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EVIDENCE FOR THE EFFECT ON INEQUALITIES IN HEALTH OF INTERVENTIONS DESIGNED TO CHANGE BEHAVIOUR

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Summary

This investigation of the evidence for the effect on inequalities in health of interventions designed to change behaviour was undertaken to examine an apparent neglect of the issue evident in the reviews prepared for the Programme Development Group on Behaviour Change. It was conducted by a combination of conventional narrative reviews of expert opinion and commentaries, combined with some literature searches used illustratively.

1. There was a consensus view in the literature that behaviour was relevant to inequalities in health, and could and should be changed. This was because of the apparently clear associations of historical patterns of behaviour and lifestyle with social class, and particularly with education (though the association with practical economic and other circumstances and with regional cultures must also be emphasized).
In general, there was widespread consensus that rigorous evidence is lacking, but that that interventions designed to change behaviour rarely alleviate inequalities in health, and in some cases may exacerbate them.

2, Examination of systematic reviews, and sample analyses of some examples, supported the view that data relevant to social inequalities is rarely discussed in them. By far the largest proportion of the papers, reports and reviews in the data-bases comes from the medical literature, though topics vary. Even selecting only the social sciences literature, only a small proportion provides analyses by socioeconomic variables
A detailed analysis of 456 papers or reports on behavioural interventions on one topic (smoking), which were identified by data-bases as referring to social variables, demonstrated that most of the findings related to associations rather than the result of controlled trials. Much of this literature is of clinically-identified patient groups, of doubtful generalisability. Many descriptive or survey-based population studies, or studies of particular demographic groups including the disadvantaged, do offer insights into behavioural change and inequalities in health, but they are unlikely to be included in systematic reviews.

3. These analyses, and a series of published reviews specifically of interventions designed to reduce inequalities in health, demonstrate why – at the level of individual interventions – there is an apparent neglect of the topic in systematic reviews. The absence of any information in meta-reviews of interventions about social variables or differential effects is, to a very limited extent, an artifact of the reviewing process. However, only a small minority of studies on the effect of interventions do include relevant information, and they are likely to be rejected for inclusion in evidence-based reviews on quality grounds. They are likely to be descriptive studies of associations, surveys, or modeling exercises, rather than true interventions. Fundamental problems include lack of theoretical clarity about the components of “inequality” or the components of behaviour change, the bias

towards medical literature in the standard data-bases, and issues of quality such as lack of baseline data or lack of control groups. Simple experimental designs of intervention are more likely to fill the criteria for inclusion in evidence-based reviews, but they are also more likely to be trivial in their scope or impact. Important interventions which actually aim to alter behaviour or change health are likely to be complex and longitudinal.

At the wider population level, interventions such as policy, regulatory or fiscal changes are even less likely to be easily included in systematic reviews. Their effects are likely to rest on apparent associations with group behavioural change or health change, and too many confounding events or trends intervene in real-life situations over the time periods necessarily involved to allow for clear evaluation of outcomes. This is particularly obvious if international comparisons are used, because of the varying nature of the legislative frameworks, cultural patterns, and organizational structures. Within nations, the complexity and dependence on local contexts of community-level interventions makes them difficult to evaluate.

4. However, despite their absence in the review or evidence-based literature, it would be quite untrue to say that the issue of alleviating inequalities in health, in part through behaviour change, is a neglected topic in policy and practice related research. There are many evaluated examples of health-promoting initiatives explicitly addressing inequalities, usually at the community level. This literature can provide some generalizations, and new approaches to evaluation need to be developed.

5. It is concluded that the evidence certainly suggests that interventions to change behaviour do not necessarily reduce inequalities in health, and sometimes exacerbate them. The absence of this evidence, largely, from systematic reviews relates to the nature of the literature and the way in which reviews are carried out.

Suggestions can be derived for research and review:

Narrative review methods, and narrative and meta-analytic approaches to reviewing observational data, need to be improved.

At the level of individual interventions, especially those deriving from within medicine, it could be recommended that socioeconomic variables should be included more routinely in evaluations.

At the wider level, there is considerable need for attention to the evaluation, analysis and review of policy initiatives, and of community programmes. New approaches should be encouraged

EVIDENCE FOR THE EFFECT ON INEQUALITIES IN HEALTH OF INTERVENTIONS DESIGNED TO CHANGE BEHAVIOUR

Included in the Scope of the Programme Development Group for the Development of Public Health Guidance in Behaviour Change was the requirement to "consider any evidence of the impact of interventions on inequalities in health". However, in the comprehensive series of reviews which were commissioned for the Group there was very little evidence about the effects on inequality of any attempts to change behaviour, and most of them commented on a lack of information about interventions from this point of view. This review was therefore undertaken to look more closely at the literature of behaviour change and inequality, and consider the reasons for this apparent neglect.

This is not addressed by a formal systematic review, but by a combination of conventional narrative reviews of the literature with some literature searches used illustratively. The question is broken down into:

1. What is the general consensus of expert academic and policy opinion about the effect of behavioural interventions on social inequalities in health?
2. What evidence can be found in the literature, at both the review level and in individual studies? Do disciplines, health-behaviour topics, and distinct bodies of literature, differ in the amount of attention paid to social inequalities?.
3. Why, if evidence seems to be lacking in reviews, is this so?
4. What evidence exists from other types of literature on policy initiatives and from research which is directed specifically at the alleviation of inequalities in health?
5. What conclusions may be drawn, and what recommendations about research?

1. WHAT IS THE CONSENSUS OF EXPERT OPINION?

Method

This section draws together academic and policy publications in this area, to provide an overview and describe the consensus of opinion. Beginning from personal knowledge of key papers in the literature, a conventional literature search was undertaken, based partly on following reference trails from frequently-cited papers. This was supplemented by entering the terms *health behaviour, intervention, health promotion/health education, inequalit(ies)/social class/socioeconomic* into the databases Medline, Scopus, ASSIA, and PsycINFO. The citation records of papers were examined, and precedence was given to

a) papers and other publications since 1996, though important earlier work was not excluded
b) papers with high citation records
c) commentaries from the UK and to some extent from Europe, though the USA and elsewhere were not excluded.

Forty-two papers were read in full. Inevitably, the 28 papers chosen for summary in the account which follows are selected, on the grounds of being the most cited, written by the most authoritative authors, and judged to be the most important and influential. These are starred in the Reference list

FINDINGS

1a Agreement that behaviour could and should be changed

There is general agreement, in the medical, policy and sociological literature, that behavioural change is relevant to inequalities in health. At least part of social class inequality is due to, or is associated with, differering lifestyle and behavioural patterns. Thus, if behaviour could be changed – whether by individual approaches or by wider social interventions – inequalities might be alleviated.

The grounds for this belief lie in:

(1) *long-term and clearly-shown patterns of "unhealthier" behaviour in the less advantaged social classes*, compared with the more advantaged, in every developed country (see national surveys and studies *passim*, such as, in the UK, the General Household Survey or the Health Survey for England). Smoking and diet, particularly, are class-related, and also leisure exercise to some extent. It must be noted that this does not include *all* health-related behaviour: excessive alcohol, the use of drugs, and risk-taking behaviours, have more complicated social distributions.

(2) *historical evidence and the phenomenon of "cultural shift"* , that is, the process by which behavioural patterns "migrate" from one section of society to another. In the case of "healthy" lifestyles, promoted by the development of knowledge, the activities of health education, the policies of governments, and sometimes by commercial interests, change is likely to take place first among the better-educated and those in a position to change most easily, with perhaps the greatest control over their own lives. As time goes on, however, these activities may become diffused throughout the social scale, and become a norm of society in general: there will necessarily be a time-lag which may have clearly identifiable effects on health. The diffusion process may be assisted by deliberate "aspirational" activity among those seeking to present themselves as culturally upwardly mobile. In sociological theory, the work of Bourdieu (1984) is currently influential in understanding these processes, with a concept of *habitus,* the ensemble of dispositions by which actions and attitudes in the everyday world

are habituated and taken for granted, typically in keeping with the norms of a group or social class. Sociological theories of post- or “late” modernism are also relevant (Giddens 1991), where the contemporary period is seen as a “runaway world”, one in which the pace of social change is not only faster than in any prior system but more profound in the way in which social practices and behaviour are affected. In the shift to a consumer-oriented society, change occurs rapidly but differentially among social groups. The discourse of health promotion is incorporated first within the lifestyles and consumption preferences of the “middle classes”, but subsequently the base is widened (Bunton and Burrows l995).

Well-known examples of cultural shift include, for instance, patterns of smoking. At one time a universal male habit, and rare behaviour among women (with even a trend towards wealthier and more “sophisticated” classes at one period), many decades of widespread health education since the establishment of the link with disease has been associated with considerable decline in smoking overall, but a greater decline among higher social classes than lower. In women, a cultural shift towards greater acceptance of the behaviour began a trend towards greater “equality” in smoking-related disease, still increasing (because of the considerable time-lags involved in the development of disease) despite a parallel greater response to health promotion among the best educated. These cultural trends have clear consequences for health statistics, which are particularly obvious in the case of smoking and lung cancer.

Other well-documented examples are in the fields of childbirth and infant care. Breast-feeding, or the early feeding of solids to infants, are health-relevant behaviours where knowledge about health effects, and “fashions” or cultural practices, have changed markedly over the last century. Always there have been notable social class differences, based not only on cultural norms and responses to health education but also on practical issues which favour more fortunate classes, and to a limited degree on pressures from commercial interests and from health services. These practices, and the health effects associated with them, will always be subject to cultural time-lags, sometimes overlapping as changes succeed each other. Similar processes can be seen for many other behaviours, based on new knowledge, seen as fashionable, or promoted as approved behaviour: examples include attitudes to “heathy ageing” and the “third age”. Analysis of the rise and fall in cultural acceptability of recreational drugs among different population groups can demonstrate that cultural shift is not necessarily positive for collective greater *health,* though it affects *equality* in health.

(3) *the clear evidence of social class variation in the uptake of public health and preventive interventions,* evidence which is of course felt as particularly salient in medical and policy circles. There is usually agreed to be some evidence that both health services in general and specific interventions may be delivered unequally to different social groups, but there has also long been concern – supported by a very large volume of research literature – that the uptake of a

number of public health interventions varies markedly by social class. White et al 2007 demonstrate that there are well-known socioeconomic variations in, for instance, failure to take advantage of preventive medicine, including immunization, dropping out of screening programmes, or the use of dental services. Compliance with wider health initiatives, such as the use of safety equipment is also socially biased towards higher social classes. The specific interest of this Programme Development Group excluded differences in medical care or service utilization, so this is not a focus here, but help-seeking behaviour may be relevant (see eg Victora et al 2003).

Since the middle of the last century, concern has been expressed (deriving principally from the USA) about a "culture of poverty", characterized by marginality, a low level of social organization, and a feeling of helplessness, which was said to explain a low level of the use of preventive health services. (for a UK review, see Rutter and Madge 1976) Preventive behaviour, it was argued, requires an orientation towards the future which may be incompatible with the fatalism characteristic of deprived lives. This formulation is out of fashion now, but the differential behaviour towards preventive health still causes concern.

(4) *the clear association of educational attainment with health-related behaviour.* Education is clearly associated with attitudes, and attitudes have some association with behaviour. The relationship between knowledge, attitudes and behaviour is too complex a topic to be dealt with here. However, research and theoretical development over the last forty years have contributed to the consensus view that social inequalities in health could and should be addressed by attitude and/or behaviour change, because:

- though attitudes do not determine, or precisely correlate with, behaviours, there is nevertheless a well-documented association between the values assigned to health, expressed attitudes, and acting in a "healthy" manner

- these attitudes and declared beliefs about the value of behaviour change are clearly associated, at a group level, with social class and with characteristics which are components of social class, notably education.

- though social class (and education) do not necessarily show clear relationships to expressed specific intentions to adopt healthy lifestyles – for instance, intentions to quit smoking or lose weight – they do show very marked associations with attitudes to health generally and preventive health in particular. The British *Health and Lifestyle Survey* (Blaxter 1990, see also Pill et al 1994)), a sample population survey with interview and clinical measures, included a particularly detailed analysis of the relationships between health concepts and attitudes, knowledge, values and beliefs, and different types of health behaviour. Health-harming behaviours showed the expected relationships, both singly and in combination, with social class and with education. Knowledge of the effects of behaviour varied by age but not by class. Attitudes to health varied markedly by class and education (but not so clearly by income), controlling for age and gender, in indices formed from the answers to questions about “doing things to keep healthy”, “wanting to do things to keep healthy”, or the causes of health and illhealth in populations.

The consideration of social inequality in health is complicated by issues relating to its definition (a topic to be considered later in connection with the literature searches), but the use of education as a surrogate is common in the USA and also more common than “class” labels in medical literature. Income is also a commonly used measure in the USA and there are many studies comparing income and education as indicators of inequality in health. In these, education is usually considered to discriminate more clearly: for instance, Huisman, 2005, showed that educational inequality had a greater association with smoking than income, among men in all the countries of Europe studied and all women in Northern Europe.

The actual reasons why heath behaviours show class differences may include many practical issues, and are not simply related to attitudes (much less to poorer knowledge or understanding), Chamberlain and O’Neill 1998, for instance, is one of very many studies which show a clear association of attitudes and behaviour with social class, but emphasise that the situational context and material circumstances play an important part in socioeconomic differences in health behaviour. Nevertheless, the association with attitudes, and with education, is so clear that it is not unreasonable for policy-makers and health educators to feel that at least part of social inequalities in health is due to attitudes which could perhaps be changed by educative initiatives.

(5) *theoretical modeling shows what the effect of differential behaviour change might be.* There are many studies, based on the findings above, which demonstrate what the health effects of altering behaviour in lower class or more poorly educated populations might be, at the levels of both individual intervention and policy change. For instance, Betmelmanns (2006) demonstrated that if the smoking difference according to educational status in the Dutch population disappeared, differences in life expectancy would theoretically be reduced from 5.1 to 3.6 years for men and 2.7 to 1.7 years for women, though in practice it was calculated that tobacco control targeted at the least educated might reduce differences by approximately 10%.

In general, because of the apparently clear association of these historical patterns of behaviour and lifestyle with social class, and particularly with education (though the associations with practical circumstances and with regional cultures must also be emphasised), there is the commonsense assumption that it might, through health education or the encouragement of lifestyle change, be possible to change behaviour, and this might alleviate social inequalities in health

1b. Agreement that there is little rigorous evidence about the differential effect of interventions directed at behaviour change, but that there is the possibility that interventions can increase inequalities

In general, it is felt that research on the achievement of a reduction of inequalities in health is lacking. The Acheson Report (1998) noted that It was disappointing that there was so little empirical evidence about the effectiveness of strategies for reducing health inequalities, and Kelly (2006), referring to the response to the Black Report, suggested that

“The question of what can be demonstrated to work to reduce inequalities on the basis of scientific evidence, as against what might work on the basis of a desire for social justice, has not really articulated in the debates” p. 46

In 2002 a Department of Health/Treasury joint report on tackling inequalities in health, which brought together Ministers and officials from across government departments together with academic experts to develop a long-term strategy to narrow the health gap, highlighted the existence of a high volume of research but relatively little intervention research identifying practical responses. An inverse relationship between the volume and quality of research, and the potential effectiveness of interventions researched, was noted (Nutbeam 2004). Most of the research was said to come from studies designed to modify individual behaviour and was often on selected groups not necessarily typical of the general population. There was relatively little on interventions in wider social, economic and environmental determinants of health. For public policy changes, such as fiscal or regulatory governmental action, experimental evidence was never likely to be available. Thus the emphasis was on “downstream” interventions focusing on individual behaviour (eg smoking) rather than “upstream” proposals concerning legislation, policy, or economic factors.

In particular, systematic reviews and well-designed evaluations have frequently been noted as more common in the evaluation of interventions from clinical medicine than in the area of policy. Notably, the report of a workshop involving senior policy advisors, mostly in the UK and in public health, (part of the ESRC project “Evidence Network”) “reinforced the view of a lack of information on the effectiveness and cost-effectiveness of policies” (Pettigrew 2004, p.812). In any case, the policy process was said by this forum to emphasize face validity as well as the evidence base , and doubts were expressed about a hierarchy of evidence in public health parallel to that of evidence-based medicine

On the issue of the effect on inequalities, it is generally agreed that there is “a tension between the goals of generating health gain and the reduction of inequalities” (Macintyre 2000). White et al (2006) suggest that

“although common sense may suggest that the aims of improving overall health and reducing inequalities between groups should be available in tandem, an intervention that improves the health of a population overall may, paradoxically, increase inequalities in health".

As Arblaster et al, 1996, noted, though here referring specifically to health service interventions:

"It should not be assumed that the general application of an effective health care intervention will reduce inequalities. If, for instance, uptake or effect differs by social group inequalities may actually widen" (p.101)

The impact of interventions or policies on health is not the same as the impact on health inequalities: some may generate an overall health benefit but can actually increase social inequalities. Macintyre (2000b) pointed out that the capacity to benefit from individualized risk management or health education may be least among the most disadvantaged people, and the costs (to them and to others) of improving their health may be greater than improving the health of relatively advantaged people. In any case, the results of interventions require rigorous monitoring: "Good intentions are not enough". There are examples of well-meaning interventions that actually did harm (Macintyre et al 2001) and it is necessary to know what the differential impact is on different population groups in a rigorous way – "how much good, at what cost, for whom". Plausibility is not a sufficient basis for policy making (an instance cited is infant sleeping positions and SIDS). With reference to inequalities, there are many examples of the known effects of public policy measures which have improved overall health but are not associated with the elimination of inequalities, or have even increased them. The fluoridation of water, for instance, is effective in improving dental health, but does not remove social inequalities altogether, since there are other determinants (James et al 1999). The differential use of screening or immunisation provides strongly held evidence, within medicine, that better take-up of services overall has the potential to increase inequalities (eg Reading et al 1994)..

The Acheson Report had introduced the idea of a concept, analogous to the Inverse Care Law, for prevention, whereby those most likely to benefit from preventive measures, those most at risk, are least likely to receive them, but had not produced evidence to substantiate this. Victora et al (2000) built on this by introducing (but only, in this paper, for low-income countries) an "Inverse Equity Hypothesis", the diffusion of innovation process by which new public health interventions lead to an initial widening of social inequalities due to preferential uptake by the most advantaged, before inequality narrows and overall health improves through a trickle-down effect.

In general, there is widespread consensus in the research and policy literature that rigorous evidence is lacking on the effect on inequality of interventions designed to change behaviour but that that they rarely alleviate inequalities in health, and in some cases exacerbate them.

2. **WHAT EVIDENCE CAN BE FOUND IN THE LITERATURE?**

This section examines examples of reviews of interventions relevant to behaviour change, and reports the results of experimental searches of the data-bases, in order to answer the questions

- Is the consensus of opinion regarding the absence of data on social inequalities in systematic reviews accurate? Is this also an accurate representation of the component reviews, and of the individual publications that are included in them: that is, are social differences in participation in response not recorded, or not reported?

- What proportion of publications relating to interventions, whether or not included in reviews, does in fact include information relevant to social inequalities? Are there differences between different disciplines and different bodies of literature?

- What evidence does exist about differential effects of interventions (using the example of one topic) and why is it not included in systematic reviews?

Method

Three sets of illustratory data-searches were undertaken:

1. First, examination of examples of well-cited systematic reviews or meta-reviews to ascertain whether differential response to behavioural interventions according to social variables is in fact reported, and examination of examples of the individual studies included in these reviews to ascertain whether differences by social variables in participation, response or effect were actually measured or reported

2 Then, search strategies used experimentally to focus on interventions and social inequalities, and ascertain whether there are systematic differences between disciplines or bodies of literature in the attention paid to social variables

3. Finally, detailed analysis of the 456 publications found, in one data-base and on one topic, to relate to “interventions” and to “social inequality”

These searches, together with the commentaries of Section I of this review, are then used to offer conclusions about why few of these publications appear in systematic reviews.

FINDINGS

2a Do systematic reviews offer evidence on inequalities. and is this a true reflection of the studies reviewed?

There is general consensus that reviews neglect the topic of health inequalities. Swann et al (2006) commented that there is

,,,"a lack of information on what works to reduce health inequalities…either because reviews simply did not explicitly (or simply did not) include the inequality dimension in their scope, operation or analysis, or because data on inequalities was not collected in the primary data,,,in the first place."

The systematic reviews produced for the Programme Development Group on Behaviour Change all, without exception, remarked on the lack of information available at the review or meta-review level on differential effects of interventions and any effect on inequality in health. The review of "*The Effectiveness of interventions, approaches and models and individual, community and population level that are aimed at changing health outcomes through changing knowledge attitudes and behaviour",* Jepson et al, 2006, typically stated:

"Population sub-group analysis…within each of the six health behaviours is largely absent in the reviews included in this report. Although socio-economic data receves a brief mention in some of the reviews, it is usually mentioned in passing…It is not clear whether the gap in this evidence is related to the lack of socio-economic data and analysis within the primary studies themselves, or whether the gap is a reflection of the lack of interest in health inequalities by those conducting systematic reviews" (p115)

This is at the level of individual interventions, with rigorously-applied standards for the quality of reviews included. At the somewhat looser level including population-level interventions, as the review on the "*Effectiveness of road safety and pro-environmental interventions",* Stead et al 2006, remarked, there were fewer relevant reviews. Thus it was found necessary to include some which were narrative reviews or low-quality analyses, and a little more data on differential effect by income or social class was reported (for instance, one review on bicycle helmet use, and another on rear-seat restraint use). In general, however, little was found at any level which was relevant to inequality, in any of the meta-reviews.

Although it was not possible to examine in detail all of the component reviews in any topic, the individual reviews included in two topics – "Prevention of tobacco use, smoking cessation and reduction " (40 reviews) from the meta-review Jepson et al 2006, and "Healthy eating and weight control in adulthood" from the meta-review Taylor et al 2006 (20 reviews) were all examined individually, at least at the level of abstracts. It was true that in this sample of reviews, no analyses by social variables were mentioned.

Is this a failure of the original studies to collect, or to analyse. data relevant to social inequalities?
The examples of three different systematic reviews, accepted as of high quality, were examined from this point of view: They were selected as representing examples of a continuum, from the most "medical" to the more policy-oriented and "social". All the original studies were examined, at least at the level of abstracts, and as many as possible in full.

(1) *Relapse prevention interventions for smoking cessation*, Hajek, 2006 (40 studies, excluding here the pharmacological studies)
There was no data relevant to social inequalities in any of these 40 studies. This was largely because 32 of them were from the United States, where socioeconomic class is not commonly used as a variable. Two were from the UK, and six from other countries. It was also because the populations studied were "volunteers", ie people attending clinics, in 24 of the studies, some obtained by advertisement or telephone canvassing, constituting socially-biased samples of unknown representativeness. Also, 18 of the studies concerned selected groups of the population – pregnant women and mothers (9), armed services (2), substance abusers (2), workplace settings (2) and health service patients (3).

(2) *Interventions for promoting physical activity*, Hillsdon et al, 2006, 17 studies. Only 17 studies out of 28236 database "hits" had met the rigorous criteria for a systematic review. No doubt these represent the "best" evidence-based data, but the studies are extremely selected. Thirteen were from the United States, 3 from the UK and one from Australia. Their study populations are special ones: 5 elderly, 4 from workplace settings, and 2 from student populations (where socio-economic variables may not be appropriate). and 8 from primary care (where socio-economic variables are not commonly kept). Eight of the US studies did collect data by ethnicity, but did not report the findings by this variable. No study reported results by class, income, or education.

(3) *Interventions for promoting booster seat use*, Ehiri et al, 2006, 5 studies. These studies came from the United States. Canada and Australia, and generalisability is affected by differing national legislative and policy environments Four of the five studies did not include socio-economic characteristics of the parents providing the booster seats. One study was specifically of vulnerable groups (minorities, low-income, attending public hospitals*.*

The examples examined support the view that data relevant to social inequalities in health is lacking in systematic reviews, and in the component studies which are selected for review in them

2b What proportion of publications on behavioural interventions (whether included in systematic reviews or not) does in fact present data relevant to social inequalities?

New exploratory searches were conducted on two topics through the database SCOPUS. These were designed to test how many studies would be identified in a standard search using the search terms relating to behavioural interventions, if a selection was made by specifiying also search terms relating to inequalities in health. The topics of smoking and diet were chosen, to represent two bodies of literature which might differ in discipline and style of research. The database SCOPUS was chosen because, as well as full inclusion of Medline, ASSIA and other standard databases, it has a better coverage of reports and the “grey” literature and enables search by disciplinary categories.

(1). Smoking (see Appendix 1)
The search terms (smoking or tobacco) and (cessation or abstinence or reduction or treatment or program) were used, confining the search to articles, reviews and reports, and to the years l989 – 2006, selecting “health sciences literature” and “social sciences literature” (which in this database both include sections of psychology) in turn. There is a very small overlap between these two. There were, of course, a very large number of “hits”, but the great majority, 89%, were ascribed to “health sciences literature”. By far the most papers or studies were categorized as deriving from the discipline of medicine or other “medical sciences”: 96% in “health sciences” and even 60% in “social sciences”. For health sciences, the next most frequent categories were psychology, and nursing; for social sciences, the next most frequent categories were psychology, social sciences, and health professions.
The most frequent journals used were, in order, for health sciences, *Preventive Medicine, Addictive Behaviours, Nicotine and Tobacco Research, Tobacco Control,* and *Amer. J. Public Health,* and for social sciences, *Addictive Behaviour, Health Education Research, J. Consulting and Clinical Psychology, Drug and Alcohol Dependence,* and *Social Science and Medicine.*

This was then repeated, adding (social class or socioeconomic or educational status or income) to the search terms, and separating “articles and reports” and “reviews”.
In “health sciences” 330 articles or reports were offered, and 56 reviews – ie. only 0.14% of the total offered without specifying the “social class” terms. In

“social sciences” there were 59 articles or reports and 11 reviews – 0.2% of the total. Medicine was still the most common discipline involved – 84% of the papers and almost all the reviews under “medical sciences”, with social science accounting for 11%, psychology for 5% and nursing for 3%. Six of the 11 reviews under “social sciences” also came from within medicine.

The major journals used, in order, were. for health sciences, *J.Epidemiology and Community Health, Social Science and Medicine, Internat. J. Epidemiology, Amer. J. Epidemiology, Preventive Medicine and Nicotine and Tobacco Research,* with the majority of reviews in *Amer.J.Public Health,* and for social sciences, *Social Science and Medicine, Public Health* and *Substance Use and Misuse.*

The number of journals in which papers appeared was notable. Even the most used journal, *Preventive Medicine,* accounted for only 2% of the papers found in the medical literature without the inclusion of the “social class” terms, and the total list of journals referred to extended to over 600. In the social science literature, *Addictive Behaviours* accounted for l4%, but was then followed by another long list. Even when the search terms for social class were added, the most popular journal in the medical literature included only 5% of the papers, though *Social Science and Medicine* included 22% of the papers in the social science literature. In both literatures, almost all the reviews were single examples in their journals. It is obvious that this literature is particularly difficult to retain awareness of simply by reading what would seem to be the most appropriate journals.

(2) Diet (see Appendix 2)
This experimental exercise was then repeated for the behavioural search term (diet or food or eating). The results were similar, except that “social sciences” accounted for a slightly higher proportion of papers. when compared with “medical sciences”. The addition of the social class terms selected a higher proportion of the studies – 8% of the total under “medical sciences” and 13% under “social sciences” – and both before and after the addition of the social class terms, medicine ceased to be the most favoured discipline under “social sciences”. The most favoured journal for papers offering social variables, for both disciplinary groups, was *J. Nutrition Education & Behaviour,* followed by *Social Science and Medicine.* and for “medical sciences” by a series of specialist nutrition and dietetic journals, and for “social sciences” by health education journals.

By far the largest proportion of the papers, reports and reviews on health-related behaviour in the data-bases comes from the medical literature, though topics will vary Even selecting for “social sciences”, only a small proportion of studies provide analyses by socioeconomic variables. In general, a very wide literature, involving very many journals, is relevant.

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2c Detailed analysis of studies, on one topic, which do include social variables

The 456 articles, reports and reviews for the example of smoking above which were returned as possibly relevant to inequalities in health were examined, mostly only at the level of abstracts, to see whether they were, or should have been, included in systematic reviews, and if not why not . This is not presented as a systematic review on the topic, but as an examination of the type of paper likely to be found on a topic within which there is known to be a large literature, if deliberate search is made for material related to inequalities. The actual studies found would, of course, depend to some extent on the search terms used.

7% were judged not to be relevant, since they mentioned smoking only very incidentally.
21% were not in fact accounts of interventions or treatments but were descriptive studies or discussions. 27% concerned patient populations, usually in clinic, hospital or primary care settings, commonly focusing on heart disease and lung disease. These studies were often small, and their more general applicability questionable.
9% described interventions in less-developed countries, not generalisable elsewhere.
28% were not interventions, but reported associations of smoking cessation with socioeconomic variables, usually by survey data. Approximately l2% reported the association of education with outcomes of programs or health promotion interventions (eg Osler, 1998, in Denmark, or Tillgren, 1996, in Sweden). Education was particularly likely to be used as a variable in the United States, which is, of course, the country with by far the most studies in all international data-bases.
Many of these descriptive studies or analyses of associations were, of course, relevant to issues of inequality in smoking-related health. For instance, in Germany, Richter et al, 2002, found socio-economic differences in the utilization of screening programmes and health promotion measures, especially for females. In the United States, Gilman et al, 2003, investigated socioeconomic status over the life course and smoking, showing that conditions accumulated among lower SES people to produce increased rates of smoking uptake and reduced rates of cessation. In Finland, Broms et al, 2004, showed that all socioeconomic indicators, including social class and education, were important predictors of smoking cessation in a twin data set. Sorensen et al, 2002, collected data as part of a cancer prevention trial in 44 worksites, and found that compared with other workers, “blue-collar” workers reported less pressure to quit, less social support for quitting, and more acceptability of smoking among their coworkers. Honjo, 2006, in a 3-year study of 481 respondents in the United States, with self-report, performed path analysis of smokers’ in relation to socioeconomic status, education, and income, testing the mediating effects of

differential use of resources supplied (booklet, pamphlet, quitline, nicotine replacement therapy, cessation programme). This author concluded:

"Our path analyses suggest that smokers from high social classes are likely to use effective resources for smoking cessation and have restrictive home environments in terms of smoking, which leads to a relatively higher cessation rate compared to those from lower social classes" (p. 317)

These studies were not, however, clearly about interventions, or if they were, were unlikely to meet the quality requirements for evidence-based evaluation.

Only 41 studies, 9%, were true intervention studies with an analysis of outcomes by social variables. Many of these were of special groups (children, the elderly, ethnic minorities, workplace settings) where any social class classification might be difficult to apply. Erfurt, 1991, for instance, tested four models to compare effectiveness at controlling smoking, among other behaviours, in four manufacturing plants in the United States, studying random samples of employees, and analysed by "social organization" within the plant but not by socioeconomic status. A few studies had specific "less advantaged" social groups as their subjects, without any comparison group (eg, "manual workers"). This was particularly likely in the United States, but there were occasional papers from elsewhere, such as Ritchie et al, 2004, from Scotland.

Because of the inclusion of the search terms "treatment" and "programme" the great majority of the studies in this group referred to individual interventions. However, a few studies referred to the results of wider "interventions" in the policy area. Examples include Townsend et al, 1994, a modeling study on the effects of price, income and health publicity on cigarette smoking by social class, sex and age in the UK, or Hill et al, 2005, in New Zealand, examining prevalence of smoking ratios by income and by education over time, in response to health promotion. Levy et al, 2005, used population surveys to examine the relationship between recent smoking cessation, sociodemographic characteristics, and tobacco control policies amond daily smokers in the United States, finding that cessation was related to higher cigarette prices and the presence of state-level media/comprehensive campaigns At the international level,Yamanaka et al, 1993, examined the relationship between government smoking control levels and eight health, social and economic indicators in 93 countries, finding an association between high GNP and strong smoking controls.

There were only eight studies which could be identified as true intervention studies, or reviews of intervention studies, with the response analysed by socioeconomic variables. These are listed below

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Fernandez 1999, (Spain, smoking cessation clinics) – quit ratio greater in higher social classes
Fernandez 2006, (Spain, smoking cessation clinics) - social class and educational differences examined in long-term smoking cessation success, independently of other predictors, with social class !V/V significantly less likely to succeed than I/II among both males and females
Helmert 1993, (Germany, 3.5 years of community intervention to reduce risk factors for CHD) – though some risk factors fell overall, the social class gradient in risk factors, including smoking, increased
Houston et al, 2005, United States, population-based cross-sectional self-report study of intervention, analysed by socioeconomic variables and by ethnicity – association between advice from providers and quitting associated with ethnicity, moderated by socioeconomic status and health, with the differences greater with lower education. Hispanics and African Americans reported lower rates of advice.
Foulds et al, 2006, (United States, tobacco dependence programme and free treatment clinics) – lower socioeconomic status predictive of poorer outcomes
Pisinger et al 2005, (Denmark, randomized population-based intervention study) – higher socioeconomic status predictive of success
Monso et al 200l, (Collaborative European anti-smoking evaluation trial, using nicotine patches, controlled rct) – a high impact of some housing-related components of socioeconomic status on smoking cessation. Other components such as education did not seem to have the same impact, perhaps because of the difficulty of applying educational categories meaningfully across countries. There was also under-representation of lower-education groups who did not volunteer to participate.
Gepkens and Gunning-Schepers, 1996, (smoking considered within a review of evaluated interventions to reduce socioeconomic inequalities and analyse the possible reasons for success) – the general conclusion was that the provision of education alone was more successful among higher social classes. To succeed for lower social classes, it has to be combined with personal support

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Most of these, and indeed some of the other studies in this group of 456, were included in the reviews covered by meta-reviews of the Cochrane library and those submitted to the Programme Development Group on behaviour change. Even if they were, they were not discussed, however, in terms of the relevance for inequalities in health

In the example of smoking, most of the findings of the literature on behavioural interventions which did refer to social characteristics of the populations studied, retrievable from the standard databases, related to associations rather than to the results of controlled trials. Much of this literature is of clinically-identified groups, of doubtful generalisability. The descriptive or survey-based population studies, or the studies of particular disadvantaged groups, do offer insights into behavioural change and inequalities in health, but they are unlikely to be included in systematic reviews.

3. WHY DO SYSTEMATIC REVIEWS CONTAIN SO LITTLE ON INEQUALITIES IN HEALTH?

This section uses these analyses, and commentaries in the literature or other published analyses, to consider why systematic reviews apparently fail to contribute to the area of inequalities in health.

3a At the level of individual interventions

It is argued in some circles that systematic reviews, and the methods of evidence-based medicine generally, are not easily applicable to public health topics. Experimental methods may define outcomes too narrowly and take too short a time-frame. They ”lead to narrowly defined responses” and risk obtaining “the right answers to the wrong questions” (Davey Smith et al, 200l). On the other hand, Macintyre (2000) has argued that it is a misconception that systematic reviews necessarily impose an inappropriately narrow and medical model on a complex social world, and observational studies demonstrate how important it is to evaluate rigorously, since effects are sometimes not obvious

Petticrew, 2003, noted, however, that it is common for reviews to go to exreme lengths to seek out the best evidence, only to conclude that “good evidence is currently lacking”: “Although this may be an accurate representation of the state of the evidence, it is not useful for guiding practice or policy, and users and funders will not see value in reviews that consistently and predictably conclude that no good evidence exists” (p. 756).

Several authors have conducted analyses to examine these positions and determine why strict evidence is not available for particular behavioural interventions. Arblaster et al.1996, for instance, considered a systematic review of the effectiveness of interventions carried out by health services, or health services in association with other agencies, aimed at reducing inequalities in health (the full review constituting CRD Report 3 of the NHS Centre for Reviews and Dissemination). While acknowledging that “it is likely that the most significant contributions to reducing health inequalities will be in improving economic and social conditions and the physical environment”, the review sought to consider the available evidence about the interventions which health services might use.

Only studies evaluating interventions using an experimental design were included: 94 studies including 21 reviews were identified. Some characteristics of successful interventions aimed at improving the health of disadvantaged groups were identified, including, for instance
- the provision of material support and resources
- the importance of the agent delivering the intervention, and their training
- the provision of prompts and reminders to attend
- the development of skills among target populations
- prior needs assessment to inform intervention design
- ensuring interventions are culturally appropriate
- the provision of support materials.

However, only a few of the evaluations reviewed were found to be of good quality and various problems about this evidence were discussed: these included the complex and longitudinal nature of many interventions, making cause and effect difficult to attribute; follow-up too short; the small sample sizes of many interventions, with control groups not always possible; failure to carry out and/or report baseline measures.

Mackenbach, 1994, described the national research programme on socioeconomic inequalities in health in the Netherlands which was started in 1989, with 40 studies initially commissioned, as well as local interventions in deprived areas. Mackenbach and Stronks, 2002, provided a systematic review of research in a subsequent five-year research programme. Twelve different quasi-experimental interventions were considered: for two there was no evaluation, three concerned the accessibility of health services, and three were workplace practice studies, leaving only four remaining to be considered as individual interventions. Of these, two (on smoking among children and toothbrushing at primary school) were shown to have an effect on the socioeconomic gap. These authors also commented on the limited outcomes for which quantified data are available, and the necessity to focus on intermediate targets. A further account of the development of this Dutch programme was provided in Stronks and Mackenbach, 2006.

Gepkind and Gunning-Schepers, 1996, specifically reviewed interventions designed to reduce socioeconomic inequalities in health and analyse the conditions for success. 298 publications and 31 grey literature reports were examined, mainly from The Netherlands. There were 98 publications which actually described interventions. They found that a high proportion of the interventions reported were the responsibility of medicine or public health, with few on the social or physical environment, because the latter lacked evaluation in terms of health effects. Even in studies from the health sector, actual health effects were rarely measured. Reports from the grey literature commonly lacked evaluation. These authors also remarked on the problem of length of follow-up. because of time-lags between intervention and possible health effects. It was also noted that “American studies are of little direct relevance”, because of health service and cultural differences.

A fourth systematic review of evaluative studies and inequalities, Oakley et al 1998, examined 215 health promotion initiatives on two topics, sexual health and workplace interventions. A high proportion lacked relevant information, with half failing to report social class and ethnicity. Three-quarters failed to include information on consent rates, and two-fifths lacked adequate data on participation or attrition. It was concluded that lack of data about the social characteristics of participants is an important shortcoming of many studies of the effectiveness of health promotion.

The evidence of the analyses of Sections 2a, b and c supports and adds to the findings of these studies. It is true that meta-reviews rarely contain any information about social variables or the differential effect or interventions. This is. to a very limited extent, an artifact of the reviewing process, since any information in the original papers is sifted out. However, only a minority of studies of the effect of interventions do include relevant information, and they are likely to be rejected as contributing to systematic reviews.

Many of the studies which data-bases do suggest as relevant to behaviour change and inequalities in health are not intervention studies but studies of associations, surveys of behaviour change, or modeling exercises. A fundamental problem in searching data-bases is that the inequality which is of concern to policy, and the outcomes measured, both have multiple components. As Kelly, 2006, pointed out, the reasons for the dearth of published papers relating to interventions to reduce inequalities include the fact that there is a lack of agreement as to what kinds of change should be explored: “what works” is undefined. Change in *health* (in the direction of reducing inequalities) is the ultimate aim, but the outcome of most interventions is intermediate stages presumed to affect health - change in behaviour, attitudes or knowledge. The relationship of these to actual health outcomes is by no means straightforward. “Inequality” involves similar issues. In the UK (and in the countries of Europe), social inequalities at the individual level usually refer. in official statistics and in academic work, to social class or socioeconomic status. Educational status is associated with this as a component part, but is not the same. Income is also a component part, but there are many difficulties about its use and it correlates less well with social class. Thus literature searches using “poverty” as a search term will produce a different literature to that produced by “social inequality”.

This apparent dearth of attention to socioeconomic status is in part because of the overwhelming preponderance of literature from the United States in the data bases. Social class is not a common descriptor used in that country, though broad categories of “white” and “blue” collar, or “working” and “middle” class may be found in social statistics. Education, as noted above, is commonly used, and ethnicity. Ethnicity can be, of course, a category of interest in the context of inequalities in health, but the social meaning of ethnicity in very specific in that country and not easily transferable. Social class is commonly used in European countries, and in Australia/New Zealand/Canada, making studies from these countries more relevant to the UK. The use of education as a variable may present problems because of the difficulty of comparison across national norms and systems.

Another fundamental cause of the apparent dearth of attention to the effect of interventions on social inequalities relates to the great preponderance in the literature covered by data-bases which is from medical sources and clinic, hospital or primary care populations. The majority of studies reported relate in fact to people under medical treatment, or with particular conditions where there is an interest in medical intervention (such as addictions, weight disorders, heart disease, smoking). There is less tradition of analysis by variables relating to socioeconomic status in medicine, and the data may very frequently not even be available. Participation rates or drop-out rates may be reported, but differential participation by socioeconomic status is rarely considered.

This differs by topic, as the comparison of smoking with diet showed, and differs by discipline. Work from the social sciences is more likely to include social variables than that from medicine (and from much psychology), as might be expected. As topics become more “social”, they are more likely to consider inequalities in health. However, the more specialized the topic, the more the likelihood that interventions will be described in “non-Medline” journals (which includes many journals in new and developing areas, and more in the social than the medical sciences), or in the “grey” literature

A further problem is the high proportion of interventions which are targeted at population groups who are difficult to characterize in socioeconomic terms, such as children, or groups where cause and effect of social and health inequality are difficult to distinguish, such as some clinic populations or the chronically ill

Some of the papers identified in the examples of analyses were rejected for the reviews provided for the Programme Development Group in Behaviour Change because of *a priori* restrictions on the topics to be addressed, that is, they referred to health service interventions, immunizations, the use of nicotine patches, and other excluded areas of work. Most of those which were apparently relevant, however, were excluded on grounds of quality.

Formal evaluation was commonly lacking, as was good baseline data. Often there were no control groups. Many studies score poorly on quality because of the use of survey and self-report data. As Kelly (2006) noted, studies may often actually exclude critical variables from consideration in the interests of the need to control out confounders, and being able to increase the certainty that relationships are real. If interventions have simple experimental designs they are more likely to fulfill the quality criteria for evidence-based reviews, but they are also more likely to be trivial in their scope or impact. Important interventions which actually aim to alter behaviour or affect health are likely to be complex and longitudinal, with the consequent difficulty in attributing cause and effect. As Victora (2004) noted, “the probability approach based specifically on rcts is often inappropriate for the scientific assessment of the performance and impact of large-scale interventions” (p. 401)

The analyses of Section 2, and a series of reviews of interventions designed to reduce inequalities in health, demonstrate why – at the level of individual interventions – there is an apparent neglect of the topic in systematic reviews. The absence of any information in meta-reviews of interventions about social variables or differential effects is, to a very limited extent, an artifact of the reviewing process. However, only a small minority of studies on the effect of interventions do include relevant information, and they are likely to be rejected for inclusion in evidence-based reviews on quality grounds. They are likely to be descriptive studies of associations, surveys, or modeling exercises, rather than true interventions. Fundamental problems include lack of theoretical clarity about the components of “inequality” or the components of behaviour change, the bias towards medical literature in the standard data-bases, and issues of quality such as lack of baseline data or lack of control groups. Simple experimental designs of intervention are more likely to fill the criteria for inclusion in evidence-based reviews, but they are also more likely to be trivial in their scope or impact. Important interventions which actually aim to alter behaviour or change health are likely to be complex and longitudinal.

3b at the level of policy and population interventions

Evaluation of interventions at the wider population level is not only less common than work at the individual level, but also even less likely to be included in systematic reviews. Macintyre et al, 2001, commented that

“..for some interventions, particularly policy changes, such as fiscal or regulatory governmental action – randomized experimental evidence is never likely to be available, though before and after comparisons of naturally occurring experiments can be used”

Thomson et al, 2004, discussed the evaluation of “social” interventions, concluding that there was little rigorous evidence of their effects, since the application of experimental designs was often impossible, and was thought to be both simplistic and unethical. Trials involving financial interventions present particular difficulties. They described the problems of an attempt to assess the health effects of income supplementation (uptake of benefits for the elderly) in one general practice in the UK, with a quasi-experimental design. It was concluded that the assessment of indirect effects of social interventions was complicated by the competing values involved, ie. in this case health and social justice. Connor et al,1999, did identify ten studies in N. America, but analyses of health data are not available.

Ogilvie, 2005, offered a case study of one systematic review of a social intervention, promoting a population shift from cars towards walking and cycling. Of the 69 studies included, only 4 were found in the “front-line” literature, and many were from the “grey” literature. It was concluded that mainstream electronic data-bases of health literature cannot be relied on when considering these wider interventions, and it seemed that “most relevant studies could have been found in – or in references from – documents indexed in a handful of key resources” A “surgical strike” to find the most relevant evidence would be more effective.

In general, studies of the effects of population policies or initiatives are likely to rest on apparent associations with group behavioural change or health change rather than on a clear evaluation of outcomes. Commonly, it is difficult to establish any change in behaviour or in health. Kloek et al 2005, for instance, used a quasi-experimental design in a longitudinal cohort in the Netherlands, with more than 40 intervention activities, but found little or no change.

Even if change occurs, too many confounding events or trends intervene in real-world situations over the time-periods necessarily involved. As Victora, 2004, noted;

“There are important restrictions to the external validity of rcts for complex public health interventions. One cannot take for granted that interventions that are proven efficacious in rcts can be generalized to other settings” .

This is particularly true internationally, because of the varying nature of the crucial contexts of legislative frameworks, cultural patterns, and organizational structures. Victora, 2004, noted several reasons why responses to public health interventions cannot be translated cross-nationally, including the differences between populations, the characteristics of health systems, and the importance of factors outside the health system.

The problems, and the potential, of the evaluation of wider social interventions can be demonstrated by examination of two important and well-documented health-related initiatives in the UK, where evaluations were attempted and reported: The New Deal for Communities programme and the Sure Start Plus programme

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New Deal for Communities (Office of the Deputy Prime Minister, 2005)

This initiative was primarily concerned with achieving absolute improvements in targeted deprived areas, and to a lesser extent reducing the gap between these areas and the rest of the population. Only health outcomes are considered here,

though effects were demonstrated in other dimensions.. Changes in health and the determinants of health were assessed, by age, sex, ethnicity and education, in the targeted areas to explore differential effects, and to judge whether any differential changes mirrored what happened in comparator non-targeted deprived areas. Examples of the health-related results reported include:
- there were overall improvements in reported physical wellbeing in the targeted areas, and 10% of the population quit smoking.
- better education was associated with higher rates of smoking cessation, and less likelihood of developing new long-term illness
- the already large differences by education for smoking and long-term illness actually widened during the two-year follow-up. Those with greater educational achievement appeared to derive greater benefit from the resources provided by the initiative.
- there was no *differential* change in self-rated health, the dietary habits measured, or physical activity
- there were generally trivial differences between the targeted areas and the comparator areas in either absolute changes, or social differentiations in changes, in health or health behaviours.

Problems of providing robust evidence of the impact of the programme were noted. There was little evidence of a New Deal for Communities effect either overall or in terms of differential impacts. Differences between the targeted and comparator areas in the relationship between socioeconomic variables and health variables had been small at base-line, with differences *within* areas more apparent. The initiative did not change this: the report comments that the residents within the areas provided with better resources may utilize services better, and the least stable sections of the population may be overwhelmed by new interventions. There were complications about the overlap of areas. Modest health gains or changes in health behaviour were recorded, but they may only have been part of wider trends. It was noted that these modest improvements were all that could be expected with the short length of follow-up.

Sure Start Plus (Wiggins et al, 2005)

This UK governmental initiative was designed to support young pregnant women and parents under 18 years, with one of its core aims “the improvement of health of young pregnant women, young parents, and their children” Some of the targets were service-provision ones, or in areas other than health, but health-related targets included, for instance, the reduction of teenage mothers’ smoking, or the increased identification and support for postnatal depression. Twenty pilot areas were targeted, all in Health Action Zones, which had previously had local Sure Start programmes established. The programme lasted 5 years to 2006. Six of the study sites were selected as a case study for the evaluation, which consisted of a service-delivery study, and impact study, policy and practice analysis, and an economic commentary. The programme was able to provide 12 clear recommendations about support to pregnant teenagers and young parents, though on health “None of the models of Sure Start Plus service delivery made much difference to meeting the specific health targets.” (p.63) . On two objectives, for instance, the reduction of smoking and the promotion of breast feeding, no differences were found.

Many difficulties of the evaluation were noted. There were differences between the individual programmes in what they prioritized, and also between the needs and characteristics of their target populations: “the variation across local programmes means that the power of comparison is diluted”. (p.87).   Monitoring data were poor, and statistics were not routinely collected on many of the issues. Questionnaire surveys showed differing emphases in the Sure Start Plus areas and in matched areas, but there was little evidence of different *practices.* The programmes received widely differering funding.

The authors noted the following intrinsic limitations of the evaluation:
- randomization of the intervention areas and the matched areas was impossible, They were different from each other in unknown ways that could not be controlled for. There were complications about the overlap of areas
- in practice, diversity of the programmes meant that like was not been compared with like
- many other welfare initiatives and social programmes that could impact on this were in place or started during the intervention
- the evaluation was not begun until too late, and relevant base-line data do not exist
- evaluation depended to some extent on the professionals involved, who were unable or unwilling to judge outcomes of services
- more fortunate sections of the community may be able to access services betterand the least stable sections of the population may be overwhelmed by new interventions.

Modest health gains or changes in health behaviour were recorded, but they may only have been part of wider trends. It was noted that these modest improvements were all that could be expected with the short length of follow-up.

At the wider population level, interventions such as policy, regulatory or fiscal changes are difficult to evaluate rigorously and thus even less likely to be included in systematic reviews. Studies of the effects of population initiatives are likely to rest on apparent associations with group behavioural change or health change. Too many confounding events or trends intervene in real-life situations over the time periods necessarily involved to allow for any clear demonstration of cause and effect. The problems are particularly obvious if international comparisons are used, because of the varying nature of the legislative frameworks, cultural patterns, and organizational structures. Within nations, the complexity of community-level interventions makes them difficult to evaluate.

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4. WHAT EVIDENCE EXISTS FROM OTHER TYPES OF LITERATURE AND FROM RESEARCH SPECIFICALLY DIRECTED AT THE ALLEVIATION OF INEQUALITIES?

The remit of this review was interventions in the general population, excluding research specifically directed at the correction of inequalities in health. Though this cannot be comprehensively reviewed here, it must be mentioned. The two illustrative programmes described above not only demonstrate why the inclusion of wider interventions in systematic reviews is difficult, but are also examples of the very large literature which does directly engage with inequalities. The volume and value of this literature, at every level from national programmes to small local ones, must not be underestimated.

It would be quite untrue to say that behavioural interventions designed to alleviate social inequalities in health, which are a part of this literature, are a neglected topic in policy- and practice-oriented public health research.

Klein, 2004, suggested that since “orthodox responses to health inequality based on improving access to health services and changing the behaviour of high risk groups” have not been successful in achieving equity in health, there is a need for targeted interventions in spatial concentrations of inequality (in addition to redistributive social policies). Accounts of targeted interventions are found in the literature of social exclusion, neighbourhood renewal, and community interventions.

There are many examples of health-promoting or health-enhancing policy initiatives in the UK, especially in schools. This is also true elsewhere: in the United States, particularly, there have been many community and population programmes designed to tackle the effects of poverty, widely evaluated. Rarely, and somewhat arbirtrarily, findings from these programmes do appear in evidence-based reviews of health behaviour change. For the most part they are

excluded, however, for a variety of reasons illustrated in the examples above. Primarily, this is because
- they are complex interventions, involving many different areas of society and not necessarily directed solely at health
- evaluation is difficult, long-term, and often neglected
- generalization from one context to another cannot be assumed
- in the real world, effects cannot be separated from temporal changes.

As Benzeval, 2006, noted, in connection with the evaluation of the Health Action Zones policy of the UK, “The complexity of the multilayered and dynamic contexts in which HAZs operated, the contested nature of the problem HAZs were trying to address and the limited understanding of their causal pathways” were among other practical reasons why clear evaluation of their results was difficult.

This literature does provide some generalizations   Arblaster et al 1996, for instance, concluded that successful interventions were those which employed a combination of initiatives and a multidisciplinay approach, addressed the identified and expressed needs of the populations targeted, and involved peers in the delivery of interventions. Mackenbach and Stronks, 2002, used their review of interventions designed to reduce inequalities to develop a strategy spanning the entire range between “upstream” measures targeting social disadvantage and “downstream” measures targeting accessibility and quality of healthcare services. Four entry points were distinguished: three related to anti-poverty policies, accessibility and quality of healthcare services, and policies to reduce the effects of health on socioeconomic disadvantage. The fourth, targeting factors mediating the effects of socioeconomic disadvantage, is more directly relevant to behavioural interventions, and included various recommendations about health promotion programmes. These are unusual examples of attempts to tackle the difficult task of reviewing the literature on cross-sector or multi-component policy initiatives:to redress inequalities.

Hill, 2004, provided an important and comprehensive document on the dilemmas of large-scale. large-budget and high-profile community interventions, which – since they are commonly applied to less advantaged communities – are very relevant to inequality in health. The changes in evaluative method seen as necessary included
- change from a broadly linear model of causality to an appreciation and understanding of the complex, holistic and relational nature of reality
- change from a hierarchical approach to research methods in which experimental methods are favoured to a greater pluralism
- change from knowledge production being seen as a professional and academic task to being seen as a collaborative and emergent activity resulting from communication and debate between different stakeholders.

A number if new evaluation approaches are described, more commonly used in the United States or Australia than in the UK. These “generally represent an attempt to find evaluation frameworks that adhere broadly to classic, scientific principles, but can accommodate the complexities inherent in community-level interventions" (p.26). They include

- models that incorporate systematic hypothesis testing, but also aspects of theory and context which previous experimental designs tended to overlook
- evaluation frameworks that incorporate a range of different approaches within a single coherent model
- models that address the complexity of concepts of health, drawing on socio-ecological models
- new outcome measures that seek to capture system-level changes
- new approaches to systematic reviews that incorporate a range of research methodologies

Much of this work remains to be developed.

Despite its absence in the literature (especially the review literature) of interventions designed to change health-related behaviour, it would be quite untrue to say that the alleviation of inequalities in health, in part through behaviour change, is a neglected topic in policy and practice related research. There are many examples of health-promoting initiatives, usually at the community level. This can provide some generalizations for policy, though evaluation presents many problems, and new approaches to evaluation need to be developed.

5. CONCLUSIONS AND IMPLICATIONS FOR RESEARCH

There is certainly a body of evidence which suggests that interventions to change behaviour do not necessarily reduce inequalities in health, and sometimes exacerbate them. The absence of this evidence, largely, from systematic reviews relates to the nature of the literature and the way in which reviews are conventionally carried out. As Pettigrew, 2003, noted,

"There is a growing recognition that the methods developed for the field of evidence-based health care cannot automatically be transferred across to the more complex task of synthesizing evidence for wider public policy. New methods and approaches need to be developed"

Cochrane reviews, as Heller and Page, 2002, pointed out, are largely still restricted to systematic reviews rather than developing new methods. However, it has been endorsed by the Cochrane and Campbell Collaborations that investigation of the effects of interventions by socioeconomic status should be routine (Tugwell et al 2006).

At the level of individual interventions, with the great preponderance of studies conducted within medicine which has been demonstrated, a strong recommendation might be made that the inclusion of socioenonomic variables in every study should be encouraged. Their exclusion conceals any differential participation in interventions and distorts their results. Intervention studies must provide proper details of their study populations, and interpret their results in the light of social contexts A need for the more routine collection of social variables in clinical and preventive practice is implied., and this includes ethnicity as well as social class and education (Aspinall 1999).

At the wider level, there is a considerable need for attention to the evaluation, analysis and review of policy intitiatives and local programmes. New approaches should be encouraged, such as the “equity effectiveness loop” of Tugwell 2006, Rychetnick et al’s (2004) “evidence agenda map” to assist in identifying health promotion goals against the required and available evidence, or Abbema’s (2004) suggestions for constructing individual effect evaluation within community programmes. Initiatives such as Public Health Observatories to improve the collection of and access to relevant data should be supported. Particular work is needed on how to approach applicability and transferability of population and community initiatives, given the importance of culture, systems, and context in behaviour change (Wang 2006) Protocols should be refined for the conduct and reporting of plausibility, as distinct from experimental, designs, and methods developed for interpreting across studies. More organized systems to facilitate access to studies outside the conventional more medically-oriented data-bases would be helpful.

Much of this relates to the fact that health-related behaviour is part of a web of social life, and cannot be separated from it. The recommendation of the Acheson report that all policies, from whatever area, likely to have an impact on health should be evaluated in terms of their impact on health inequalities was widely welcomed, but has not in fact been thoroughly followed through.

The evidence certainly suggests that interventions to change behaviour do not necessarily reduce inequalities in health, and may sometimes exacerbate them. The absence of this evidence, largely, from systematic reviews relates to the nature of the literature and the way in which reviews are carried out.

At the level of individual interventions, it could be recommended that socioeconomic variables should be encouraged in more evaluations, especially those deriving from within medicine.

At the wider level, there is considerable need for attention to the evaluation, analysis and review of policy initiatives and community programmes. New approaches should be encouraged.

APPENDIX 1

Exploratory literature searches on smoking interventions and inequality

Database: SCOPUS, including articles, reviews, reports
Search terms: (smoking or tobacco) and (cessation or abstinence or reduction or treatment or program)
Years 1989 – 2006
Confining first to “health sciences literature” and then to “social sciences literature” (a small overlap between the two)

Number of items

health sciences literature	27821	social sciences literature	3353

Major disciplines involved, in order

medicine (26600)	medicine (2000)
medical sciences	psychology
psychology	social sciences
nursing	health professions
social sciences	nursing

Major journals used, in order

Preventive Medicine 544	Addictive Behaviour 492
Addictive Behaviour 496	Health Education Research 126
Nicotine and Tobacco Research 407	J. Consulting & Clin. Psych. 122
Tobacco Control 364	Health Psychology 114
Amer. J Public Health 319	Drug & Alc. Dependence 110
(Followed by a list of over 600 other journals)	(Followed by a list of over 200 other journals)

Adding (social class or socioeconomic) to search terms: selecting “health sciences literature”

Number of items

Articles and reports	291	Reviews	46

Major disciplines involved, in order

medicine (256)	medicine (43)
social sciences	social science
medical sciences	nursing
psychology	
economics	

Major journals used, in order

J. Epidemiolgy & Comm. Hlth. 16	Amer. J. Public Health 3
Internat. J. Epidemiology 13	Health Technology Assess. 2
Social Science and Medicine 11	Substance Use & Misuse 2
Amer. J. Epidemiology 10	(otherwise single journals)
(long list of journals with <10)	

selecting “social sciences literature”

Number of items

Articles and reports	(49)	Reviews (13)

major disciplines involved, in order

social sciences (35)	medicine (6)
medicine	social sciences
psychology	psychology

major journals used, in order

Social Science & Medicine 11	Substance Use & Misuse 2
Public Health 6	(otherwise single journals)
J. School Health 4	

APPENDIX 2

Exploratory literature searches on diet interventions and social inequality

Database: SCOPUS, including articles, reviews, reports
Search terms: (diet or food or eating) and (program or treatment or health promotion)
Years 1989 – 2006
Confining first to “health sciences literature” and then to “social sciences literature” (a small overlap between the two).

Number of items

health sciences literature	11844	social sciences literature	1560

major disciplines involved, in order

medicine	social science
biological sciences	medicine
nursing	psychology

major journals used, in order

J. Amer.Dietetic Assn.	J. Nutrition Ed. & Behaviour
J. Nutrition	Social Science and Medicine
Preventive Medicine	Food & Nutrition Bull.
Amer. J. Clinical Nutrition	Health Education Research
European J. Clinical Nutrition	Int. J. Eating Disorders

Adding (social class or educational status or socioeconomic) to search terms:

number of items

health sciences literature	912	social sciences literature	206

major disciplines involved, in order

medicine (778)	social sciences (172)
social sciences	medicine
biological sciences	psychology-

major journals used, in order

J. Nutrition Edn. & Behavior	J. Nutrition Edn. & Behavior
Social Science and Medicine	Social Science and Medicine
J. Amer. Dietetic Assn.	Health Education Research
European J. Clinical Nutrition	Health Promotion International
Health Education Reseach	Public Health

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