# Blood Cholesterol Measurement in the Prevention of Coronary Heart Disease

THE SIXTH
KING'S FUND FORUM

Consensus statement

The sixth King's Fund Forum was held in London from 26 to 28 June 1989. A panel of twelve listened to evidence from experts in public sessions attended by 200 people including professionals from many fields as well as public and press.

**The panel comprised:** Maurice Hayes (Chair), Mildred Blaxter, Martin Buxton, Philippa Champion, Desmond Julian, Shirley Goodwin, James McEwen, Tara Mukherjee, Peter Smith, Lesley Southgate, Jill Stern, Barbara Young.

**Invited experts presenting evidence were:** Robert Anderson, John Betteridge, Patricia Birkett, Geoffrey Cannon, John Catford, Jackie Chambers, Kathy Elliott, Godfrey Fowler, Ranaan Gillon, Ken Grant, Helen Howson, Marie Johnston, Margaret Jones, Tim Lang, Michael Marmot, Michael O'Connor, Michael Oliver, Richard Peto, Sibi Ramharry, Christopher Robbins, Gerry Shaper, Anthony Winder,

**We were asked to address the following questions:**

**1. What is the relationship between dietary fats, blood cholesterol levels and coronary heart disease?**

**2. What individual or community-wide dietary or other interventions can reduce blood cholesterol levels and the risk of coronary heart disease safely?**

**3. How useful is the measurement of blood cholesterol levels in identifying individuals at risk of coronary heart disease and in their subsequent management?**

**4. Should the measurement of blood cholesterol levels be an integral part of the assessment of individuals at risk of coronary heart disease, and what are the most effective options for organising such services?**

**5. How will the costs of such services influence the choice of options made?**

As a Panel, we took the view that cholesterol testing should be seen in the context of the primary goal of reducing mortality and morbidity from coronary heart disease (CHD). This drove us to the conclusion that cholesterol should not be considered in isolation, but in association with other risk factors for CHD. Thus, we have dealt with the points raised in the questions in a more general context. However, we believe that we have provided answers to the five questions we were set, although not in the form of direct responses.

Some of the debate seemed to rest on insufficient data , not all of which had been validated by research, and much of what we heard was mere assertion. We were particularly struck by the lack of information on costings, and the frailty of the assumptions on which the economic assessments presented to us were based.

## CORONARY HEART DISEASE

Coronary heart disease (CHD) is the most important cause of death in middle aged men in most industrialised countries. It is a major cause of death in women and a significant cause of morbidity in both sexes. The rates for CHD in the United Kingdom are among the highest in the world. CHD accounts for over a third of all deaths in men aged between 40 and 70. Death rates have changed comparatively little over the last 20 years, but there has been a marked decline in some other countries, notably the USA. Within the UK CHD death rates are highest in Scotland and Northern Ireland. There is also a higher risk in the Asian community and in manual socio-economic groups.

Epidemiological evidence shows that the incidence of CHD is largely determined by life-style and environmental factors. In certain parts of the world CHD is comparatively rare. Yet when people from these countries emigrate to areas where CHD is more prevalent, their rates move towards those of the new country.

Among risk factors found to be strongly associated with CHD are high blood cholesterol levels, a family history of the disease, cigarette smoking, high blood pressure, and a lack of exercise.

## BLOOD CHOLESTEROL AND CHD

In those countries with a high incidence of CHD, average blood cholesterol levels in the population are also high. Correspondingly, average blood cholesterol levels are low in countries where the incidence of CHD is low. Within populations, the higher the blood cholesterol level of an individual the more likely that person is to develop CHD. This relationship is continuous and there is no threshold of risk.

Although those with the highest cholesterol levels are at the highest risk of CHD, most deaths attributed to CHD occur in people with blood cholesterol levels in the moderate range. This is because the majority of the population falls into the moderate category. High blood cholesterol levels interact with other risk factors synergistically modifying the risk of CHD. The risk attributable to a high blood

cholesterol level on its own is not as high as that which occurs in conjunction with other risk factors.

Expert reports based on international epidemiological evidence, and controlled dietary experiments, show that blood cholesterol levels are influenced by the amount and ratio of polyunsaturated and saturated fat in the diet. We accept the recommendations of other expert reports such as the Government's own COMA Report * on the prevention of heart disease which have the following common features:

- a reduction in total energy derived from dietary fats
- a reduction in the intake of saturated fats, which could also be achieved through an increase in the intake of polyunsaturated fats.

## THE PREVENTION OF CORONARY HEART DISEASE

The most promising strategy for reducing CHD is by tackling the three major risk factors: smoking, high blood pressure and high blood cholesterol.

Much of the success in reducing CHD so far is likely to have been a result of the reduction in cigarette smoking. The treatment of high blood pressure has reduced death rates from stroke, heart failure, and kidney failure, but appears to have had little effect upon mortality from CHD.

It is probable that a further major impact on CHD mortality will only be achieved through reducing blood cholesterol levels. This will depend on a general reduction of blood cholesterol levels in the whole community. This is because virtually the whole of the British population has levels of blood cholesterol which are high by international standards, and is therefore at increased risk. This requires a change in national dietary habits.

If diet fails to reduce high blood cholesterol levels there are several categories of drugs which may do so - especially the recently introduced HMG Co-A reductase agents. These drugs show promise, but have not yet been tested adequately for their long term adverse effects and efficacy.

**Committee on medical aspects of diet. Diet and cardiovascular disease. Report on health and social subjects no 28. London, HMSO.*

Previously available drugs have been shown to reduce the incidence of heart attacks, but they have not been shown to lower overall mortality, and may have increased non-cardiac mortality and morbidity.

## A NATIONAL STRATEGY

We believe that any serious attempt to reduce the general blood cholesterol in the entire population requires a national strategy linking food supply with health.

The aim of such a strategy must be to achieve an overall reduction in blood cholesterol levels in the whole population by dietary means. This should be part of a broad health promotion strategy aimed at reducing risk factors for CHD and other diseases. If this were achieved a much smaller proportion of the population would require cholesterol-lowering drug treatment or need treatment for subsequent CHD. The failure to initiate such a preventive programme places an undesirable reliance on medical correction of blood cholesterol levels through medication.

Such a strategy is long term, but is long overdue and now urgently required. It requires clear objectives, coordination across government departments with concerted action and regular review at national and local levels. Most of all it requires political will.

Existing food policies do not amount to a coherent national strategy to promote health. They often ignore health considerations and may even be inimical to health. It is both desirable and feasible to introduce health objectives into UK national food policy, and to incorporate this into all national policies affecting food. The negative aspects of existing policies such as those which subsidise the consumption of saturated fat should be removed.

Such a national policy needs to take account of supports to food producers, production quality, food composition, food prices, food labelling, catering and education. Recent fiscal measures in favour of lead-free petrol and the positive public response to them indicates that price changes can profoundly affect demand. Welfare policies can also influence the nutritional value of the national diet. A national strategy should not be divorced from local health promotion initiatives which need to work through a diversity of agencies. Health Authorities or Boards have a clear leadership role, particularly in ensuring that relevant services reach those with traditionally poor access.

It is not our remit to define a national policy, but such a policy is a prerequisite for successful health promotion initiatives. The public will then be better able to respond and act upon a consistent message linking food and health in policy, provision and promotion. It is for government to decide how to implement an effective food strategy given the division of responsibility between government departments, other agencies and the European Community.

We recognise that this is a new departure for public policy in the UK, but the increased public demand for healthy food and a growing commercial interest in meeting this demand indicates that the climate is right.

We would emphasise that mass public education campaigns aimed at behavioural change at the individual level cannot be expected to succeed in the absence of the overall national strategy which we advocate. Individually orientated campaigns are known to be least readily accepted by those social groups most at risk. Also, behaviour, especially in the area of food choice, is not always voluntary. National policies are required to remove the barriers to change experienced by the most disadvantaged members of the community.

## RISK ASSESSMENT AND HEALTH PROMOTION

The second major element of our recommended approach is a strategy to identify men and women at increased risk of CHD and to target interventions at this group. We recommend therefore a concerted approach which would make opportunistic risk assessment and health promotion an important priority in primary care. A high proportion of cases of CHD arise in individuals who have easily identifiable risk factors for the disease, that might be detected either by the individuals themselves or with assistance from a health worker. These include cigarette smoking, a high fat diet, high blood pressure and a family history of CHD under the age of 50 years. We consider it essential that all GPs be encouraged to record such risk factors in their practice records, and that patients be provided with appropriate advice on healthy lifestyles by a member of the primary health care team. This must be reinforced and complemented by the work of Health Authorities and their community health services, occupational health services, voluntary bodies and the private sector. The aim of this strategy is to enable people to know their risk status in order to modify their behaviour accordingly.

## MEASURING BLOOD CHOLESTEROL

It is essential that blood cholesterol levels should not be seen in isolation from other risk factors, because the risks associated with raised blood cholesterol are synergistic with other risk factors rather than simply being additive. For this reason we recommend that individuals should be selected for blood cholesterol testing based only on the presence of one or more *other* major risk factors for CHD (including those with previously identified CHD). Those without such risk factors should not be encouraged to have their blood cholesterol assessed, but all individuals should be encouraged to change their diet in order to lower cholesterol levels. We are unconvinced that offering blood cholesterol testing to all individuals is justified, given that a high proportion of those at increased risk of CHD could be identified through the opportunistic risk factor assessment and selective cholesterol testing strategy outlined above.

Cholesterol measurement is of value in identifying people at high risk who may benefit from special dietary regimes or drug therapy. We therefore recommend cholesterol testing for those with a family history of premature coronary disease, clinical features of hyperlipidaemia, those with manifest coronary disease, those under treatment for diabetes and high blood pressure and those with a long history of heavy smoking. Strict adherence to rigid blood cholesterol threshold levels recommended by several groups is not justified by the evidence.

Blood cholesterol tests should only be carried out where there is access to facilities for obtaining accurate assays of blood cholesterol which are subject to regular and strict quality control. Information and counselling should be available to help interpret the results of tests (including the variations in measurement that may arise due to natural variations in individuals and errors in the testing procedure). Advice and counselling should also be given to people identified to be at high risk to help them to take appropriate corrective action. Care should be taken that those tested are not unduly alarmed by the results, so that those with high levels are encouraged to take positive action while avoiding unnecessary anxiety, and that those whose blood cholesterol levels are not regarded as high are not lulled into a false sense of security.

An argument advanced for testing blood cholesterol levels in all individuals is that it may be a potent means by which people can be motivated to follow advice to alter their diet. While theoretically plausible we were presented with no evidence to support this.

One of the most strongly expressed arguments for universal testing is the need to identify individuals with very high levels of blood cholesterol due to a genetic defect (familial hypercholesterolaemia) who are at high risk of early death from CHD and whose cholesterol levels are unresponsive to dietary change. However, this condition affects only a small percentage of the population (about 0.2%). Other approaches might be used to detect many of these individuals through detailed family histories of CHD and establishing registers of such families. In addition, all first degree relatives of any person who develops symptomatic heart disease and who has a high blood cholesterol level, should have their own blood cholesterol measured. Such case-finding should be led by lipid specialists and cardiologists.

A possible danger associated with widespread cholestorol testing is that it may distract from, rather than complement, other health improvement strategies, such as the development of population-wide approaches to healthier eating. We also fear that it may create an inappropriate demand for drugs for people whose risk could be lowered by dietary measures.

## COSTS

The available economic evidence on the cost-effectiveness of alternative strategies for reducing blood cholesterol is unsatisfactory, not least because of the absence of good data on the relative effectiveness of the specific intervention strategies that have been proposed. There is no clear evidence available on morbidity and mortality changes, whether in response to diet modification or to drug intervention strategies.

However a few general points about cost are fairly clear. Whilst the unit cost of taking and measuring blood cholesterol may be low (an estimate of £2.50 was suggested to us), establishing baseline levels and monitoring change would require a sequence of several tests. The cost of counselling following cholesterol measurement depends critically on who does it. To be effective it cannot be limited to a short, one-off, consultation. Drug therapy costs about £500 a year for each patient, and may have to be provided for the rest of the patient's life. Estimates from a variety of sources suggest that drug therapy is currently an expensive way of generating 'life-years saved' relative to other interventions. But even if drug treatment becomes more effective, any policy that leads to sizable proportions of the population receiving drug treatment will represent a major

financial commitment. If we accept, as has been implied by a number of participants, that drug treatment might be appropriate for up to 10% of men aged 40-69, the NHS drug bill in England and Wales would be increased by some £400 million annually, or approximately 20%.

In the absence of firm costings we are not able to express a view on cost in relation to benefits, except that drug-based therapy is likely to be considerably more expensive than dietary intervention. We believe, but regrettably are not in a position to be able to prove, that our proposed population strategy is likely to be more cost-effective, particularly when account is taken of the beneficial health effects of dietary modification in addition to CHD prevention. But, however cost-effective, this strategy will consume resources.

## TRAINING AND SERVICE IMPLICATIONS

The strategy we have outlined needs to be supported by an extensive training programme. There will be an increase in demand for training in the primary health care sector in particular, as this is where most of the demand for advice and care will fall.

Although primary health care teams will shoulder the major responsibility and will require additional training in counselling and giving dietary advice, other health professionals, including hospital consultants, should also participate in the education programme. This will require the deployment of more dietitians and health promotion specialists. These additional responsibilities, as well as the possible increase in demand, must be recognised in setting up budgets and allocating resources. Special targetting of resources will be required for deprived areas.

A major initiative such as we propose will not succeed unless there is coordination of the provision of such services at a local level. The general practitioner's records should be regarded as the focus for all information on CHD. The results of risk assessments and advice given in other settings should be communicated to the general practitioner.

We recommend that the implementation of our proposals for primary care be included in the proposed medical audit system to be developed by Family Practitioner Committees. In addition we recommend that the overall provision of

health promotion and risk assessment be an integral part of the public health responsibility of Regional and District Health Authorities.

## RESEARCH

We have mentioned the lack of information on some topics. We would particularly recommend additional research in the following areas:

- the possible motivational effect of cholesterol measurement in encouraging people to accept and act on dietary and other life style advice.
- the effectiveness of drugs currently in use, or new drugs as they are introduced, with particular reference to costs and possible side effects. This will require large-scale trials.
- the cost-effectiveness of the approaches we have recommended and the costs of selective or other screening programmes.
- the development of effective alternative strategies to widespread cholesterol measurement to identify people at risk of familial hypercholesterolaemia.
- the predictive value of high levels of blood cholesterol and other risk factors for CHD in pre-menopausal women, members of the Asian community, lower socio-economic groups and elderly people.

## RECOMMENDATIONS

1. The most important and effective way to reduce CHD is through a national food and health strategy to reduce the general level of blood cholesterol in the population.

2. Clear and consistent information about risk factors and the means of reducing those which are affected by changes in individual behaviour, especially smoking and diet should be disseminated.

3. Everyone should be encouraged and advised to make appropriate dietary changes.

4. Mass measurement of blood cholesterol levels in the population is not justified.

5. CHD risk assessment should be made on the basis of factors other than measured blood cholesterol levels. If one or more major risk factors is present we then recommend cholesterol testing.

6. Cholesterol measurement should never occur without direct access to advice and counselling services.

7. Only when dietary changes are seen to be ineffective or inappropriate, should drug therapy be considered.

8. The initiation of drug treatment requires specialist medical advice.

9. All cholestorol-lowering drugs should be subject to adequate evaluation and monitoring.


*For further copies of this statement please contact the King's Fund Centre, 126 Albert Street, London NW1 7NF Tel: 01-267 6111*