Inequalities in health: a matter of social justice

Michael Marmot
Director
International Institute for Society and Health

Chinese University of Hong Kong
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The gradient
Poverty?
Not inevitable
Selection?
Causal pathways
Action
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MORTALITY OVER 25 YEARS ACCORDING TO LEVEL IN THE OCCUPATIONAL HIERARCHY: WHITEHALL

(Marmot & Shipley, 1996)
Mortality over 25 years according to level in the occupational hierarchy: Whitehall

(Marmot & Shipley, BMJ, 1996)
Self-reported physical health in older people: WII study

Chandola et al 2007
Poor self-rated health at age 50+ and accumulation of socio-economic risk factors over life course in Russia

Risk factors:
• Ever hungry to bed aged 15 yr
• Elementary /vocational education
• Adult household income below median

(Nicholson et al )
MEN AGED 64 IN 1990 WHO DIED UP TO 1996 BY EDUCATION SWEDISH NATIONAL SAMPLE

Erikson 2001
MORTALITY* AND EDUCATION, SOUTH KOREA

*Mortality in Korean working population aged 20-64, 1993-1997, adjusted for age
(Source: Son et al. JECH 56:798, 2002)
Oscar winning actors and actresses lived an astonishing 4 years longer than their co-stars and the actors nominated who did not win. (Redelmeier & Singh)

Winning the Oscar is like reducing your chance of dying from a heart attack from about average to zero.

Status Syndrome
The widening trend in mortality by education in Russia, 1989-2001

45 p20 = probability of living to 65 yrs when aged 20 yrs

Source: Murphy et al, AJPH, 96, 1293-9, 2006
Life expectancy at age 15, men, 1970-2004

From WHO Health For All database
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## Life Expectancy at Birth

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indigenous</strong></td>
<td>59.4</td>
<td>64.8</td>
</tr>
<tr>
<td>Australian*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non Indigenous</strong></td>
<td>76.6</td>
<td>82.0</td>
</tr>
<tr>
<td>Australian*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India**</td>
<td>61.8</td>
<td>65.0</td>
</tr>
<tr>
<td>Russia**</td>
<td>59.0</td>
<td>72.1</td>
</tr>
</tbody>
</table>

## INFANT MORTALITY/1000 LIVE BIRTHS

<table>
<thead>
<tr>
<th></th>
<th>INFANT MORTALITY PER 1000 LIVE BIRTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABORIGINAL*</td>
<td>12.7</td>
</tr>
<tr>
<td>AUSTRALIAN</td>
<td>5.2</td>
</tr>
<tr>
<td>SIERRA LEONE</td>
<td>181</td>
</tr>
<tr>
<td>ICELAND</td>
<td>3</td>
</tr>
</tbody>
</table>

*Aboriginal and Torres Strait Islanders
Life expectancy and GDP per capita in $US (PPP) in 2004

<table>
<thead>
<tr>
<th>Country</th>
<th>LE at birth</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>82.2</td>
<td>29,251</td>
</tr>
<tr>
<td>Switzerland</td>
<td>80.7</td>
<td>33,040</td>
</tr>
<tr>
<td>Sweden</td>
<td>80.3</td>
<td>29,541</td>
</tr>
<tr>
<td>Spain</td>
<td>79.7</td>
<td>25,047</td>
</tr>
<tr>
<td>France</td>
<td>79.6</td>
<td>29,300</td>
</tr>
<tr>
<td>UK</td>
<td>78.3</td>
<td>30,821</td>
</tr>
<tr>
<td>Greece</td>
<td>78.3</td>
<td>22,205</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>78.3</td>
<td>9,481</td>
</tr>
<tr>
<td>Chile</td>
<td>78.1</td>
<td>10,874</td>
</tr>
<tr>
<td>Cuba</td>
<td>77.6</td>
<td>5,700</td>
</tr>
<tr>
<td>US</td>
<td>77.5</td>
<td>39,676</td>
</tr>
</tbody>
</table>

(Human Development Report 2006)
## GDP PER CAPITA AND LIFE EXPECTANCY: SELECTED COUNTRIES

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP PER CAPITA (PPP US$)</th>
<th>LIFE EXPECTANCY AT BIRTH (MALES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRI LANKA</td>
<td>3,778</td>
<td>68</td>
</tr>
<tr>
<td>COSTA RICA</td>
<td>9,606</td>
<td>75</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>9,230</td>
<td>58</td>
</tr>
<tr>
<td>CHILE</td>
<td>10,274</td>
<td>74</td>
</tr>
</tbody>
</table>

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Life expectancy at birth for men by social class in England and Wales

Social Class
Source: Donkin, Goldblatt, and Lynch 2002

Years

<table>
<thead>
<tr>
<th>Social Class</th>
<th>1972-76</th>
<th>1997-99</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td>4.3</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td>4.6</td>
</tr>
</tbody>
</table>

Source: Donkin, Goldblatt, and Lynch 2002
Life expectancy at age 30 by education for men in the US

Source: Crimmins and Saito 2001
The widening trend in mortality by education in Russia, 1989-2001

45 p20 = probability of living to 65 yrs when aged 20 yrs

Source: Murphy et al, AJPH, 96, 1293-9, 2006
Mortality for non-manual and manual workers in nine European countries
Ranked by absolute level of mortality of manual workers; age groups 45-59
Life expectancy at age 15, men, 1970-2004

From WHO Health For All database
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Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
Whitehall II – Is education related to health?

-0.13**

0.42**

-0.04

0.15**

0.50**

0.42**

0.57**

-0.04

Multiple regression

Path analysis
Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
controlling for (a) age, and (b) age, smoking systolic blood pressure, plasma cholesterol concentration, height and blood sugar
Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
## Total expenditure on health as % of GDP (2003)

<table>
<thead>
<tr>
<th>Country</th>
<th>%</th>
<th>LE at birth 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>15.2</td>
<td>78</td>
</tr>
<tr>
<td>UK</td>
<td>8</td>
<td>79</td>
</tr>
<tr>
<td>Cuba</td>
<td>7.3</td>
<td>78</td>
</tr>
<tr>
<td>Japan</td>
<td>7.9</td>
<td>82</td>
</tr>
<tr>
<td>Sweden</td>
<td>9.4</td>
<td>81</td>
</tr>
<tr>
<td>Iceland</td>
<td>10.5</td>
<td>81</td>
</tr>
</tbody>
</table>

World Health Report 2006
EXPENDITURE ON MEDICAL CARE PER CAPITA IN US AND UK

UNITED STATES:
- US$ 5274

UNITED KINGDOM:
- US$ 2164 (adjusted for purchasing power)

(Human Development Report 2005)
HEALTH DIFFERENCES BETWEEN ENGLAND AND THE US
55-64 year olds

% Prevalence

Low income  Middle income  High Income

Heart disease  Diabetes  Cancer

Source: Banks, Marmot, Oldfield and Smith; JAMA 2006
AHEROSCLEROSIS IN MONKEYS

Shively, 1999
Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
SELF-REPORTED JOB CONTROL AND CHD INCIDENCE WHITEHALL MEN AND WOMEN

Adjusted age, sex, length of follow up
+ effort/reward imbalance
+ grade, coronary risk factors, negative affect

Rate ratio

High job control  Intermediate job control  Low job control

Bosma et al, 1998
EFFORT-REWARD IMBALANCE AND CHD WHITEHALL II

*Adjusted for age, sex and grade

(Kuper et al. 2002, Occup Environ Med, 59, 777-784)
PAR* for coronary heart disease (fatal CHD/non fatal MI/definite angina)

*Population attributable risk
odds ratios adjusted for age, sex, employment grade

PAR for all combined *
30%  95% CI 10%-46%
adjusted for other predictors
29%  95% CI 9%-45%
Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
Stressful close relationships and CHD: Whitehall II

Negative aspects of social support
- lowest
- middle
- highest

Hazard ratio

Model 1
Adj for age, sex, emp grade, marital status, obesity, hyoertension, diabetes, cholesterol, work stress etc

Model 2
Adj for Model 1 and negative affect and source of support

(De Vogli et al 2007, Arch Int Med in press)
Causation

- Life course
- Behaviours
- Medical care
- Control
- Social supports
- Biology
Odds Ratio* of Metabolic Syndrome by Exposure to Iso-strain: Whitehall II Phases 1 to 5

*Adj. for age, employment, grade and health behaviours

Chandola, Brunner & Marmot, BMJ, 2006
MECHANISMS

- HYPOTHALAMIC PITUITARY AXIS HPA – CORTISOL
- SYMPATHETIC/PARASYMPATHETIC
CORTISOL AND SOCIAL STRESSORS IN PRIMATES

Adapted from: Abbott et al. Hormones and Behavior 43 (2003) 67-
METABOLIC SYNDROME AND HEART RATE VARIABILITY: W II STUDY MEN

(Hemingway et al. Circulation, 2005)
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THE SOLID FACTS: 10 MESSAGES

THE SOCIAL GRADIENT
STRESS
EARLY LIFE
SOCIAL EXCLUSION
WORK

UNEMPLOYMENT
SOCIAL SUPPORT
ADDICTION
FOOD
TRANSPORT
Commission on Social Determinants of Health
2005 -2008

- Commissioners
- 9 Knowledge Networks
- Partner Countries
- Civil society work
- Global initiative
- WHO integration

Set up by the World Health Organisation

www.who.int/social_determinants
Conceptualising the Social Determinants of Health

SOCIAL CONTEXT
Natural Environment; Norms & Values; Governance; Social Policies & Systems (e.g. education, health, labour, housing, social protection); Urbanisation; Human Rights

STRATIFICATION
- Sex
- Ethnicity
- Place
- Education
- Occupation
- Income

DIFFERENTIAL EXPOSURES & VULNERABILITIES
- Material circumstances
- Psychosocial factors
- Behaviours
- Biological agents

Average and differential health outcomes
Policy Entry Points

- Social stratification – people’s social position related to their health
- Differential exposure to health damaging conditions
- Differential vulnerability
- Differential consequences of ill health

Level

- Global
- Regional
- National
- Local
- Household
- Individual
Action

- Why?
- What?
- How?
The Commission on Social Determinants of Health fosters a global movement that places fair health at the head and the heart of governance.

www.who.int/social_determinants/en