MPIDR-NES Training Programme

Moscow, New Economic School,14th January - 1st February 2013

Population and Health

Лекция 9. Неравенство в здоровье: факты и объяснения

Lecture 9: Health inequalities: facts and explanations

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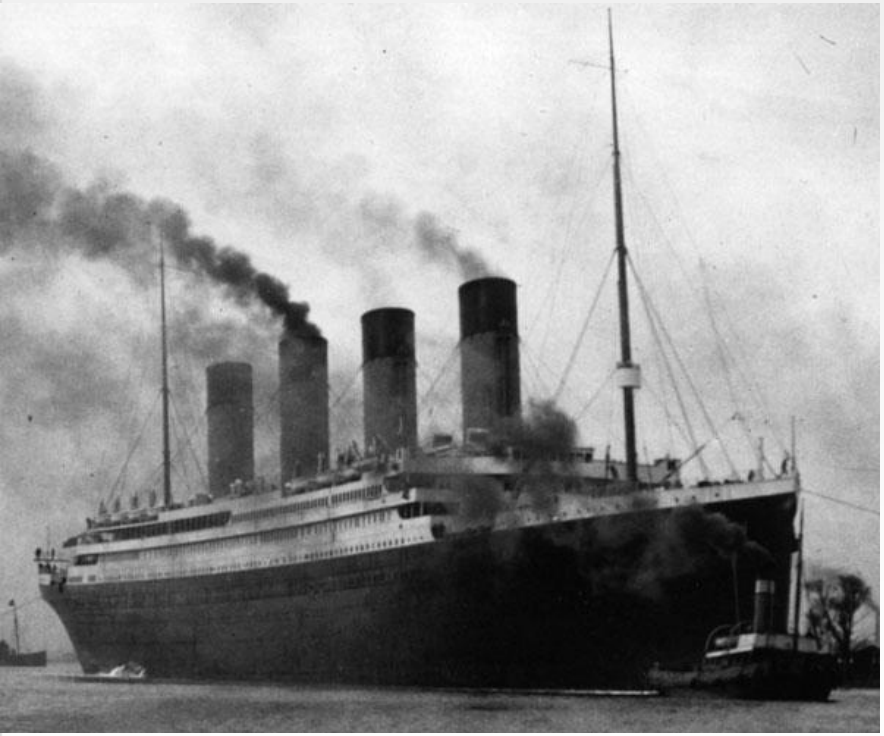
Inequality in face of death



Aaron Antonovsky (1967):

"Death is the final lot of human beings. But, as the tragic experience of the Titanic passengers dramatically illustrates, the time at which one dies is related to one's class."

Official <u>female</u> casualties by travelling class

	Died	Total	% survived
First class:	**4**	143	97%
Second class:	**15**	93	84%
Third class:	**81**	179	55%

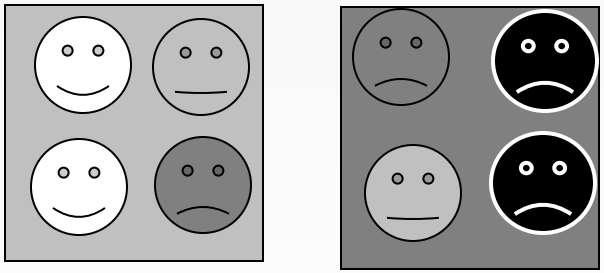
Outline of Lecture 9

- Definition of health inequalities
- Concepts of social class and social group. Principles of classification
- Socio-economic inequalities in mortality in developed countries
- Explanations of socio-economic inequalities in health
- Other (socio-demographic) dimensions of health inequalities
- Policy issues and economic costs

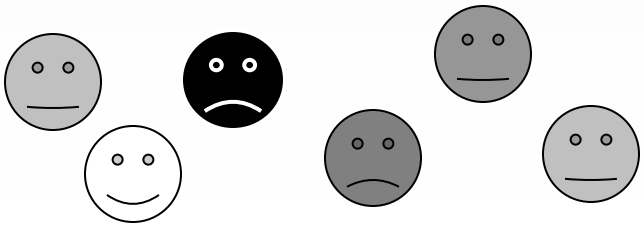
Definition of health inequalities

- **Population health - health outcomes of a group of individuals, including the distribution of such outcomes *within* the group.**
  Source: Kindig & Stoddart, 2003.

- **Inequality in health: between individuals or groups?**



Group-specific inequalities:
differences in health outcomes across groups of population with similar characteristics (education, income, occupation, marital status, housing, …). Studies using such approach compare *AVERAGE* levels of health across groups.



Inter-individual inequalities:
differences in health outcomes across *ALL* individuals in a population. Studies using such approach compare each individual's health to every other individual's health (Murray et al., 2001)

Conceptualization of social group: Karl Marx and Max Weber

Karl Marx: Social class position is strictly determined by a degree of access to a society's means of production. Two *classes*: the bourgeoisie (owners and managers) and the proletariat (workers).

Max Weber (1922):
Status group refers to people who share similar material circumstances, prestige, education and political influence. Thus, in addition to wealth, the *status group* is defined from *life style, education, and occupational rank.*

Four status groups by Max Weber: 1 - the class of those privileged by great property and high education, **2** - less propertied but highly educated intellectuals,
3 - the lower middle class, and **4** - the working class.

Life styles are based upon what people *consume* and refer to the *patterns of behaviors* of individuals over the life course. Life styles depend on *life conduct* or choices the people have in the life styles they want to adopt, whereas the potential to realize such choices refer to *life chances* (financial resources, status, rights, …).
Life chances primarily represent **class position** – either empower or constrain choices determining behavioral outcomes.

Health is something to be *consumed* to maintain or enhance personal wellbeing or ensure longer life. ***Health lifestyles*** – are collective patterns of health-related behaviours based on choices from options available to people according to their life chances (*Cockerham, 2000, 2007).*

Different forms of capital and health: social capital

Bourdieu (1986): capital can present itself in the three forms:

1. Economic capital (can be converted into money and institutionalized into the property rights;
2. Cultural capital: forms of knowledge, skills and education (can be institutionalized in educational credentials).
   2.1. Human capital (OECD, 1998): "the knowledge, skills and competences and other attributes embodied in individuals that are relevant to economic activity";
3. Social capital – resources acquired by individuals through their membership in groups or networks.

Robert Putnam (2000):

Social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them.

Two types of social capital:

1.Bonding social capital ties people together from the same social background;
2.Bridging social capital links people with different social backgrounds.

Importance of social capital for individual health:

1. Social networks may provide economic support, care or [by reducing stress] may provide safety feeling; 2. Social networks may reinforce healthy norms; 3. Socially cohesive communities are most able to organize quality medical services; 4. Social capital may stimulate immune systems of individuals to block stress and fight disease.

Durkheim (1897): theory of suicide – individuals are protected from suicide by their close integration into society.

Principles of classification: socio-economic variables

EDUCATION – refers to personal abilities to make rational choices and acquire positive social, psychological, and economic resources.

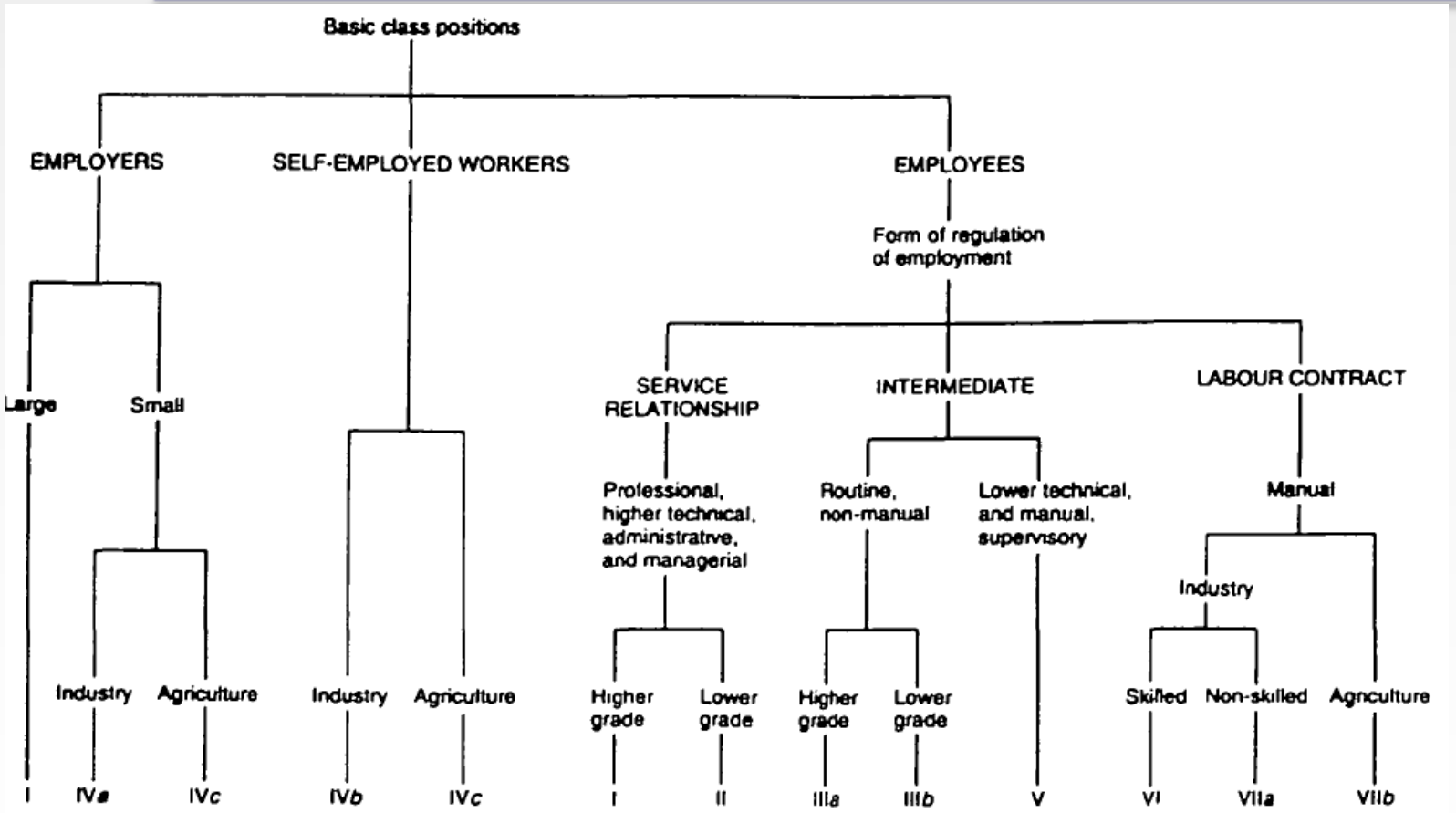
OCCUPATIONAL STATUS – refers to job status, level of responsibility at work, health risks associated with work;
INCOME – reflects purchasing power, housing, diet and quality of medical care;

Also HOUSING, CAR OWNERSHIP, ...

Some technical aspects
Individual characteristics of education, income, and occupational status are typically **measured at ages above 30**. It is assumed that social mobility is very high below this age. For children, a socio-economic status of parent(s) can be assigned.

Most studies use ***one-dimensional* socio-economic status groups** capturing only one dimension of inequality. An alternative – ***multidimensional groups*** (education-occupational groups, and etc.)

Examples of hierarchical classifications (1)
Erikson-Goldthorpe-Portocarero (EGP) classification scheme



5 class scheme:

1. **Non-manual employees**
2. **Manual workers**
3. **Farmers and farm labourers**
4. **Self-employed**
5. **Unknown**

Sources: Erikson & Goldthorpe, 1993; Cavelaars et al., 1998.

Examples of hierarchical classifications (2)

Scheme of occupational classes used in England & Wales from 1913 to 2001:
Class I – upper and middle class (professional employees);
Class II – intermediate (managerial and technical employees)
Class IIIN – skilled non-manual workers
Class IIIM – skilled manual workers
Class IV – semi-skilled non manual workers
Class V – unskilled manual workers

Classification of education and occupation in Finland (Valkonen et al., 1993):

Education: higher (university, >13 years), secondary (upper secondary, vocational training, 10-12 years), basic or lower education (middle school or lower, <9years).

Occupational class: upper white-collar employees (managers, higher administrative or clerical empl.), lower white-collar empl. (lower administrative or clerical empl.), manual workers, farmers, others.

Measurement issues of inter-group mortality differences: absolute vs. relative differences

Relative inter-group differences in mortality or illness:
e.g. mortality rate ratios or regression-based indexes of relative effects. They measure the inequality in relation to a certain group.

Absolute inter-group differences in mortality or illness:
e.g. mortality rate differences . They measure absolute differences (losses) in comparison to a certain group.

Absolute inter-group differences in life expectancy or temporary life expectancy

All measures usually compare illness / mortality / life expectancy between the least healthy and the healthiest group or between the lowest and highest socio-economic groups.

Although relative measures seem to be more illustrative and understandable, sometimes they cannot give a definite answer about trends or differences in inequality levels between countries. In addition, “50% higher rate of a rare health problem may be much less important for the public's health than a 10% higher rate of a frequent health problem” (Mackenbach & Kunst, 1997).

Absolute vs. relative differences: an example

Standardized death rates from coronary heart disease among men age 35-64 by social class in England & Wales (per 100,000)

	1976-81	1986-92
Social classes		
Highest	246	160
Lowest	363	266
Rate ratio (low to high)	**1.48**	**1.66**
Rate difference (low minus high)	**117**	**106**

Sources: Drever & Whitehead, 1997 (quoted in Anand et al., 2001).

An overview of socio-economic health inequalities in developed countries

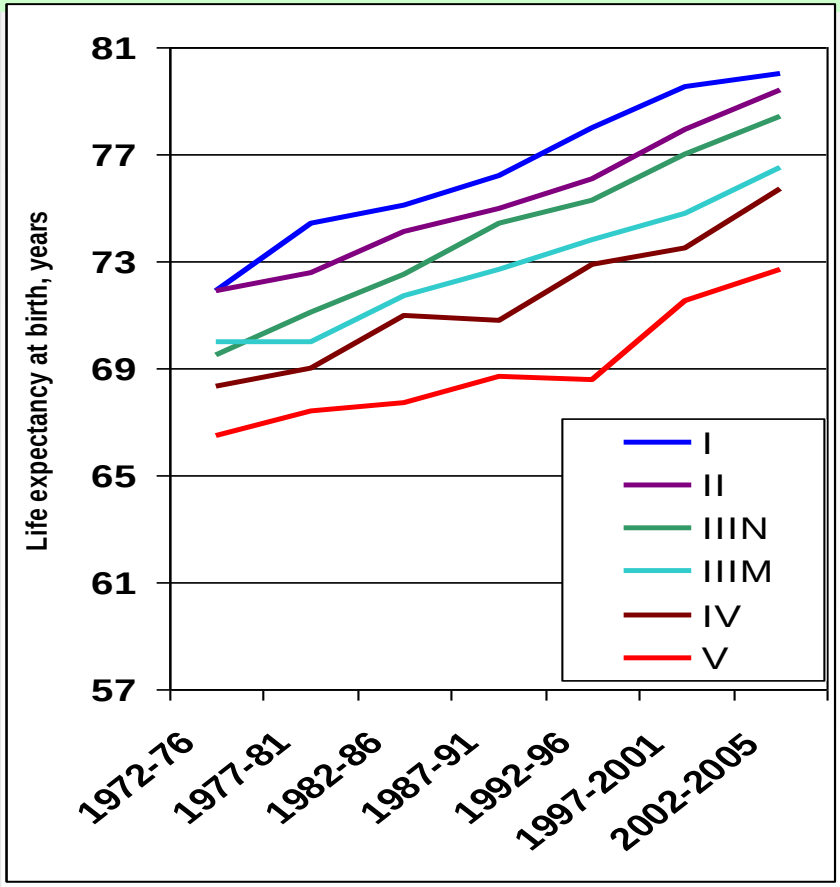
Consistent findings from different countries:

1) Whether socio-economic status is measured by occupational status or by any other criterion, those at the bottom of the social scale experience higher mortality (also for the most causes of death).

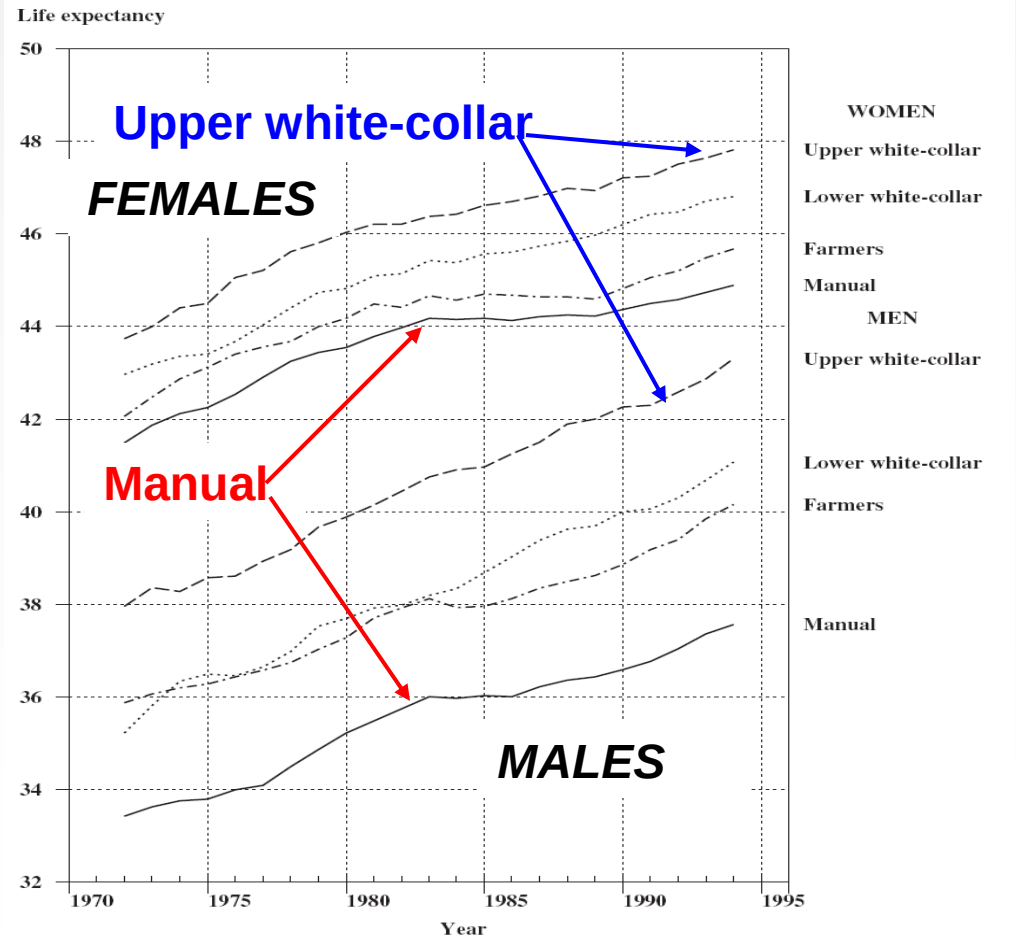
2) During the last decades, there is no evidence of substantial narrowing of life expectancy and relative mortality differentials. On the contrary, many countries face a widening of inequalities.

Socio-economic health inequalities in developed countries: Western and Northern Europe

Life expectancy at birth by social class in England & Wales, 1972-76 – 2002-05



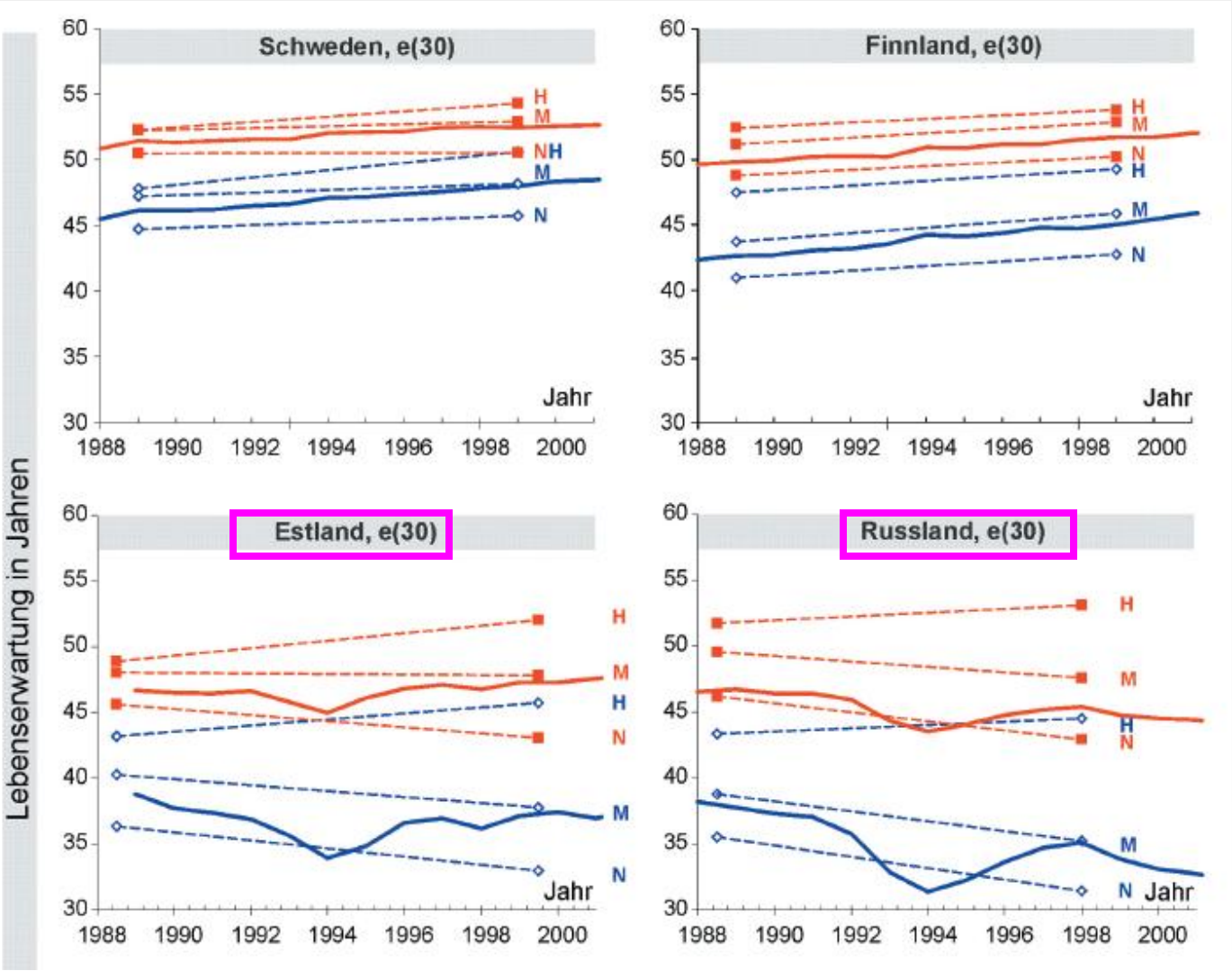
Life expectancy at age 35 by occupational class in Finland, 1970-1995



Sources: The ONS, 2007; Valkonen, 2001.

Global trends in health inequalities: Eastern Europe

Male life expectancy at age 30 by level of education



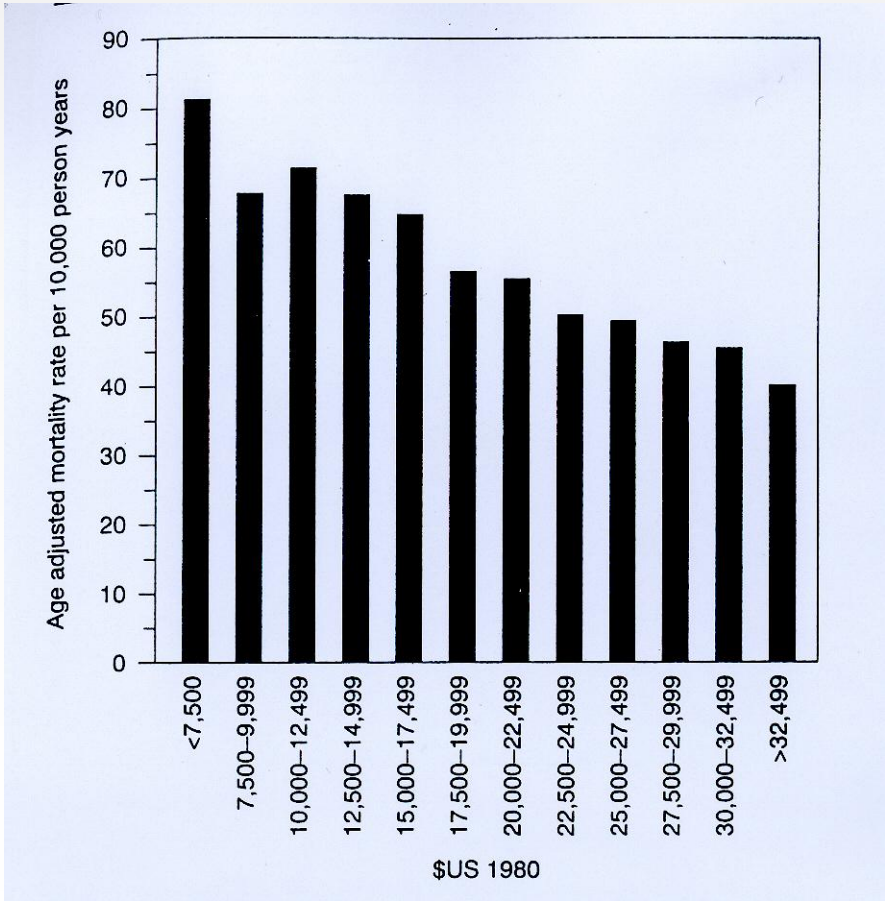
H – high
M – medium
N - low

Males – blue
Females - red

Source: Shkolnikov et al., 2006; Jasilionis, Jdanov, Leinsalu, 2007.

Global trends in health inequalities: USA

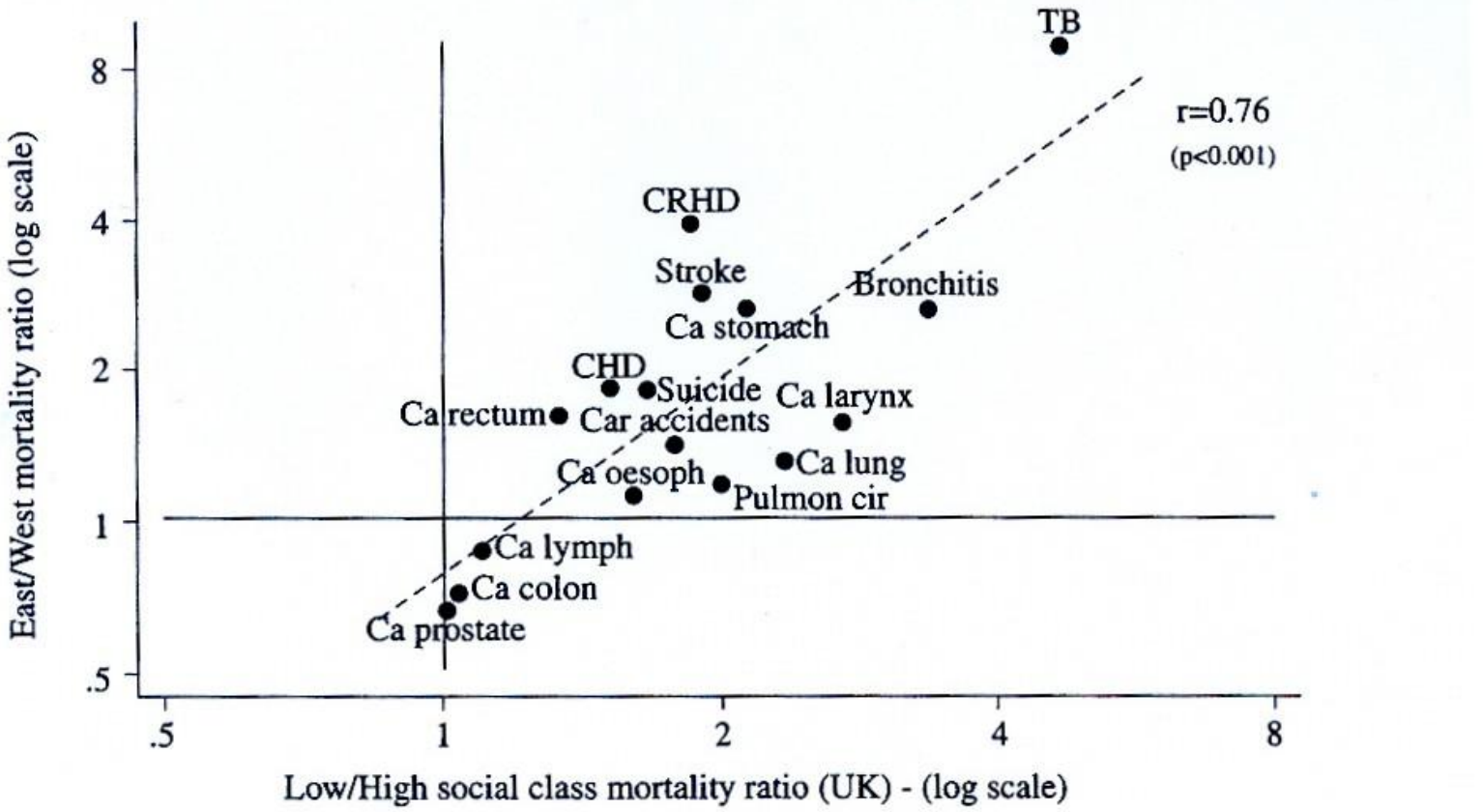
Age-adjusted mortality rate among white US men, 1980



Willkinson, 1996.

Common patterns of inequalities between and within countries (1)

East-West vs. social class
age-standardized mortality rate ratios by cause, men aged 15-74

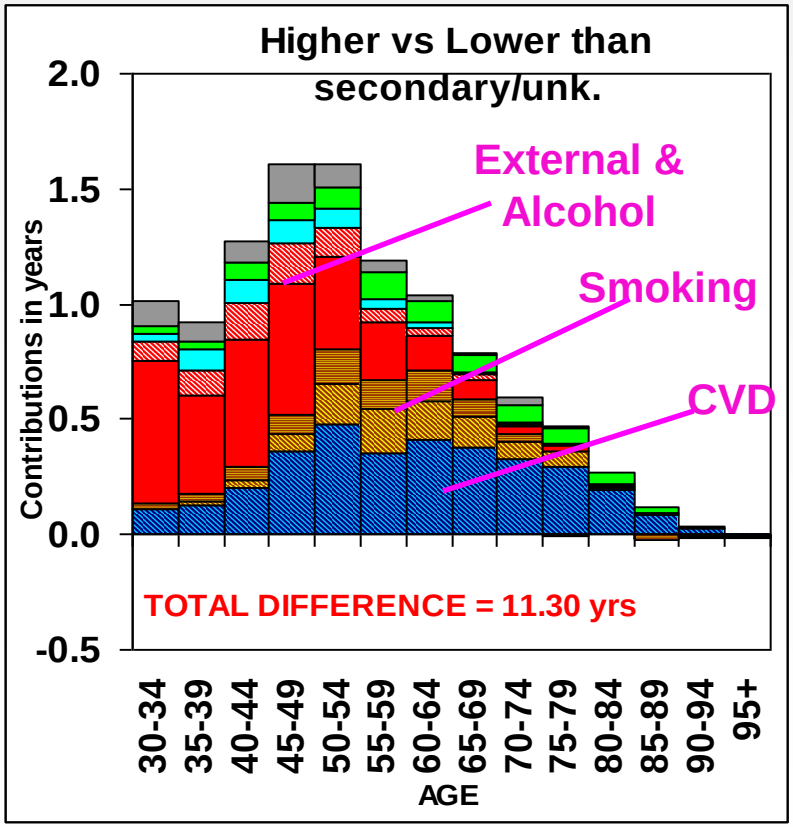


East-West mortality gap is built by (broadly) the same causes of death as the mortality difference between social classes.

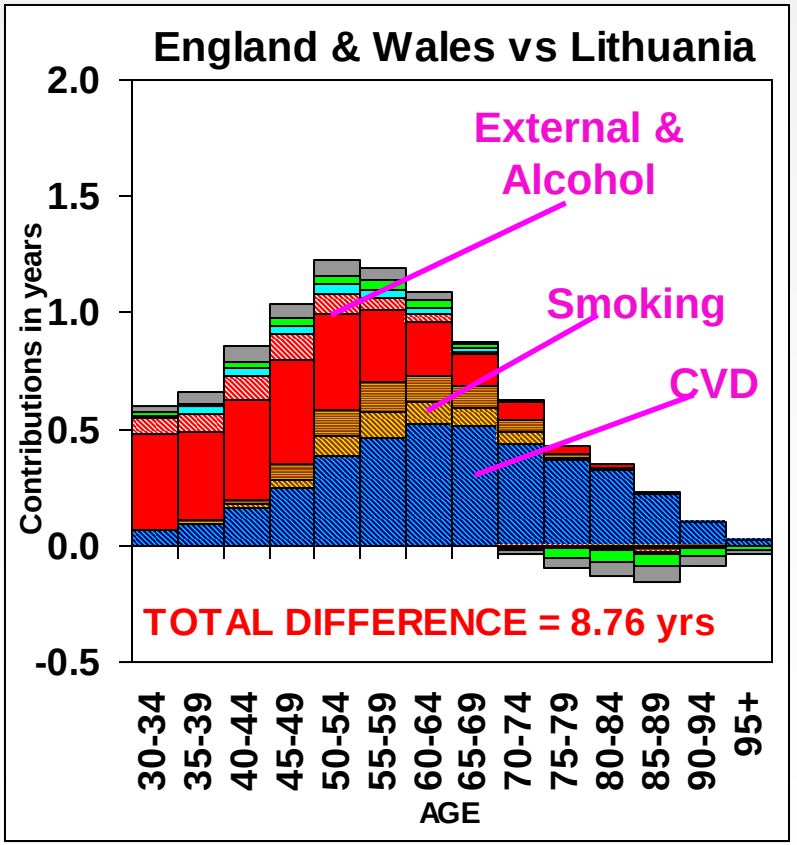
Source: Leon, 2001.

Common patterns of inequalities between and within countries (2)

Lithuanian males, highest vs lowest education



Lithuanian vs E&W males



CVD

External causes

Respiratory syst. diseases

Smoking-related cancers

Alcohol-related deaths

All other causes

Other cancers

Infectious dis.

Source: Jasilionis et al., 2007.

Explanations of health inequalities: social determinants of health

How society can make people sick – the role of social factors:

- Biomedical model: “every disease has a specific pathogenic origin whose treatment can be accomplished using medical procedures”. Epidemiology, medicine typically minimize the role of social factors – they have only *indirect or only secondary impact* on individual health outcomes;
- Alternative idea is that social factors may have *direct* causal effect on physical health. Some pathogens like viruses or cancer cells are lethal. But they have to be exposed to a human host in order to become “killers” (causal factors).
- Social factors can initiate the *onset* of the disease or pathology and in this way may be considered as direct causes for a number of diseases.

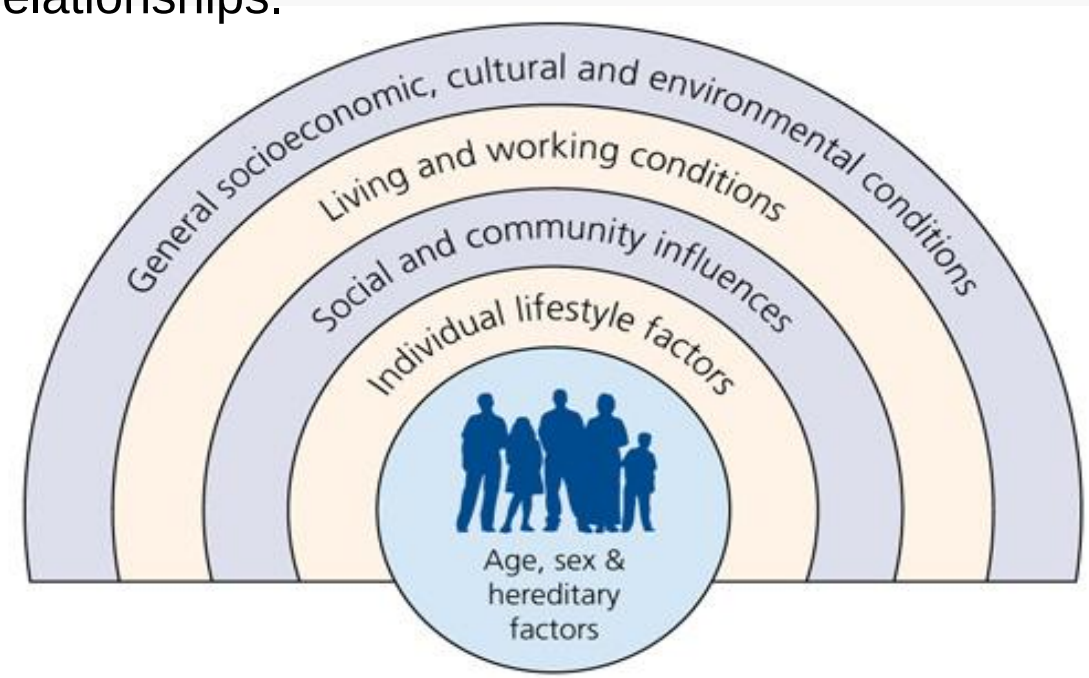
Source: Cockerham, 2007.

Explanations of health inequalities: a scheme of major influences on health

5 different levels of determinants of health:

- Age, sex, and hereditary factors – are fixed and unchangeable factors;

- Other (amenable to change) factors range from individual behaviors (life styles), through psychosocial and community influences, to living and working conditions, and beyond these to the broader macroeconomic environment. These layers do not operate in isolation but interact in complex relationships.



Source: Dahlgren & Whitehead, 1991; Drever & Whitehead, 1997.

Explanations of health inequalities: an explanatory scheme from the Black report

The Black report on health inequalities in England & Wales (1980):

1) A description of differences between occupational classes in mortality, morbidity, and use of health services;
2) Analysis of likely explanations of inequalities;
3) Recommendations for further research and broad strategy to reduce inequalities.

Explanation:	"Hard" version	"Soft" version
Artefact	No relation between class and mortality; purely an artefact of measurement	Magnitude of observed class gradients will depend on the measurement of both class and health
Natural/social selection	Health determines class position, therefore class Gradients are morally neutral and explained "away"	Health can contribute to achieved class position and help to explain observed gradients
Materialist/structural	Material, physical conditions of life associated with the class structure are the complete explanation for class gradients in health	Physical and psychosocial features associated with the class structure influence health and contribute to observed gradients
Cultural/behavioural	Health damaging behaviours freely chosen by individuals in different social classes explain away social class gradients	Health damaging behaviours are differentially distributed across social classes and contribute to observed gradients

Source: Macintyre, 1997.

Explanations of health inequalities (1)

1. A statistical artifact (measurement errors)?

2. Direct or indirect selection?

Direct selection: more illness in lower classes because of chronically sick persons tend to "drift" downwards in social hierarchy, whereas only healthy persons more tend to move upwards.

Indirect selection: a selection through confounding factors such as higher social status of parents, inherited life style model or better schooling.

Limited and conflicting empirical evidence about the role of health selection:

Marmot (2004): "the evidence suggest that class position contributes MORE to the onset of poor health than poor health causes class position".
Wadsworth (1986): in the 1946 birth cohort in UK, children who showed evidence of illness were less likely to be upwardly mobile than healthy children and more likely to be downwardly mobile. However, the effect was very small (Wadsworth, 1986; Blane et al., 1993; Marmot, 1999).

Sources: Cockerham, 2007; Marmot, 1999; Valkonen, 2006.

Explanations of health inequalities (2). Social causation hypotheses

3. Materialistic / structural view:

Cockerham (2007): *health life styles* are restricted by options available to people according to their *life chances (*financial resources, social status, rights, ...).

Valkonen (2006): poorer health of lower socio-economic groups originates from the following restrictions in their life chances: a) worse material living conditions (income, nutrition, health care); b) lower ability to cope with life challenges.

Life course approach (Davey Smith, Gunnell, Ben-Shlomo, 2001)*:*

Material deprivation is associated exposure to specific sets of health risks producing specific diseases or deaths *immediately or later in life.*

The majority of studies focus on socio-economic distribution in deaths and causes of death *in one (last) phase of life*, typically, in late adulthood. Such approach ignores possible links between death, final, and previous life events (such as changes in socio-economic status).

Life course approach looks how the cumulative effects of a number of situations (careers) experienced throughout life influence the risk of death.

Materialistic / structural view: early life or current circumstances?

Evidence about the importance of early life conditions

Age-adjusted adult (35-64) male mortality rate ratios for cardiovascular system diseases at three different stages of life course in the West of Scotland Collaborative study.

Father's social class	
Father, non-manual	1.00 (reference)
Father, manual	**1.41*** (1.15-1.72)
First social class	
Non-manual	1.00 (reference)
Manual	1.08 (0.90-1.30)
Current social class	
Non-manual	1.00 (reference)
Manual	**1.20*** (1.01-1.43)

Source: Davey Smith et al., 1997.

Specific patterns of life-course exposure are related to specific diseases:

-*stroke and stomach cancer* are related to early life influences;

- *coronary heart diseases, chronic obstructive respiratory disease, breast cancer, and suicide* are mostly determined by exposures acting right across life.

- Majority of risk factors measured in adulthood failed to account for much of the socio-economic mortality gap.

Source: Davey Smith Gunnell, Ben-Shlomo, 2001.

Materialistic / structural view: early life or current circumstances?

Opposite results on effects of early life conditions

Lynch et al. (1994): no impact! High socio-economic status in childhood and low adult income levels show the highest risk for all-cause mortality and no significant impact on cardiovascular mortality. 42-60-year old Finnish males

Socioeconomic status		All-cause mortality		Cardiovascular mortality	
Child	Adult	Relative risk	95% CI	Relative risk	95% CI
High	High	1 00	..	1 00	..
Mid	High	0 88	0 44–1 74	0 78	0 32–1 92
Low	High	1 14	0 56–2 31	0 99	0 39–2 51
High	Low	2 93	1 39–6 17	1 59	0 52–4 88
Mid	Low	2 55	1 38–4 70	2 26	1 02–4 99
Low	Low	2 39	1 28–4 44	2 02	0 90–4 54

Vagero & Leon (1994): low socio-economic status in childhood has significant impact on higher risks in both total and cardiovascular mortality. Swedish males born in 1946-1955

Social class	All causes		IHD	
	Crude OR	Adjusted OR*	Crude OR	Adjusted OR*
Childhood				
Non-manual	1·00	1·00	1·00	1·00
Manual	1·36 (1·26–1·47)	1 28 (1·18–1·39)	2·29 (1·51–3·46)	1·99 (1·30–3·05)
Non-employed	1·89 (1·64–2·18)	1·52 (1·32–1·76)	2·23 (1·08–4·59)	1·82 (0·88–3·77)
Adulthood				
Non-manual	1·00	1·00	1·00	1·00
Manual	1·82 (1·65–2·00)	1·68 (1·52–1·85)	2·14 (1·43–3·20)	1·77 (1·17–2·67)
Non-employed	6·31 (5·72–6·97)	6·03 (5·46–6·67)	3·56 (2·19–5·78)	3·22 (1·98–5·25)

95% CI in parentheses. *Mutually adjusted odds ratios (OR) shown. All ORs adjusted for year of birth. Non-manual class=reference category.

Explanations of health inequalities: the general susceptibility view

4. General susceptibility:

Marmot, Shipley & Rose (1984): certain social groups always share a higher risk of death whatever causes (of death) are operating. This relationship cannot be explained by known risk factors and suggest about the fact that there are some **common factors that increase susceptibility of disease**.

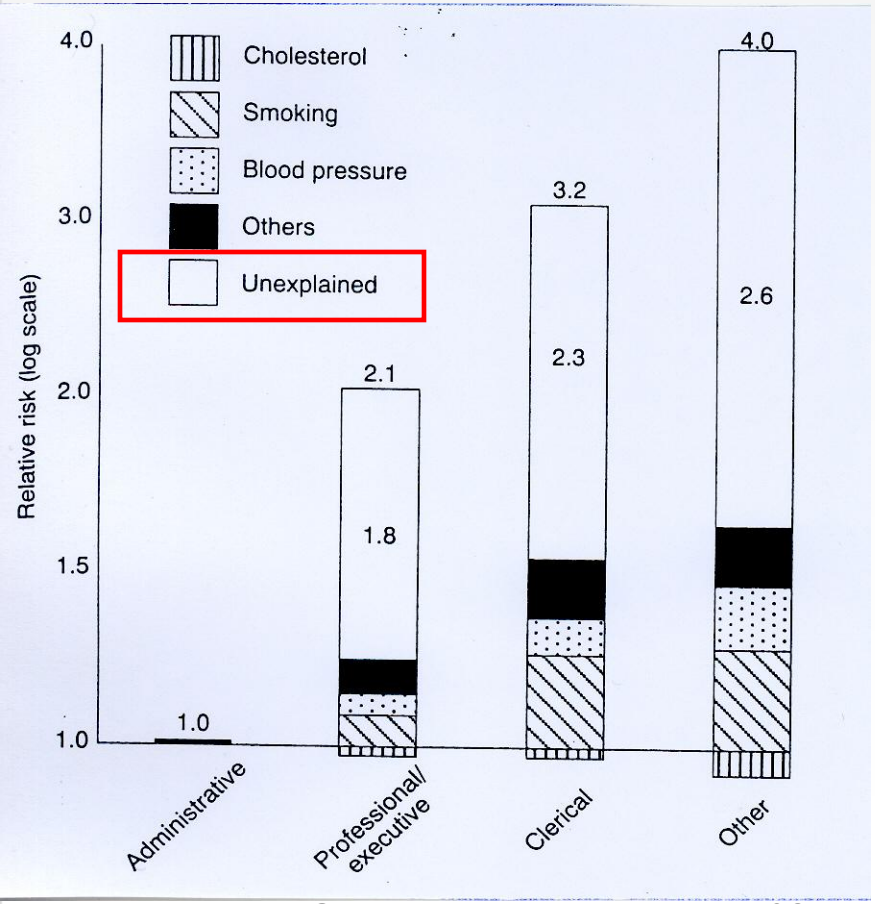
"Administrator who smokes twenty a day has a LOWER risk of lung cancer than a lower grade civil servant smoking the same amount, even after pack years and tar content of cigarettes are taken into account".

Possible factors explaining higher susceptibility of disease among lower socio-economic groups:

- Psychosocial stress;
- Inadequate coping resources;
- Genetic disadvantage.

General susceptibility: findings from the Whitehall study (1)

Relative risk of death from coronary heart disease according to employment and proportions of differences that can be explained by various risk factors



Whitehall study: 18.000 British civil servants aged 40-69 interviewed in 1967-69 and their cohort followed for mortality.

Important! The study population is relatively homogenous and well-off – having stable, secure hazard-free jobs and equal access to medical care.

Main findings:

- Only ¼ of the differences in coronary heart disease mortality can be explained by smoking, physical activity, high blood pressure, and high cholesterol.
- No evidence of strong effect of unequal access to medical care;
- No evidence of health selection effect.

Importance of other factors – psycho-social / behavioural factors and early life experience.

Sources: Rose & Marmot, 1981; Marmot, Shipley & Rose, 1984.

General susceptibility: the role of psychosocial stress

Definition of stress (Selye, 1936, 1955):

"**Stress** is the nonspecific response of the body to any demand, whether is caused by, or results in, pleasant or unpleasant conditions".

Psychosocial stress refers to the stress due to acute or chronic events of psychological or social origin (Cockerham, 2007).

Three major types of social stressors (Pearlin, 1989; Thoits, 1995):

1. Life events (accumulation of several events in person's life within a short period);
2. Chronic strains (persistent demands over prolonged period);
3. Daily hassles (short term events requiring small behavioural adjustments).

General susceptibility: income inequality and psychosocial stress

Wilkinson (1992, 1996):
Relative levels of incomes within a society have greater effects on health and mortality than the society's absolute level of wealth.

Person's position relative to other people in social hierarchy can be determined by their relative incomes. Psychosocial effects (stress) of such inequalities (different social positions) have health consequences [especially among the disadvantaged classes].

Stress, poor social support networks, low self-esteem, depression, and loss of sense of control can be reduced and social cohesion can be enhanced – ONLY if income inequality is reduced.

Two contrasting cases – USA (high income inequality) and Sweden (low income inequality).

Criticism: income is only one dimension of health inequality, even such egalitarian country as Sweden shows health inequalities.

General susceptibility:
the relationship between socio-economic class and stress

Documented disadvantage of lower classes:
- more negative life events and chronic strains (Pearlin et al., 2005);
- tend to be more stressed by their living environment (Browning & Cagney, 2003);
- have fewer personal resources/knowledge to cope with stress (Mirowsky & Ross, 2003);
- more frequently have feelings of fatalism (*feeling that outcomes of situations are determined by forces external to the individual = low control over life*) which is related to psychosocial stress (Mirowsky & Ross, 2003).
- have lower ability of body to respond to the stressors (lower saliva cortisol response to stress) (Kristenson et al., 2001);

Effort-reward imbalance model (Siegrist, 2000, 2005)**:**
- Male blue-collar workers: high personal effort (competitiveness, work-related over-commitment) and low gain (poor promotion prospects and blocked career) creates job-related stress which leads to higher risk of heart disease.
- There is an evidence about effort-reward imbalance and its relationships to the increased risk of stress among adult males experiencing elevated mortality risks in some populations (e.g. males in Eastern Europe or lower socio-economic groups).

Advantages of high socio-economic classes (Evans, Barer & Marmor, 1994)**:**
- although the burden of responsibilities may be even greater than among those belonging to the lower classes, they have greater control over their lives, more and better resources to cope with stress, usually live in supportive micro-environments.

Individual vs. contextual determinants: A multilevel approach (1)

Individual characteristics are important, but the contextual (area, municipality) characteristics also influence mortality.

Examples of the contextual characteristics:
- Educational structure: % of people with high or very low education
- Family structure: % of non-married people
- Occupational structure: % of manual workers
- Other: unemployment, urbanization, voting turnout (public participation), etc.

Multilevel approach is a powerful framework to distinguish and assess the effects of individual and contextual characteristics on mortality risk.

The multilevel modelling allows to address several interesting issues:

1. What part of mortality variation across areas (contexts) is explained by individual and area characteristics?

2. What are effects of individual and contextual (area-level) variables?

3. Whether effects of area characteristics remain significant if individual characteristics are taken into account.

Individual vs. contextual determinants: A multilevel approach (2). Examples from two studies

Example 1. Blomgren et al. (2004). *The effects of area characteristics on alcohol-related mortality in Finland.*

The effects of adjustments for individual- and area-level variables on the average relative deviation in area-level alcohol-related mortality

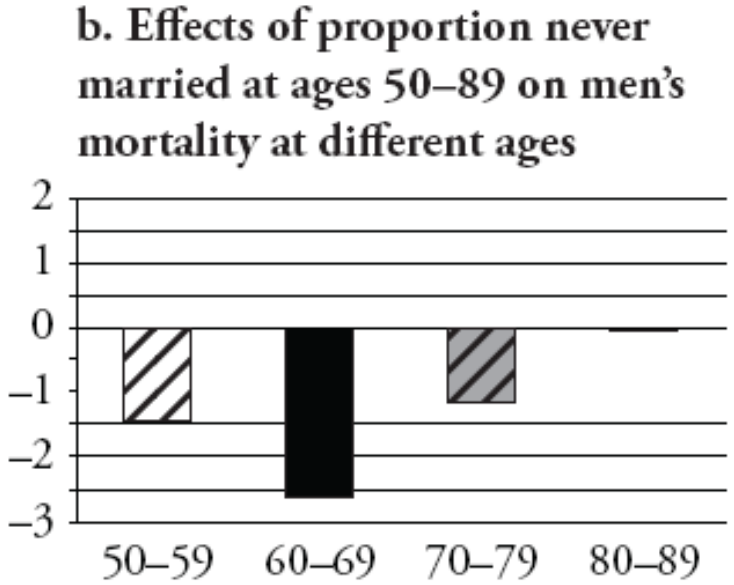
	Average relative deviation (%)	Change (%) from the age-adjusted model
Age adjusted	21.1	
Age and all individual-level variables adjusted	12.5	−40.7
Age and all area-level variables adjusted	5.7	−72.9
All variables adjusted	4.4	−79.2

Alcohol-related mortality rate ratios for voting turnout

Model with all individual and area variables adjusted

Voting turnout (%)		
76.09–82.31	1.00	
73.55–76.08	1.09	(0.98–1.22)
70.62–73.54	1.09	(0.96–1.23)
64.01–70.61	1.23	(1.09–1.38)

Example 2. Kravdal (2007). *Multilevel analysis of how community family structure affects individual mortality in Norway.*

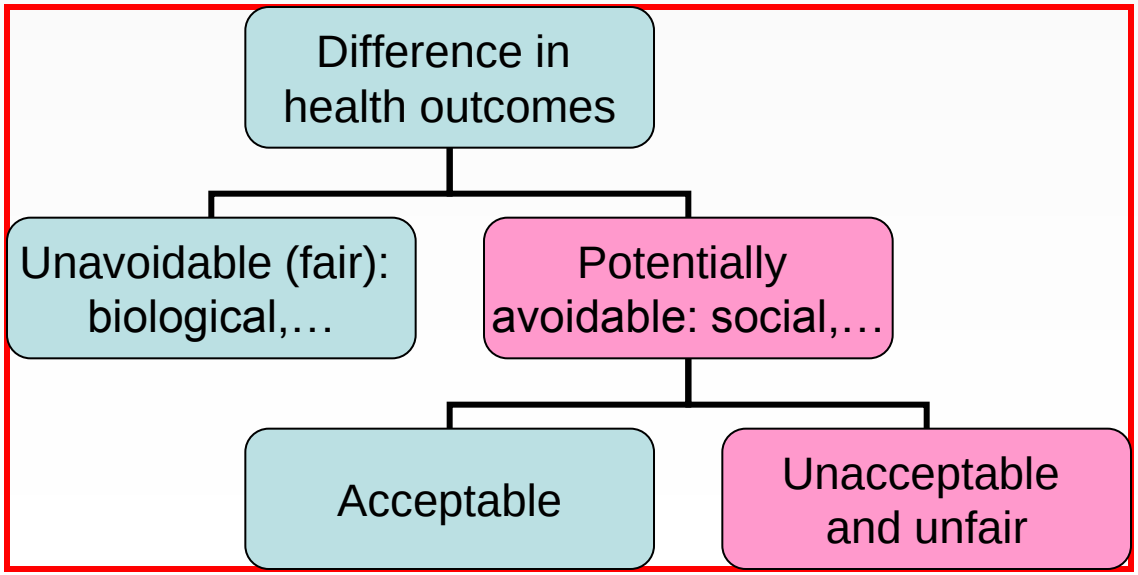


Addressing health inequalities (1)

Economic argument: improving the health of the poor helps them to extract themselves from poverty. Ill-health is an obstacle for economic progress (WHO, 1999).

Ultimately ethical issues – a socio-economic disadvantage and adverse health conditions in some populations should be considered on *moral grounds*, not in terms of economic return. Most of health inequalities between and within countries are not genetic differences, nor they are biologically inevitable. Therefore, the inequalities *can be* reduced by appropriate policies in public health, health systems, and other areas (Leon & Walt, 2001).

Judging the equity of health outcomes: a possible scheme



Source: Whitehead, 1992.

Addressing health inequalities (2): Economic arguments

Mackenbach, Meerding, Kunst (2011):

EVERY YEAR inequality related losses to health in the European Union amount for:

➔ More than 700 thou. avoidable deaths;

➔ 33 mil. prevalent cases of ill-health.

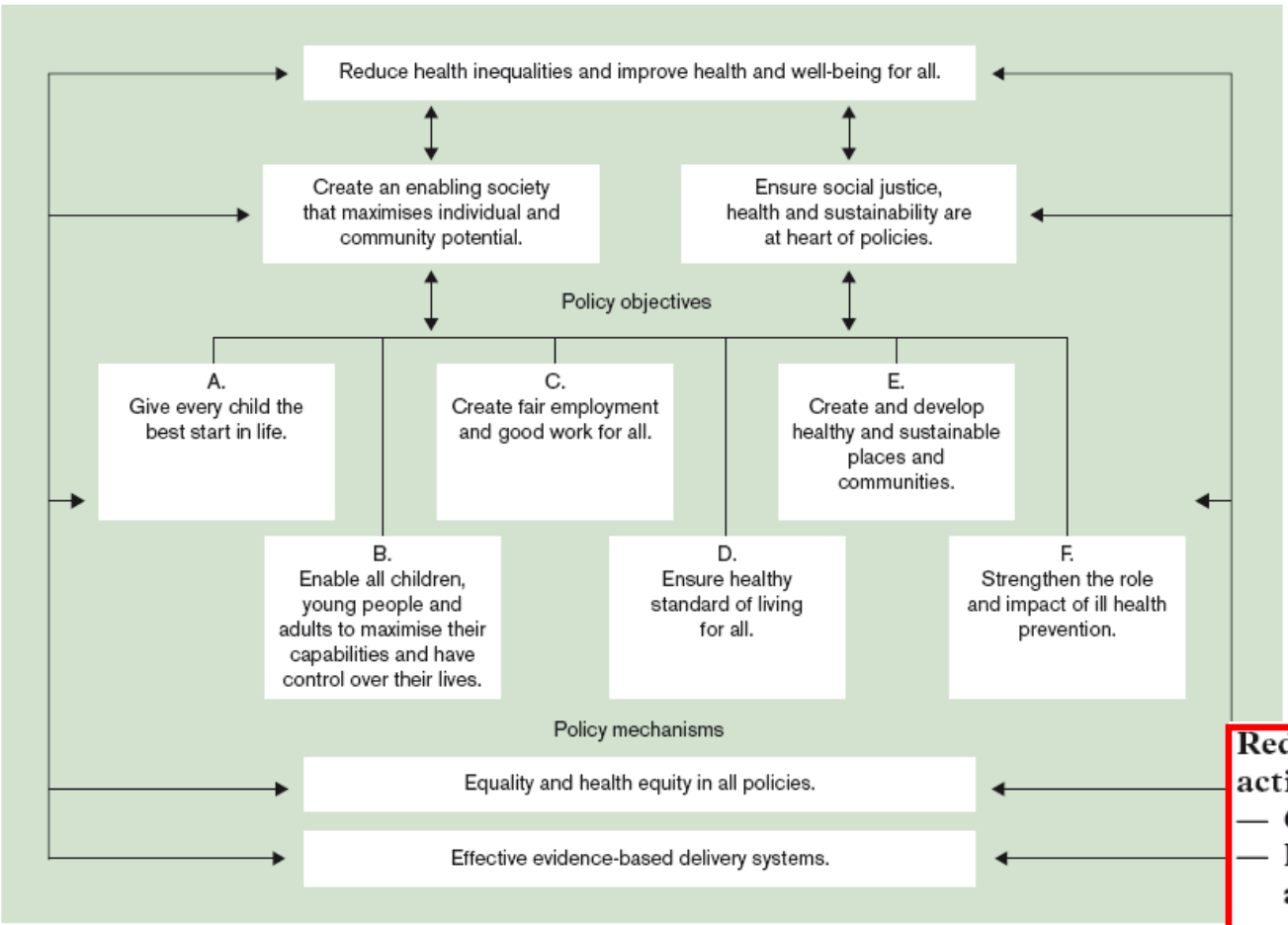
EVERY YEAR inequality related ECONOMIC losses to health amount:

➔ 1.4% of GDP (or €141 billion) – through avoidable loss of labour productivity;

➔ 5% of the costs of social security systems;

➔ 20% of the costs of healthcare systems.

Addressing health inequalities (3): Need for adequate policies: The Marmot Review (2010)



Reducing health inequalities will require action on six policy objectives:

- Give every child the best start in life
- Enable all children young people and adults to maximise their capabilities and have control over their lives
- Create fair employment and good work for all
- Ensure healthy standard of living for all
- Create and develop healthy and sustainable places and communities
- Strengthen the role and impact of ill health prevention

Source: Marmot, 2010.

http://www.instituteofhealthequity.org

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Other dimensions of health inequalities

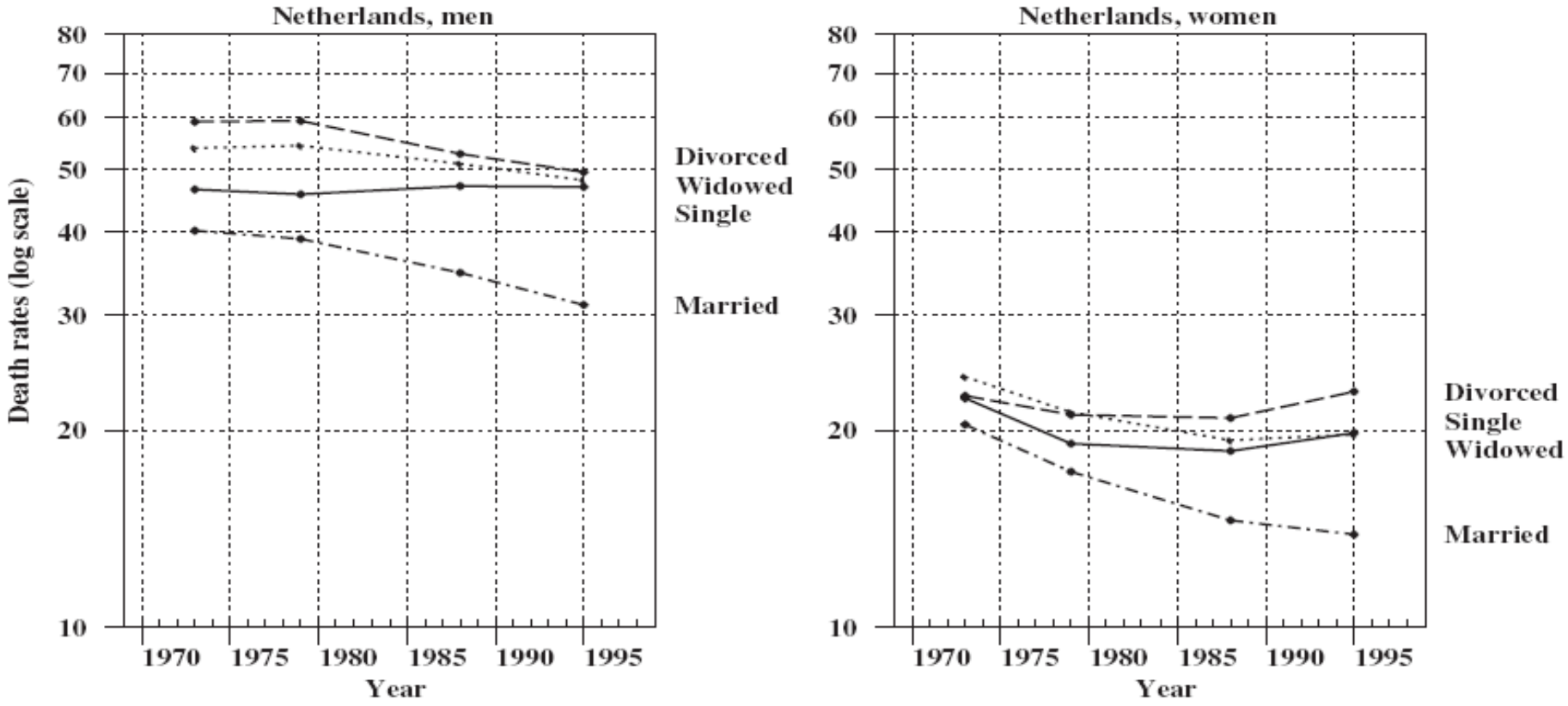
MARITAL STATUS – one of the most studied health inequalities (studies date back to the 19th century). All developed countries show a consistent health advantage of married groups against never married, divorced, and widowed. 1) Social causation (behavioral / environmental) explanation: the role of beneficial protective effect of marriage stemming from social and psychosocial factors. Departure from the married state are particularly unhealthy (e.g. bereavement effect in case of widowhood).
2) Selection hypothesis: marriage is selective – it selects healthier individuals and leaves among single a higher proportion of persons with serious health problems. Most researchers agree that of combination both behavioral / environmental and selection factors explains the marital status differentials (Hu & Goldman, 1990).

RACE / ETHNICITY – non-modifiable factors which can be closely correlated with other factors like socioeconomic status (e.g. education) or living conditions. Race is assumed as a physical characteristic (e.g. color of skin), whereas ethnicity refer to cultural characteristics.

URBAN – RURAL PLACE OF RESIDENCE / GEOGRAPHICAL DIFFERENCES – partly linked to the particular history of each country, region or other geographical unit. They necessarily change over time, although in some cases there is a persistence regional mortality patterns over longer periods. Related to differences in composition of population in different units, geographical / environmental factors (e.g. climate, pollution), and socio-economic and cultural factors (life styles, occupation structure).

Other dimensions of health inequalities: marital status

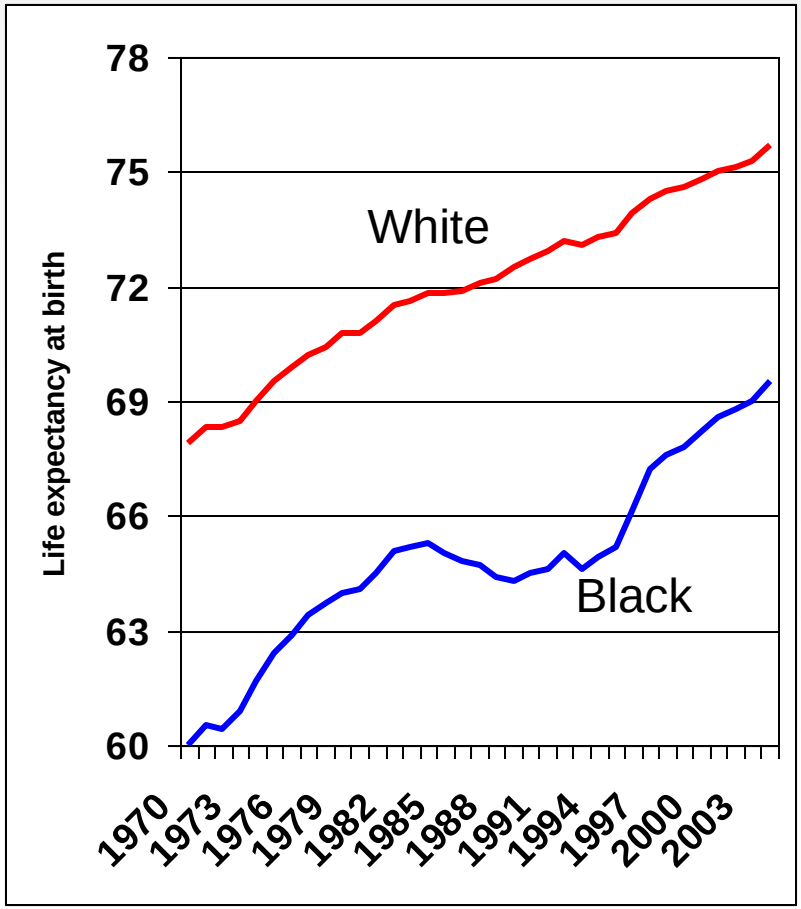
Death rates (per 1000) by marital status and sex at the age of 65-74 in the Netherlands during the period 1970-1998



Source: Valkonen, 2001.

Other dimensions of health inequalities: race

Male life expectancy at birth by race. USA, 1970-2004



Centers for Disease Control and Prevention, 2007.