Social Inequalities and Health

Lecture 3
Social Determinants of Health and Health Inequalities

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Last week, you were presented with some information about how health has improved over time; and how this is has been associated with significant demographic changes, especially in relation to population growth.

You were also given some information about the pattern of mortality and illness worldwide ... what do people die from; where; and at what age

You will have seen that health is associated with wealth – richer countries have higher LE; and lower mortality rates. Richer countries also have different patterns illness and mortality.

In the next two lectures, we are going to discuss what is meant by social inequalities in Health; and begin to examine how social factors impact on health.

- Do social inequalities merely get translated as health inequalities through economic / material pathways?
- Does inequality itself have any additional or separate effect itself on health and well-being of individuals?

‘individual income theory’

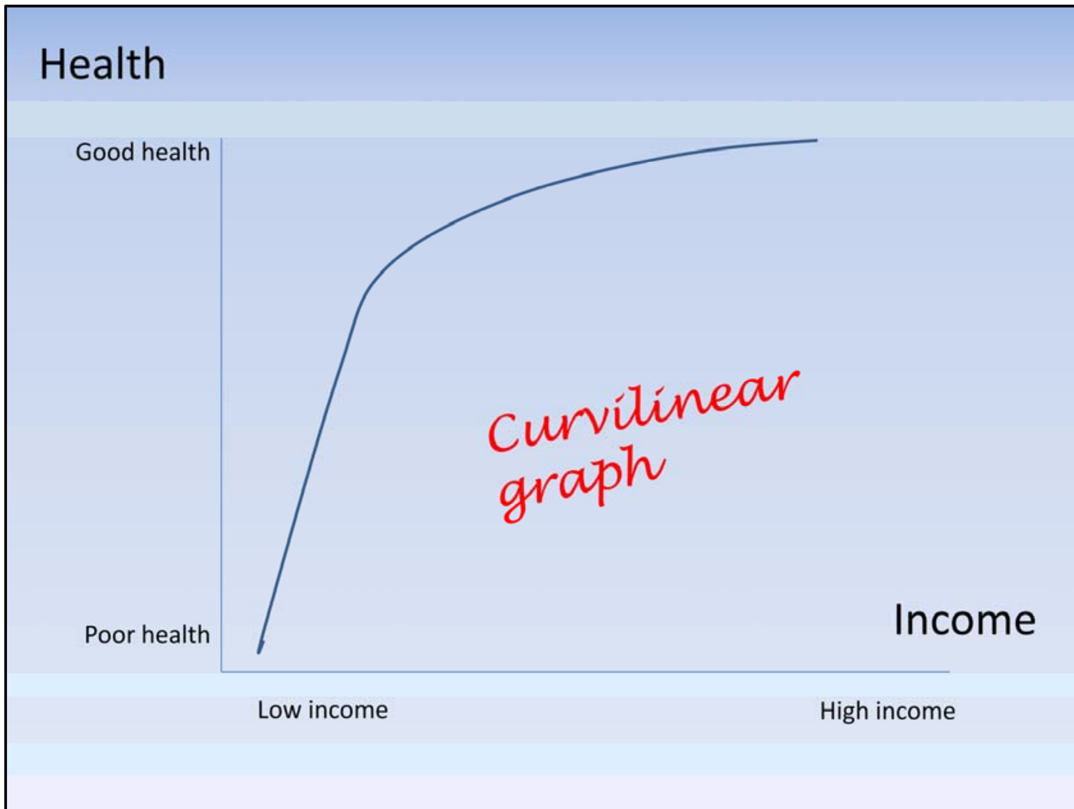
- The population level association between income inequality and health reflects only an aggregate of the individual level associations between income and health (health effects at the population level are merely sums of individual effects)
- A curvilinear relation between income and health at the individual level is a sufficient to produce health differences between populations with the same average income but different distributions of income.

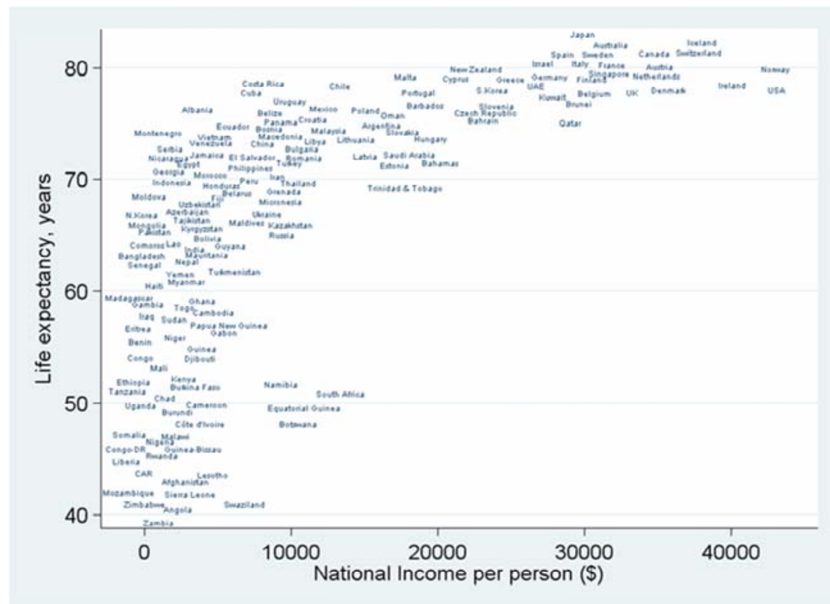
There is a lot of debate about the relationship between income inequality and the average level of health in a population.

One group of people argue that societies with greater income inequality have poorer average health outcomes. In other words, something about the degree of income inequality has an impact on the overall / average state of population health. Others argue that there is no such relationship.

The population level association between income inequality and health reflects only an aggregate of the individual level associations between income and health (health effects at the population level are merely sums of individual effects). This group argues (as well as other things) that the observed correlation between income inequality and health seen at a population level is due to the fact that a society with greater income inequality will have a higher percentage of people with low incomes, and this helps account for the relation with poor health, partly because of the curvilinear relationship between income and health.

The curvilinear relationship simply states that the relationship between income and health at the individual level is stronger at lower levels of income than at higher levels of income.

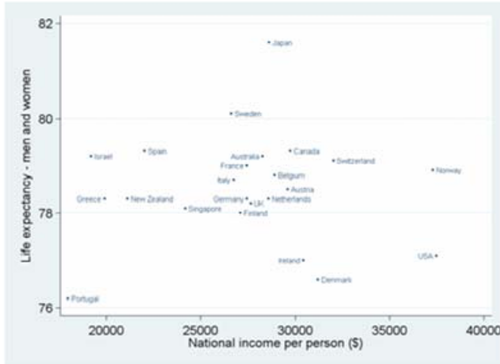

Health
Good health
Poor health
Curvilinear graph
Income
Low income
High income



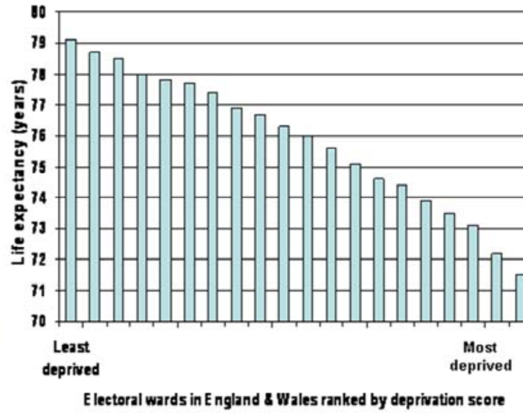
This slide shows relationship between income and health at country level

Health is related to income differences *within* rich societies but not to those *between* them

Between (rich) societies



Within societies



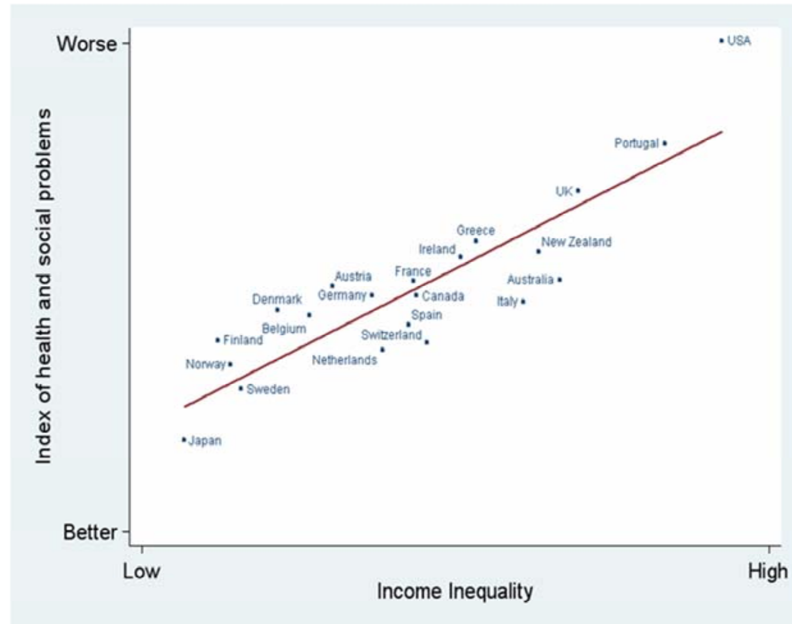
Source: Wilkinson & Pickett, The Spirit Level (2009)

www.equalitytrust.org.uk

The Equality Trust

The slide on left shows that in rich countries, the relationship between income and health breaks dow

However, the relationship between income and health remains within those same countries.



While income and health shows no relationship in rich countries, income inequality and health does sh

This leads us to ask the question of whether social inequality itself is a determinant of overall levels of

Is social inequality itself a determinant of overall levels of health at the population level?

The Whitehall studies

- Differential mortality rates amongst British civil servants
- Men in the lowest grade (messengers) had CV mortality rates three times higher than those in the highest grades (administrators)
- Lower grades associated with higher rates of obesity, smoking, blood pressure, and reduced physical activity
- But when these factors were controlled for, there was still a 2.1 times higher cardiovascular mortality rate amongst lowest grade
- Investigators put this down to greater existence of cortisol – due to their lack of autonomy and control over their working environment

Your level of income has direct material effects on health; but income also has a social meaning which can impact on health

Income inequality is a proxy measure for class inequality and social differentiation

In richer countries, levels of economic development mean that living standards have ensured basic material standards for all

Despite this, mortality rates among the poor in richer societies remain significantly higher than among the rich

Psychosocial pathway

Social inequalities produce psychosocial stress

- being low(er) in social hierarchy results in less control over one's own life, less social support, less autonomy at work, less job security, more shame, less trust ...
- causes stress which leads to various psycho-neuro endocrine response which impact biologically
- leads to adverse behaviour – smoking and excess drinking, homicide, anti-social behaviour, violence, suicide

The effects of social organisation are mediated by psychological and biological processes

Psychosocial theory

Psycho-neuro endocrine response

- Sympathetic nervous system's release of noradrenaline and adrenaline – into nerve endings and blood respectively.
- Hypothalamic-pituitary-adrenal pathway results in the release of cortisol into the blood stream.

Sympatho-adrenal pathway. Much variation across individuals in the size and duration of this 'fight or flight response. This appears to be due in part to constitutional factors and partly to social and individual differences in psychological coping mechanisms.

Cortisol has both metabolic and psychological effects. Raise blood glucose levels and release fatty acids.

Chronic stress can raise baseline levels of say, blood pressure or insulin resistance.

Cellular and physiological effects include rise in BP; rise in glucose; decrease blood flow to certain parts, raise in clotting tendency; low level inflammation;

Air travel ....

- Differences between first and economy class can produce health inequalities after a long flight.
- First class passengers get better food and service, more space and a wider, better sleep. They arrive refreshed and rested, while many in economy arrive feeling a bit rough. First class passengers may have a lower risk of Deep Venous Thrombus (DVT)
- The materialist theory explains the difference in health to material or physical factors. Psycho-social theory would suggest the addition of stress-related factors.

Under a psychosocial interpretation, these health inequalities are due to negative emotions engendered by perceptions of relative disadvantage.

Under a material or neo--material interpretation, people in economy have worse health because they sat in a cramped space and an uncomfortable seat, and they were not able to sleep.

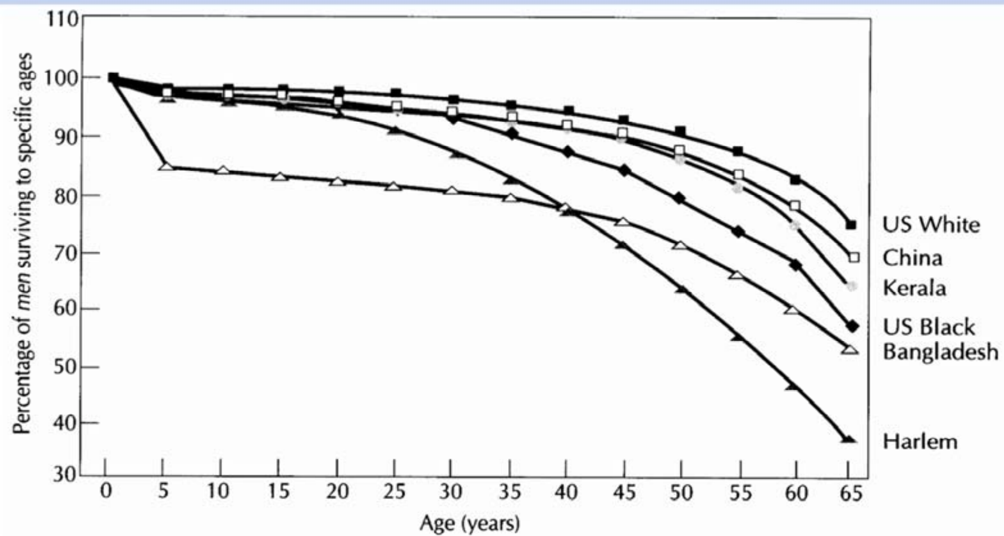


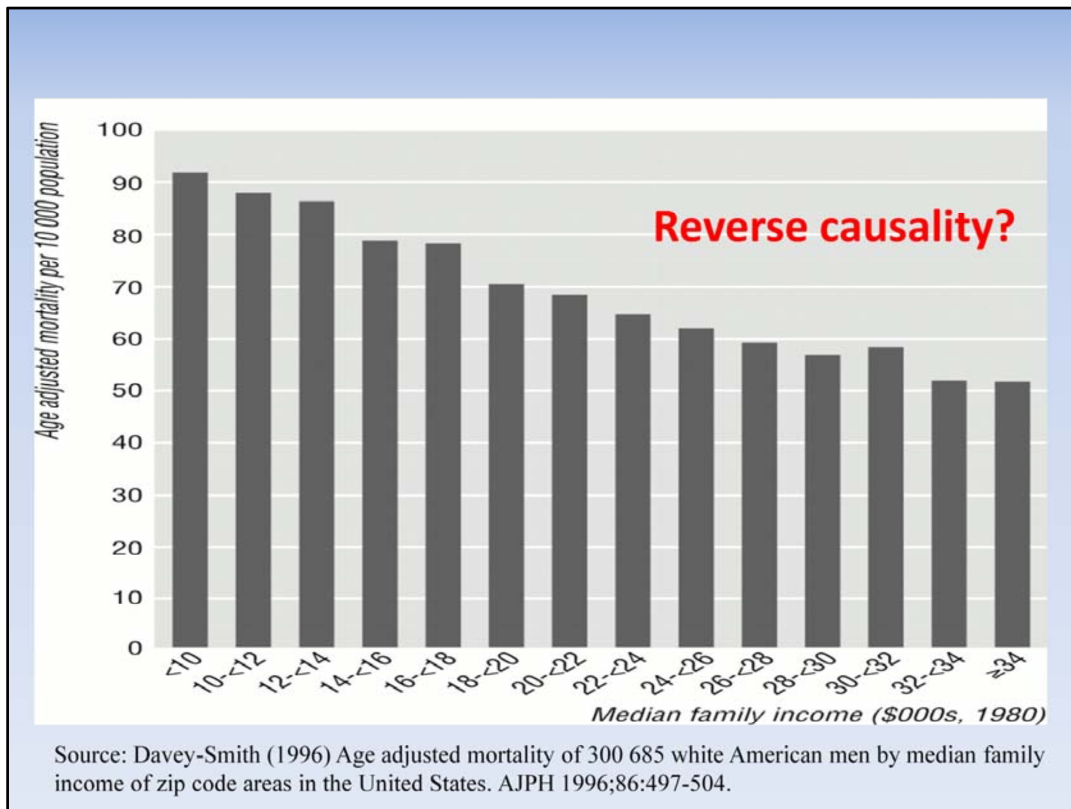
Fig. 5. *Variations in male survival rates by sex and region.*
Source: Sen (1993*a*), which also explains the data sources.

Refer this back to individual income theory ....

- In 1996, black American men had a median income of $26,522 and a life expectancy of 66.1 years.
- Men in Costa Rica had a mean income (at purchasing power parity) of $6410 and a life expectancy of 75 years.
  - Four times the real income bought a life expectancy of nine years less?

About 40% of Costa Ricans lived on less than $2 a day

The explanation for the poorer health of black people in the US must have more to do with the psychosocial effects of relative deprivation—such as educational disadvantage, racism, gender discrimina-tion, social and family disruption, and fear of crime - than with the direct effects of material conditions themselves.



This figure shows that the relationship between income and health at the individual level involves more than poverty. Every step in the socioeconomic ladder is associated with an increment - albeit a diminishing one - in better health.

Evidence has converged around the general conclusion that socioeconomic disadvantage precedes poorer health. This does not exclude reverse causation - poor health affects earnings - but it is not the primary mechanism behind the association between income and health. Research demonstrates that for the majority of cases the causality must run from income to mortality and not the other way around.

Social hierarchy works through ..

- Material pathways

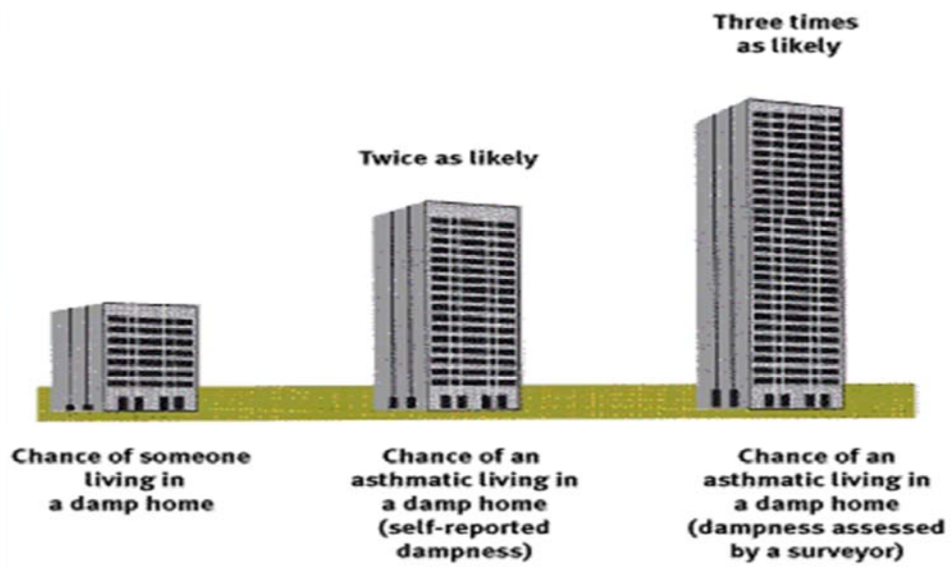


Fig 4.3 Asthmatics are two to three times more likely than the general population to live in damp properties
Three times as likely
Twice as likely
Chance of someone living in a damp home
Chance of an asthmatic living in a damp home (self-reported dampness)
Chance of an asthmatic living in a damp home (dampness assessed by a surveyor)
Residents of Glasgow, 1991-1993
Source: Williamson IJ et al. (see References Section)

Social hierarchy works through ..

- Material pathways
- Psycho-neuroendocrine pathways

CHD Mortality in Lithuania and Sweden

- CHD mortality similar in 1978
- By 1994, CHD mortality four times higher in Lithuania
- Why?
- Detailed study comparing two cities: Linkoping and Vilnius (Kristenson et al, 1997, 1998)

CHD Mortality in Lithuania and Sweden

- Conventional risk factors?
  - Smoking; serum cholesterol; blood pressure did not explain differences
- Higher levels of anti-oxidants (suggested differences in diet may be important)
- Indicators of stress (social isolation; job stress, depression) showed big difference between the cities (as well as between high and low income groups within the cities)

CHD Mortality in Lithuania and Sweden

- Contrasting psychosocial environments translated into different patterns of the HPA axis stress response

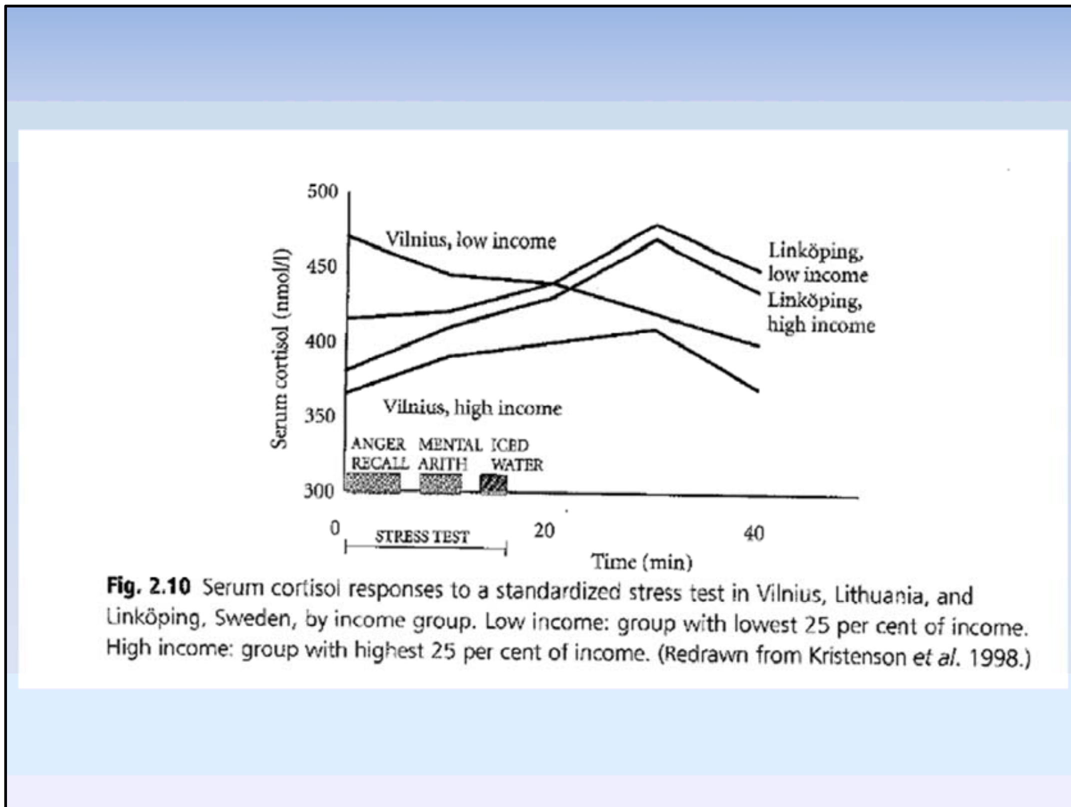
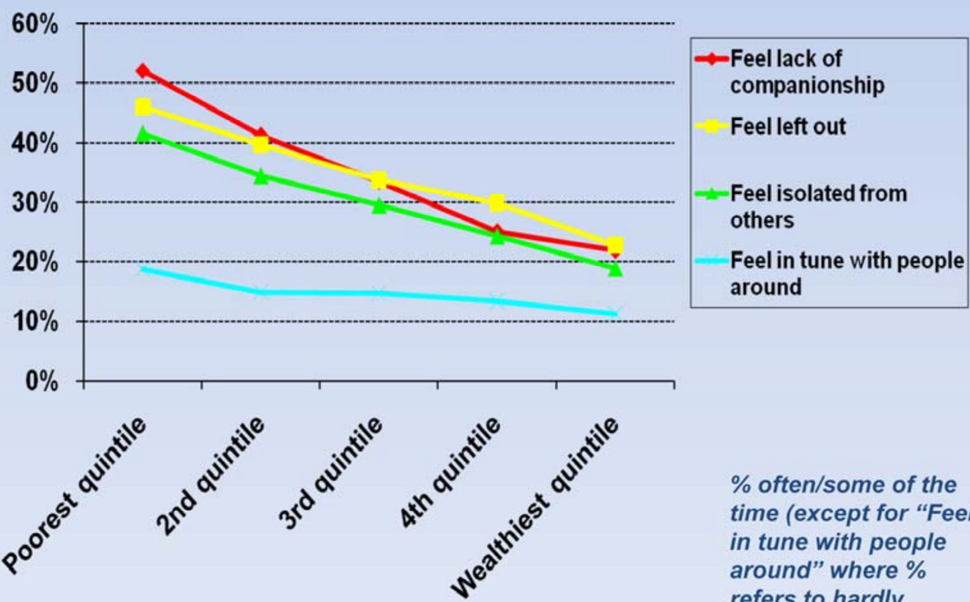


Fig. 2.10 Serum cortisol responses to a standardized stress test in Vilnius, Lithuania, and Linköping, Sweden, by income group. Low income: group with lowest 25 per cent of income. High income: group with highest 25 per cent of income. (Redrawn from Kristenson *et al.* 1998.)

The graph above shows very different physiological responses to a standard ‘stress test’. The linkoping residents shoed a ‘normal’ response to stress: a rise in serum cortisol after the stress, followed by a drop. In Vilnius, low income residents started off with high levels of cortisol and this dropped after stress. High income residents in Vilnius had an attenuated response to stress.

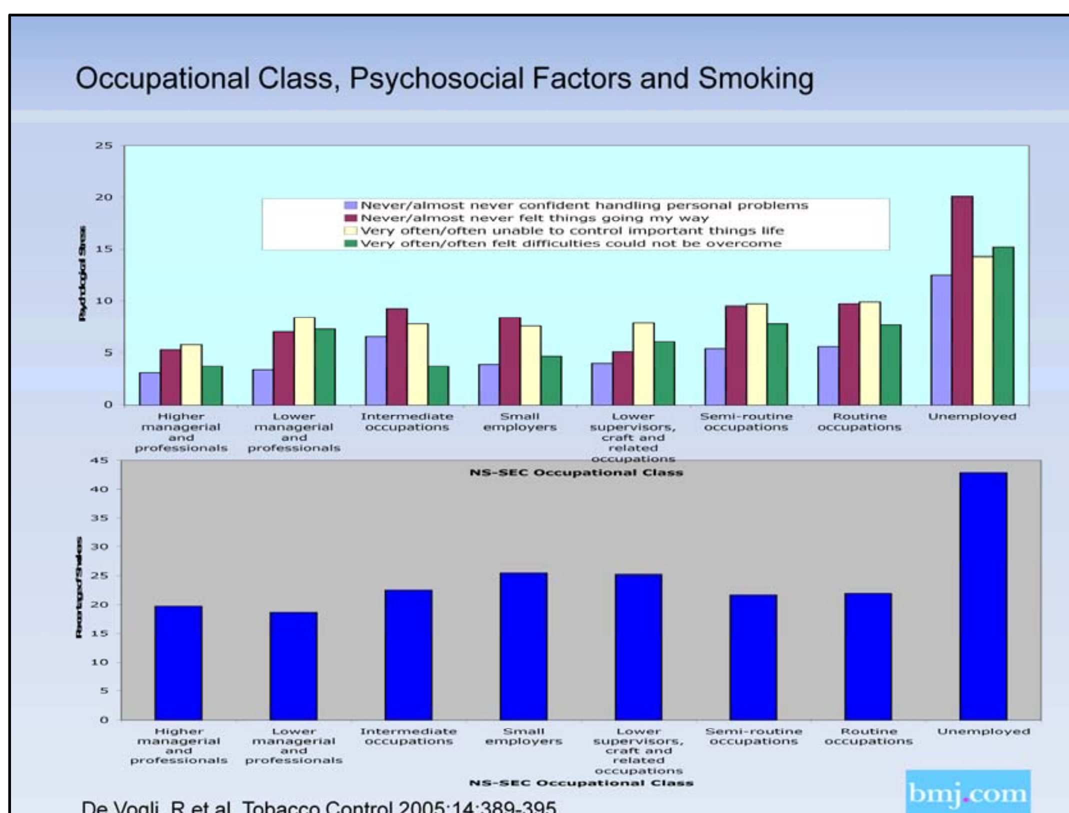
Social position and the psychosocial importance of consumption

- Over and above satisfying basic needs, consumption serves social, psychosocial, and symbolic purposes. It expresses identity. Self image is enhanced by possessions. Shopping provides "retail therapy." Wealth is a marker for social status, success, and respectability, just as poverty is stigmatising. At work, higher incomes are associated with less subordination, more autonomy and control, and less job insecurity.
- Even Marx's paleo--materialism acknowledged the psy-chosocial effects of inequality: "A house may be large or small; as long as the surrounding houses are equally small, it satisfies all social demands for a dwelling. But if a palace arises beside the little house, the little house shrinks to a hovel . . . the dweller will feel more and more uncomfortable, dissatisfied and cramped within its four walls."
- Adam Smith recognised that material conditions were important for more than their value in providing for life's basics: "By necessaries, I understand not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even the lowest order to be with- out . . . a creditable day labourer would be ashamed to appear in public without a linen shirt."
- Social position has psycho-social effects; not just material effects


Loneliness by wealth
60%
50%
40%
30%
20%
10%
0%
Feel lack of companionship
Feel left out
Feel isolated from others
Feel in tune with people around
Poorest quintile
2nd quintile
3rd quintile
4th quintile
Wealthiest quintile
% often/some of the time (except for "Feel in tune with people around" where % refers to hardly ever/never)
Source: English Longitudinal Study of Aging (ELSA)

Social hierarchy works through ..

- Material pathways
- Psycho-neuroendocrine pathways
- Behaviour



One of the major paths the financial crisis will affect health is unemployment. A recent Lancet paper showed that increased unemployment after the crisis is associated with increased suicide rates especially in those countries without welfare security.

The study is based on the analysis of the 2003 Health Determinants Surveillance System (HDSS), a cross-sectional telephone survey of civilian, non-institutionalized, adults living in the Veneto region of Italy. Interviews lasted about twenty minutes and were conducted in Italian. The HDSS questionnaire was adapted from previous health interview surveys .

The sampling strategy involved a 2-stage design. In the first stage, random selection of households stratified according to seven provinces. Two low-density populated provinces were over sampled to limit sampling error. In the second phase, a quota sampling strategy was used to select respondents within the household for age, sex, educational attainment, employment status, and place of birth.

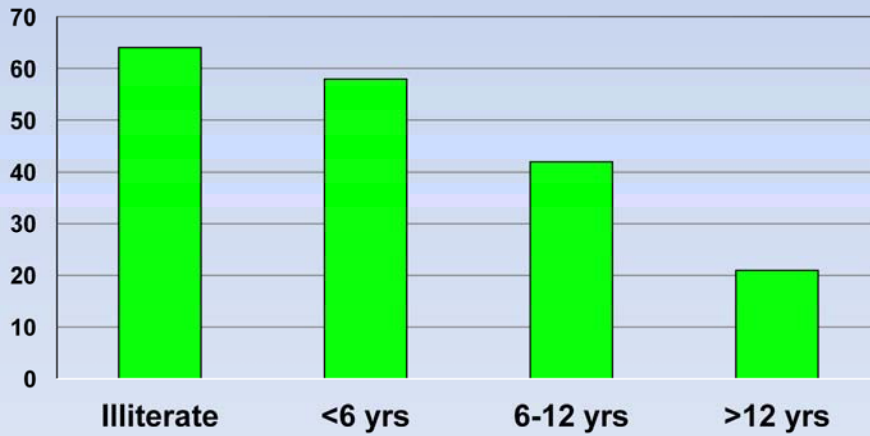
Data were collected on a sample of 4,002 subjects. A response rate of 57% was achieved*. In comparison with the general population of Veneto, a slightly lower proportion of old adults aged 65 or more (16.4% vs. 18.0%) and a slightly higher proportion of people with less than high school diploma (76.1% vs. 72.1%) responded.

Psychological stress. Stress was measured using a brief version of the Perceived Stress Scale composed by 4 items: 1) In the last month, how often have you felt confident about your ability to handle your personal problems?; 2) In the last month, how often have you felt that things were going your way?; 3) In the last month, how often have you felt that you were unable to control the important things in your life?; 4) In the last month, how often have you felt as difficulties were piling up so that could not be overcome?. Alternatives were the following: never (0), almost never (1), sometimes (2), fairly often (3) and very often (4).

Occupational class was strongly associated with psychological stress. Unemployed people were much more likely than any other social category to be psychologically distressed. On the other hand, managers were the least psychologically distressed among the eight NS-SEC categories.

In the multivariate logistic regression models, the odds of smoking among the unemployed was 2.52 (95% CI = 1.47 – 4.31) times higher that of managers and professionals after controlling for

Smoking is more common among less educated men in India (Chennai)

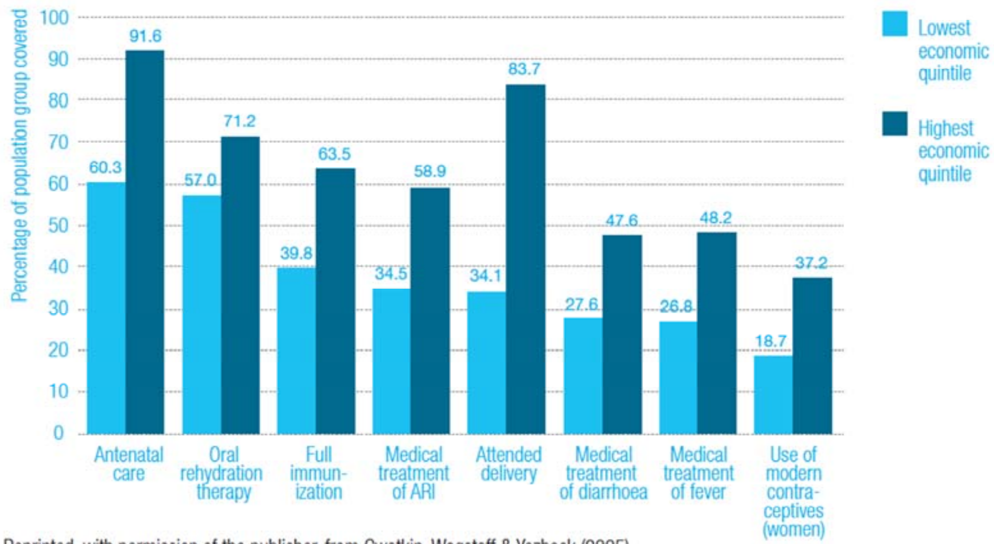


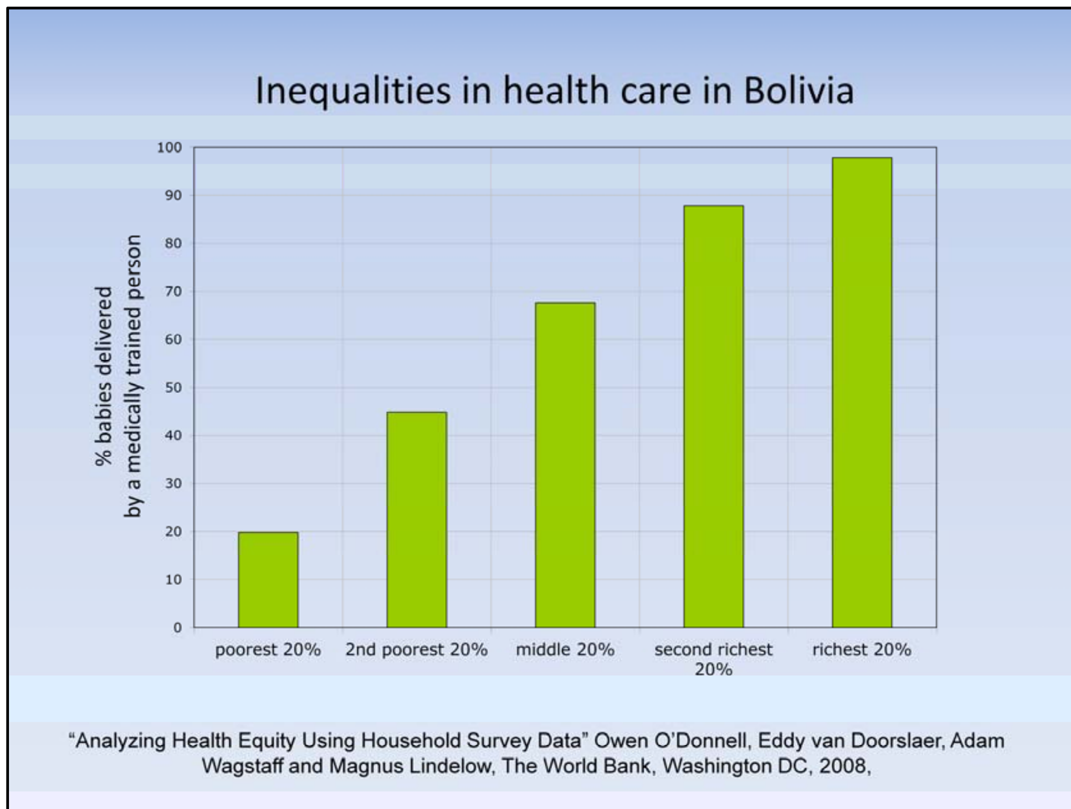
(Gajalakshmi, CK et al. Patterns of Tobacco Use and Health Consequences, Background Paper for “Curbing the Epidemic: Governments and the Economics of Tobacco Control, World Bank, 1999).

Education is a proxy for income?

Social hierarchy works through ..

- Material pathways
- Psycho-neuroendocrine pathways
- Behaviour
- Access to health care


Use of basic maternal and child health services by lowest and highest economic quintiles, 50+ countries.
Percentage of population group covered
100
90
80
70
60
50
40
30
20
10
0
91.6
60.3
71.2
57.0
63.5
39.8
58.9
34.5
83.7
34.1
47.6
27.6
48.2
26.8
37.2
18.7
Antenatal care
Oral rehydration therapy
Full immun-ization
Medical treatment of ARI
Attended delivery
Medical treatment of diarrhoea
Medical treatment of fever
Use of modern contra-ceptives (women)
Lowest economic quintile
Highest economic quintile
Reprinted, with permission of the publisher, from Gwatkin, Wagstaff & Yazbeck (2005).



1. Data are from the 2003 Bolivian Demographic and Health Survey (see lecture 2). See Davidson R. Gwatkin, Shea Rutstein, Kiersten Johnson, Eldaw Suliman, Adam Wagstaff, and Agbessi Amouzou. Socio-Economic Differences in Health, Nutrition, and Population in Bolivia (Washington, D.C.: The World Bank, 2007). http://siteresources.worldbank.org/INTPAH/Resources/400378-1178119743396/bolivia.pdf (accessed 15.01.08).

2. Individuals are ranked by an index of household wealth
3. Point to be made is that there are tremendous differences between the rich and the poor in child survival and access to maternal care. Such differences are the central interest of this course – their measurement and explanation.

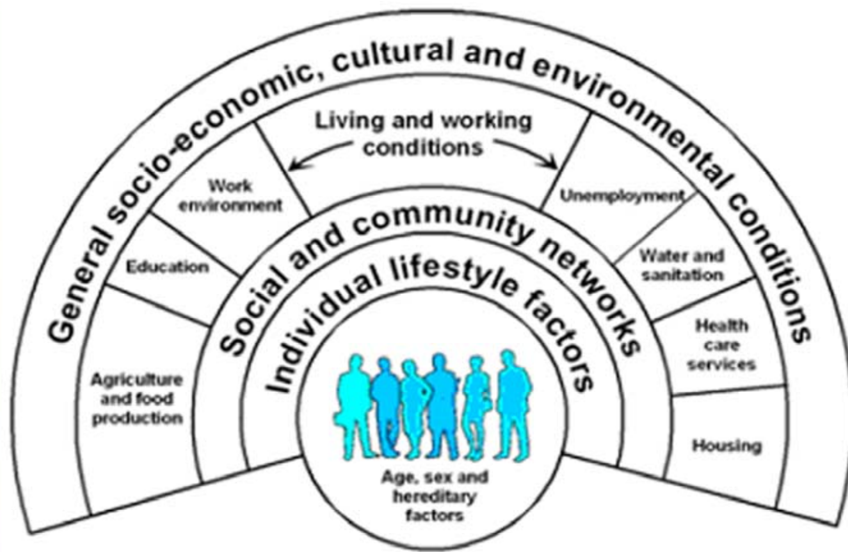
Criticism of Spirit Level thesis

- The data are wrong – any correlation (if it exists) between income inequality is the result of confounding
- Social capital is greater in countries with higher GDP per capita, not lower income inequality
- Income is related to health because it is a determinant, not of class differences or social position, but of material living standards.
- Small area studies show no effect of income inequality on health

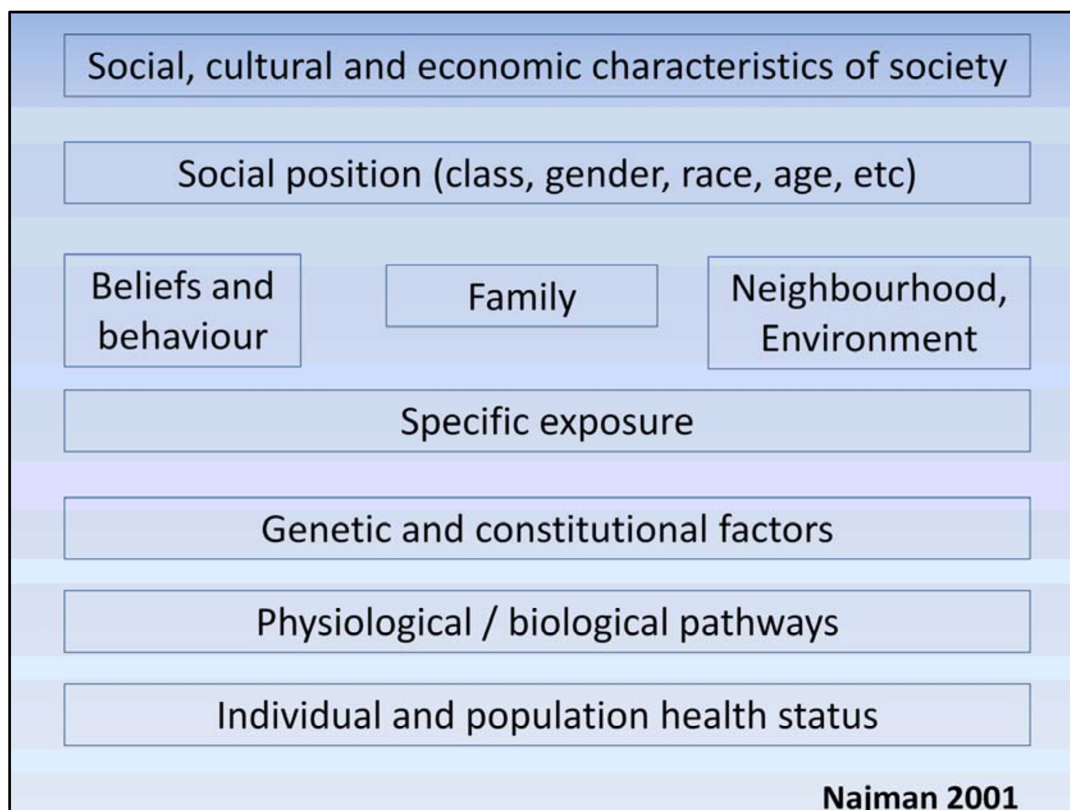
So what determines health?

There are many conceptual frameworks …

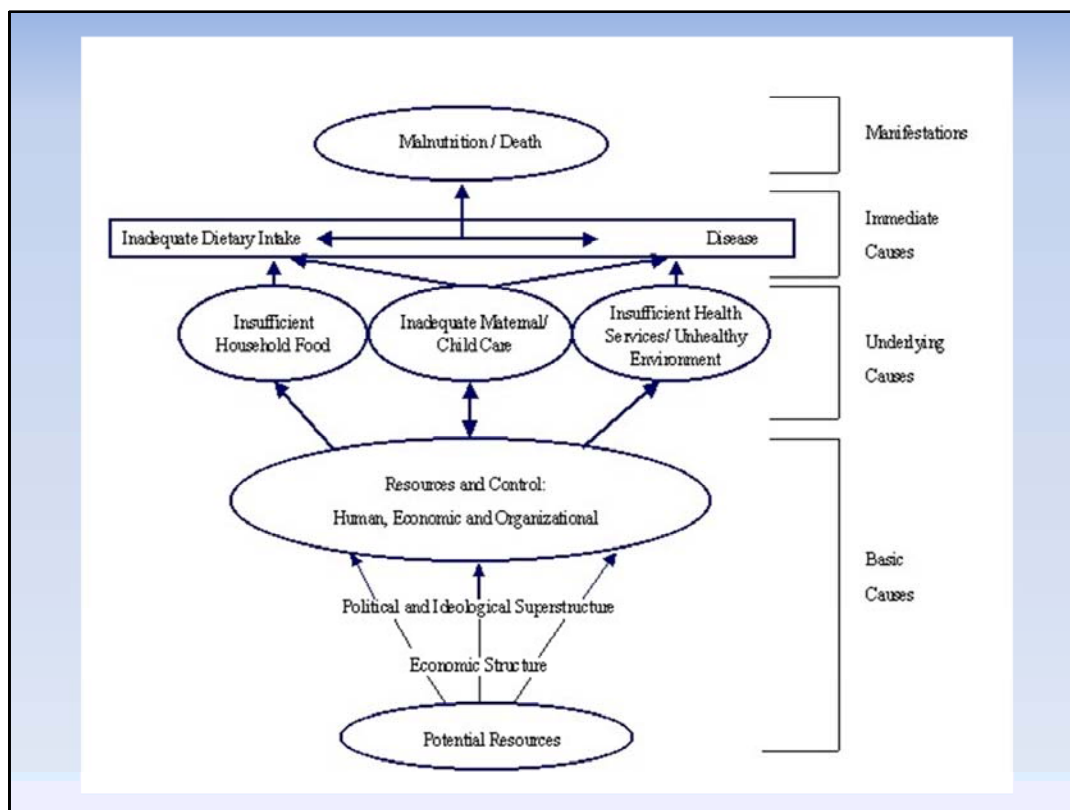
Various conceptual models exists



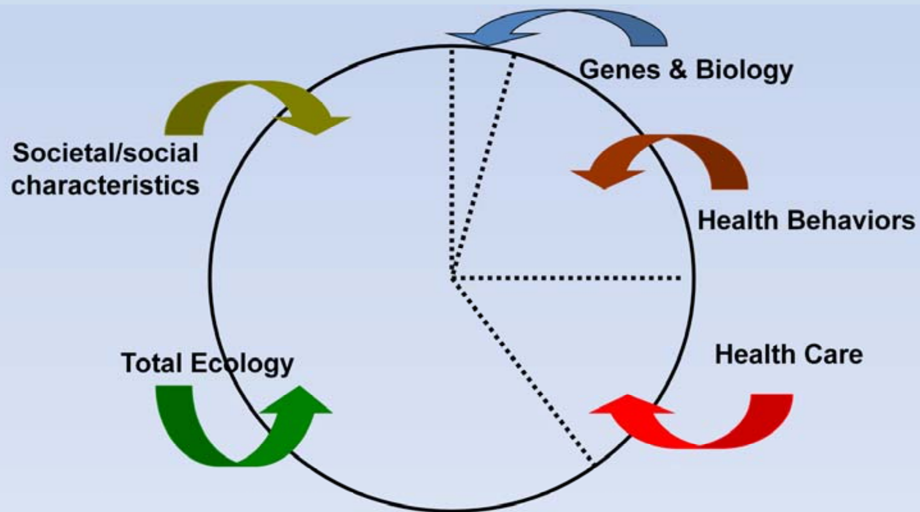
GLOBAL ECOSYSTEM
NATURAL ENVIRONMENT
BUILT ENVIRONMENT
ACTIVITIES
LOCAL ECONOMY
COMMUNITY
LIFESTYLE
PEOPLE
Age, sex, hereditary factors
Climate change
Natural habitats
Buildings, Places
Working, Shopping, Moving
Wealth creation
Social Capital
Networks
Markets
Living, Playing, Learning
Streets, Routes
Air, Water, Land
Biodiversity
Macro-economy, Politics
Culture, Global forces
other Neighbourhoods
other Regions
The determinants of
health and well-being
in our neighbourhoods

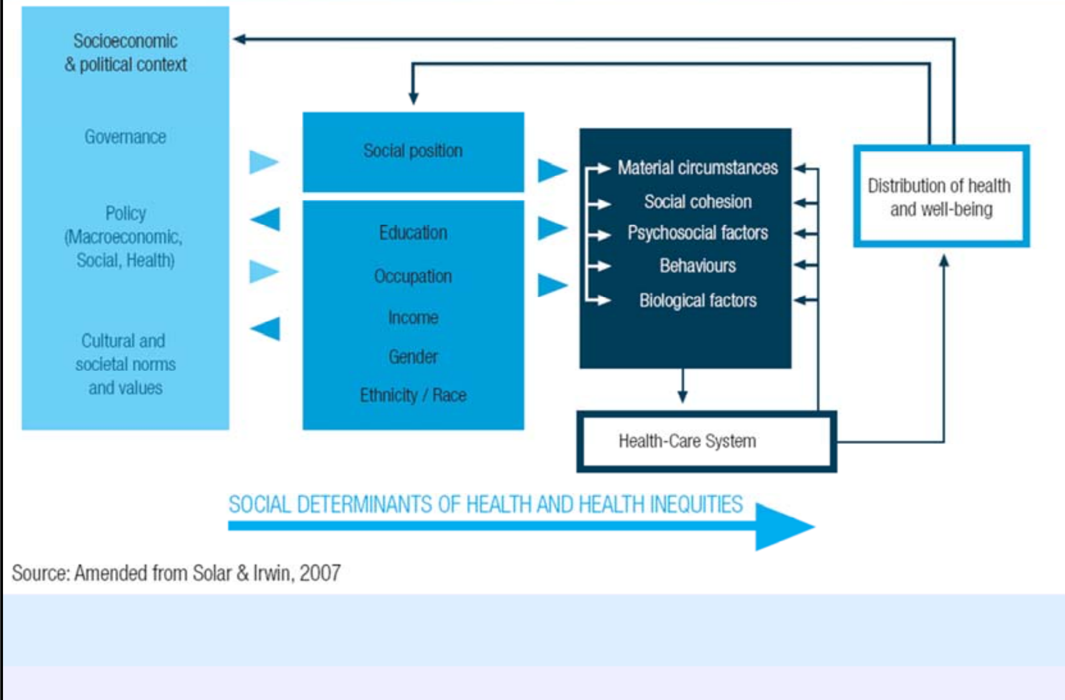


From Najman 2001. A general model of the social origins of disease



UNICEF Conceptual Model


So what determines health? And to what extent?
Genes & Biology
Societal/social characteristics
Health Behaviors
Health Care
Total Ecology
[b]This manuscript is a slightly modified version of Chapter 17 by Tarlov and St. Peter in Society and Population Health; A Reader. Volume II: A State Perspective. Alvin R. Tarlov & Robert F. St. Peter, Eds. 1999. The New Press, New York.



Unlike the earlier frameworks, this one highlights the relationship between social hierarchy and health (and not just social factors and health)

Life course perspective

- Adds a temporal dimension to understanding the determinants of health
- Health is not just the result of current conditions and individual lifestyle choices but is also determined by past living conditions and events.

Early childhood development

- Begins at moment of conception
- Foetus to 2 years: particularly heightened sensitivity to environmental influences
- Environmental adversity in early years of life have been found to induce long term patterns of physical, cognitive and emotional development

Children's social environments influence the biology of brain development

Early childhood development

- Separating environmental exposure from biological consequence is not straightforward.
- But it's clear that human development is genetically regulated; but not genetically determined
- Social conditions in childhood may affect biological development, and these social and biological factors then combine to influence both social circumstances and health in later life.
- The interweaving of the social and biological makes it difficult to attribute the effects of poor health in adulthood unambiguously to one or other set of mechanisms.

(Graham, H 2010)

Genes and epigenetics

- Genetic variation within population groups is larger than genetic variation between population groups
- Genes play a role; but so does the environment of genes

Epigenetics essentially means that there are “non-genetic factors that can shape how an organism's genes behave (or "express themselves")

Epigenetics helps explain why there are differences between identical twins. This is because even within utero, embryonic development in twins with an identical DNA structure may nonetheless experience differences in cellular multiplication and differentiation due to differences in their micro-environment.

Epigenetic influences can also occur at the level of the maternal environment. For example, maternal stress, behaviour and diet may predispose offsprings to various conditions later in life due to prenatal epigenetic effects.

Epigenetics is a growing field of research; but the take home message is: even the influence of our genes is to some extent socially determined.

Inter-generational equity

- The type of physiological environment created by a pregnant woman for her unborn child, can be shaped by the conditions of the mother's *early life*
- Experiences or exposure in early childhood may, for example, shape a mother's neuro-endocrine response to stress during pregnancy
- The social position of grandparents can therefore matter for the health of the child *in utero*

Measuring the foetal origins of adult disease is difficult – it requires longitudinal studies carried out over decades!

The combination of poor foetal growth and subsequent weight gain is especially important in increasing the risk of CVD in adulthood. Being obese is not good for anyone; but especially for those who were born small and thin.

Take home message: This is all complicated stuff; and there are few hard measures about the extent to which inter-generational factors contribute to health status. But you simply need to be aware of the concept.