

THE EFFECTIVENESS OF PREVENTIVE MEDICINE IN PRIMARY CARE: STRATEGIC CONSIDERATIONS*

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Health checks are in vogue and popular with the public, which is one reason why the Government introduced them to primary care via the GP contract. They may be profitable for the health care industry, particularly if targeted at healthy people who do not need them. However, health checks have had a bad press.¹ It was not that the OXCHECK study² and the British Family Heart Study³ failed to reduce risks in populations by using this approach. Both studies achieved small reductions in risk. The drawback was that these reductions were achieved by personalised advice from nurses, which are impractical within the already overcrowded daily routines of primary care.

These reversals of the health check bandwagon have added to the underlying unease which general practitioners have about health promotion in primary care.^{4,5,6} For many it is a new form of work, which they perceive as dull, tedious and boring. It detracts from the more familiar territory of responding to patients' needs and problems as they present through the surgery door. It requires information systems which are unfamiliar. For others, health checks represent an unwarranted moral intrusion into the personal lives of patients, particularly in areas of socio-economic deprivation, where patients may have different problems and priorities to the prudent and moderate lifestyles of the middle classes.

The majority of general practitioners were conscripted to health promotion by the new NHS contract. When it was introduced in 1990, no new money was provided for the additional activities which GPs were expected to undertake. Instead, the contract was re-structured so that monies, formerly used for training and seniority allowances, had to be re-earned in return for carrying out health promotion.

Accordingly, GPs are being paid to collect information about cardiovascular risk factors in their patients. Some of the information, such as smoking habit and blood pressure, is uncontroversial, but other items such as height and a family history of various diseases do not have a strong scientific basis.

Although the contract provides a payment for clinics to provide continuing care for patients with diabetes and asthma, no support has been provided for the follow up of patients with hypertension, despite evidence of continuing failure to provide in practice the benefits of anti-hypertensive treatment as demonstrated in controlled clinical trials.⁷

Whatever their views on these developments, GPs ignored them at financial cost to themselves. As the targets were more difficult to achieve in areas of socio-economic deprivation, GPs working in such areas were awarded deprivation payments, not to finance a different way of delivering the package, but to compensate for anticipated loss of income.

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Against this background, I wish to review the effectiveness of preventive medicine in primary care, concentrating on cardiorespiratory health problems in middle age. My guide is the late Professor Geoffrey Rose, whose book⁸ *Strategies of Preventive Medicine* is already a classic. Rose is best known for his propounding of population strategies of prevention, whereby small changes achieved in the majority are more effective than large changes achieved in a few. He is less well known for the breadth of his use of this argument. He identifies numerous problems in society, which are merely the tips of icebergs, whose roots and main mass are to be found within society as a whole. Rose comments that if the tip of the iceberg is seen separately from its base, it is not possible either to understand or to deal adequately with the problem.

Few of us have difficulty in accepting this argument when it is demonstrated using population data on uncontroversial variables such as blood pressure. But if we are to address major public health problems in Scotland, the argument comes closer to home.

INEQUALITIES IN HEALTH

Coronary mortality rates for both men and women are about 40 per cent higher in Glasgow than in Edinburgh. Russell Ecob and I have shown that this difference is part of a broader pattern of higher mortality rates from most major causes of death in Glasgow, which has been established in successive cohorts of citizens by at least the age of 25.⁹ Health promotion policies which focus on coronary heart disease hardly being to address this broader picture.

The Health of the Nation targets for countries in the UK are reasonable, aiming to reduce the incidence of major health problems, such as heart disease and cancer, but they do not address the social and economic reasons for poor health. By focussing on specific diseases, health policy does not address the fundamental question of why poor people die earlier from all major categories of death. It is the age of death, not cause of death which counts.

Lifestyles (diet and smoking) are important but access to different levels of resources is the principle explanation of inequalities in health. Resources include not only money in your pocket, but the quality of your environment (a warm, dry, affordable home), social support (including family, friends and local services) and hope and prospects for the future.

It is simplistic to view the comparison of Glasgow and Edinburgh as part of the traditional rivalry between Scotland's two largest cities, or to seek individual stereotypes to 'represent' the contrasting health profiles. It is not that there are no rich people in Glasgow or poor people in Edinburgh. Both cities have similar social ranges, but the balance of affluence and poverty is markedly different. Comparison of Glasgow and Edinburgh provides a window on a problem which pervades Scottish Society but which is hidden from view by the convention of reporting mortality data for large opaque aggregates such as health board areas or local government districts.¹⁰ When Carstairs and Morris first reported social gradients in mortality by categories of postcode sector, ranked in terms of census-based measures of socio-economic status, they helped to reveal the fine grading which links mortality and social position throughout Scotland.¹¹ Inequality in health is not a minor issue confined to peripheral housing schemes in big cities, but a major feature of contemporary Scotland and a massive public health problem. Comparing the top and bottom deprivation categories, life expectancy

varies by 7–8 years, one tenth of the biblical span of three score years and ten. Larger differences exist between defined sections of the population.

What needs to be done?

The first step needed to reduce differences in life expectancy in Scotland is a government health target¹⁰ and a health monitoring indicator, equivalent to the Dow Jones of FTSE indices on the financial markets. If differences in life expectancy are not being narrowed, health policies are not working.

The second step is to adopt policies which recognise the relationship between economic policy and health. Analysing follow up mortality data for 300,000 participants in the MRFIT study, George Davey Smith and colleagues showed a continuous association of decreasing mortality risk with increments of income across the entire range of incomes.¹² There are similar differences in mortality rates between middle and high, as between middle and low income groups.

Rose's population principle now poses a simple solution. When risk is distributed throughout society, only a population strategy is adequate to deal with it. Just as the control of high blood pressure requires a population strategy affecting blood pressure levels in everyone, so a strategy to prevent the worst health effects of poverty must affect the income of everyone, albeit by a small amount.

Of course, observational data are insufficient to prove cause and effect, and formal experiments of the relationship between income and health are never going to be carried out. However, two recent 'natural experiments' provide support for a causal relationship.

First, Wilkinson has shown that the largest recent increases in life expectancy within the European Union occurred in societies that moved towards more equitable distributions of income.¹³ Second, there are the health and social consequences of recent economic policy in the UK.

During the 1980s, economic policies resulted in better off people being even better off, and poorer people standing still.¹⁴ 'To those that hath shall be given.' During the same period, the difference in mortality rates between rich and poor has widened, not because mortality rates among the poor are getting worse (with the exception of some rates in young men, they are improving), but because the better off are living longer.¹⁵

This divisive policy has had several effects. At the poorer end of society, a substantial minority is being excluded from the general prosperity which most enjoy. Dying before your time is the ultimate exclusion from society, but there are many less dramatic ways in which disadvantage and exclusion affect health, principally by putting people under stress, from difficulties in everyday living and from the lack of hope and prospects. In young men, we see rising suicide rates, increased levels of crime, drug misuse and violence. In young mothers, we see mental stress and anxiety which, in turn, may affect the development of their children. While widening of inequalities in adults, and increasing suicide rates in young men are current issues, the long-term worry is the health of children, who in increasing numbers are being brought up below the official poverty line.¹⁴

Answers to these problems cannot be found in areas of socio-economic deprivation, because they require the consideration of society as a whole, including taxpayers and supporters of particular policies, everyone agreeing that these problems are worth addressing. The key question for politicians and policy makers, perhaps the most important one for the 1990s, is whether those sections

of society which gained economically during the 1980s are prepared to forego additional gains, or even sustain a degree of personal financial loss, in order to address the problem of inequalities in health.

One probably cannot look to altruism, or to public concern about differences in life expectancy. Premature death gives rise to personal grief, not public outrage. There are at least two arguments which might catch public attention.

The first argument concerns the negative consequences of economic policies which favour some social groups more than others. There may come a time when self interest is seen to be self-defeating, when the advantages of living in a cohesive society outweigh those of living in a free market. People may come to value investments in public services such as health and education more than further increases in disposable income. They may want to be shareholders in their communities, rather than in private companies. They may remember a time (only 10 years ago) when we did not have people begging on the streets. They may look to the United States, where there are much wider inequalities, and not like what they see—one half of society frightened by the other. Personal safety did not use to be a major concern of citizens of the UK, but it is now.

The second argument concerns the positive value of policies to provide economic opportunities more fairly. It is wasteful to have large numbers of children born and brought up to fail in the educational and economic system. The Canadians say a dollar spent pre-school earns 7 dollars for the economy later on. We need economic policies which invest in human capital. If we share the resources of our country more fairly, we shall have a more cohesive society, and also reduce inequalities in health.

What can doctors do?

When the natural history of a condition has been described, the challenge is to change it. Thus, a very important question for public health policy is whether the historical underpinning of current day inequalities in health can be reversed. We have no difficulty in imagining how health might get worse, as a result of epidemics such as tuberculosis or cigarette smoking, but it is less clear how health might get better. Although specific medical interventions may save lives, it is only when such measures affect very large numbers of people that summary statistics such as life expectancy can be changed.¹⁶

In this respect, current research interest in the origins in early life of ill health in middle age is a distraction.¹⁷ What matters is whether anything can be done for the large numbers of people in their 40s, 50s and 60s who will be keeping the health service busy for the next thirty years.

The overall problem can only be addressed by population measures, especially those which widen economic opportunity. A more equitable distribution of income might help, in the same way that redistribution of food during the war probably helped to improve mortality temporarily.¹⁸ Health care interventions can only have a small effect, but what effect might they have?

Two anecdotes illustrate possible answers to this question. The Hypertension Detection and Follow-up Program in the United States had the uncommon effect of reducing all cause mortality rates and making trial participants live longer.^{19,20} Intriguingly, a reduction in non-cardiovascular deaths contributed about one third of the favourable effect. How could a hypertension trial achieve such an effect? The answer may lie in the design of the trial, for in the US in the 1970s, it was

considered unethical to randomise hypertensive patients to placebo treatment. Thus, trial entrants were randomised either to stepped care, consisting of comprehensive health care, free at the time of use, or referred care, consisting of referral back to the usual medical care under the US system. Thus poor Americans had access for the first time to a proper health service and, presumably, a variety of conditions were diagnosed and treated more promptly with favourable effects on mortality.

In this country, the well known general practitioner, Julian Tudor Hart, reviewed 25 years' of anticipatory care in his Welsh mining village practice, in which by the time of his retirement, he had accrued a comprehensive case-load of patients with cardiovascular and other risks requiring assessment, control and follow up. Despite similar levels of socio-economic deprivation, mortality rates in his village were about 40 per cent lower than in the neighbouring village, where active case-finding had begun much later.²¹

Neither of these examples is sufficient to prove the case, but they complement observations on control groups in intervention trials, which suggest that a structured approach, delivering care comprehensively and consistently to a population at risk may have favourable effects on survival.

In an evaluation of health checks, it was found that the social groups who might have benefited most were least likely to attend²²—an example of Hart's inverse care law.²³ For this reason, promotion of cardiovascular health in primary care is probably best carried out within routine consultations, when people attend for other reasons. This was the basis on which Hart carried out most of his preventive work over a period of 25 years. The implication is that consultation times need to be long enough to allow the inclusion, where appropriate, of preventive activities alongside other activities such as the management of acute and chronic conditions, and exploring patient's understanding of their problems and of the solutions which have been suggested.²⁴ Buchan and Richardson 30 years ago proposed 10 minutes for the patient;²⁵ we have yet to achieve this target.²⁶

The challenge of delivering high quality, structured care to defined populations is particularly difficult in areas of socio-economic deprivation, where consultation rates are higher,²⁷ and the 'agenda' within consultations is characterised by the severity, complexity and number of health and social problems within individual families. Deprivation payments may help to keep general practitioners working in these areas, but we also need a proper review of what primary care can and should achieve. Whatever the outcome of such a review, it seems likely that a problem whose basic cause involves a lack of resources will require a solution which involves the injection of resources, for example by allowing doctors and their professional colleagues more time with patients, without loss of income or other disincentives.

Such thoughts concerning the structure and the resources of primary care in deprived areas do not address my final topic, namely the content of preventive medicine in primary care.

What should general practitioners prevent?

First, it is necessary to review preventive activities according to three levels of prevention. Primary prevention is concerned to prevent the development of disease. Secondary prevention is concerned to reverse risks to health by larger-

scale strategies. Tertiary prevention aims to prevent complications in people with established disease.

These activities differ not only in the size of the target groups, but also in the work required to prevent health problems. The work may also be categorised according to single procedures such as immunisation, an example of primary prevention which is easily incorporated in practice, or control of risk factors, which may require continuous follow up over many years.

Metanalyses have shown that anti-platelet therapy lowers the incidence of non-fatal myocardial infarction by 30 per cent in all categories of patients studied.²⁸ However, because of the different levels of absolute risk, the amount of work required to prevent one event varies substantially between groups of patients. In order to prevent one cardiovascular event in patients with established cardiovascular disease, 100 patients would have to be treated for one year. In order to prevent one event in patients at high risk, on grounds of raised levels of blood pressure or cholesterol or cigarette smoking, 1000 patients would have to be treated for one year.

It follows that the best return for invested time and effort in preventive work occurs in tertiary prevention, which is concerned with the prevention of complications in people with established disease. In a typical general practice of 10,000 people in Newcastle, Charlton and colleagues estimated that there are approximately 175 patients with angina, 347 survivors of myocardial infarction, 165 people with diabetes, 4 new cases per annum of transient ischaemic attacks and 20 new survivors of stroke.²⁹

In addition, there are a substantial number of patients at high risk, including 1145 people with hypertension, 2183 people with moderate obesity, 2689 smokers and 1285 people with a hazardous level of alcohol consumption. How should general practitioners allocate their time between and within these groups?

Again, it is increasingly recognised that treatment decisions should be based not on absolute levels of risk factor, but on absolute levels of risk of a clinical event. For example, it has been recommended that the threshold for treating high blood pressure should be an associated risk of sustaining a cardiovascular event of 20 per cent over a ten year period.³⁰ In terms of the clinical trials, this would mean treating 150 patients for one year to prevent one cardiovascular event.

The joint guidelines of the European Society of Cardiology, the European Atherosclerosis Society and the European Society of Hypertension recommend a similar approach and have produced a chart which indicates levels of absolute risk in groups of men categorised by age, blood pressure, cholesterol and smoking.³¹

While providing a useful illustration, this chart has limited utility in the central belt of Scotland, given that the data are based on the Framingham Study, and are now substantially out of date. Even the Dundee risk disk may have limited relevance in Scotland, given that the scoring system is based on prospective data from the WHO Collaborative Study, and was validated against the Whitehall study of civil servants.³² These epidemiological data do not allow for the increased level of risk within Scotland for a given level of risk factor. They also exclude the strongest clinical predictor of premature death in the West of Scotland.

The MIDSPAN studies set up by Victor Hawthorne in the early 1970s are unique among UK prospective cohort studies of cardiovascular risk, in that they were set in an area with high levels of socio-economic deprivation and high

coronary mortality rates. They also included women, and a cohort of people working in industries in the West of Scotland.³³ Accordingly, it is possible to compare data from the general population study in Paisley and Renfrew, with data from a working population in the same area and data from the Whitehall study of civil servants. As expected the data show that the large differences in mortality between Whitehall and Paisley/Renfrew are partly accounted for by a healthy worker effect, but much of the difference remains unexplained.

It has long been known that rates of incidence of lung cancer in the West of Scotland are higher for a given level of cigarette consumption than in other prospective cohort studies.³⁴ In a recent comparison of data from the Whitehall and Paisley/Renfrew studies, Carole Hart has shown that these differences are largely attenuated or disappear when controlled for social class.³⁵ Thus, the large difference in lung cancer incidence is explained not by local factors particular to the West of Scotland, but by factors common to both studies which are more prevalent in the West of Scotland. Accordingly, the Paisley/Renfrew findings are relevant to other parts of the UK and, in particular, to the industrial conurbations of Northern England.

Davey Smith has gone on to show that the large differences in coronary mortality rates between Paisley/Renfrew and Whitehall are largely explained by associated differences in social class, smoking and reduced FEV1.³⁶ For mortality from all causes, reduced FEV1, comparing observed values for those expected according to age and height, has a risk which is second only to smoking, and greater than either raised blood pressure or cholesterol.³⁷

It is not known to what extent respiratory impairment is a historical or topical explanation of raised mortality rates in the West of Scotland, although clearly, following the Clean Air Act, there has been a substantial improvement in air quality. It is interesting to note, however, that in a recent cohort of 15 year old males in the West of Scotland who had not been exposed to major air pollution, there was already a social gradient in FEV1.³⁸

Fortunately, the existence of the Paisley/Renfrew data makes it possible to produce a chart of absolute levels of risk which takes into account risk levels in the West of Scotland and also the contribution of respiratory impairment.

In comparison with the high risk approach, primary prevention offers substantially lower returns. Rose estimated that if Framingham men ate differently up to the age of 55 years in order to reduce their serum cholesterol by 10 per cent, approximately one man in 50 could expect to avoid a myocardial infarction and 49 men out of 50 would have eaten differently every day for 40 years without personal benefit.³⁹ This example illustrates the prevention paradox. Whereas the population strategy only requires small changes in behaviour in individuals, the changes offer little to each participating individual.

CONCLUSION

At one level, consideration of the effectiveness of preventive medicine in primary care is a technical matter, to be sorted out by general practitioners, epidemiologists and perhaps economists. In the wake of the results of recent trials involving health checks in general practice, it would certainly be helpful to revalue preventive activities, so that general practitioners are more aware of the relationship between what they do and what they achieve. Until such times as the rule of halves is successfully addressed, so that all patients who might benefit

from a treatment actually receive it, it makes sense to target resources for prevention at the population subgroups at highest risk to secure the largest health gain.

In the case of primary prevention, there needs to be a parting of the ways. The way to achieve large population changes in risk behaviours has been demonstrated clearly in North Karelia, where changes in fat intake and serum cholesterol level, which some would consider ambitious at an individual level in this country, have been achieved across the population as a whole.⁴⁰ General practitioners should of course support the measures required to achieve such changes, and might act as role models within their communities,⁴¹ but it is not part of the business of primary care to activate such changes by a mass strategy of personal persuasion, at least until such times as high risk and tertiary prevention strategies are properly resourced and made effective. This requires actions at a higher level.

With respect to the narrowing of differences in life expectancy, preventive medicine is not primarily a professional issue. That is not to say that professionals should not be involved, or take a lead in public debate. Choices of a moral and political nature are required. Rose began his book by quoting Dostoevsky—'All are responsible for all'—and ended by concluding 'Medicine and politics cannot and should not be kept apart.' Without actions and policies based on these principles, preventive medicine in primary care can only be partially effective.

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REDUCING THE RISK OF COT DEATHS: OUTLINE OF A REGIONAL AND NATIONAL CAMPAIGN*

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During the 1970s and early 1980s attempts by health care professionals to reduce the incidence of cot deaths were broadly divided into two main areas:

- 1) Attempts to define a group of infants at increased risk of sudden death and then focusing the attention of health care professionals upon that group.
- 2) The provision of respiratory or cardiac monitoring devices for infants deemed to be at increased risk (eg, siblings of victims, babies born prematurely and those who had suffered an apparent life-threatening event).

Both attempts had only limited success. Both focused attention on infants deemed to be at high risk, and thus provided no additional support to the great majority of infants. Whilst the former approach was shown to lead to a reduction in the incidence of the sudden infant death syndrome (SIDS) within the high risk group in some geographical locations, this was not universally true,¹ and the overall incidence in the population was little changed. The second approach was very expensive in resources and staff time and has not been shown to have any significant impact upon the overall incidence.²

In the late 1980s information began to accumulate that, apart from the innate inborn risk identified in some infants (which was therefore not amenable to change), there were a number of environmental factors and child care practices which were associated with the increased risk and which might be amenable to change.

The concept that by altering child care practices within a community the incidence of SIDS might be reduced originated in Holland and South Australia, where publicity campaigns to dissuade parents from sleeping babies in the prone position was followed by a reduction in the incidence.^{3,4}

RISK REDUCTION CAMPAIGN IN AVON

The County of Avon is in the south-west of England. The Infant Mortality Study was set up in 1983 as a means of collecting detailed information on every infant death from birth to 1 year occurring to a resident of the County of Avon. A detailed account of the study and its results have been reported.⁵ (Fig 1).

By the Autumn of 1989 it had become clear that a number of environmental and infant care practices were significantly associated with an increased risk for SIDS. These factors included the prone sleeping position, heavy wrapping particularly in a warm environment, parental smoking, and failure to recognise significant illness (in particular, continued heavy wrapping in the presence of acute viral infection).

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