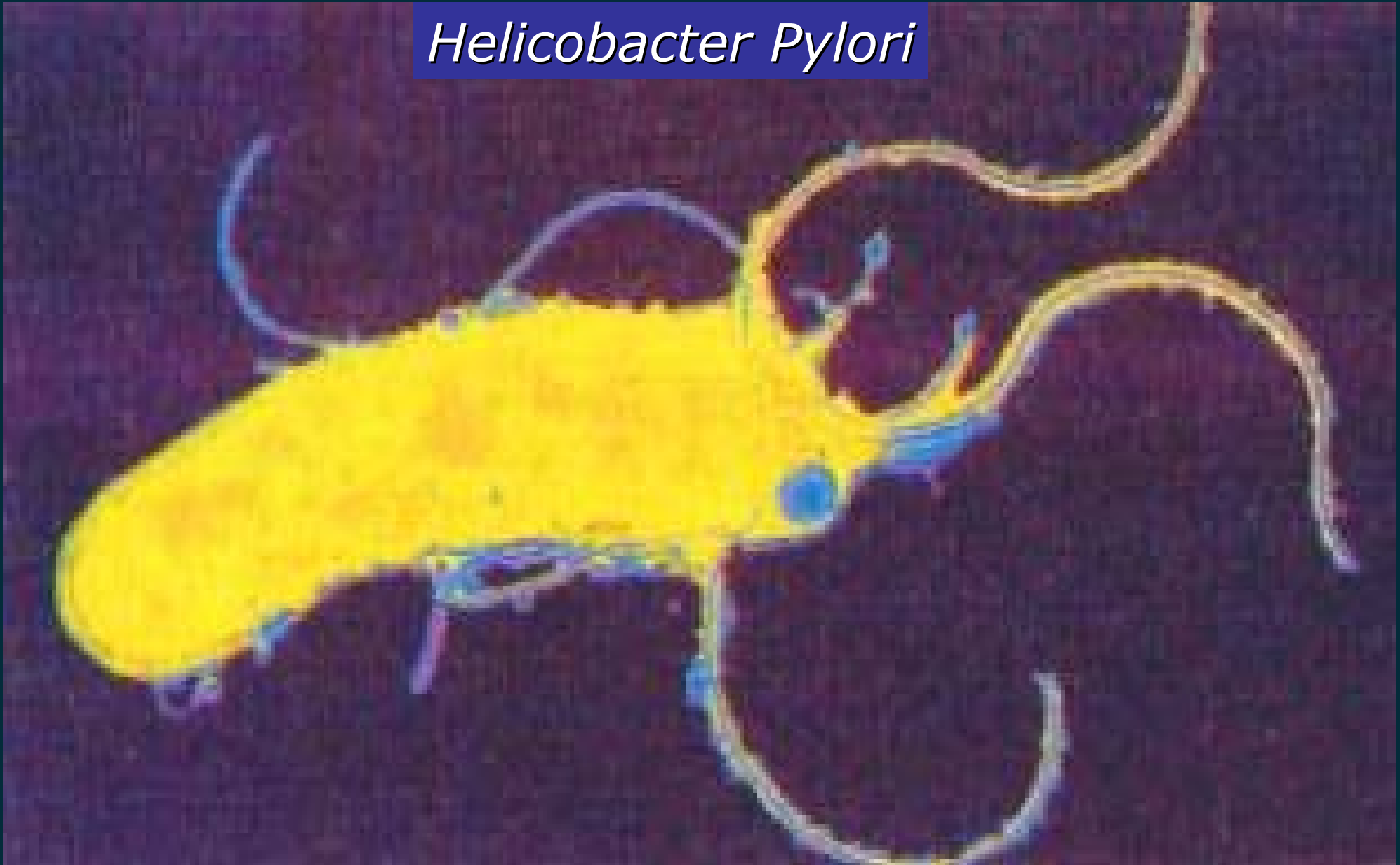
The evidence “. . . does not exclude the possibility that a major single causal factor awaits discovery”

Mervyn Susser. *Journal of Chronic Disease*

1967;20:435-456

*What causes peptic ulcer?*

*Helicobacter Pylori*



"*H pylori* eradication, without altering acid output, will become the mainstay of duodenal ulcer treatment because it cures the disease."

Rauws and Tytgat. *Lancet* 1990;335:1233-5

**Part 4.** What are some of the lessons for better understanding social disparities in health?

- *Considering heterogeneity in our explanations*

## *The Standard View of Socioeconomic Health Disparities*

"Socioeconomic status is a strong and consistent predictor of mortality and morbidity. Individuals lower in the SES hierarchy suffer disproportionately from almost every disease ... This association is found with each of the key components of SES: income, education and occupational status."

Adler, et. Al., *JAMA* (1993) p. 3140

"Throughout history SES has been linked to health. Individuals higher in the socioeconomic hierarchy typically enjoy better health than those below; SES differences are found for rates of mortality and morbidity from almost every disease and condition."

Adler, et. al., *Am Psychologist* (1994) p. 15



This sort of mind-set has encouraged a focus on universal processes that make the disadvantaged “generally susceptible” to all sorts of poor health conditions

- John Cassell’s – the “father” of US social epidemiology - ideas on social support and general susceptibility have been influential
- Ideas on general susceptibility have been combined with later evidence (e.g., Whitehall studies) on the apparent inability of material conditions; and traditional risk factors and behaviors to explain socioeconomic gradients in CHD

For example, in regard to the Whitehall study, it has been argued that a “ . . . gradient in mortality among civil servants who are not poor argues for the importance of psychosocial factors linked to position in the hierarchy.”

Marmot and Bobak. *BMJ* 2000 (p. 1127).

## *The Whitehall II Study*

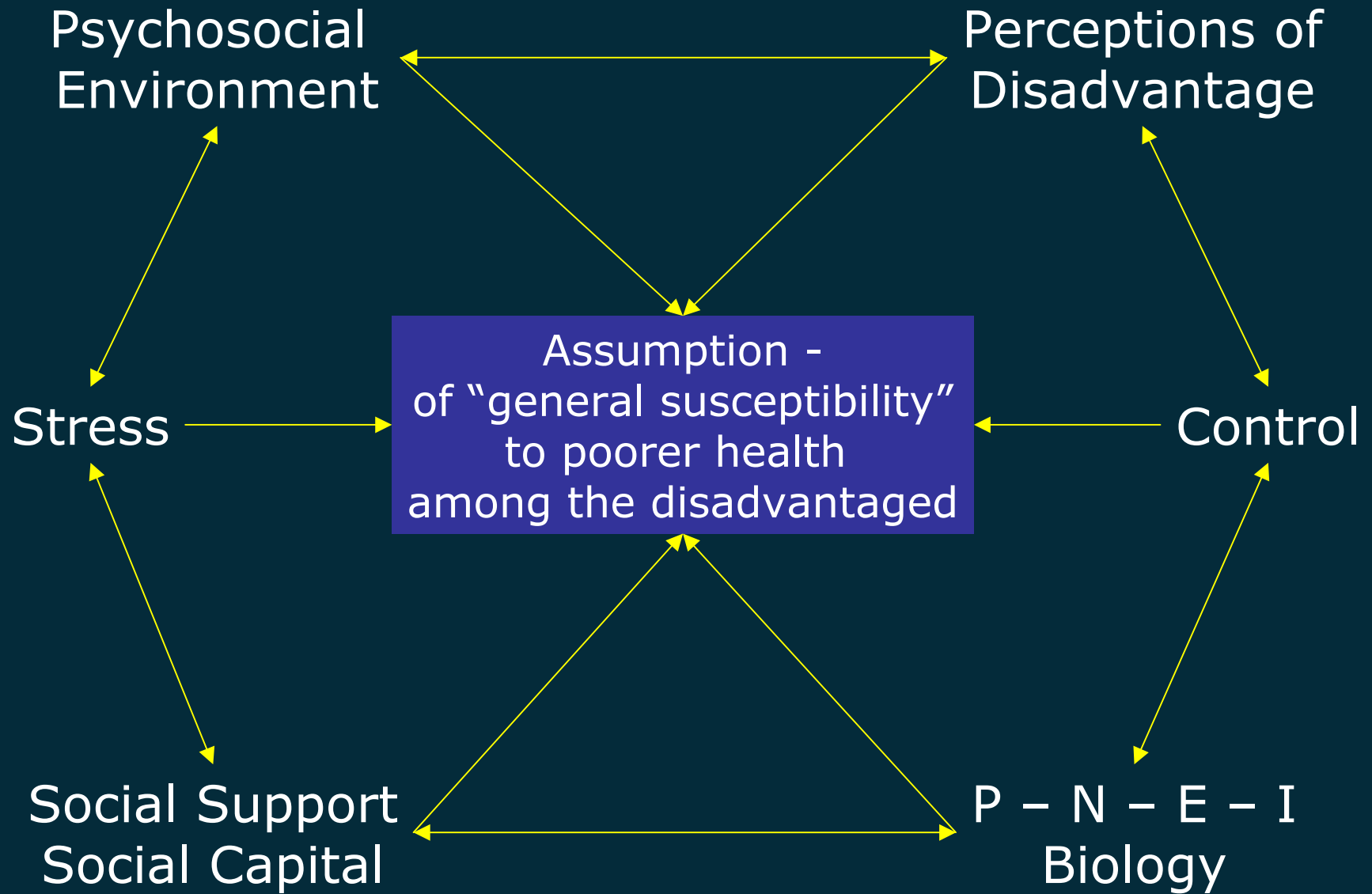
“As predicted, the specific psychosocial work characteristic of low control made an important contribution to the social gradient in incident CHD in the Whitehall II study.”

“ ... work is the major cause of the social gradient in CHD incidence in this cohort, ...”

“Much of the inverse social gradient in CHD incidence can be attributed to differences in psychosocial work environment.”

# Explanations for Health Disparities

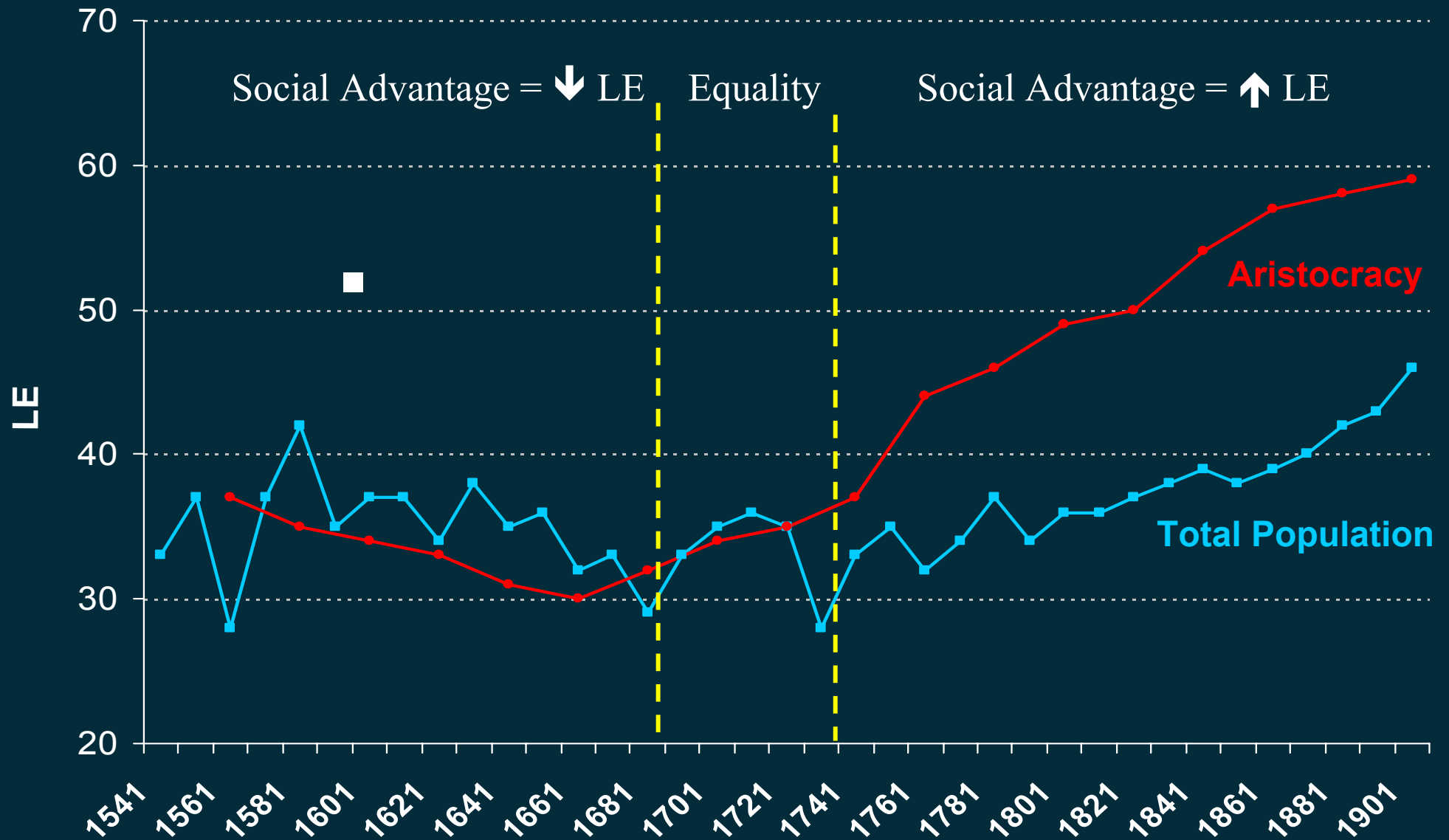
- ~~Materialist~~ “objective” conditions & life circumstances
- ~~Behavioral~~ diet, smoking, exercise, alcohol
- Psychosocial stress, negative emotions, control, social support account for the general susceptibility of the disadvantaged



Heterogeneity of links between  
socioeconomic factors and different outcomes?

# Heterogeneity and History

# Life Expectancy at Birth - Britain (1540-1901)

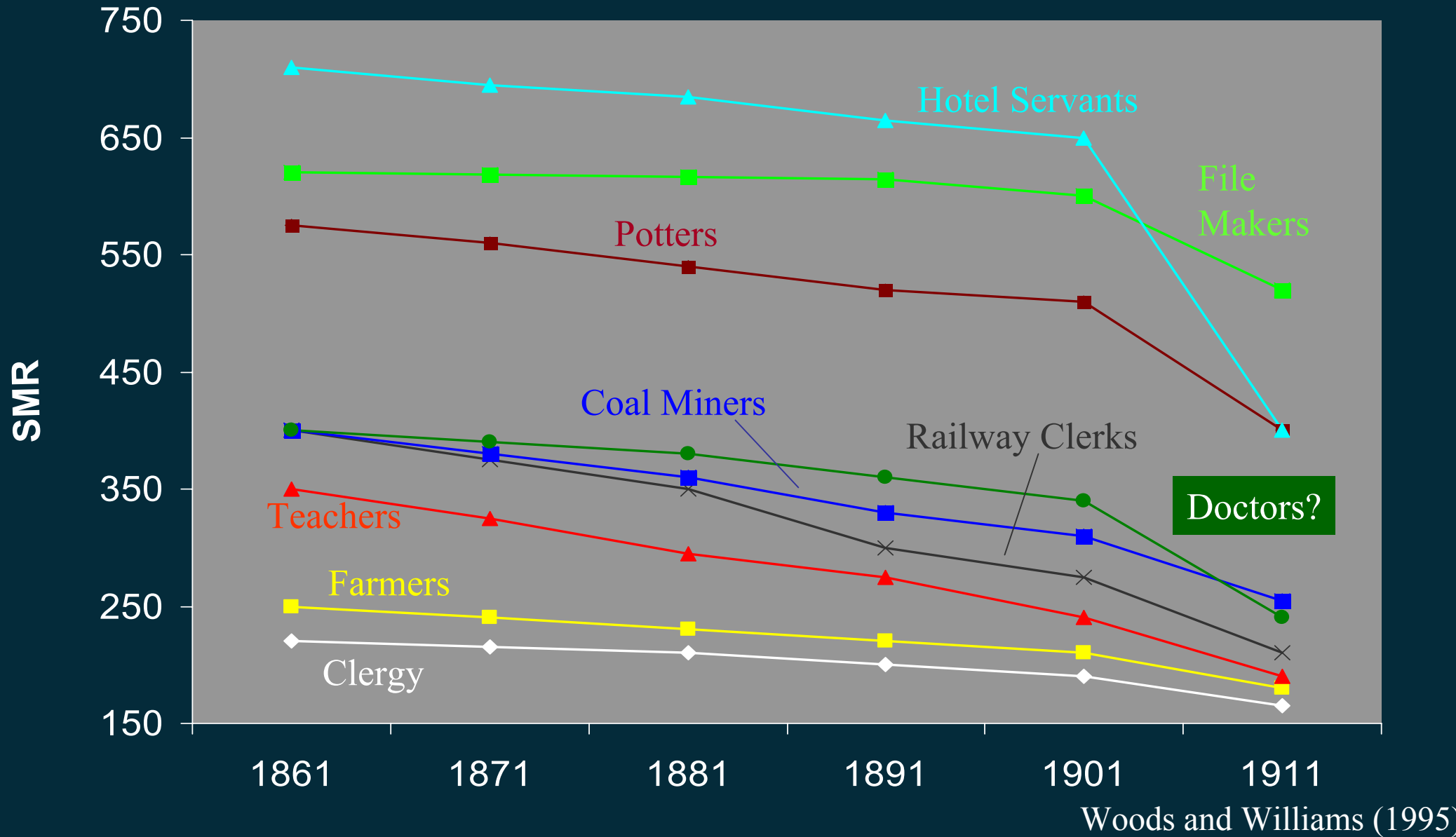




“... in early modern Europe rulers and their subjects seem to have had similarly low levels of life expectancy at birth (30-35 years) at least before 1700. Some low-income peasant families had substantially higher levels of life expectancy at birth than wealthy peers (40-50 years) although some had lower (20-25 years). ... **what matters most to explaining pre-transition mortality is location not income.**”

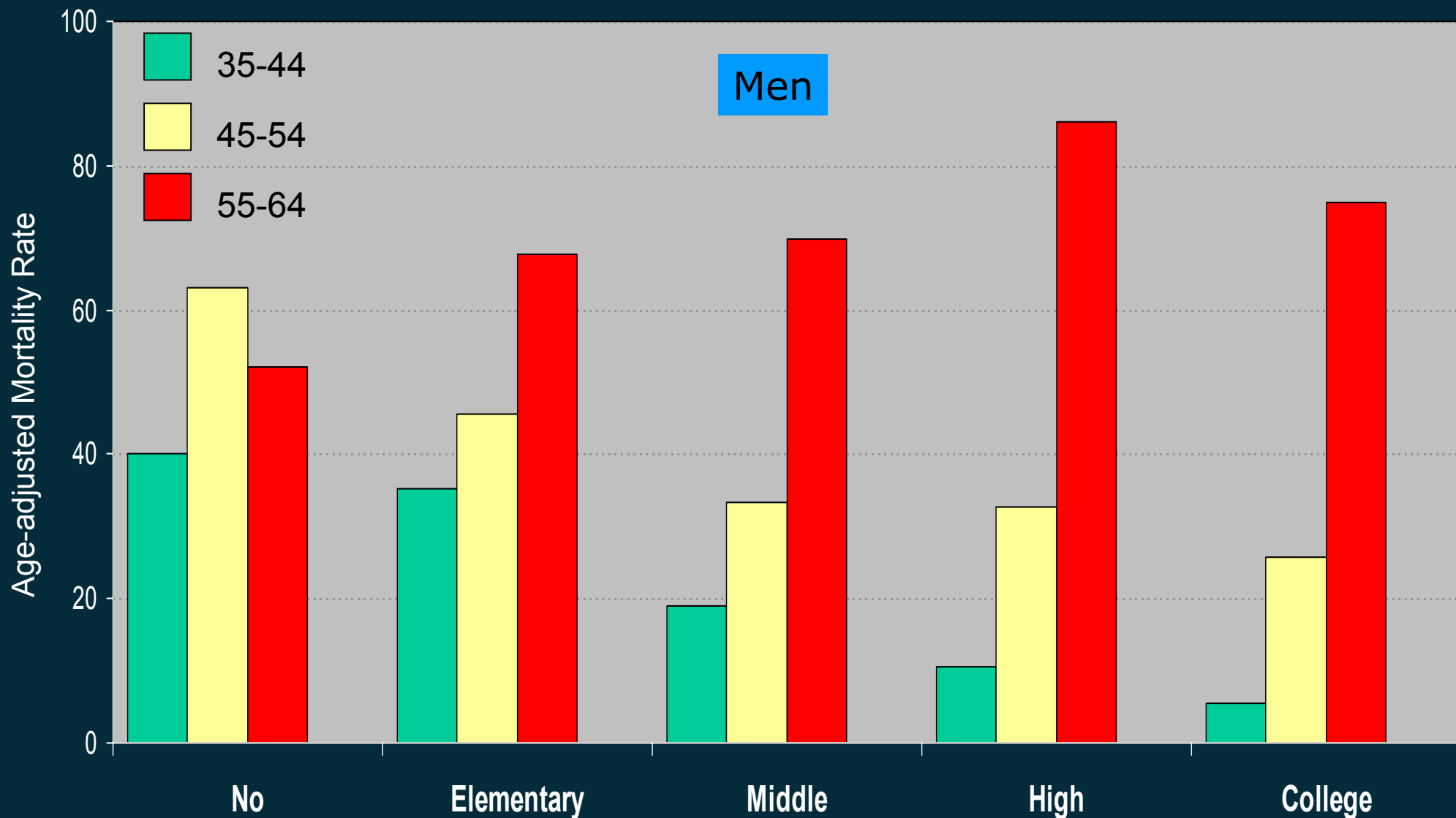
Johansson (1999)

# Trends in Death Rates for Selected Occupations, 1861-1911



# Education and IHD Mortality, Korea (1995-2000)

Census Linkage Study of 15 million individuals



Kang, Lynch, et al (in press)

# Heterogeneity of Race / Ethnic Disparities in Health

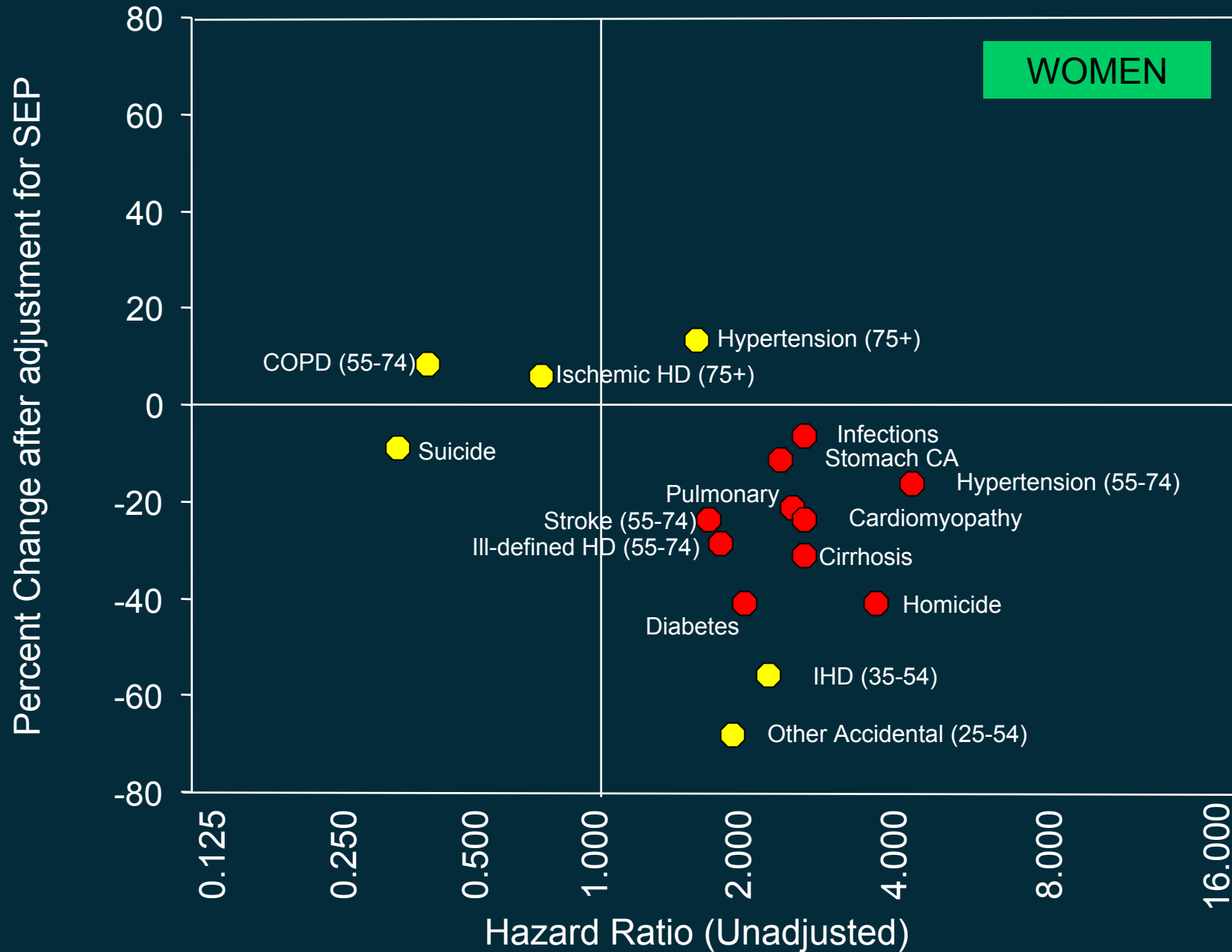
## Mortality Unrelated to Race, 1979-89

Women			Men		
Disease	Age strata	Estimated Hazard	Disease	Age strata	Estimated Hazard
Oral CA		1.26	Oral CA		1.14
Colon CA		1.12	Colon CA		0.94
Rectal CA		1.21	Rectal CA		0.62
Pancreatic CA		1.25	Pancreatic CA		1.34
Lung CA		1.03	Bladder CA		1.24
Breast CA		0.98	Kidney CA		1.15
Ovarian CA		0.91	Leukemia		0.54
Bladder CA		0.58	Other lymph CA		1.07
Kidney CA		1.24	Hypertension	[75+]	1.78
Brain CA		1.11	Ischemic HD	[35-54]	1.19
Leukemia		0.73	Heart Failure	[55-74]	1.16
Other lymph CA		1.05	Heart Failure	[75+]	0.81
Hered. & deg. of CNS		0.67	Ill-defined HD	[75+]	1.19
Ischemic HD	[55-74]	1.07	Stroke	[75+]	0.83
Heart Failure	[55-74]	1.40	Art/arterio/cap		0.80
Heart Failure	[75+]	1.01			
Ill-defined HD	[75+]	0.79			
Stroke	[75+]	0.80			
Art/arterio/cap		0.98			
COPD	[75+]	0.71			
Automobile		0.94			
Other accidental	[55+]	0.96			

# Mortality Related to Race, With and Without Adjustment for SEP, 1979-89

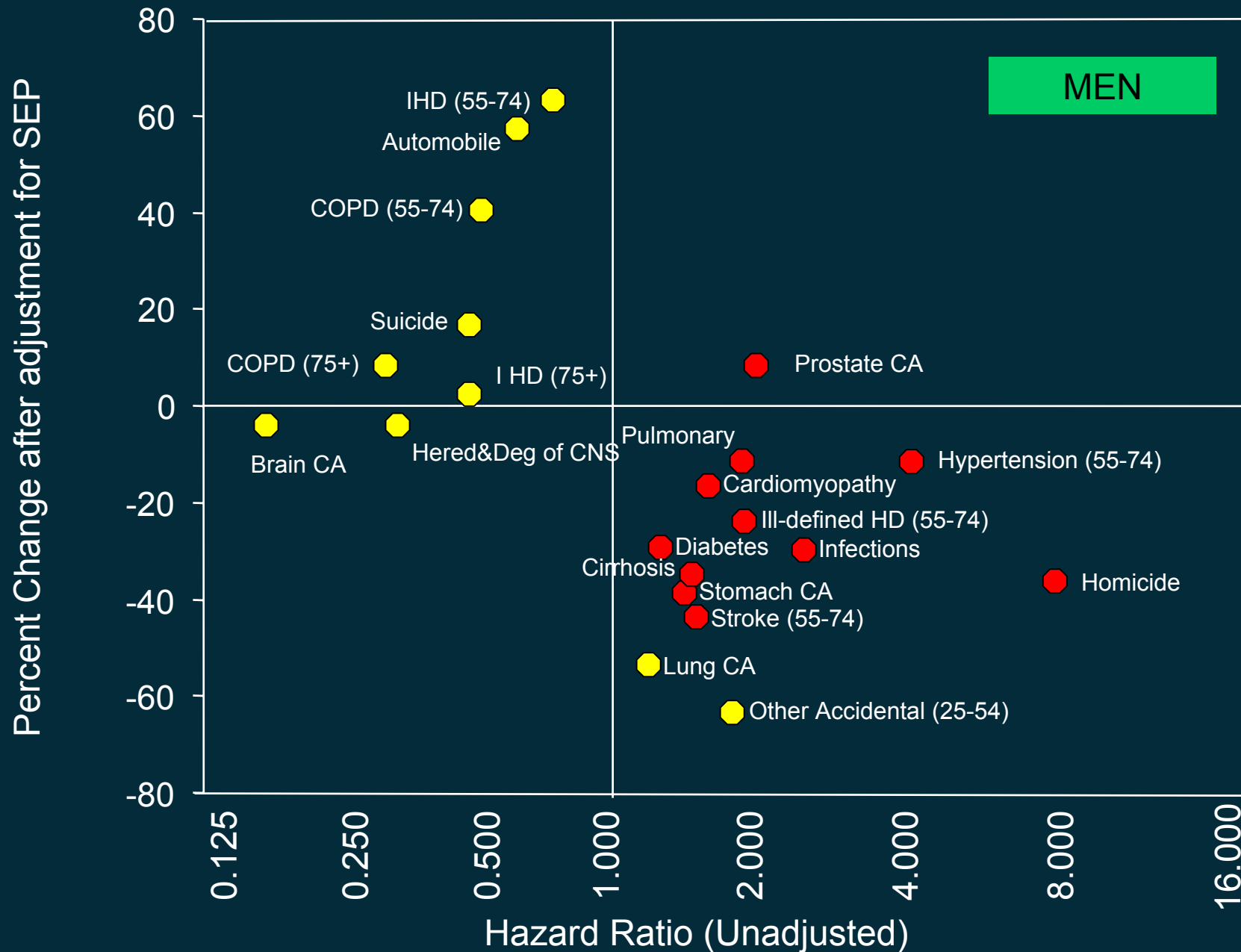
Women				Men			
Disease	Age strata	Unadjusted H.R.	Adjusted H.R.	Disease	Age strata	Unadjusted H.R.	Adjusted H.R.
Infections		2.50	2.33	Infections		2.21	1.87
Stomach CA		2.23	2.06	Stomach CA		1.65	1.46
Diabetes		2.11	1.70	Lung CA		1.28	1.15
Hypertension	[55-74]	4.86	4.17	Prostate CA		2.11	2.15
Hypertension	[75+]	1.71	1.79	Brain CA		0.22	0.24
Ischemic HD	[35-54]	2.36	1.63	Diabetes		1.48	1.36
Ischemic HD	[75+]	0.72	0.71	Hered. & deg. CNS		0.42	0.43
Pulmonary		2.49	2.19	Hypertension		4.04	3.60
Cardiomyopathy		2.59	2.26	Ischemic HD	[55-74]	0.85	0.76
Ill-defined HD	[55-74]	1.76	1.55	Ischemic HD	[75+]	0.50	0.49
Stroke	[55-74]	1.71	1.53	Pulmonary	[55-74]	2.55	2.34
COPD	[55-74]	0.40	0.37	Cardiomyopathy		2.02	1.84
Cirrhosis		2.64	2.25	Ill-defined HD	[55-74]	2.66	2.26
Suicide		0.34	0.37	Stroke	[55-74]	1.77	1.51
Homicide		4.60	3.28	COPD	[55-74]	0.65	0.52
Other accidental	[25-54]	1.98	1.32	COPD	75+	0.35	0.33
				Cirrhosis		1.72	1.52
				Automobile		0.78	0.65
				Suicide		0.49	0.41
				Homicide		8.18	5.94
				Other accidental		1.67	1.30

# Hazard Ratio for Black versus White Race for Death Related to Race, 1979-89



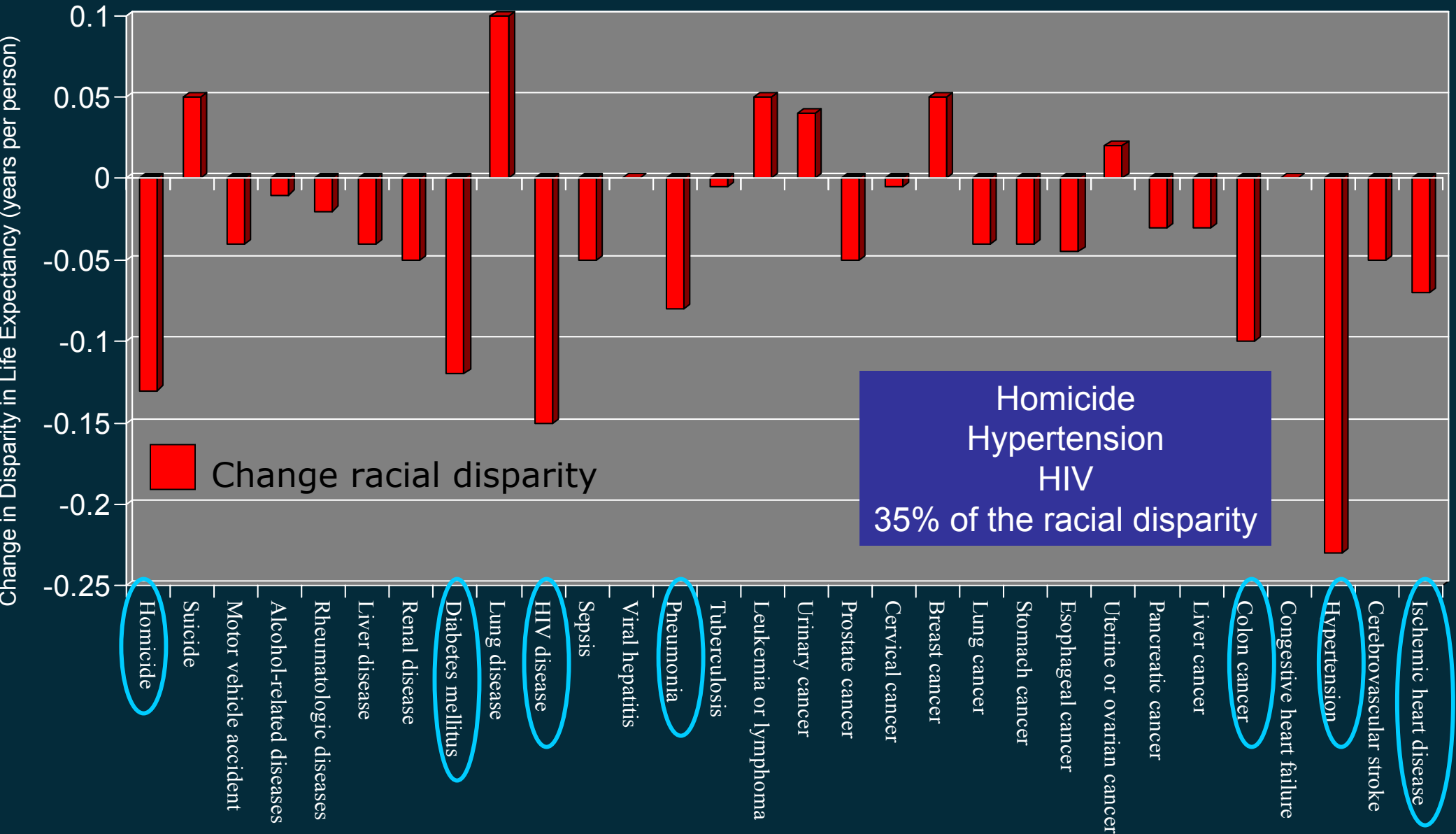
Howard et al.,  
*Annals of  
Epidemiology*,  
2000; 10: 214-223

# Hazard Ratio for Black versus White Race for Death Related to Race, 1979-89





# Change in the Disparity in Life Expectancy if Selected Diseases were Eliminated



# Heterogeneity of Socioeconomic Disparities in Health

# Causes of death and median income of Zip Code area of residence in the men screened for MRFIT: relative risk for \$10,000 lower income

## RR > 1.50

AIDS

Diabetes

Rheumatic  
Heart Disease

Heart failure

COPD

Pneumonia/  
Influenza

Homicide

## RR 1.21-1.50

Infection

Coronary Heart  
Disease

Stroke

Cirrhosis

Genitourinary  
disease

SR Symptoms

Accidents

Lung cancer

Liver cancer

Colorectal cancer

## RR 1.00-1.20

Aortic aneurysm

Suicide

Nervous system  
disease

Oesophageal  
cancer

Stomach cancer

Pancreatic cancer

Prostate cancer

Bladder cancer

Kidney cancer

Brain cancer

Myeloma

Leukaemia

## RR < 1.00

Blood disease

Motor neurone  
disease

Flying accidents

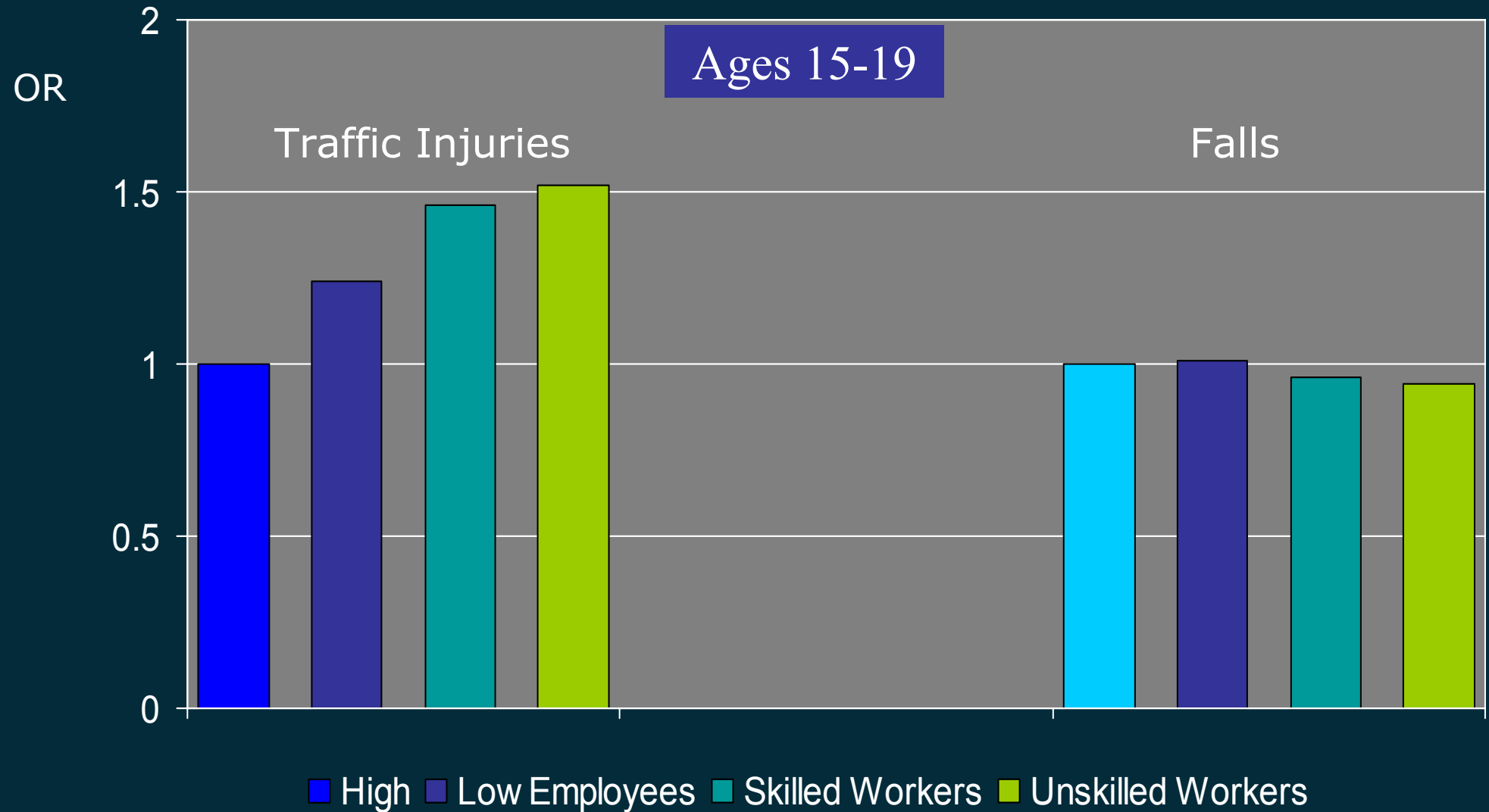
Lymphoma

Hodgkin's disease

Melanoma

Bone/connective  
tissue cancer

# Parental Occupation and Relative Risk for Injury, Sweden, 1990-1994



## More Common Among Poor

Incidence Mortality

Mouth/Pharynx	?	●
Oesophagus	●	●
Stomach	● ■	●
Liver	●	●
Nasal	●	●
Larynx	●	●
Lung	●	●
Cervix	●	●

## More Common Among Rich

Incidence Mortality

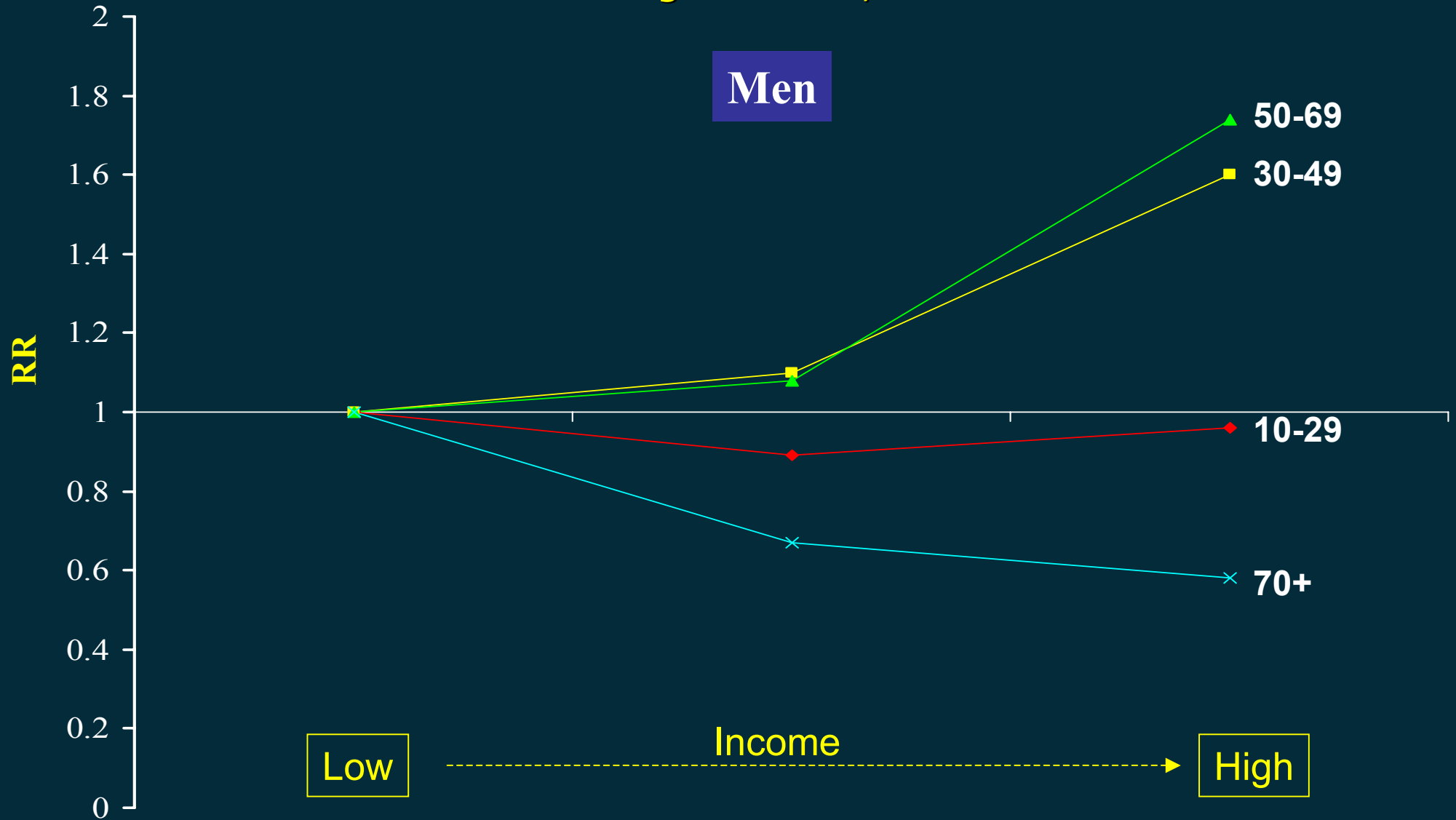
Melanoma	●	●
Breast	●	●?
Colon	●	●
Ovarian	●	●
Testis	●?	●

**No Evidence for Socioeconomic Patterns**

Rectum, Pancreatic, Bone, Connective Tissue, Prostate, Bladder, Kidney, Brain, Thyroid, Lymphomas, Leukemia

# Age-specific Melanoma Risk and Census Tract Income

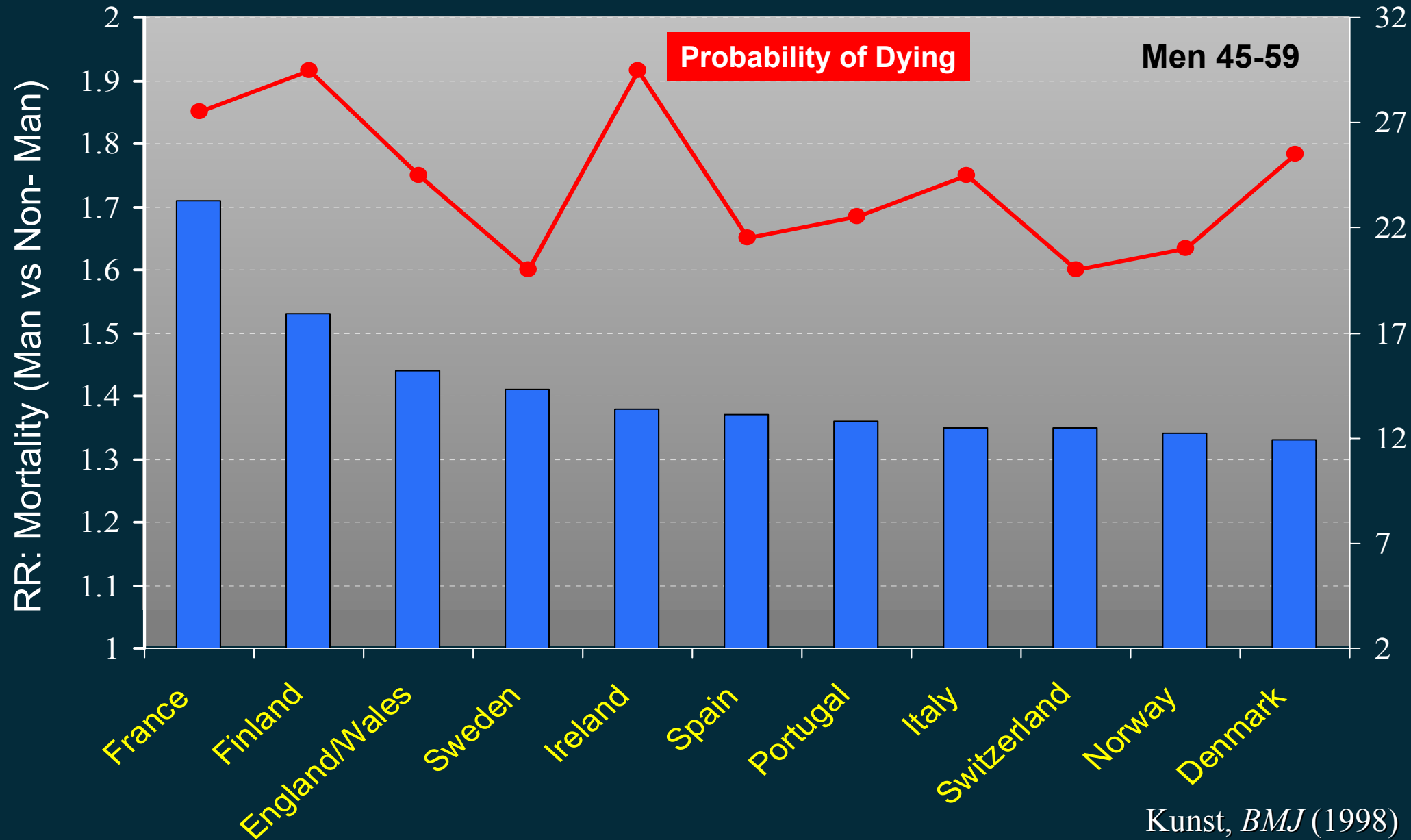
## Washington State, 1974-85



Constance, *Int J Cancer* (1990)

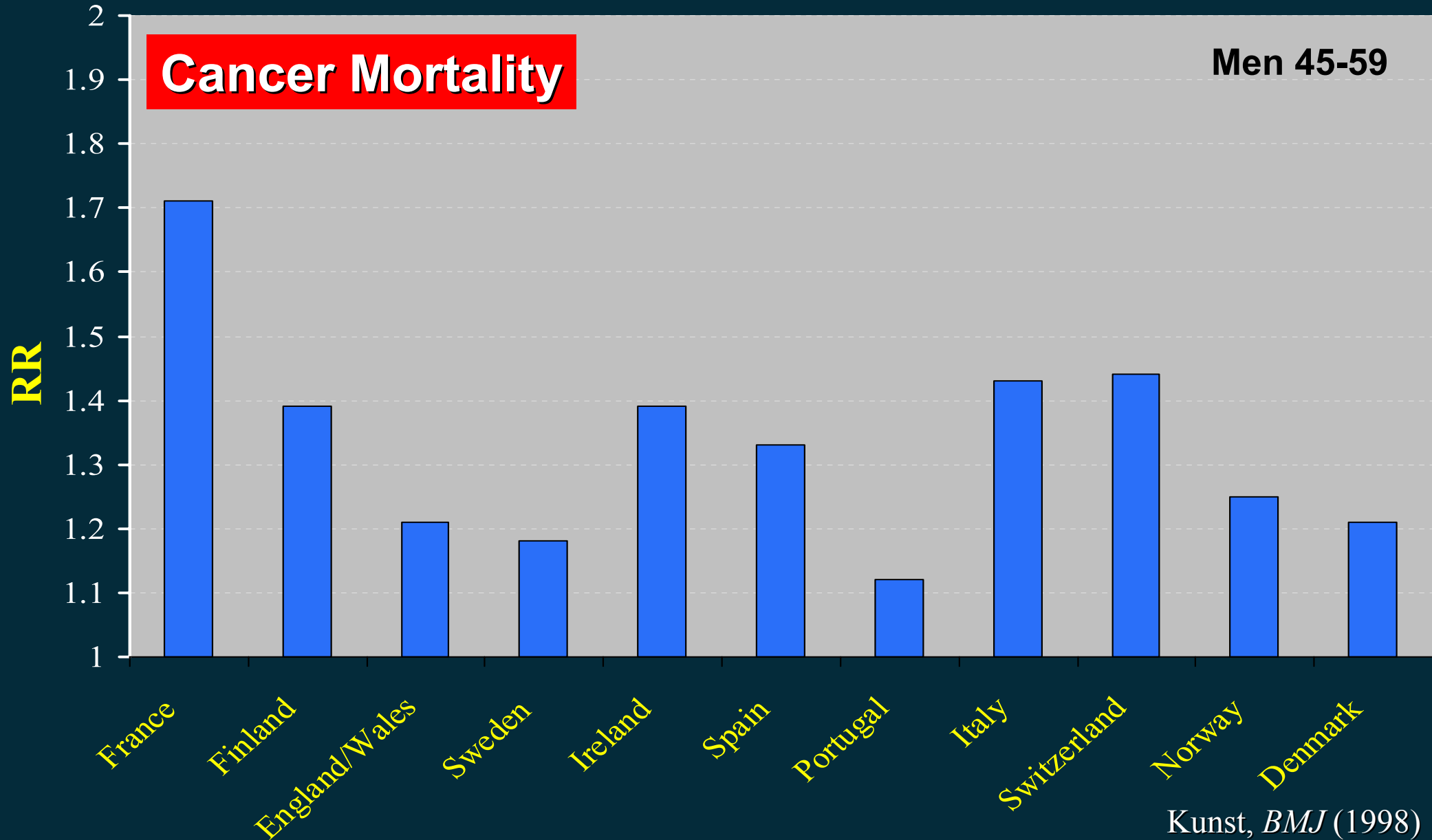
# International Heterogeneity in the Magnitude and Direction of Social Inequalities in Health

# Manual vs Non-Manual Health Inequalities, Europe

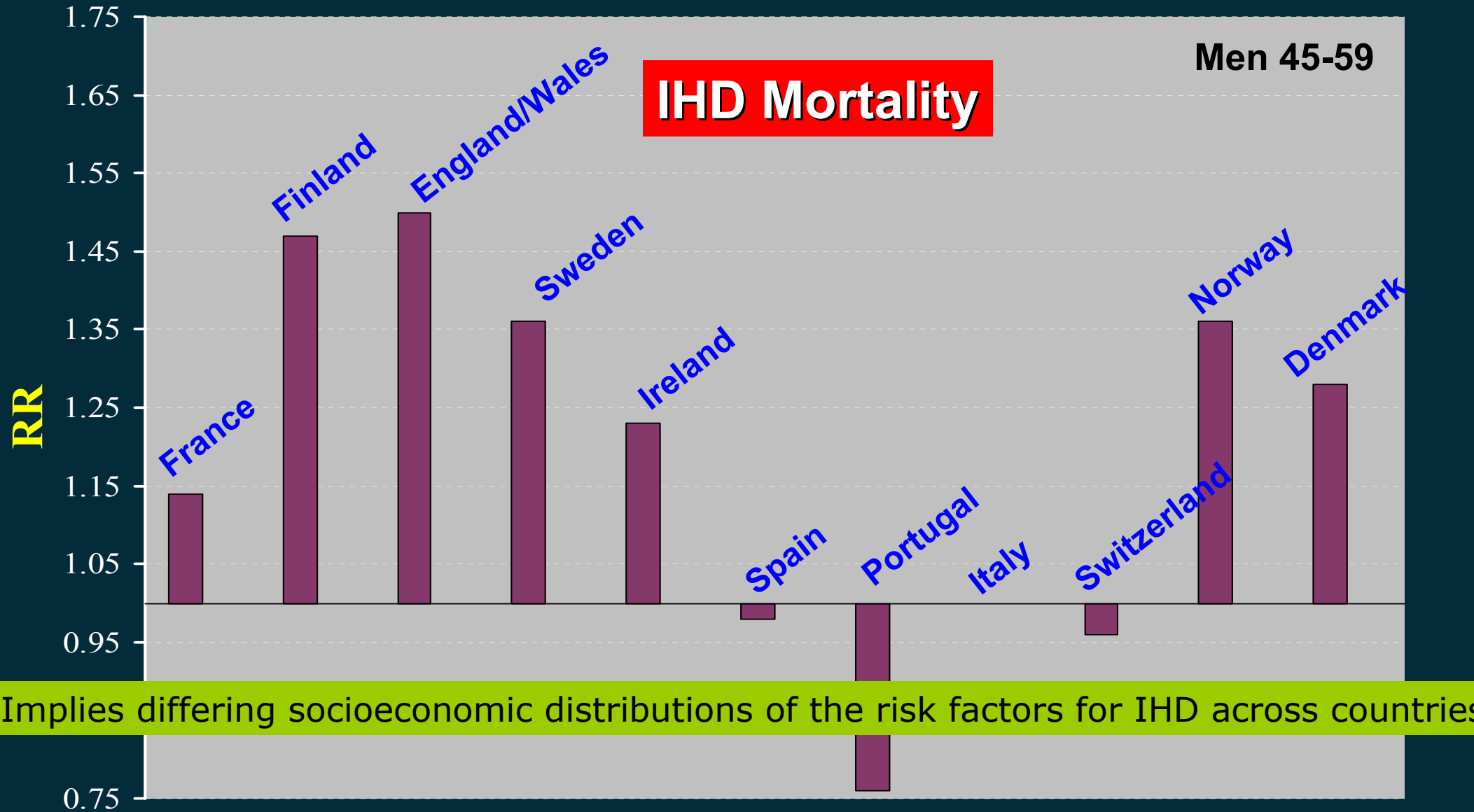




# Rate Ratio: Manual vs Non-manual



# Rate Ratio: Manual vs Non-manual



So what have we learned?

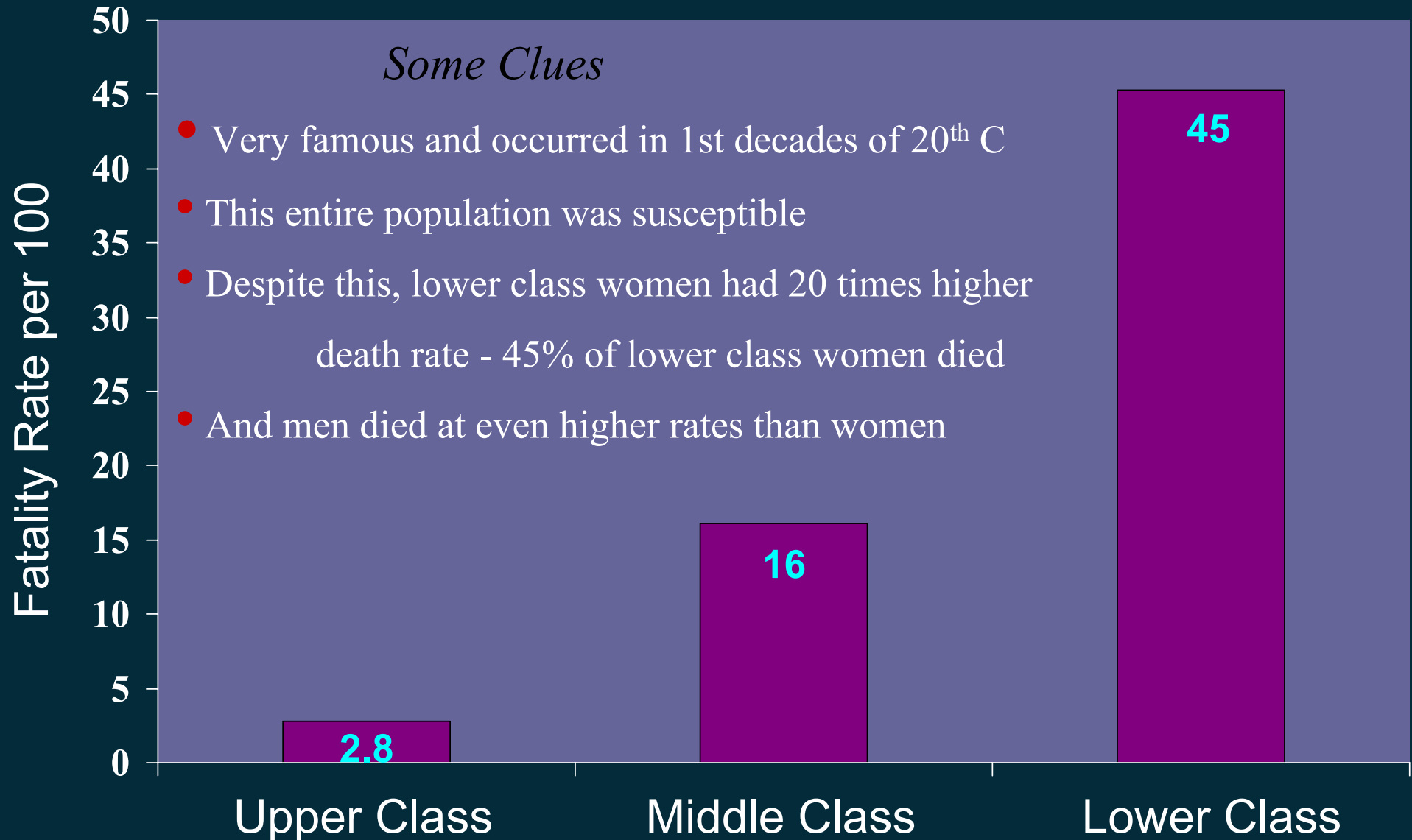
This is your quiz

Can You Explain this Health Disparity?

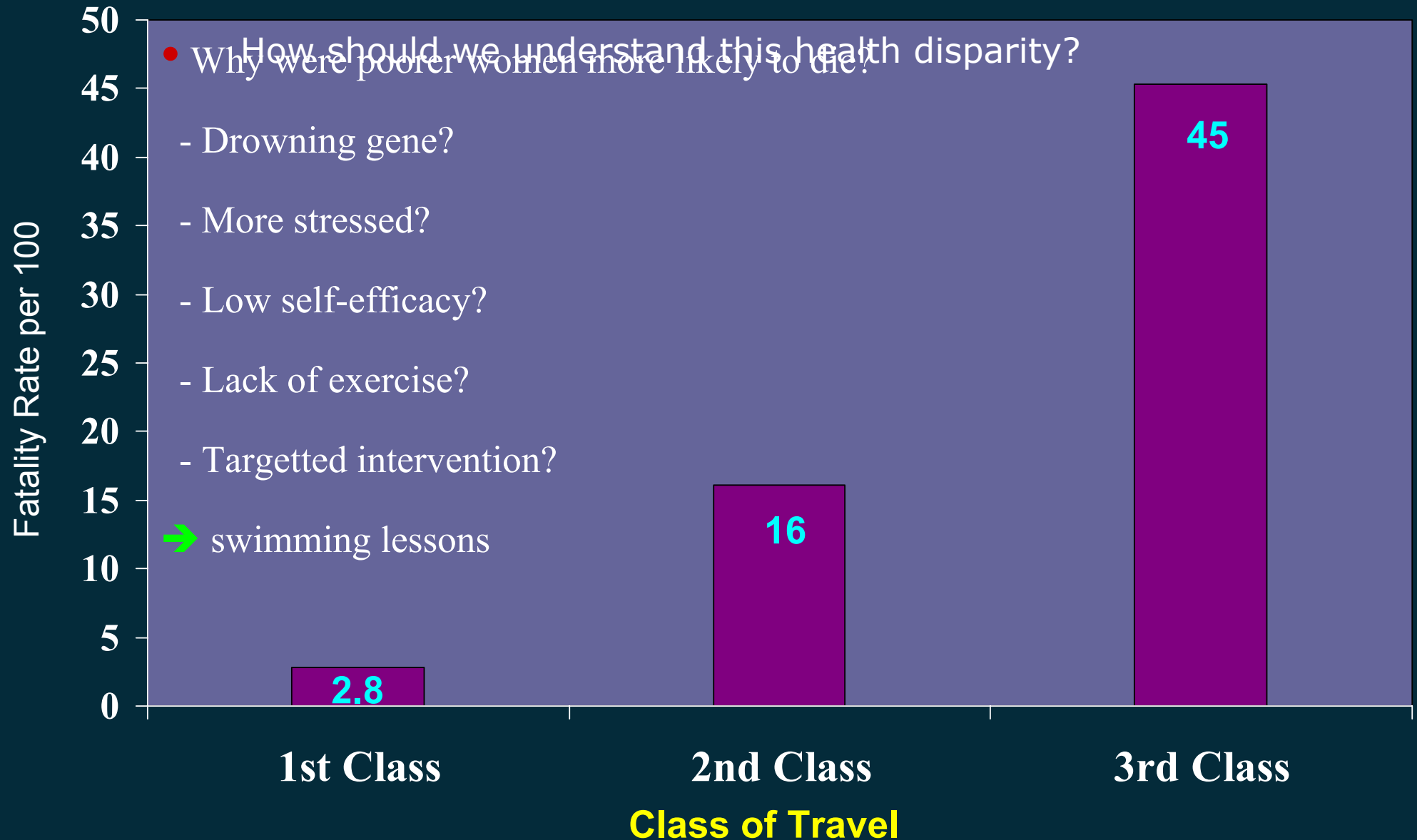
# What process generated this health disparity?

## *Some Clues*

- Very famous and occurred in 1st decades of 20<sup>th</sup> C
- This entire population was susceptible
- Despite this, lower class women had 20 times higher death rate - 45% of lower class women died
- And men died at even higher rates than women



# Fatality Rates per 100 Women Passengers: HMS Titanic



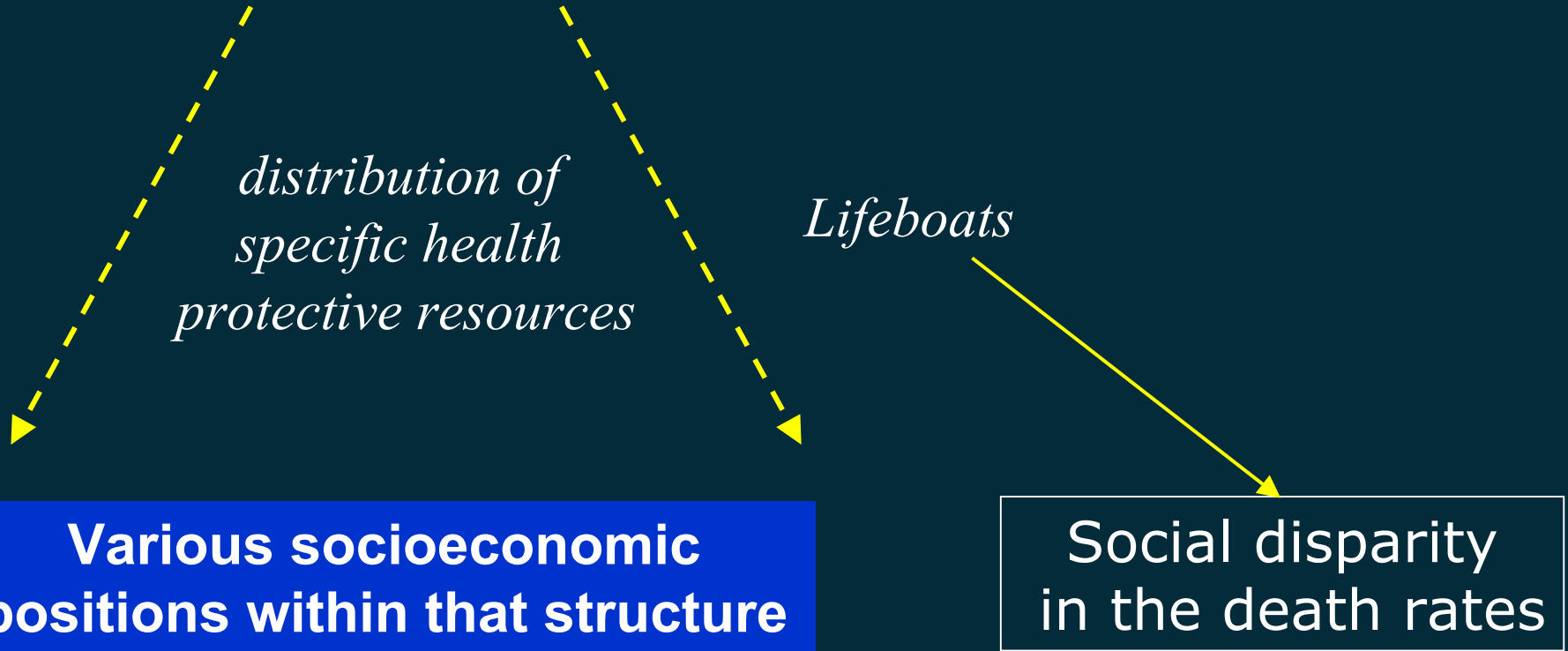
**Nature of the  
Social Structure**

*distribution of  
specific health  
protective resources*

*Lifeboats*

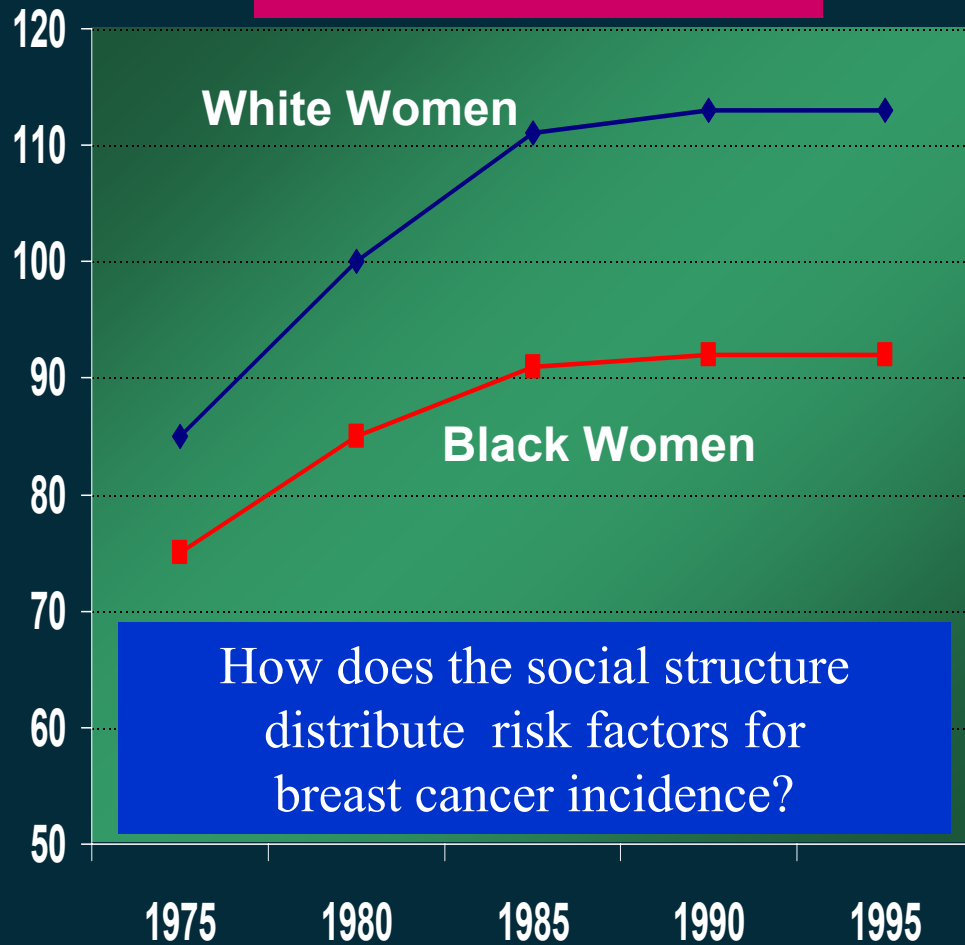
**Various socioeconomic  
positions within that structure**

**Social disparity  
in the death rates**

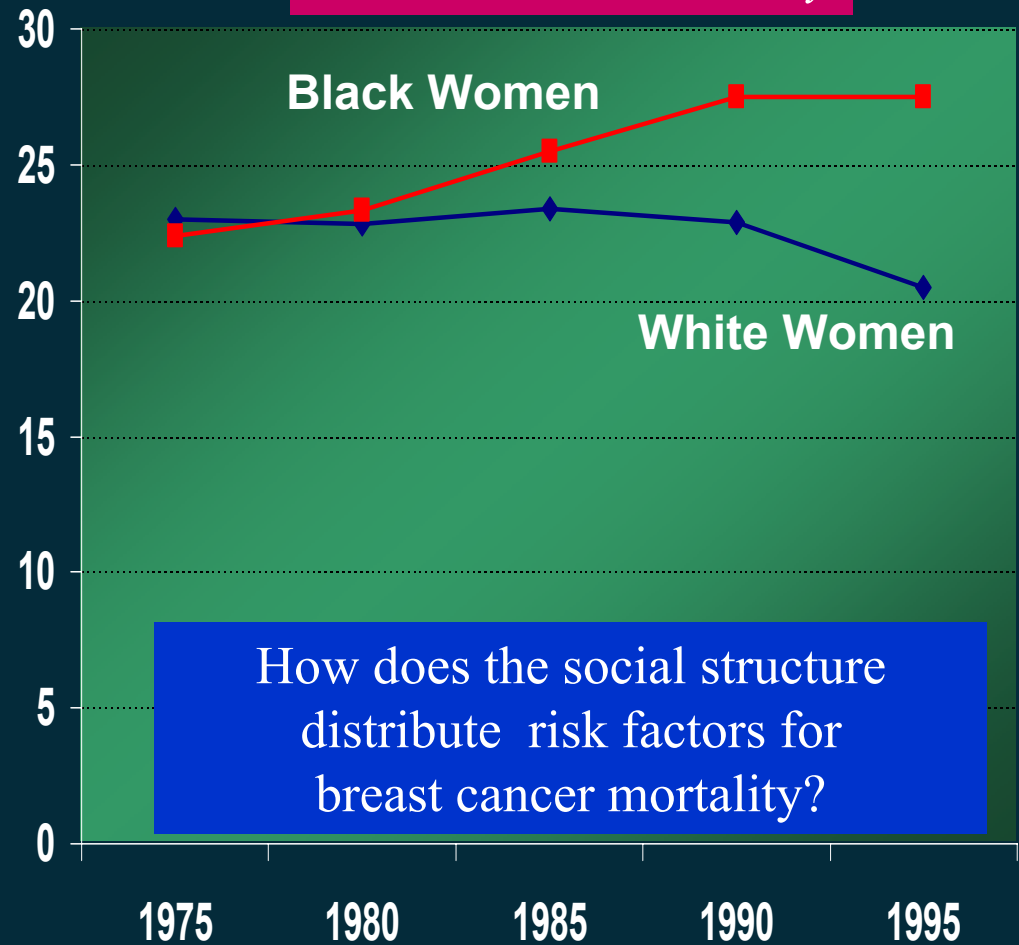


# Can apply the same idea to understanding this pattern

*Breast Cancer Incidence*



*Breast Cancer Mortality*



National Center for Health Statistics, USA (1998)

We need to include heterogeneity in our explanations for social disparities in health

The direction and extent of social disparities in health differs

- by outcome
- by exposure – education, income
- by place
- over time

This may help make the problem of health disparities seem less intractable and suggests that social disparities in health are rooted in the nature of the social structures created by humans and thus amenable to change



# Conclusion

- The example of the Russian mortality crisis and the rise in Japanese LE show how social factors can strongly affect levels and trends in population health BUT they do so specifically through their links to risk factors for specific outcomes.
- Applied to health disparities, this suggests we can use the underlying heterogeneity of associations to suggest more specific links between socioeconomic markers and race/ethnicity and risk factors and specific health outcomes
- This may weaken the case for general psychosocial processes in determining population health or health disparities

## *Where do psychosocial factors fit?*

- The case for the importance of psychosocial factors to health does not need to be made on the grounds that they are key determinants in the etiology of diseases like CVD and cancer, although they may be etiologically important to some outcomes such as homicide.
- They are also important outcomes in their own right because of their contributions to quality of life in affluent societies.
- The quantity of life may well be a relatively unimportant contributor to the quality of life in affluent societies and this means psychosocial phenomena are important as population health outcomes.

Thank you