

**Inequalities in health in Scotland:**  
what are they and what  
can we do about them?

**Sally Macintyre**



**MRC Social & Public Health Sciences Unit**

**Occasional Paper No 17**

**October 2007**

MRC Social & Public Health Sciences Unit,  
4 Lilybank Gardens,  
Glasgow, G12 8RZ.  
Tel: 0141 357 3949  
<http://www.sphsu.mrc.ac.uk>

**MRC**  
Medical Research Council

## **Acknowledgements**

This paper is based on a briefing paper commissioned by the Health Improvement Directorate of the Scottish Government for the Ministerial Task Force on Health Inequalities. The views expressed here are my own and do not necessarily reflect the official policies of the Medical Research Council or the Chief Scientist Office of the Scottish Government Health Directorates (who fund my work).

I am grateful to Mark Petticrew and Linda Bauld for advice in the preparation of this paper.

© Copyright MRC SPHSU 2007

## Table of Contents

	Page
<b>Acknowledgements</b>	<b>i</b>
<b>Inequalities in health in Scotland: what are they and what can we do about them?</b>	<b>1</b>
<b>What are inequalities in health, and what causes them?</b>	<b>1</b>
<b>Social gradients in health and health risks</b>	<b>2</b>
<b>Policy issues and principles</b>	<b>5</b>
<b>What do we know about what works to reduce inequalities in health?</b>	<b>6</b>
<b>What do we know about what is likely to reduce inequalities in health?</b>	<b>7</b>
<b>Possibly competing goals</b>	<b>11</b>
<b>Appendix 1: Chronology of selected reports and actions on inequalities in health in the UK</b>	<b>12</b>
<b>References</b>	<b>14</b>

## Inequalities in health in Scotland: what are they and what can we do about them?

Socio-economic inequalities in health have been observed in the UK since records began. In his 1842 report on the conditions of the labouring poor in Britain, Edwin Chadwick noted that, when he asked for two maps of Aberdeen, one marked with the prevalence of fever and one with the location of the different social orders:

‘They returned a map so marked as to disease, but stated that it had been thought unnecessary to distinguish the streets inhabited by the different orders of society, as that was done with sufficient accuracy by the different tints representing the degrees of the prevalence of fever’.<sup>1</sup>

### What are inequalities in health, and what causes them?

In all known societies health risks, health-related behaviours, physical and mental health, and life expectancy tend to vary between social groups. Key axes of variation include socio-economic status, gender, ethnicity, and place of residence. This briefing focuses on socio-economic status (SES for short) inequalities but many of the same principles apply to other inequalities.

The most immediate causes of SES inequalities in health are specific exposures (e.g. damp housing, hazardous work or neighbourhood settings, infectious agents, adverse life events), behaviours (e.g. smoking, diet, exercise), and personal strengths or vulnerabilities (e.g. coping styles, resilience, ability to plan for the future) (See Figure 1). Mechanisms can be physical (e.g. exposure to air pollution), psychosocial (e.g. adverse life events), behavioural (e.g. smoking) or combinations of these (e.g. smoking to deal with stress caused by living in a physically threatening environment). Such influences are often referred to as ‘downstream’ causes.

Intermediate causes are the pathways by which members of different SES groups get to be at lower or higher risk of such exposures and vulnerabilities (e.g. the education, taxation, and health care systems, the labour and housing markets, planning regulations, crime and policing etc). The most fundamental causes are international political and economic forces, and the forms of social stratification in a given society. For example, in the USA health tends to be strongly associated with the distribution of income and with race, while in the UK it tends to be more strongly associated with social class. Such influences are often referred to as ‘upstream’ causes.

Figure 1: Causes of SES inequalities in health <sup>2</sup>



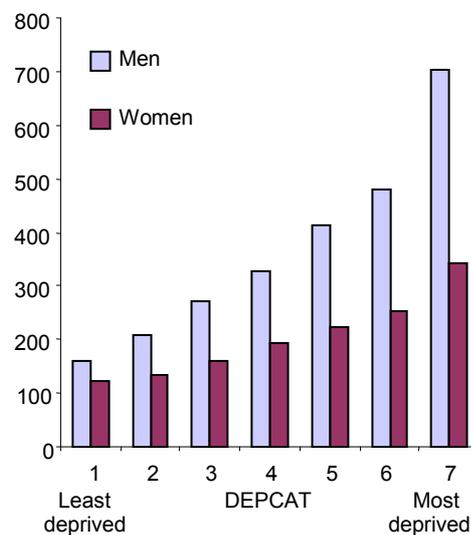
Some SES inequalities are generated at or before birth. For example, data from the West of Scotland show that stomach cancer and stroke risk are associated more with one's parents' SES than with one's own position in adult life<sup>3</sup>. Low birth weight is a good marker of the environment in the womb, and thus of the mother's health. It is strongly associated with socio-economic deprivation, and low birth weight babies have continuing health and social disadvantages, not only in childhood but into adult life, as expressed for example in raised risks of coronary heart disease in middle age<sup>4</sup>.

Exposure to socially patterned risks (e.g. to hazardous working environments, smoky environments, poverty) also occurs in adult life. Earlier and later life risks can be cumulative; exposure to damaging environments in both childhood and adulthood is worse than exposure in only one period<sup>5</sup>. Experiences and behaviours in later life can help to reduce risks generated earlier.

### Social gradients in health and health risks

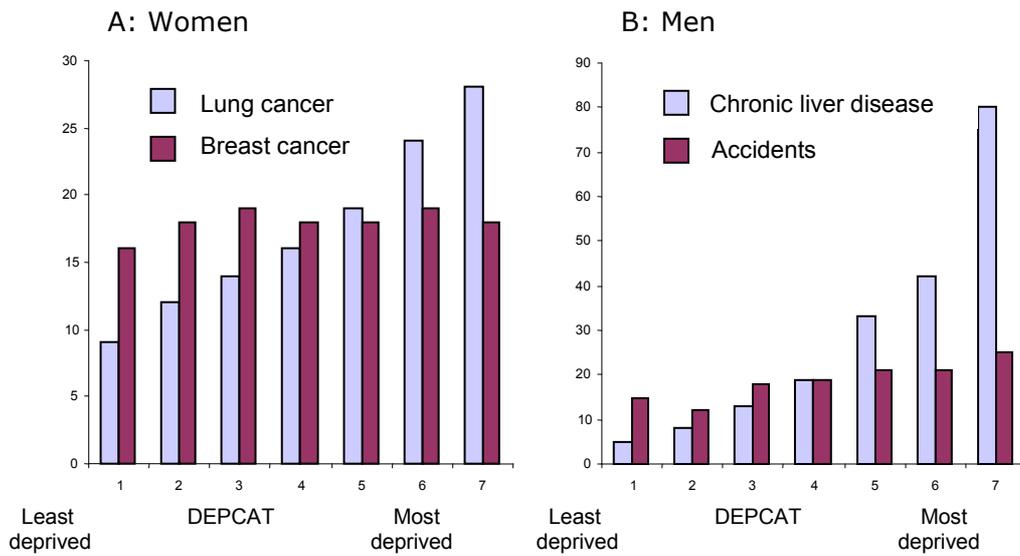
Health usually displays a gradient by socio-economic status, so that each successively more advantaged group has longer life expectancy and better health. There is a gradient all the way up the social scale, rather than a threshold between the poor and the rest of society above which there are no social differences. For example, in Scotland death rates decrease even between the three least deprived categories (see figure 2).

Figure 2: All cause death rate per 100,000 population, Scotland 2001 – Men and Women<sup>6</sup>



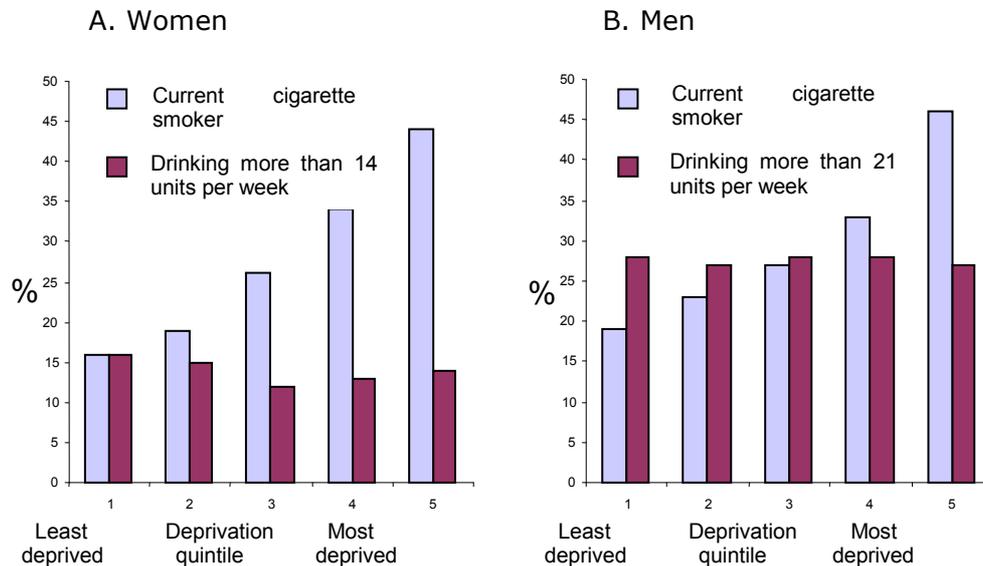
Although this social gradient is found in most diseases, there are some exceptions, and gradients are steeper for some conditions than for others. For example, among women death rates from lung cancer are strongly socially patterned while those from breast cancer are not (Figure 3A); among men the social gradient is steeper for deaths from chronic liver disease than for deaths from accidents (Figure 3B).

Figure 3: Death rate per 100,000 population, Scotland 2001 <sup>6</sup>

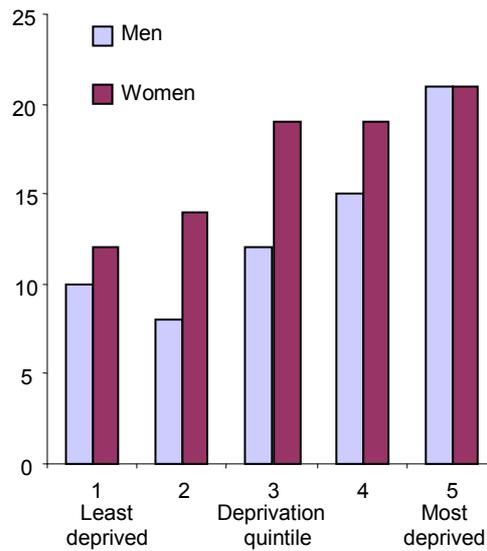


Similarly, gradients by behaviours vary: it is not true that: 'the poor always behave badly'. Smoking rates are much higher in more disadvantaged groups, but the pattern for alcohol is somewhat more complicated. For example, although binge drinking is more common among deprived men, there is little social gradient in weekly alcohol consumption, among men or women (see figure 4).

Figure 4: Self-reported smoking and drinking, Scotland 2003 <sup>7</sup>

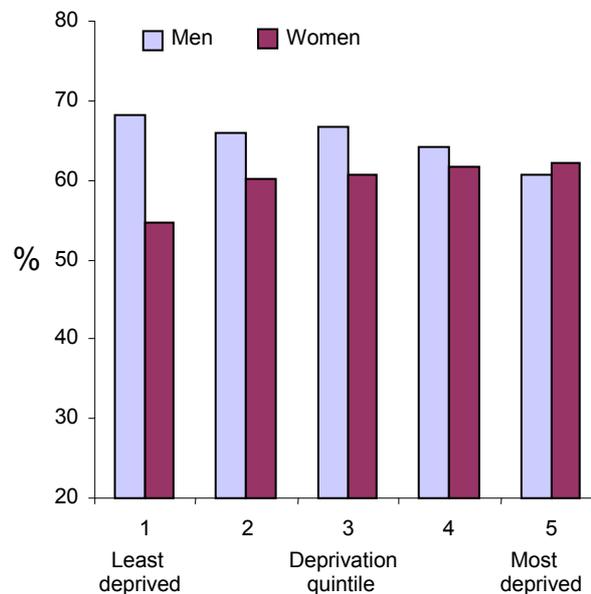


SES gradients are also found in measures of mental health and wellbeing. Figure 5 shows the percentages scoring above a cut-off, indicating probable need for treatment, on a measure indicating psychological distress.

Figure 5: Psychological distress (GHQ 4+), Scotland 2003<sup>7</sup>

Although SES gradients are manifest in many biological measures (e.g. birth weight, height, respiratory functioning) they are, somewhat surprisingly, not found in others (e.g. blood pressure and cholesterol, even though these are risk factors for major illnesses, such as cardiovascular disease, which are strongly socially patterned)<sup>7</sup>.

Social gradients differ by age, tending to be steep in infancy, flatter in youth, then steeper in adulthood and flatter in old age. There are also gender differences in socio-economic gradients; for example, overweight rises with decreasing SES among women, but the pattern is more mixed or reversed among men. (See Figure 6)

Figure 6: Body Mass Index 25+ Men and Women, Scotland 2003<sup>7</sup>

SES patterning varies by levels of economic development and by culture, and can change over time as patterns of exposure, and the relative influence of different determinants, change. For example, rates of heart disease and smoking used to be higher in higher social classes whereas in most developed countries they are now

consistently higher in lower SES groups<sup>8</sup>. Smoking rates are still higher in higher social classes in Southern countries in Europe<sup>9</sup>. In developed countries smoking has become a more important cause of health inequalities as its prevalence has declined, because the decline has been greater among more affluent people<sup>10</sup>.

### **Policy issues and principles**

While life expectancy, health and health related behaviours have shown a steady improvement over the last 50 years, more advantaged social groups have seen a faster improvement, which means that the gap between the bottom and top of the social scale has widened. However, this does not mean that social and public health policies have not had a positive impact on inequalities in health. These inequalities would undoubtedly be much wider were it not for universal health care and education free at the point of use, and a number of measures such as progressive taxation, income support, neighbourhood regeneration, housing improvements, and control of the environment via clean air acts, health and safety at work legislation etc. Thus it is important to maintain such equity enhancing policies.

Ultimately, the most 'upstream' policy would be to reduce inequalities in society. The problem with relying on 'downstream' interventions is that, meanwhile, more people are falling into the river upstream, e.g. smoking cessation services would continually have to deal with new cohorts of smokers. This suggests one needs both upstream and downstream interventions; to create an environment in which people do not start smoking in the first place, as well as helping people to stop.

Some people have objected to attempts to reduce inequalities in health on the basis that it would be wrong to make some people less healthy or successful simply in order to 'level the playing field'. However, policy can focus on levelling up, not down<sup>11</sup>. Noting the health gaps between social groups indicates what might be possible for the whole population, and gives us goals to which we can aspire. If life expectancy at birth in 2001 can be 74.6 years for men and 79.8 for women in Edinburgh, this suggests that life expectancy of 69.2 for men and 76.5 for women in Glasgow could be improved<sup>6</sup>.

Education, employment and income are often seen as key entry points for reducing social and health inequalities. Education provides literacy, numeracy, and analytical and communication skills which increase people's employability and ability to cope with a range of issues including health. Employment builds on these skills and provides income, and income provides access to health promoting resources such as housing, heating, food etc. Education, employment and income also enhance mental and social wellbeing and social inclusion. A long term evaluation of the High/Scope Perry pre-school program delivered as a randomised trial to high risk children in Michigan in the 1960s showed positive effects at age 27 on achievement test scores, grades, graduation from high school, home ownership and earnings, as well as negative effects on crime rates and welfare use, and estimated a sevenfold return on investment<sup>12</sup>.

Most of the major drivers of the distribution of health in the population lie outside the NHS, however, the NHS has an important role to play in promoting health, preventing disease, and ameliorating the health damage caused by disadvantage. The 'inverse care law' (by which services tend to be least available to those who need them most<sup>13</sup>) needs to be addressed across a whole range of services. Both NHS and wider determinants of health inequalities need to be tackled.

Area-based approaches are attractive because they allow for local involvement and ownership, many interventions or policies may be intrinsically area based (e.g. ensuring equitable access to good quality education, housing, health service, retail

food outlets, public transport etc.) and it is often reasonably straightforward to identify areas in greater need. However, identifying deprived areas is not the same as identifying deprived people or households, because not all deprived people live in deprived neighbourhoods. It was estimated that if 20% of the most deprived postcode sectors in Scotland in 1991 were targeted, only 41% of unemployed people and 34% of low income households would have been captured<sup>14</sup>. Thus area based initiatives need to be complemented by approaches which target disadvantaged individuals or households.

Box 1 summarises these policy principles, and others derived from the evidence about what works best (see below).

#### **Box 1: Principles for effective policies to reduce inequalities in health**

- maintain and extend equity in health and welfare systems
- address 'upstream' and 'downstream' causes
- level up not down
- reduce inequalities in life circumstances (especially education, employment, and income)
- prioritise early years interventions, and families with children
- address both health care and non health care solutions
- target, and positively discriminate in favour of, both deprived places and deprived people
- remove barriers in access to health and non-health care goods and services
- prioritise structural and regulatory policies
- recognise need for more intensive support among more socially disadvantaged groups
- monitor the outcome of policies and interventions, both in terms of overall cost effectiveness and differential cost-effectiveness
- ensure programmes are suitable for the local context
- encourage partnership working across agencies, and involvement of local communities and target groups

#### **What do we know about what works to reduce inequalities in health?**

It is important to note a distinction between two questions: *does it work to improve health? And does it work to reduce health inequalities?* An intervention which, in general, works (e.g. dental health education) might have no effect *on health inequalities* if all SES groups benefit equally; increase them if the rich benefit more; and reduce them if the poor benefit more.

As has been noted in numerous recent reviews, (see appendix), there is a lack of evidence about the effectiveness and cost effectiveness of policies, programmes, and projects in reducing inequalities in health. Attempts to conduct reviews in this field have all reported a lack of good primary evidence which could be summarised. Reasons for this lack of information include:

- Many evaluations of policies or programmes focus on inputs, throughputs and customer or professional satisfaction rather than on outcomes (e.g. the mapping exercise for Sure Start in Scotland)
- When evaluations do look at outcomes, health is often not studied (e.g. in 1999 a review found 10 randomised controlled trials of income supplementation schemes. Only one of these, however, looked at *health outcomes* [this showed that birthweight increased in higher risk experimental groups])<sup>15</sup>

- Few interventions are rolled out in ways which permit rigorous evaluation: often they lack clear or measurable goals, baseline information, cost/benefit data, and control or comparison groups or areas <sup>16</sup>
- Most evaluations focus on, and have sufficient sample size for, assessment of the *overall* effect (for example, overall reduction in smoking) but not on *differential* effects by SES
- Policies may take some time to have the desired effects
- Lack of UK studies (e.g. some early years interventions have been trialled in the USA where there is no free universal health care coverage or prenatal care. Additional home visiting for high-risk mothers in that context may have much larger effects than in the UK context where there is already universal access to general practice, prenatal care, health visiting etc. <sup>16</sup>)

Lack of robust evidence of effectiveness is not a justification for inaction. However governments could learn more about what works by encouraging:

- evaluations which look at the actual health outcomes, rather than only at implementation issues
- the implementation of policies or programmes in ways which facilitate more conclusive answers about effectiveness and cost effectiveness e.g. collection of baseline data and information about the value of the outcomes, and the use of control or comparison groups (e.g. by randomising areas or individuals to receive the intervention, or to early or late receipt of it)
- evaluations which explicitly examine the issue of differential impact by SES
- appropriate use of relatively immediate indicators (e.g. breast-feeding rates, birthweight, obesity, respiratory function), as well later functioning, disease or mortality endpoints
- consideration of the context in which evaluations have been undertaken, and the likelihood of interventions working in the Scottish and/or local context.

### **What do we know about what is likely to reduce inequalities in health?**

Recently there have been increasing attempts both to:

- conduct studies which specifically examine the differential effects on SES groups of specific policies or programmes, and
- summarise and review what is known from existing studies

The Appendix lists some organisations trying to pull together evidence. Many reviews examine the world literature (e.g. reviews of housing improvement <sup>17</sup>, feeding supplementation <sup>18</sup>, tobacco control policies <sup>19</sup>) but some are more focused on Europe or the UK (e.g. area-based interventions <sup>20</sup>). I am not aware of any reviews bringing together studies specifically from Scotland. Some general principles can however be established which are likely to be applicable to Scotland.

Interventions to reduce inequalities in health can be directed at one or more of three levels, e.g. in relation to diet:

- the structural or regulatory level (e.g. farming and trade policies, food labelling regulations, addition of vitamins to margarine and folate to flour)
- the local level (e.g. encouragement of food co-operatives, free fruit in schools, planning and rating policies to ensure the provision of affordable and healthy foods in deprived areas)
- individuals or families (e.g. nutrition education in schools or during pregnancy, mass media health promotion advice, weight loss clinics in general practice).

Interventions at the higher, more regulatory or structural, levels (Clean Air Acts, seat belt legislation, food supplementation, banning smoking in public places) appear to do more to reduce health inequalities than information based approaches (e.g. nutrition labelling, anti-smoking adverts, drink driving campaigns, etc.).

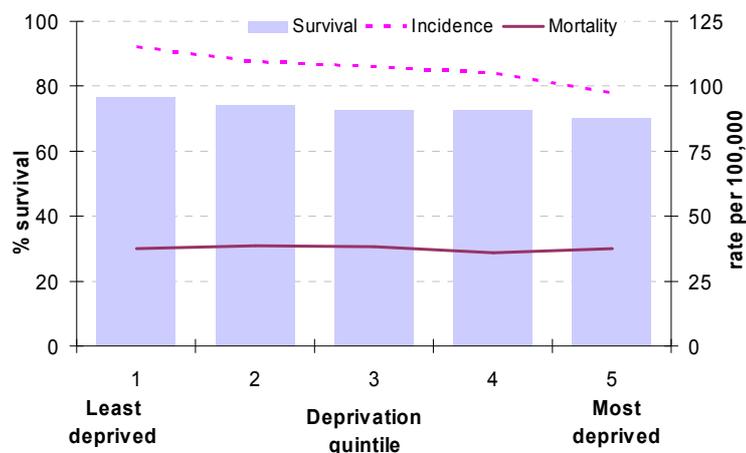
This is because more advantaged groups in society find it easier, because of better access to resources such as time, finance, and coping skills, to avail themselves of health promotion advice (e.g. to give up smoking, improve diet, use fluoride toothpaste etc.) and preventive services (e.g. immunisation, dental check ups and cervical screening). Disadvantaged groups tend to be harder to reach, and find it harder to change behaviour. A dental health education project in Scotland widened health inequalities in dental health because it was more successful among higher SES groups<sup>21</sup>. A mass media campaign intended to reduce socio-economic differences in women's use of folic acid to prevent neural defects resulted in more marked social class differences in use than before the campaign<sup>22</sup>.

This suggests that interventions with more disadvantaged groups may need to be much more intensive and targeted than might be appropriate for more advantaged groups: information based approaches such as food labelling, pamphlets in doctors' surgeries, and mass media campaigns, or those which require people to take the initiative to sign up for, may be less effective among more disadvantaged groups.

Although services may be relatively less effective for poorer people when they do sign up to them, this does not mean that such services do not contribute to reducing inequalities. Several studies in England and one in Glasgow have now found that NHS stop smoking services are effective in reaching smokers living in more disadvantaged areas<sup>23-26</sup>. Research has consistently shown that more disadvantaged smokers are less likely to quit than their more affluent neighbours<sup>26-28</sup>, but this can be offset by substantial positive discrimination in service delivery towards such groups. The impact of services in reducing rates of premature death in disadvantaged areas, and of reducing smoking-related inequalities in health, is a function of both reach and success. Very recent research in England has found that NHS stop smoking services are, overall, making a contribution to reducing inequalities, although their contribution is modest<sup>29</sup>. This suggests the need to target resources towards more disadvantaged individuals and areas.

Poorer sections of society may also receive less benefit from lifestyle change or access to services; because they are still vulnerable to other damaging exposures, and/or their health may already be compromised by other factors. For example although the incidence of breast cancer is lower among more deprived women, survival rates are worse among them (a 6% 5 year survival rate gap between top and bottom deprivation categories, see figure 7). A study in Glasgow showed that women from deprived areas are more likely to present with locally advanced or metastatic disease<sup>30 31</sup>. A follow up of this study concluded that women living in affluent areas did not receive better NHS care, and that women from deprived areas seem to have greater co-morbidity<sup>32</sup>. This suggests the need to address wider determinants of health and help seeking behaviour.

Figure 7: Incidence, mortality and cause-specific survival at 5 years by deprivation quintile, Scotland, female breast cancer patients diagnosed 1991-95



<http://info.cancerresearchuk.org/cancerstats/types/breast/survival/>

Some apparently promising interventions may not only increase inequalities in health, by benefiting the advantaged more, but may actually harm the more disadvantaged. The initial evaluation in England of Sure Start, an area based programme designed to tackle child poverty and social exclusion, found few significant differences between intervention and comparison areas, but some indication of adverse effects among the most deprived (the children of teenagers, lone parents, and workless households) <sup>33</sup>.

An Australian school based bicycle safety training programme was found to increase accident rates among boys and children of poorer families, both of whom already have higher accident rates <sup>34</sup>. A review of UK area based regeneration initiatives showed some improvements in average employment rates, educational achievements, household income and housing quality, all of which may contribute to a reduction in inequalities in health, but it also noted that there can be an increase in housing costs which renders residents poorer, and that the original residents in the regenerated areas may have left the area <sup>20</sup>. It is therefore very important to monitor the outcomes of social and public health policies, not only for their overall impact, but also for their potentially differential effects on socio-economic groups and the possibility of actual harm for some groups.

Boxes 2 and 3 give some examples of the types of interventions which current evidence suggests might be more and less likely to reduce inequalities in health; these are not exhaustive or prioritised, and those listed as less effective may be *effective in themselves*, just not the most effective *in reducing inequalities in health*.

**Box 2 Characteristics of policies more likely to be effective in reducing inequalities in health**

Structural changes in the environment: (e.g. **area wide traffic calming schemes, separation of pedestrians and vehicles, child resistant containers, installation of smoke alarms, installing affordable heating in damp cold houses**)

Legislative and regulatory controls (e.g. **drink driving legislation, lower speed limits, seat belt legislation, smoking bans in workplaces, child restraint loan schemes and legislation, house building standards, vitamin and folate supplementation of foods**)

Fiscal policies (e.g. **increase price of tobacco and alcohol products**)

Income support (e.g. **tax and benefit systems, professional welfare rights advice in health care settings**)

Reducing price barriers (e.g. **free prescriptions, school meals, fruit and milk, smoking cessation therapies, eye tests**)

Improving accessibility of services (e.g. **location and accessibility of primary health care and other core services, improving transport links, affordable healthy food**)

Prioritising disadvantaged groups (e.g. **multiply deprived families and communities, the unemployed, fuel poor, rough sleepers and the homeless**)

Offering intensive support (e.g. **systematic, tailored and intensive approaches involving face to face or group work, home visiting, good quality pre-school day care**)

Starting young (e.g. **pre and post natal support and interventions, home visiting in infancy, pre-school day care**)

**Box 3: characteristics of interventions less effective in reducing inequalities in health**

**Information** based campaigns (mass media information campaigns)

**Written** materials (pamphlets, food labelling)

Campaigns reliant on people taking **the initiative to opt in**

Campaigns/messages designed for the **whole population**

**Whole school health education approaches** (e.g. school based anti smoking and alcohol programmes)

Approaches which involve significant **price or other barriers**

Housing or regeneration programmes that **raise housing costs**

### **Possibly competing goals**

Because of the likelihood of the better off gaining more from social and public health policies, two public health goals; *improving population health* and *reducing health inequalities*, may sometimes conflict. Targeting the already advantaged may produce more aggregate health gain (e.g. reducing the overall prevalence of cigarette smoking in Scotland) at relatively less cost, whereas targeting the disadvantaged may produce less aggregate health gain (less decrease in overall prevalence) and at greater cost. Value judgments may have to be made about the relative priority to be given to creating aggregate health gain as compared to reducing inequalities.

## Appendix 1:

### Chronology of selected reports and actions on inequalities in health in the UK

**1975** Sir John Brotherton, CMO in Scotland, reviewed mounting evidence for continuing and increasing inequalities in health, despite the introduction of the NHS and Welfare State <sup>35</sup>.

**1980 Black** report on *Inequalities in Health*, making 37 recommendations, prioritizing giving children a better start in life and a wider anti-poverty strategy. Patrick Jenkin, the new Secretary of State, did not endorse the proposals <sup>36</sup>.

**1995 Metters** report '*Variations in Health: What can the Department of Health and the NHS do?*' published. Commissioned a literature review on the evidence of effectiveness of practical public health interventions, which noted a lack of evidence. Recommended that the NHS should have a plan for identifying and tackling variations and evaluating interventions, and should work to ensure equitable access to services <sup>37</sup>.

**1998 Acheson** report '*Independent Inquiry into Inequalities in Health*' published. 39 recommendations <sup>38</sup>; key priorities similar to those of Black report, namely:

- All policies likely to have an impact on health should be evaluated in terms of the impact on health inequalities
- High priority should be given to health of families with children
- Further steps should be taken to reduce income inequalities and improve living standards of poor households.

The evaluation group (which I chaired) found that the submissions to the Acheson Group contained a wealth of descriptive and explanatory material on inequalities in health, but much less evidence about the effectiveness of interventions aiming to reduce these inequalities, and virtually nothing on cost effectiveness <sup>39</sup>.

**1999** '*Towards a Healthier Scotland: a White paper on Health*' published. Overarching aim to tackle inequalities; specified 3 action levels for better health:

- life circumstances
- lifestyles
- health topics

It set targets for lifestyles and health topics but not life circumstances.

**2001** Secretary of State for Health (England) published national health inequalities targets: to narrow the gap in life expectancy between areas, and reduce the difference in infant mortality between social classes, by 10% by 2010.

**2001 Health Development Agency** (England) reviewed evidence on public health research in the UK <sup>40</sup>. Found that:

- Of published or funded public health research in UK, 4% deal with interventions rather than descriptions of the problem
- Only 10% of them (0.4%) deal with outcomes of interventions
- in specific topic areas evidence about inequalities, and tools for capturing social differences, not very robust
- very few systematic reviews have focused on effect of interventions on inequalities in health

**2002** HM Treasury and the Department of Health (England) publish '*Tackling Health Inequalities: a Cross Cutting Review*' (CCR). It identified 5 themes:

- breaking the cycle of health inequalities (by early years interventions)
- tackling the major killers
- improving access to public services and facilities
- strengthening disadvantaged communities
- supporting targeted interventions for specific groups

**2003** Department of Health (England) publishes '*Tackling Health Inequalities: A Programme for Action*'. This reported how they proposed to implement the CCR, and prioritized 4 themes:

- Supporting families, mothers and children
- Engaging communities and individuals
- Preventing illness and providing effective treatment and care
- Addressing the underlying determinants of health

**2003** Scottish Executive publishes 'Report of measuring inequalities in health Working Group'. This recommended against setting targets for the reduction of inequalities, but proposed 23 indicators by which progress could be measured.

**2003** '*Improving Health in Scotland: the Challenge*' endorsed previous commitments to tackling health inequalities as an overarching aim of the health improvement agenda. This had 4 themes:

- Early Years
- The teenage transition
- The workplace
- Community-led

**2004 Wanless Report** '*Securing Good Health for the Whole Population*' (commissioned by HM Treasury) published. Noted that:

'Although there is often evidence on the scientific justification for action and for some specific interventions, there is generally little evidence about the cost-effectiveness of public health and preventative policies or their practical implementation...and little evidence about what works among disadvantaged groups to tackle some of the key determinants of health inequalities'

**2005 Department of Health (England) '*Tackling health inequalities: Status report on the Programme for Action*'. Showed:**

- a continuing widening of inequalities as measured by infant mortality and life expectancy;
- an inconclusive picture on other indicators 'but with progress on child poverty and housing'.

**1996 onwards** increasing efforts to get better evidence on how to reduce inequalities in health, by groups including :

WHO European Office for Investment for Health and Development (Venice)  
Health Development Agency (England), now incorporated into:  
Centre for Public Health Excellence, NIHCE (England)  
Campbell/Cochrane Collaboration Health Equity Field  
Cochrane Collaboration Health Promotion and Public Health Field  
Centre for Reviews and Dissemination (England)  
NHS Health Scotland  
MRC/CSO Social and Public Health Sciences Unit, Glasgow

## References

1. Wohl AS. *Endangered Lives; Public Health in Victorian Britain*. London: J M Dent, 1983.
2. Dahlgren G, Whitehead M. *Policies and strategies to promote social equity in health*. Copenhagen: World Health Organisation, 1992.
3. Davey Smith G, Hart C, Blane D, Hole D. Adverse socioeconomic conditions in childhood and cause specific adult mortality: prospective observational study. *BMJ* 1998;316(7145):1631-1635.
4. Barker D. *The fetal and infant origins of adult disease*. London: BMJ Publications, 1992.
5. Blane D, Hart C, Davey Smith G, Gillis C, Hole D, Hawthorne V. Associations of cardiovascular disease risk factors with socioeconomic position during childhood and adulthood. *BMJ* 1996;313:1434-8.
6. Leyland AH, Dundas R, McLoone P, Boddy FA. Inequalities in mortality in Scotland 1981-2001. *MRC Social and Public Health Sciences Unit Occasional Papers no 16*. Glasgow: MRC Social and Public Health Sciences Unit, 2007.
7. Bromley C, Sprosten K, Shelton N, editors. *The Scottish Health Survey 2003. Volume 2: Adults*. Edinburgh: Scottish Executive, 2005.
8. Marmot M, Adelstein A, Robinson N, Rose G. Changing social class distribution of heart disease. *British Medical Journal* 1978;2 (6145):1109-12.
9. Cavelaars AEJM, Kunst AE, Geurts JJM, Crialesi R, Grotvedt L, Helmert U, et al. Educational differences in smoking: international comparison. *BMJ* 2000;320(7242):1102-1107.
10. Townsend J. The burden of smoking. In: Benzeval M, Judge K, Whitehead M, editors. *Tackling Inequalities in Health*. London: Kings Fund, 1995.
11. Whitehead M, Dahlgren G. Levelling up (part 1): a discussion paper on concepts and principles for tackling social inequalities in health. *Studies on social and economic determinants of population health, No. 2*. Geneva: World Health Organisation (Regional Office for Europe), 2006.
12. Schweinhart LJ, Barnes HV, Weikart DP. *Significant benefits : the High-Scope Perry preschool study through age 27*. Ypsilanti, MI: High/Scope Press, 1993.
13. Tudor Hart J. The inverse care law. *Lancet* 1971;i:405-412.
14. McLoone. Targeting deprived areas within small areas in Scotland: population study. *BMJ* 2001;323(18 August 2001):374-375.
15. Connor J, Rodgers A, Priest P. Randomised studies of income supplementation: a lost opportunity to assess health outcomes. *Journal of Epidemiology and Community Health* 1999;53:725-730.

16. Scottish Executive NHDP. National Health Demonstration Projects, Evaluation Task Group Review, Final Report. Edinburgh, 2004.
17. Thomson H, Petticrew M, Morrison D. The health effects of housing improvement: a systematic review of intervention studies. *British Medical Journal* 2001;323:187-190.
18. Kristjansson E, Robinson V, Petticrew M, MacGowan J, Farmer A, Shea B, et al. School feeding for improving the physical and psychosocial health of disadvantaged elementary school children. *Cochrane Database of Systematic Reviews Issue 1 Art No:CD004676*, 2007:DOI:10.1002/14651858.CD004676.pub2.
19. Thomas S, Fayter D, Misso K, Ogilvie D, Petticrew M, Sowden A, et al. Population tobacco control interventions and their effects on social inequalities in smoking:systematic review. in preparation.
20. Thomson H, Atkinson R, Petticrew M, Kearns A. Do urban regeneration programmes improve public health and reduce health inequalities? A synthesis of the evidence from UK policy and practice (1980-2004). *Journal of Epidemiology & Community Health* 2006;60:108-115.
21. Schou L, Wight C. Mothers' educational level, dental health behaviours and response to a dental health campaign in relation to their 5 year old children's caries experience. *Health Bulletin* 1994;52:232-239.
22. de Walle H, van der Pal K, de Jong-van den Berg L, Jeeninga W, Schouten J, de Rover C, et al. Effect of mass media campaign to reduce socioeconomic differences in women's awareness and behaviour concerning use of folic acid: cross sectional study. *British Medical Journal* 1999;319:291-292.
23. Chesterman J, Judge K, Bauld L, Ferguson J. How effective are the English smoking treatment services in reaching disadvantaged smokers? *Addiction* 2005;100(2):36-45.
24. Lowey H, Tocque K, Bellis M, Fullard B. Smoking cessation services are reducing inequalities. *Journal of Epidemiology & Community Health* 2003;57(8):579-580.
25. NEPHO. Are NHS Stop Smoking Services Reducing Health Inequalities in the North East of England (Report No. 20): North East Public Health Observatory, 2005.
26. Bauld L, Ferguson J, Lawson L, Chesterman J, Judge K. Tackling Smoking in Glasgow: Final Report: Glasgow Centre for Population Health, Glasgow, 2006.
27. Judge K, Bauld L, Chesterman J, Ferguson J. The English Smoking Treatment Service: short term outcomes. *Addiction* 2005;100(2):46-58.
28. Ferguson J, Bauld L, Chesterman J, Judge K. The English Smoking Treatment Service: one year outcomes. *Addiction* 2005;100(2):59-69.
29. Bauld L, Judge K, Platt S. Assessing the impact of smoking cessation services on reducing health inequalities in England: observational study. *Tobacco Control* in press.
30. Macleod U, Ross S, Gillis C, McConnachie A, Twelves C, Watt GCM. Socio-economic deprivation and stage of disease at presentation in women with breast cancer. *Ann Oncol* 2000;11(1):105-107.

31. Thomson CS, Hole DJ, Twelves CJ, Brewster DH, Black RJ. Prognostic factors in women with breast cancer: distribution by socioeconomic status and effect on differences in survival. *J Epidemiol Community Health* 2001;55(5):308-315.
32. Macleod U, Ross S, Twelves C, George WD, Gillis C, Watt GCM. Primary and secondary care management of women with early breast cancer from affluent and deprived areas: retrospective review of hospital and general practice records. *BMJ* 2000;320(7247):1442-1445.
33. Belsky J, Melhuish E, Barnes J, Leyland AH, Romaniuk H, National Evaluation of Sure Start Research Team. Effects of Sure Start local programmes on children and families: early findings from a quasi-experimental, cross sectional study. *British Medical Journal* 2006;332:1476-.
34. Carlin J, Taylor P, Nolan T. School based bicycle safety education and bicycle injuries in children: a case control study. *Injury Prevention* 1998;4:22-27.
35. Brotherston J. Inequality; is it inevitable? In: Carter CO, Peel J, editors. *Equalities and inequalities in health*. London: Academic Press, 1976:73-104.
36. Black D, Morris J, Smith C, Townsend P. Inequalities in health: report of a working party. London: Department of Health and Social security, 1980.
37. Department of Health. *Variations in Health; What can the Department of Health and the National Health Service do?* London: Department of Health, 1995.
38. Department of Health. *Independent Inquiry into Inequalities in Health*. London: The Stationery Office, 1998.
39. Macintyre S, Chalmers I, Horton R, Smith R. Using evidence to inform health policy: case study. *BMJ* 2001;322:222-225.
40. Milward L, Kelly M, Nutbeam D. Public Health Intervention research: the evidence. London: Health Development Agency, 2001.