Health targets in the NHS: lessons learned from experience with breast feeding targets in Scotland

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Goal and target setting is a basic precondition to effective management and the basis for accountability for both the use of health services and for achieving health care outcomes[1]

Target setting has long been seen within business as an essential part of formulating any strategy. Targets should be related to actions known to be effective, be achievable but challenging, and be able to be monitored through indicators (see box).[2] Targets can highlight key aspects of policy and act as a stimulus to increase commitment to policy implementation. Careless target setting, however, based on inadequate data or unrealistic short term objectives, can be counterproductive in that the resulting targets may discourage action and place unnecessary stress on those expected to achieve them.[3-5]

The publication of the consultative documents *The Health of the Nation* in 1991 and *Scotland's Health: A Challenge To Us All* in 1992 heralded a new government approach to health planning, central to which was a need to identify clear objectives and specific targets for improving health.[6 7] These targets were to be identified in each of the key areas of greatest health concern and where the greatest opportunity for real improvements in health could be realised. Their main aim is to stimulate and direct coordinated action.[6]

Although it was envisaged that the results of target setting would be assessed, no published reports have looked at the results of target setting for health in the UK. A number of key questions posed in the *BMJ* five years ago are still unanswered:

Do targets inspire, motivate and encourage coordination and common purpose among health workers and organisations?

Can they engage other sectors at local and national level?

Will they mobilise support from ordinary people and communities? [8]

In this article we take the opportunity provided by the recent adoption of breast feeding targets by all Scottish health boards to look at one example of target setting in the NHS in Scotland.

Health targets: desirable features

- Should provide an overall goal and sense of purpose
- Should be related to actions known to be effective
- Should be achievable over a specified time
- Should be realistic but challenging
- Should be measurable and be able to be monitored
- Should be agreed by those who have a part to play in their achievement
- Should be expressed in terms of health improvements or reductions in risk factors in the population

Summary points

- Given the centrality of targets to government health strategy, the process of target setting has received very little attention
- Our review of experience with breast feeding targets in Scotland found little evidence of targets stimulating coordinated intersectoral action
- Inadequate attention was given to the process of target setting
- Targets were generally established with little or no public consultation
- Experience with target setting should be reviewed to identify problems and to highlight and share good practice
- Health commissioning staff need opportunities to share their experiences and training to develop their skills in formulating targets

Breast feeding targets

In 1993 the national review of food and nutrition in Scotland recommended the adoption of targets for breast feeding,[9] and in November 1994 the Secretary of State for Scotland announced a national target: more than 50% of women to be still breast feeding their babies at six weeks of life by the year 2005 (an annual increase of 1.3% in the percentage of mothers breast feeding every year from 1990). The Management Executive of the NHS in Scotland reinforced this by asking all health board general managers to advise them of proposals for local breast feeding targets and milestones in line with local circumstances by January 1995.[10]

The case for setting breast feeding targets in Scotland is well founded: breast feeding rates are the second lowest in Europe and among the lowest in the world.[11] There is good evidence that raising these rates would improve health in children by preventing diarrhoeal episodes[12-14] and reducing the numbers of cases of lower respiratory infection,[14 15] necrotising

Table 1 Sources of advice and bodies consulted by health boards in formulating targets and specific activities undertaken to achieve targets

	No of health boards
Sources of advice used in formulating target	
Scottish Needs Assessment review[11]	12
Management Executive letter[10]	9
Scottish diet review[9]	5
Other sources (including local data and literature reviews)	8
Consultation	
Multidisciplinary joint breast feeding initiatives	11
Primary care teams	6
Voluntary agencies	5
Public	1
Local health councils	0
Promotional activities	
Baby friendly hospital projects[34]	5
Breast feeding workshops for staff	3
Establishment of hospital based support groups	2
No new activity	7

enterocolitis,[16] and other serious neonatal infections.[17] In addition, there have been more recent reports of biologically plausible links between breast feeding and improved intellectual development in young children.[18 19]

Breast feeding rates are measurable, and national systems either exist or could be readily put in place to monitor them. Effective action to support women who choose to breast feed has been identified. Several studies have shown that support for breast feeding mothers in UK maternity hospitals is inadequate,[20-23] and trials have shown that improving hospital practices can increase the rate of breast feeding.[24-29] Recent experience from several countries, including Norway, Denmark, Australia, and Canada, has shown that coordinated interagency action can substantially increase in breast feeding rates over one or two decades.[30-32]

Experience in setting breast feeding targets in Scotland

To review experience with setting breast feeding targets in Scotland, we sent, on behalf of the Scottish joint breast feeding initiative, a short questionnaire to the directors of public health of 14 Scottish health boards in July-October 1995. Details of breast feeding targets were requested together with information on how these were set, how they were to be monitored, what consultation underpinned the target formulation, and how the targets related to activities designed to achieve them.

Results

A completed questionnaire was received from directors of public health or their representatives in all 14 health boards. Table 1 shows the sources of advice used by the health boards in formulating their targets and the groups involved in consultation about the targets, and table 2 shows the breast feeding data they used.

All health boards established breast feeding targets within six months of receiving the Management Executive letter on breast feeding targets. Before then only five health boards had had breast feeding targets. Nine health boards adopted the national target proposed by the Management Executive, with four of these adopting supplementary additional targets. Of the remaining five health boards, three adjusted the national target either up or down to make it more realistic and achievable for their area, and two expressed the target as annual milestones—that is, percentage increases each year from a baseline level.

Seven health boards reported that the process of target formulation was not linked to any new strategies or activities to promote breast feeding (table 1). Even among the boards that did take action, such as those adopting baby friendly hospital projects,[34] none reported more broadly based breast feeding promotion strategies or strategies involving partners outside the NHS. Despite this, 11 health boards considered that the establishment of breast feeding targets would be effective in raising rates of breast feeding in their area and that the target set was achievable.

Health boards' plans for monitoring breast feeding rates are shown in table 2.[35 36] Four health boards had adopted strategies which would not provide the data necessary to monitor their stated local target.

No link between targets and action

These results show that experience with breast feeding targets in Scotland is not encouraging. The establishment of targets did not lead to the development of new activities designed to achieve these targets in seven health boards. In the seven health boards which did record new activities, these were all restricted to NHS action. In an area where healthy alliances with other agencies and organisations is essential, the dominant focus on NHS activities is disappointing. Although consultation with health professionals was achieved through local multidisciplinary "joint breast feeding initiatives," only one health board reported that it had consulted the public and none reported consulting its local health council. Equally, it is disappointing that the national call to health boards to formulate breast feeding targets was not accompanied by new government action in support of breast feeding.

Central input to target setting

The uncritical adoption of the national target reported by the NHS in Scotland in the Management Executive letter to all health boards[10] resulted, in three cases, in

Table 2 Sources of data on breast feeding and their use by health boards in the setting and monitoring of targets

		No of health boards consulting this source in:	
Data source	**Time of data collection**	**Target setting**	**Target monitoring**
Scottish Morbidity Record (routine NHS data on all maternity hospital discharges)	Hospital discharge	8	2
Breast feeding data from Scottish neonatal screening laboratory (collected at time of Guthrie test)[35]	1-2 weeks	0	1
Health visitor records	1-2 weeks	1	3
OPCS infant feeding survey (5 yearly)[36]	At birth, 1-2 weeks, 6 weeks, 4 months, 9 months	0	1
Data on breast feeding from child health surveillance programme (held by 9 boards)	1-2 weeks, 6 weeks, 9 months	1	3
Data from national breast feeding survey 1992-4	At birth, hospital discharge, 6 weeks, 4 months	9	0
Local ad hoc surveys		3	6

NATIONAL CHILDBIRTH TRUST 1996/CHRISTINE ROCHE

Various groups produce material to promote breast feeding. This one comes from the National Childbirth Trust (drawn by Christine Roche)

local targets that were not appropriate. In one case the adopted target was too low as it was below the baseline rate, and in the other two cases it appeared to be too high since the health boards concerned acknowledged in the questionnaire that the target would "probably or definitely not be achieved." Such targets are likely to be counterproductive and not to result in an increased commitment to promoting breast feeding.

The rate of annual increase in breast feeding rates required for health boards to reach their targets ranges from 0% to 2.3% with a median of 1.5%. Four boards preferred a system in which they would make a proportional contribution to the national target whatever their starting point. This approach, however, would result in considerable variations between areas in the absolute change each was required to achieve and would perpetuate existing variations.[5] Ten health boards favoured a system of local autonomy in target setting with decisions made on the basis of planned actions and agreed in corporate contracts with the NHS in Scotland.

Clear national direction is important, as is assuring that national information systems exist to underpin monitoring of target indicators. Five of the health boards did not report viable monitoring systems and another six mentioned the requirement for local surveys that consumed both time and resources.

Furthermore, targets were expressed variously as rates at birth, hospital discharge, six weeks, and four months after birth. This unnecessary variation will not facilitate national monitoring. Targets need to be expressed in a standard manner, and efficient national systems should be in place for both monitoring and reporting progress. Such systems would avoid unnecessary local time and resources being spent in establishing local data collection systems. This is one example of the need to define and distinguish national and local actions and responsibilities in target setting.

Local input to target setting

Relevant local factors which should be considered in target setting include baseline rates and trends in breast feeding; local interventions being carried out and their likely effectiveness; and an assessment of the extent to which the target depends on factors not amenable to control within the NHS. Clearly health boards should attempt to broaden the base of consultation. In particular, target setting should be seen as an opportunity to involve other statutory agencies in "healthy alliances," offering them partnerships in expressing local targets and encouraging ownership of and commitment to these targets. Examples of this could include collaboration with local education departments in presenting education about breast feeding and infant nutrition in schools as part of "preparation for parenthood" or "preconceptual health" programmes; collaboration with social work departments and local employers in improving the adequacy of facilities for breast feeding in businesses, shops, and public facilities; and collaboration with local authorities to fund and support voluntary groups to support women who choose to breast feed.

Methods of including the public in consultation exercises also need to be further developed. Increased partnership with local health councils and voluntary organisations may be one way to achieve this. Supportive community action to promote breast feeding would probably contribute significantly to achieving breast feeding targets.

Further discussion is required on how targets set by health commissioners within health boards should be transmitted to provider trusts. Opinions on this varied widely: one respondent noted that specifying milestones would be less antagonistic than targets, while another recommended that targets must have financial penalties to be effective. The results of this survey suggest that it may be worth while to provide an opportunity to share experience in how local targets are communicated to provider trusts so that they lead to motivation and joint action rather than confrontation and conflict.

Need to review experience with local target setting

Many of the problems identified with breast feeding targets in this survey are due to inadequate attention being given to the process of target setting. Several possible reasons exist for this. Targets may have been set in response to the national call for a target but without adequate local priority being given to breast feeding promotion. Alternatively, the short period for response to the Management Executive letter and the existence of many competing demands on health boards may have resulted in inadequate staff resources being available for the target setting exercise. Finally, health board commissioning staff may not have had the opportunity to develop skills in target formulation.[8]

Given the centrality of targets to government health strategy, it is remarkable that more attention has not been given to this issue. The Audit Commission has recently highlighted areas in which progress towards targets has been poor and emphasised the importance of having targets which are achievable yet challenging to encourage and direct action.[33] If we are to understand the role of target setting in improving NHS performance then reviewing experience in setting targets is important.

Two main aims of targets were to direct and coordinate NHS action and to promote intersectoral collaboration. If we are to achieve these aims we need to document current practice, identify both good and bad practices, and train staff. We need to identify more precisely what actions are most appropriately carried out at a national or local level and assess what contribution targets can make in mobilising support for health action from other statutory agencies and non-NHS partners and from local communities.

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Integration of hepatitis B vaccination into national immunisation programmes

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Summary

Hepatitis B is a major public health problem even though safe and effective vaccines have been available for over 10 years. Because hepatitis B infection is largely asymptomatic with long term complications occurring after many years it has not received the attention it deserves. Strategies to immunise those at high risk have failed to control the disease. Delegates to the World Health Assembly of the World Health Organisation recommended in May 1992 that all countries should integrate hepatitis B vaccination into their national immunisation programmes by 1997. Some western European countries remain unconvinced that the burden of disease warrants the expense of universal vaccination. However, epidemiological data and economic evaluation show that universal hepatitis B vaccination is cost effective in countries with low endemicity and that it will control hepatitis B, reinforcing the necessity for action.

Size of the problem

More than one third of the world's population are estimated to have been infected with hepatitis B virus. Most have recovered, but there are around 350 million chronic carriers of the hepatitis B virus, about 5% of the world's population.[1] About a quarter of these carriers will develop serious liver disease, including chronic hepatitis, cirrhosis, and primary hepatocellular carcinoma. The World Health Organisation estimates that hepatitis B infection results in more than one million deaths every year worldwide.[1-3]

Based on the prevalence of carriers of hepatitis B surface antigen in the general population, countries

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are classified as having high (≥8%), intermediate (2-7%), or low endemicity (<2%). In Europe the level of endemicity generally increases from north to south and from west to east, but factors such as changes in family size, high risk lifestyles, and population migration from areas of high to low endemicity are also affecting the distribution of the virus.

In most European countries notification of acute hepatitis B cases is mandatory. However, wide differences exist between case definitions and in the completeness and methods of reporting, making it difficult to draw meaningful conclusions from comparisons between countries. In addition, the number of cases notified each year is far below the true overall incidence of infection.

After correcting for underreporting and for the fact that at least half of hepatitis B virus infections are asymptomatic, the Regional Office for Europe of the WHO estimates that a million people are infected in Europe every year. Of these, about 90 000 will become chronically infected carriers and about 22 000 will die from cirrhosis and liver cancer.[4] Unexpectedly high prevalences of hepatitis B carriage have been found in many parts of central and eastern Europe and the newly independent states of the former Soviet Union. In the Central Asian republics of the former Soviet Union and in some countries of central and eastern Europe (such as Albania, Bulgaria, Moldova, Romania), hepatitis B is a serious threat to community health, with an estimated annual incidence of 520 infections/100 000. These countries have intermediate or high endemicity.[4] The remaining countries of central and eastern Europe have an estimated annual incidence of 130 infections/100 000. Although the need for universal hepatitis B vaccination is unquestioned in areas of intermediate and high endemicity, so far, only Albania, Bulgaria, Moldova, Poland, Romania, and Slovenia have been able to implement vaccination programmes. Most of the countries of the former Soviet Union lack the financial resources to obtain these vaccines, and donors, in general, have been unwilling financially to support integration of hepatitis B vaccines into national immunisation programmes.

Although western Europe, north America, and Australia have a low endemicity of hepatitis B virus, the incidence of new infections and the burden of acute and chronic disease place hepatitis B among the most important communicable diseases. For instance, in the United States mortality from hepatitis B was five times that from *Haemophilus influenzae* type B and 10 times that from measles before routine vaccination of children was introduced (unpublished data, Centers for Disease Control, 1993).

Hepatitis B vaccine being manufactured using DNA recombinant technology

High risk strategies

Although safe and effective hepatitis B vaccines have been available for over 10 years, universal vaccination is still being postponed in many countries. One reason is the weakness of our social commitment to preventive medicine and vaccines.[5] Important also is the lack of medical and public awareness: the public does not perceive hepatitis B as a threat to the population at large, and governments, expected to respond to public demand, have not considered hepatitis B prevention as a priority and have opted for selective prevention strategies. Although the incidence of hepatitis B infection has decreased in many countries as a consequence of behavioural changes secondary to the AIDS epidemic, experience has shown that targeting hepatitis B vaccine at high risk groups and screening pregnant women do not work. Such strategies, which have been used in countries with low endemicity since 1982, have failed to control hepatitis B for various reasons[1 6]: most high risk groups are difficult to access, there is a lack of perceived risk among those at risk, and over 30% of those with acute hepatitis B infection do not have identifiable risk factors. In some countries with low endemicity universal antenatal screening for hepatitis B is not well implemented, and even when used selective antenatal screening failed to identify about half of the pregnant women whose neonates were at risk.[7 8]

Except in a few countries the high risk strategy has resulted mainly in the immunisation of healthcare workers and some categories of patients—for example, those receiving haemodialysis, transplants, and multiple blood transfusions or with hepatitis C infection. About 85% of vaccine has gone to the healthcare workers, who account for only 5 to 10% of reported cases of hepatitis B infection in most European countries and North America.[1] While healthcare workers should certainly be immunised, this high risk strategy will not control hepatitis B on a population basis.

Need for universal immunisation

The failure of the high risk immunisation strategy and a better knowledge of the burden of disease have emphasised the necessity for action to control the risk of acquiring hepatitis B in the community. In 1991 the global advisory group of the Expanded Programme on Immunisation recommended integration of hepatitis B vaccine into all national immunisation programmes. The deadline for countries with a prevalence of carriers of 8% or more was 1995 and for other countries was 1997.[2 3] This recommendation was endorsed in May 1992 by the World Health Assembly, the governing body of the WHO. In 1994, the World Health Assembly added a disease reduction target, calling for a 80% decrease in the incidence of new hepatitis B virus carriers in children by 2001.

By early 1996 more than 80 countries included hepatitis B vaccine as a routine part of their infant or adolescent immunisation programmes. These coun-

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Transmission electron micrograph of hepatitis B virus

tries represent roughly 40% of the world's 145 million newborns annually but almost 60% of the world's 350 million carriers. Of these 80 countries, 53 report hepatitis B vaccine coverage to the WHO: 40% of these countries report 80% or greater coverage with three doses of hepatitis B vaccine in infants. Many countries using adolescent immunisation have not yet established effective immunisation monitoring programmes.

Among countries with low endemicity the United States, New Zealand, Canada, France, Germany, Italy, Luxemburg, Portugal, and Spain have implemented universal vaccination programmes. The Australian National Health and Medical Research Council has recently recommended infant and adolescent immunisation. Belgium, Greece, the Netherlands, Switzerland, Turkey, and other European countries are seriously studying the issues or are making budgetary provisions for introduction of the vaccination programme.

Safety and effectiveness

Data from clinical trials as well as from universal immunisation programmes show that hepatitis B vaccines are well tolerated. Several hundred million doses of hepatitis B vaccine have been given worldwide, and no serious complications have been causally linked to vaccination.[9 10] Effectiveness of the hepatitis B vaccines has been shown in several community trials. The carrier rate has been reduced from over 8% to under 2% in immunised cohorts of children in Gambia, China, Singapore, Hong Kong, Taiwan, Alaska, Thailand, Indonesia, South Korea, and American Samoa. Since the introduction of routine hepatitis B vaccination in the Alaska native population in 1983, the incidence of acute hepatitis B has fallen by over 98%, and no new carriers have been detected among those vaccinated.[11] Similarly, 10 years after implementation of a mass vaccination programme in Taiwan the annual incidence of hepatocellular carcinoma in children (10-14 years) has fallen.[12]

In western Europe universal immunisation programmes in Spain and Italy have proved highly successful. In Italy, population surveys conducted in 1994-5 show a vaccine coverage rate of over 90% both in children and adolescents; notification data show a 50% reduction of acute hepatitis B in subjects aged 15-24 years in 1994 compared with 1988.[13 14]

Economic evaluation

Some decision makers in northern Europe are not convinced that the burden of disease of hepatitis B justifies the expense of universal vaccination. However, cost effectiveness studies performed in countries with low endemicity (Belgium, Canada, United Kingdom, United States) consistently find that universal vaccination is economically attractive.[15-18] Health policy makers should look carefully at these studies. Cost effectiveness ratios varied from $1000 to $20 000 (£625-12 500) per discounted life year gained depending on the country's epidemiological and organisational characteristics and assumptions made about cost of vaccine and coverage. In general, these calculations compare favourably with prevention and vaccination strategies for other diseases that are already implemented and well accepted. Benefits of immunisation were increased if the indirect costs of loss of productivity among those affected were taken into account.[15-8] These economic evaluations indicate that economic arguments cannot be used to delay the implementation of universal hepatitis B vaccination in countries with low endemicity.

Conclusion

Emerging data on the long term effectiveness of hepatitis B vaccines, knowledge that infants and adolescents can be reached through already established vaccination delivery systems, and studies showing that these interventions are cost effective, indicate that hepatitis B virus can be controlled and eliminated by universal immunisation. The choice of whether to immunise infants or adolescents depends on each country's epidemiology and organisation of the vaccine delivery systems.

In future, combination vaccines containing hepatitis B will be used. Such vaccines will mean fewer injections; save on syringes, storage, transportation, record keeping, and training; and improve acceptance, integration into existing vaccination programmes, and harmonisation of vaccination schedules. However, countries should not wait for the arrival of combined vaccines before implementing universal immunisation. In Europe much work remains to be done to implement interventions that will bring us closer to the WHO goal and to control hepatitis B in the community. Only a united effort by all those involved in preventive health care can ensure effective implementation of these important preventive measures.

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Commentary: Antenatal screening and targeting should be sufficient in some countries

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Van Damme and colleagues criticise some European countries for failing to integrate hepatitis B vaccine into national immunisation policies as recommended by WHO. But does their analysis really apply to countries which, like Britain, have hepatitis B virus carrier rates as low as 0.3%[1] and report yearly incidences of acute infection of about 1/100 000?[2] And is the inclusion of three doses of vaccine in infant schedules, or an attempt to deliver three doses to all adolescents, the most cost effective preventive approach for these countries? We doubt it and suggest that at present it would be preferable to concentrate on reinforcing existing strategies.

The most important step is to stop maternal transmissions of hepatitis B virus, with their high risk of long term carriage developing in the newborn. Thus, in Britain the Departments of Health advise that "antenatal clinics should ... consider offering [HBsAg] screening to all antenatal patients" and that neonates born to positive mothers should be fully immunised. Even if, as Van Damme *et al* suggest, there was a universal immunisation programme for infants, those born to women infected with hepatitis B would still have to be identified and immediately given hepatitis B immunoglobulin or vaccine, or both, at birth, with at least two further doses of vaccine. This intervention has been shown to prevent 90% of maternal transmissions and universal infant immunisation would merely be a supplement, not an alternative, to it.

Unfortunately only a minority of pregnant women in Britain are currently screened for hepatitis B surface antigen despite government advice. Moreover, the proportion of infants thereby identified who complete the three dose vaccine schedule is disappointingly low. Infants to whom the Public Health Laboratory Service Communicable Disease Surveillance Centre issues hepatitis B virus immunoglobulin are all followed up, and reminders are sent to the paediatrician or general practitioner to ensure that the second and third doses of vaccine are given. Nevertheless, of 2514 infants followed up between 1987 and 1995, only 1633 (65%) received all three doses. Failure by the hospital to inform the general practitioner that second and third doses are required, poor understanding of the need for immunisation by parents (many of whom are immigrants with English language difficulties), and lack of an identified individual with local responsibility for the programme seem to be contributing factors. In Connecticut, United States, by contrast, completion of the three dose course has increased from 48% to 91% since dedicated nurses were appointed to implement the neonatal programme, and a computerised tracking system has been used to identify impending births to carrier mothers and the need for follow up doses of vaccine.[4]

Full implementation of the rest of the existing British immunisation strategy would, by protecting more of those at identifiable risk, prevent many of the remaining virus transmissions. It should be actively promoted in clinics and in the primary care of groups at risk and by counselling known carriers and immunising their contacts. Those known to have antibody to hepatitis C virus who lack markers for hepatitis B virus should also be immunised.[5] Admittedly, it is not easy to deliver full courses of vaccine,[6] but there has been partial success. The falling incidence of reported acute hepatitis B infections in England, Wales, and Scotland over the past 10 years[2 7] can be attributed to the vaccination policy as well as to changes in sexual behaviour and intravenous drug abuse.

Global strategy is inappropriate

Countries with a low incidence or prevalence of hepatitis B should therefore not be bound by a global strategy that, for them, is inappropriate. Two recent studies in Britain have examined the likely cost effectiveness of universal immunisation, though both suffer from a lack of accurate information about the age specific incidence of infection and the proportion of overt to cryptic infection. These uncertainties have led to substantially different cost benefit calculations. Mangtani *et al* suggested that supplementing the existing selective strategy by universal infant or adolescent immunisation would improve cost effectiveness,[8] but Fenn and colleagues remain sceptical.[9] The assumptions that only 10% of carriers in the Britain arise through perinatal transmission[8] and that the laboratory confirmed acute hepatitis B cases reported to the Communicable Disease Surveillance Centre represent only 10% of all infections[9] certainly need to be supported by fuller seroepidemiological studies.

Results from adolescents born in England and Wales before neonatal immunisation against hepatitis B virus was generally available showed a surface antigen carriage rate of 0.15%, consistent with what would be expected from perinatal acquisition.[10] A universal infant immunisation programme would therefore add little to the reduction in carriage rates in children achieved by a selective programme for high risk infants. A more definitive cost benefit analysis of universal immunisation, at least in England and Wales, must, however, await the results of the seroepidemiological study in adults. When this analysis is done it should take account of the difficulties of delivering a full course of the three dose vaccine, the likely long term protective efficacy of the course, and its possible impact on the continued acceptability of the whole immunisation programme.[11]

Right or wrong, Van Damme *et al*'s criticisms do draw attention to the proposition that it is time not merely to immunise against hepatitis B virus but to seek to eliminate it. In Britain we envisage a phased approach towards this goal: firstly, detect and protect all babies born to infected mothers and redouble efforts to immunise fully those who have identifiable risk of exposure; then, if new surveillance data indicate a clear need for it or when a more attractive vaccine formulation becomes available, immunise adolescents or possibly infants. For example, a strategy for adolescents would be much easier to implement if a single dose vaccine were available, and its cost effectiveness might be substantially improved by use of a combined hepatitis A and B vaccine.

Our current reservations about universal immunisation should certainly not be taken to imply that prevention of hepatitis B is not a priority and that the halfhearted implementation of the preventive strategy already in place is therefore acceptable. With determination and a properly funded implementation strategy both acute hepatitis B infection and new carrier states could be virtually eliminated in Britain within the next decade.

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Socioeconomic determinants of health

Health and social cohesion: why care about income inequality?

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Summary

Throughout the world, wealth and income are becoming more concentrated. Growing evidence suggests that the distribution of income—in addition to the absolute standard of living enjoyed by the poor—is a key determinant of population health. A large gap between rich people and poor people leads to higher mortality through the breakdown of social cohesion. The recent surge in income inequality in many countries has been accompanied by a marked increase in the residential concentration of poverty and affluence. Residential segregation diminishes the opportunities for social cohesion. Income inequality has spillover effects on society at large, including increased rates of crime and violence, impeded productivity and economic growth, and the impaired functioning of representative democracy. The extent of inequality in society is often a consequence of explicit policies and public choice. Reducing income inequality offers the prospect of greater social cohesiveness and better population health.

Income inequality and mortality

The world's wealth is becoming more concentrated. According to the 1996 United Nations *Human Development Report*, the world's 358 richest individuals control economic assets equivalent to the combined annual incomes of the poor countries that are home to 45% of the world's population.[1] In the past 20 years, many countries including the United States and Britain have experienced soaring rates of income inequality. Do these trends matter for the health of populations?

No one would dispute that poverty is bad for health. In general, the lower the material standard of living (as measured by indicators like income) the worse is the level of health, whether measured by mortality, morbid-

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ity, or quality of life. In the United States, which is supposedly the richest country in the world, poverty still accounts for nearly 6% of all adult mortality.[2]

Aside from the evidence on absolute deprivation, there is growing evidence that the relative distribution of income in a society matters in its own right for population health. This thesis, which has become most closely identified with the work of Richard Wilkinson,[3 4] has been replicated in nearly a dozen studies internationally.[4] Although some questions have been raised about the international evidence linking income inequality to mortality,[5] three recent studies reported in this journal—two from the United States[6 7] and one from Britain[8]—have suggested that income inequality predicts excess mortality within individual countries. In the American study by Kennedy *et al*, income inequality at the state level was strongly correlated with total mortality rates ($r=0.54$, $P<0.05$), even after median income, poverty rates, smoking prevalence, and race were taken into account.[6] Income inequality was measured in that study by the Robin Hood index, which is the proportion of aggregate income that needs to be redistributed from the rich to the poor so as to achieve equality of incomes. A 1% rise in the Robin Hood Index was associated with an excess mortality of 21.7 deaths per 100 000 (95% confidence interval 6.6 to 36.7), suggesting that even a modest reduction in inequality could have an important impact on population health. The maldistribution of income was related not only to total mortality but also to infant mortality, homicides, and deaths from cardiovascular disease and neoplasms.

Social cohesion and income inequality

The repeated corroboration of the hypothesis that income inequality is harmful to health has spurred the search for the mechanisms underlying this relation. Some hypothesised pathways include psychologically harmful effects of relative deprivation and the lack of investment in human capital that is frequently evident in societies that tolerate large income differentials.[9] It is also possible that some other exogenous factor, such as racial discrimination in the United States, accounts for both income inequality and excess mortality. Much work remains to be carried out in sorting through these possibilities.


BRUCE STEPHENS/IMPACT

Fig 1 Socially isolated people die at two or three times the rate of people with a network of social relationships and sources of emotional and instrumental support

One notion that has existed for some time is that a widening of the gap between the rich and poor might result in damage to the social fabric. In a seminal essay on the dysfunctions of social stratification published in 1953, Melvin Tumin speculated that "to the extent that inequalities in social rewards cannot be made fully acceptable to the less privileged in a society, social stratification systems function to encourage hostility, suspicion and distrust among the various segments of society and thus to limit the possibilities of extensive social integration."[10] In his latest book, Wilkinson provides case studies of societies that at certain points in history underwent either a rapid compression of the income distribution (Britain during the two world wars) or a rapid widening of income differentials (the Italian-American community of Roseto in Pennsylvania during the 1960s).[4] In wartime Britain, narrowing of income differentials was accompanied by a greater sense of solidarity and social cohesion as well as dramatic improvements in life expectancy. In contrast, in the originally closeknit town of Roseto, rapid economic change in the 1960s opened the gap between rich people and poor people. The resulting breakdown of community cohesion was followed by a sharp increase in deaths from coronary disease.[11]

Enhanced wellbeing

That social cohesion enhances wellbeing is by now a well established fact. Ever since Durkheim's study of the causes of suicide,[12] numerous epidemiological studies have shown that people who are socially integrated live longer.[13-15] Socially isolated people die at two to three times the rate of well connected people, presumably reflecting the former's limited access to sources of emotional support, instrumental support (for example, financial aid), and other forms of support. But what has been missing from recent epidemiological studies of social relationships and health is the social context in which people lead their lives. In other words, by focusing on the outcomes of socially isolated (or well connected) individuals, epidemiology has neglected the possibility that entire communities or societies might be lacking in social connections.

"Social capital"

Fortunately, there has been a renaissance in the notion of community cohesiveness, with the publication in 1993 of a work by an American political scientist, Robert Putnam. In *Making Democracy Work* he sought to measure the strength of social cohesion—what he termed "social capital"—within regions of Italy.[16] The purpose of his 20 year study was to attempt to explain the performance of local governments, which were introduced to Italy in 1970. Local government performance in each region of Italy was assessed by its responsiveness to constituents and its efficiency in conducting the public's business. According to Putnam, the stock of social capital in a region—for example, as measured by the density of citizens' participation in community organisations (choral societies, soccer leagues, Rotary clubs, and the like) turned out to be the best predictor of local government performance. Citizens living in regions characterised by high levels of social capital were more likely to trust their fellow citizens and to value solidarity, equality, and mutual tolerance. They were also blessed with highly functioning governments.

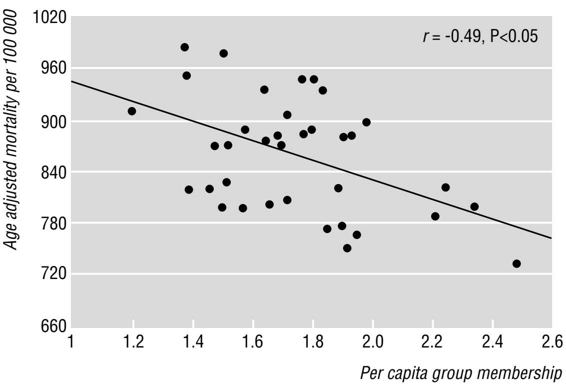

Fig 2 Relation of per capita group membership in United States to age adjusted total mortality

What can public health learn from this quasi-experiment in Italy? Although much work is needed in refining the notion of social capital, Kawachi *et al* recently carried out an analysis of income inequality in the United States and its relation to social capital, as defined by two of the indicators described by Putnam: levels of civic trust and density of associational membership. Data on social capital were obtained in 39 states from a survey conducted by the National Opinions Research Center between 1986 and 1990.[17] The survey asked respondents in each state whether "Most people can be trusted—or would most people try to take advantage of you if they got the chance?" The percentage of citizens who thought that people try to take advantage (suggesting low levels of civic trust) was highly correlated with the degree of income inequality in each state ($r = 0.7$, $P < 0.0001$). Similarly, density of associational life, as gauged by the per capita membership of groups (church groups, sports groups, fraternal organizations, labour unions, and so on), was correlated with income inequality ($r = -0.4$, $P < 0.01$). In turn, both the degree of civic distrust and paucity of associational life were strongly correlated with overall mortality (fig 2). The effect of income inequality on mortality thus seemed to be mediated through the withering of social capital.

The intervening effects of residential segregation

Concepts like income inequality and social capital are inherently "ecological"—that is, they are characteristics of places, not individuals. To understand the linkages between such variables, further research needs to focus on where people live rather than on the behaviours of individuals.[18] Several researchers have attempted to separate out individual and area effects on mortality: is the health of people with any given level of individual socioeconomic characteristic better or worse according to whether they live in a rich or poor area?[19-22] The assumption underlying such studies is that poor neighbourhoods are worse physical environments and lack amenities such as public transportation, access to primary care, banking facilities, and retail choice in healthy foods. Few of these studies have dealt with the impact of inequality itself. Indeed, not all studies have shown that poor people have worse health if they live in a poor area rather than in a rich one.[20] This lack of unanimity may be the result of the sense of relative deprivation running counter to the effects of the wider environment: a poor person living in an affluent area may have a better environment but may also feel relatively poorer.

Medical demographers have an established tradition in studying the quantifiable characteristics of neighbourhoods. One such line of research—on the health effects of residential segregation—offers a promising approach by which to link the effects of income inequality on social disintegration.[23] Accompanying the surge in income inequality in the United States since the mid-1970s, the spatial concentration of poverty has increased sharply. Between 1970 and 1990, the percentage of urban poor Americans living in non-poor neighbourhoods (defined as having poverty rates below 20%) declined from 45% to 31%, while the percentage living in poor neighbourhoods (poverty rates between 20% and 40%) increased from 38% to 41%. Meanwhile, the proportion living in very poor neighbourhoods (over 40% poverty) grew from 17% to 28%.[24] Such patterns of residential concentration impose a double burden on poor people: not only do they have to grapple with the multiple problems arising from their own lack of income, they also have to deal with the social effects of living in a neighbourhood where most of their neighbours are also poor.[25] Sociologist William Julius Wilson coined the term "concentration effects" to describe the cumulative disadvantages that are heaped on the residents of urban ghettos.[25] Wilson and Wacquant found that residents in extremely poor neighbourhoods were also less likely to report the presence of regular sources of social support, including a marital partner and close friends (fig 3).[26]

The trends in the spatial concentration of poor people fail to address what has happened at the opposite end of the income spectrum. According to Massey and Denton, affluence in the United States is even more highly concentrated spatially than poverty.[24] In 1970, the typical affluent American family—defined as having an income level at least four times the poverty rate—lived in a neighbourhood that was 39% affluent; by 1990, this had increased to 52%. In other words, the typical affluent person lived in a neighbourhood where more than half the residents were also rich. In contrast to people living in poverty stricken neighbourhoods,

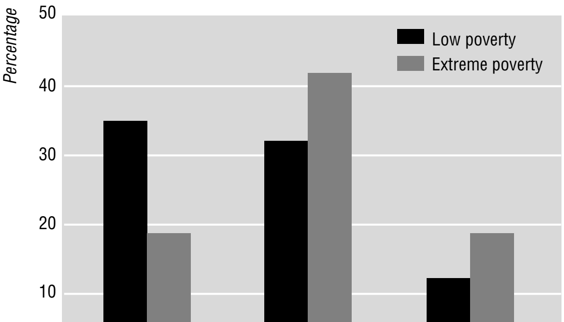

Fig 3 Social capital among black residents of Chicago neighbourhoods with low poverty (20-30%) and extreme (over 40%) poverty.[26] Reprinted by permission of Sage Publications

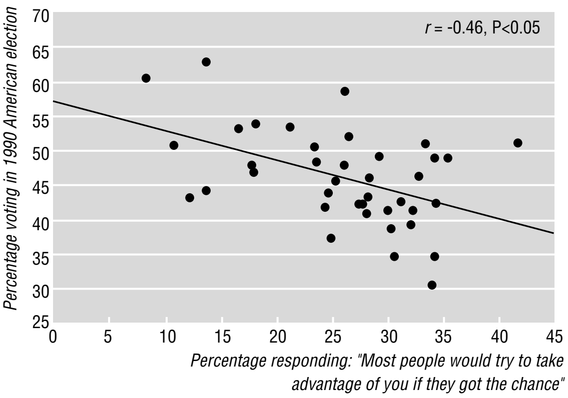

Fig 4 Relation of social distrust in United States to voter turnout in November 1990 elections

residents of affluent neighbourhoods benefit from better equipped public schools, higher quality public amenities, and more generous municipal services—all financed through higher property tax revenues. At the same time, the children of the privileged are more likely to socialise with other children of well educated and successful parents, thereby ensuring the social reproduction of material and cultural advantage.[25] Without question, the privileged classes actively invest in their own social capital when they retreat to affluent residential enclaves. But the segregated nature of the resulting forms of social capital will tend to undermine social cohesion within society at large.

The social consequences of income inequality

Why should society really care about the extent of income inequality? Firstly, because income inequality induces "spillover" effects on quality of life, even for people not normally affected by material wants. Wide income disparities result in frustration, stress, and family disruption, which then increase the rates of crime, violence, and homicide.[4] Those who can afford to will be increasingly forced to flee to walled compounds equipped with round the clock security systems, as has already happened in some American communities. Middle class flight from poor neighbourhoods results in the progressive deterioration of the public education system and the erosion of support for public schools. As Kaplan and others have shown, wide income disparities tend to coexist with underinvestment in human capital, measured in a variety of ways including high school drop out rates, reduced public spending on education, and lower literacy rates.[7] The rise of an "underclass" of poorly educated and underskilled citizens means that society will ultimately pay the cost through low productivity and slow economic growth. Finally, as Putnam has suggested, the breakdown of social cohesion brought about by income inequality threatens the functioning of democracy. Low levels of civic trust spill over into lack of trust and confidence in government.[16] To give an example from the United States, there is a strong correlation between lack of civic trust and low voter turnout at elections (fig 4). It is already known that the votes of the poor are underrepresented at election time. Political representation is further distorted by inequalities in political campaign donations across different income groups. In the United States it is estimated that the richest 3% of the voting population accounts for 35% of all private campaign donations during presidential elections.[27]

To a large extent it is a matter of public choice as to how much inequality a society should tolerate. The danger is that a society that becomes depleted of its stocks of social capital could enter into a vicious cycle—one in which lack of trust and civic engagement reinforces a kind of democracy in which public policy is no longer the outcome of collective deliberation about the public interest, but rather the residue of campaign strategy.[28] The alternative is to put a halt to the growth in income inequality, which offers the hope of revitalising social capital at the same time as improving the health of the whole population.

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