

Department of Health and Social Security

Report on Health and Social Subjects

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# DIET AND CARDIOVASCULAR DISEASE

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Committee on Medical Aspects of Food Policy

Report of the Panel on Diet in Relation to Cardiovascular Disease

London

Her Majesty's Stationery Office

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# Committee on Medical Aspects of Food Policy

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## Panel on Diet in Relation to Cardiovascular Disease

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# Preface

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It is ten years since an earlier Panel of the Committee on Medical Aspects of Food Policy produced a report on diet and coronary heart disease. During this time mortality rates for cardiovascular disease have remained high and coronary heart disease continues to be an important public health problem in the United Kingdom. In view of this, the Committee recommended to my predecessor, Sir Henry Yellowlees, that a further review be made of the relationship between diet and cardiovascular disease so as to take account of more recent evidence and research findings. The first meeting of the new Panel was held in April 1982.

Because of the long time interval since the previous report, the task of making a full review of the subject has been particularly onerous. We congratulate the Chairman of the Panel, Professor Philip Randle FRS, on his skill in steering the Panel through its deliberations and thank him for all the care that he has devoted to the preparation of the report and for his ready advice to the Secretariat. We are grateful to him and to all the members of the Panel for contributing their time and expertise. This fresh and thorough look at the problems has provided a firm basis on which to build, and the establishment of an ongoing review would allow account to be taken of new findings as they become available. The Panel, in its consideration of the complex relationship between diet and cardiovascular disease, has acknowledged that the evidence falls short of proof. Nevertheless, in the opinion of the members, it is sufficiently consistent that, if changes in the diet occur in the directions recommended, benefits to health are likely. The Panel has declined to prescribe a national diet since there are unlimited ways in which each individual can act to enjoy an overall diet and lifestyle conducive to good health. The task of interpreting the recommendations in terms of foods that people eat has been left for others to perform.

I welcome this report as a major contribution towards the development and formulation of policies for food and nutrition within the United Kingdom, and in the hope that the toll of cardiovascular disease will thereby be reduced.

**E D Acheson**  
Chairman  
Committee on Medical Aspects of Food Policy

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In the south suburbs at the Elephant,  
Is best to lodge: I will bespeak our diet,  
Whiles you beguile the time and feed your knowledge

Twelfth Night  
Act 3, Scene iii

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# 1. Introduction

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## 1.1 Terms of reference

To advise the Committee on Medical Aspects of Food Policy on the significance of the relation between nutrition and cardiovascular disease and to make recommendations.

## 1.2 Interpretation of terms of reference

1.2.1 The major cardiovascular diseases reviewed, in relation to nutrition, were coronary heart disease, cerebrovascular disease, and peripheral vascular (arterial) disease. The report is concerned mainly with coronary heart disease, because nearly all of the evidence available is concerned with this disease. Alcoholic cardiomyopathy has been considered in making a recommendation about alcohol intake.

1.2.2 The absolute and relative importance of coronary heart disease and cerebrovascular disease as causes of death in England and Wales, Scotland and Northern Ireland is shown in Section 3. The ICD code numbers (International Classification of Diseases<sup>1</sup>) of these categories of disease are also shown in that section.

## 1.3 Meetings of the Panel

1.3.1 The Panel was appointed at the end of 1981 following an earlier recommendation of the Committee on Medical Aspects of Food Policy. It has met ten times including one two-day residential meeting. The review of published evidence extended to February 1984.

1.3.2 Ten years have elapsed since the publication of the previous report on Diet and Coronary Heart Disease<sup>2</sup> by a Panel of the Committee on Medical Aspects of Food Policy. Because of the long interval our review has been substantial and detailed. We have discussed over 40 working papers prepared by members of the Panel, and by experienced investigators who were not members of the Panel, and we have taken into consideration over 600 published scientific papers.

1.3.3 We wish to express our appreciation and thanks for expert assistance to the observers and to the Secretariat. We are grateful to colleagues who have



made available to us helpful reviews and working papers and statistical information and who have attended our meetings to give evidence. Their names are recorded in Appendix B.

## **1.4 Perspectives**

1.4.1 We have attempted in this Report to interpret complex evidence in such a way that our conclusions are clear to the general public; to those responsible for offering guidance to the general public in relation to health and nutrition; to medical practitioners in giving advice to patients; to producers, manufacturers, and distributors of food and drink and caterers; and to those in the Government of the United Kingdom responsible for preparing legislation on food and drink, for allocating resources to the promotion of health and the prevention of disease, and for determining agricultural policy in the United Kingdom and in the European Economic Community. In the light of our experience as a Panel it has also seemed appropriate to draw attention to the need for further and ongoing review.

1.4.2 Diet is a matter to be decided by individuals and by families after consideration of its possible bearing on health and of such guidance as may be available. So far as we are aware no Government has attempted to enforce recommendations relating to nutrition and cardiovascular diseases by direct legislation. It seems likely that legislation based on agricultural policy, and on economic policies connected with the production of food and with the sale of food and drink, may have a significant indirect effect on nutrition in relation to cardiovascular disease.

1.4.3 If diet is to be decided by individuals then it is necessary that some foods and drinks should carry sufficient information about their composition to enable members of the public who wish to adjust their intake of particular dietary components to do so. Where such adjustments will be facilitated by making available alternative forms of certain foods agricultural policy should not discourage their availability.

1.4.4 We are required in this report to make recommendations to the general public regarding nutrition with the object of decreasing the incidence of cardiovascular diseases in general and of coronary heart disease in particular. As a matter of general principle, their implementation should also afford a reasonable prospect of improvement in life expectancy overall, and in the quality of life for the population as a whole. It follows that they should also provide diets capable of satisfying adults and children alike (see also 1.5.6)

1.4.5 Within the general population of the United Kingdom it is possible to identify, by clinical and laboratory investigation, individuals who have an increased risk of coronary heart disease. We believe it is important to identify such individuals, and to give consideration to ways and means of facilitating their identification, so that special advice may be given to them.

1.4.6 In reaching conclusions and making recommendations our discussions have concentrated on the following risk factors: cigarette smoking, obesity and insufficient physical activity which are risk factors that people may learn to recognize and correct for themselves; raised blood pressure, raised total serum cholesterol, other abnormalities of serum lipids, diabetes mellitus, use of some types of contraceptive pill (especially in older women and when other risk factors are present) and familial predisposition which are risk factors that may be detected by medical practitioners. Cigarette smoking, physical activity and the contraceptive pill have been reviewed because it has been necessary to consider their importance in relation to nutrition.

1.4.7 In affected individuals the mechanisms that have led to the cardiovascular diseases under review are rarely known with a high degree of precision. Because of this it has been necessary to evaluate the significance of many different lines of evidence for a relation between nutrition and cardiovascular disease. The evidence considered has ranged from the results of studies relating diet with atheroma and with thrombosis to the results of dietary or multiple risk factor intervention trials. A list of the major topics that have been reviewed is given in Appendix C. Because no one line of evidence is conclusive it has been necessary for us to determine whether the balance of evidence justifies a recommendation for dietary change. This consideration has also led us to make recommendations about the need for further review and for identifying people who are at increased risk from coronary heart disease (see also 1.4.1 and 1.4.5).

## 1.5 Form of the Report

1.5.1 The recommendations are given in Section 2 and are accompanied, where necessary, by a brief explanatory statement. Mortality rates for cardiovascular diseases and information about the composition of the United Kingdom diet are reviewed in Section 3. The lines of evidence upon which the principal recommendations are based are summarized in Section 4. The feasibility of making dietary changes to implement the recommendations to the general public is considered in Section 5. References are given in Section 7 and are confined to essential sources of facts and figures. To the best of our knowledge all major papers relevant to the subject under review have been taken into consideration. For the convenience of those interested reference is made to a small number of more detailed reviews of evidence at the end of each sub-section in Section 4.

1.5.2 The recommendations are unanimous recommendations unless a statement is made to the contrary.

1.5.3 The recommendations are mainly concerned with dietary changes to decrease the incidence of coronary heart disease. For cerebrovascular disease high blood pressure appears to be of greater significance than other risk factors (see 1.4.6). The risk of high blood pressure is increased by obesity and by high alcohol intake, and may be influenced by the intake of common salt.

1.5.4 Sudden unexpected cardiac death accounts for more than 50 per cent of deaths due to coronary heart disease and several mechanisms have been implicated. We are not aware of any reason to separate sudden cardiac death from coronary heart disease as a whole for the purposes of the recommendations that follow.

1.5.5 Food energy in the recommendations is exclusive of alcohol. Individual intake of alcohol varies considerably and we have not regarded alcohol as a normal component of the diet.

1.5.6 The recommendations that follow are intended mainly for older children and for young and middle-aged adults; for older people the possible benefits are less likely. They are not intended for infants (i.e. those under one year of age) and the recommendation for fat (2.1.1) is not appropriate for children under the age of five. The advice relating to infants and young children, here and in recommendation 2.1.1, is from the Panel on Child Nutrition of the Committee on Medical Aspects of Food Policy.



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## 2. Summary and Recommendations

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### 2.1 Recommendations to the general public

2.1.1 The consumption of saturated fatty acids\* and of fat in the United Kingdom should be decreased. There are no specific recommendations for change in the consumption of polyunsaturated and monounsaturated fatty acids, but to facilitate the recommendation for saturated fatty acids\* we recommend that the ratio of polyunsaturated fatty acids to saturated fatty acids\* (the P/S ratio) may be increased to approximately 0.45. The intakes recommended are 15 per cent of food energy for saturated fatty acids\* and 35 per cent of food energy for total fat. Individuals whose intakes are in excess of these levels are advised to reduce them to the recommended levels. This recommendation for change is not intended for infants; or for children below the age of five who usually obtain a substantial proportion of dietary energy from cows' milk; or for people who already consume a diet low in saturated fatty acids\* for ethnic or other reasons.

This is a majority recommendation (9 out of 10 panel members; see 4.1.11). The lines of evidence upon which it is based are summarized in Section 4.1.

2.1.1.1 The current and recommended intakes and P/S ratios are summarized in Table 2.1. The average decrease recommended for saturated fatty acids\* is 25 per cent (one-quarter). The average decrease recommended for fat is 17 per cent (one sixth) at the recommended P/S ratio of approximately 0.45 (or 25 per cent or one-quarter if the current P/S ratio of 0.23 is retained).

2.1.1.2 Families who elect to switch from whole cows' milk to semi-skimmed or skimmed milk in implementing the recommendation for fat are advised, in the light of current evidence, to continue to provide whole cows' milk for children below the age of five.

2.1.1.3 The report of the Expert Committee of the World Health Organization<sup>5</sup> has recommended that the dietary energy derived from saturated fatty acids should be limited to 10 per cent and that from fat to 30 per cent of food energy. Our recommendations of 35 per cent (total fat) and of 15 per cent (saturated plus trans fatty acids) are designed to take

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\*Inclusive of trans fatty acids—see 2.1.2. Saturated fatty acids\* is used as an abbreviation for saturated plus trans fatty acids (here and in 2.1.1.1). Saturated fatty acids (no asterisk) is used in the strict chemical sense and does not include trans fatty acids.



account of practical considerations in the United Kingdom. We doubt whether the stringent dietary changes which the World Health Organization recommendation requires would be implemented by the general population at the present time. *We all recommend such changes for people with increased risk of coronary heart disease (see 2.2.1 and 2.2.2).*

**Table 2.1:** Recommended average daily intakes of total fat, and of saturated\* and polyunsaturated fatty acids.

Category	1981 average <sup>3,4</sup>	Recommended average
Total fat:—		
g per day	104	77–87†
per cent energy	42	31–35†
Saturated fatty acids* :—		
g per day	49	37
per cent energy	20	15
Polyunsaturated fatty acids:—		
g per day	11.4	8.6–16.7†
per cent energy	4.7	3.5–6.8†
P/S* ratio	0.23	0.23–0.45

\*Inclusive of trans fatty acids—see 2.1.2.

†Depends upon the P/S ratio; the upper limit corresponds to the recommended ratio of approximately 0.45.

**2.1.2 It is recommended that trans fatty acids should be regarded as equivalent to saturated fatty acids for the purpose of recommendations 2.1.1 and 2.2.2 (see also 2.4.1 and 2.4.2).** Otherwise there are no specific recommendations about the dietary intake of trans fatty acids.

**2.1.3 There are no specific recommendations about the dietary intake of cholesterol.**

Cholesterol intake in the United Kingdom diet is approximately 350–450 mg/day in adults and is likely to fall if the recommendation regarding intake of saturated fatty acids is implemented. We believe that current intake is not excessive and that evidence for an influence of this level of intake on blood cholesterol is inconclusive.

**2.1.4 The Panel recommends that intake of simple sugars (sucrose, glucose and fructose) should not be increased further.**

These sugars and foods containing them are appreciable sources of food energy and may contribute to obesity (see 2.1.8). Certain foods containing these sugars may also contribute saturated fatty acids (eg cakes, biscuits) (see 2.1.1). The Panel notes that restriction of intake of these sugars has been recommended on other health grounds (eg dental caries).

**2.1.5 An excessive intake of alcohol is to be avoided on more general health grounds. No specific recommendations are made in respect of low or moderate intake of alcohol in relation to cardiovascular disease.**

An excessive intake of alcohol is defined as >100 ml/day (>80 g/day) for men and >65 ml/day (>52 g/day) for women. A moderate intake is defined in respect of coronary heart disease as >43 ml/day (>34 g/day) for men and >29 ml/day (>23 g/day) for women. Excessive intake of alcohol may have an adverse effect on the incidence of cardiovascular diseases. The effect of low or moderate intake has not been adequately tested. The importance of alcohol intake in relation to obesity has been stressed in Recommendation 2.1.8.

**2.1.6 The Panel recommends that the dietary intake of common salt should not be increased further and that consideration should be given to ways and means of decreasing it.**

We believe that the intake of salt in the United Kingdom diet (approximately 7–10 g per day) is needlessly high. The salt content of many foods makes it difficult for the public to effect an immediate and substantial change in intake. Approximately 70 per cent of intake is salt present in food, much of it added during manufacture. Approximately 30 per cent is added at table or in cooking and this could be decreased immediately (see 2.1.7., also 1.4.3., 1.5.3., 2.4.5., 2.6.2). The lines of evidence upon which this recommendation is based are summarized in Section 4.2.

**2.1.7 The Panel sees advantages in compensating for a reduced fat intake with increased fibre-rich carbohydrates (e.g. bread, cereals, fruit, vegetables) provided that this can be achieved without increasing total intake of common salt or simple sugars (see 2.1.4 and 2.1.6). Otherwise there are no specific recommendations about the intake of dietary fibre. The lines of evidence upon which this recommendation is based are summarized in Section 4.3.**

**2.1.8 Obesity should be avoided both in adults and in children by a combination of appropriate food intake and regular exercise. Those who are overweight are advised to adjust food intake in relation to physical activity until their weight is within the acceptable range (acceptable weight ranges are defined and given in a report of the Royal College of Physicians).<sup>6</sup>**

In general weight should be maintained at that of early adult life (except where this was outside the acceptable range). The level of food intake required to maintain weight within the acceptable range depends upon physical activity. We recommend a combination of regular exercise and appropriate food intake. It is important to recognize that alcohol may contribute to overweight. In this recommendation the term obesity is used comprehensively to include other risk factors that may be associated with it. The lines of evidence upon which this recommendation is based are summarized in Section 4.4.

**2.1.9 There are no specific dietary recommendations for people who smoke cigarettes. We recommend that people should not smoke cigarettes.**

Cigarette smoking is a risk factor for coronary heart disease, for peripheral vascular (arterial) disease, for chronic bronchitis and its cardiovascular



complications, and for other (non-cardiovascular) diseases, notably lung cancer. We are not aware of any convincing evidence that diet may mitigate effects of cigarette smoking on the risk of cardiovascular disease. There is a risk of overweight when cigarette smoking is stopped and this may be prevented by a combination of regular exercise and appropriate food intake.

2.1.10 There are no specific recommendations about the intake of oxidized cholesterol or of erucic acid in the United Kingdom diet. Further research is needed to ascertain whether dietary oxidized cholesterol is absorbed or incorporated into atherosclerotic plaques. The Panel is satisfied with the provisions of the 1977 Erucic Acid in Food Regulations.<sup>7</sup>

2.1.11 The Panel recommends that addition to the diet of supplements of *n*-3 polyunsaturated fatty acids (eg. eicosapentaenoic acid) is a matter for research and cautions against the unsupervised use of such preparations.

There is evidence that certain *n*-3 polyunsaturated fatty acids alter platelet behaviour and bleeding time and may, therefore, reduce the possibility of intravascular thrombosis. The long-term effects of a high intake of these fatty acids are not known.

2.1.12 There are no specific recommendations about the dietary intake of Vitamin E, which we believe will be adequate for the diet which may result from the recommendations in this report.

2.1.13 There are no specific recommendations about the hardness of water.

The Panel has discussed the evidence suggesting that undue softness of water may be associated with an increased risk of coronary heart disease and has noted that an EEC directive due to be implemented in 1985 will require that the hardness of water must not be reduced artificially below 150 mg of CaCO<sub>3</sub>/litre.<sup>8</sup> Individual members of the public who soften water in their own homes may wish to take the precaution of drinking unsoftened water.

2.1.14 There are no specific recommendations about the consumption of protein as such.

It may be noted that animal protein is often associated with fat that is rich in saturated fatty acids (see 2.1.1) whereas vegetable protein may be associated with dietary fibre (see 2.1.7).

2.1.15 There are no specific recommendations about the dietary intake of Vitamin C (ascorbic acid) other than to attain the recommended daily amount (currently 30 mg/day for adults in the United Kingdom).

2.1.16 There are no specific recommendations about the dietary intakes of Vitamin D, trace elements or other metal ions. The Panel believes that further studies are needed in respect of intake of Vitamin D, selenium and magnesium

in relation to cardiovascular diseases. We have noted the recommendations made in 1973 by the World Health Organization<sup>9</sup> for further studies of the possible role of a number of metal ions and of iodine and fluorine, in relation to cardiovascular diseases.

## **2.2 Recommendations to medical practitioners**

2.2.1 Special advice regarding diet should be given to people who have been shown by clinical and laboratory investigation to have an increased risk of coronary heart disease. Such people may include or be identified among those with a strong family history; individuals in whom several risk factors are present concurrently; close relatives of individuals with familial hypercholesterolaemia; and individuals with diabetes mellitus.

2.2.2 In such cases it is recommended that saturated fatty acids should contribute no more than 10 per cent and total fat no more than 30 per cent of food energy. It is recommended that dietary cholesterol should be below 100 mg/1000 kcal and that dietary fibre should be in excess of 30 g/day. In the case of diabetic subjects the Panel endorses the Dietary Recommendations for Diabetics prepared by the Medical Advisory Committee of the British Diabetic Association.<sup>10</sup>

2.2.3 Medical practitioners should be vigorous in identifying and advising people who have an increased risk of coronary heart disease.

The evidence upon which recommendations 2.2.1 to 2.2.3 are based is summarized in Sections 4.1 and 4.3.

2.2.4 The Panel wishes to emphasize the importance of an adequate intake of potassium-rich foods (principally fruit and vegetables) for individuals taking the common diuretic drugs; this is particularly desirable when these drugs are prescribed for the elderly.

## **2.3 Recommendations for health education**

2.3.1 Those responsible for health education should inform the general public of the recommendations and how to implement them. In particular advice should be given on how to construct diets and regulate physical activity in order to minimize the risk of cardiovascular disease and avoid obesity.

Experience gained in trials designed to test the effect of risk factor intervention on the incidence of coronary heart disease has shown repeatedly that compliance depends critically upon the level and quality of counseling given to participants. The percentage contribution of saturated fatty acids to food energy in the United Kingdom diet has not changed significantly over the past twenty years notwithstanding the publication of a number of reports in this country and elsewhere advocating decreased



intake of saturated fatty acids. If people are to change their diet then they must be informed of the need for change and of how the change may be implemented, and be given the necessary enabling information.

## **2.4 Recommendations to producers manufacturers and distributors of food and drink and caterers**

2.4.1 The percentage by weight of fat and of saturated, polyunsaturated and trans fatty acids in butter, margarine, cooking fats, and edible oils should be printed on the container or wrapping in which they are sold. Consideration should be given to providing in addition (i.e. not in place of) uniform and more simple labelling codes to enable the general public to distinguish easily between fats and oils with low or high contents of saturated fatty acids.

2.4.2 Information comparable to that specified in 2.4.1 should be provided, wherever practicable, for all other foods with a fat content of more than 10 per cent by weight, or which are major contributors to fat intake. If the foods are sold in prepacked form, the information should be printed on the package wherever possible. If the foods are not sold prepacked the information should be displayed prominently at retail outlets. The foods in this category are mainly meats and meat products, milk and cream, cheese, and cakes and biscuits. Equally, caterers should provide similar information in appropriate ways.

2.4.3 The concentration of alcohol (ethanol) in beers, ciders, wines, spirits and any other drinks containing more than 1.2 per cent of alcohol by volume should be printed on the container in percentage by volume. The concentration in drinks that are dispensed should be displayed prominently at retail outlets.

The current position is that every prepacked drink with an alcoholic strength by volume of more than 1.2 per cent must be labelled with its alcoholic strength expressed by volume (per cent volume) or by mass (per cent mass) but exemptions were made.<sup>11</sup> The purpose of the recommendation is to seek the removal of exemptions.

2.4.4 Recommendations to government regarding legislation and codes of practice with respect to labelling of foods and drinks in respect of 2.4.1, 2.4.2 and 2.4.3 are given in Section 2.6.

2.4.5 Where appropriate, foods or food products with lower contents of saturated plus trans fatty acids and/or common salt than is at present customary should be made available to the general public. Examples are milk, meats, and meat products such as sausages, hamburgers and minced meats, margarines (trans fatty acids), and breads and other cereal products.

## **2.5 Recommendations for further review**

2.5.1 The Panel recommends that bodies which have assumed responsibility for advising the general public, medical practitioners, and Government about

the prevention of cardiovascular disease in the United Kingdom should consider establishing joint machinery for an ongoing review. The relevant bodies identified by the Panel as having discharged some or all aspects of this function in the past are the Department of Health and Social Security, the Royal College of Physicians of London and the British Cardiac Society.

2.5.1.1 Ten years have elapsed since the publication of a report of an Advisory Panel on Diet in relation to Cardiovascular Disease of the Committee on Medical Aspects of Food Policy.<sup>2</sup> In the intervening years a Joint Working Party of the Royal College of Physicians of London and the British Cardiac Society published a report on the Prevention of Coronary Heart Disease in 1976.<sup>12</sup>

2.5.1.2 Because the interval since the publication of the earlier report from the Committee on Medical Aspects of Food Policy has been so long the Panel has found that the work involved in producing a new report has been considerable. Moreover, we have only been responsible for a review of diet in relation to cardiovascular disease and not for a review of other risk factors, although these were in the event reviewed in relation to diet. The Panel has noted that the American Heart Association has published three reports on this subject in the past ten years and seven reports since 1957.<sup>13</sup>

2.5.1.3 We believe that the prevention of cardiovascular disease by dietary and other means is a sufficiently important subject to merit ongoing review. The advantages of an ongoing review are perceived as including continuity, the evolution of a coherent policy as opposed to periodic recommendations, and greater public awareness of its importance. An evolving policy could also facilitate public education and change on the part of all sections of the food industry.

2.5.1.4 It is appreciated that advantages may be perceived in terms of independence of view and the presentation of different perspectives by reports from more than one body. However, the Panel believes that the independence and high reputation of the different bodies that may contribute to an ongoing review are such as to ensure that different viewpoints and perspectives would be adequately safe-guarded.

## **2.6 Recommendations to Government**

2.6.1 Means should be found to educate the general population of the United Kingdom in habits of eating and physical activity that will minimize the risk of cardiovascular disease and of obesity. The process of education should be started in schools (Recommendations for health education; Section 2.3).

2.6.2 Consultations should take place between the relevant Government Departments and the producers, manufacturers and distributors of food and

drink and caterers which will lead to legislation and to Codes of Practice to improve public knowledge of the composition of foods (2.4.1 and 2.4.2); improve public awareness of the alcohol content of alcoholic drinks (2.4.3); and lead to the provision of alternative preparations of some foods with lower contents of saturated and of trans fatty acids and/or common salt (2.4.5) (Recommendations to producers, manufacturers and distributors of food and drink and caterers; Section 2.4).

2.6.3 Consideration should be given to ways and means of encouraging the production of leaner carcasses in sheep, cattle and pigs (for example by adjustments to the operation of the carcass grading systems).

2.6.4 Consideration should be given to ways and means of removing from the Common Agricultural Policy those elements of it which may discourage individuals and families from implementing the recommendations for dietary change.

2.6.5 An enquiry should be made into the cost and benefit that may accrue from more vigorous attempts to identify people who have an increased risk of coronary heart disease. Research into cheaper and more simple methods which may facilitate more widespread measurement of blood lipids and of blood pressure should be encouraged.



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## 3. The Current Position

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### 3.1 Cardiovascular disease mortality in the United Kingdom

3.1.1 Coronary heart disease and cerebrovascular disease are the certified causes in 40 per cent of deaths in men and 38 per cent of deaths in women (Figure 3.1), greatly exceeding that due to any other group of diseases. Deaths from coronary heart disease outnumber those from stroke by more than 2 to 1 (in men, by 3.4 to 1).

3.1.2 Most deaths from cardiovascular disease occur in old age, the median age of death being 74 years for coronary heart disease and 79 years for stroke; nevertheless, in England and Wales death from coronary heart disease also causes the annual loss of a quarter of a million years of 'working life', with nearly 30,000 deaths in men under the age of 65.

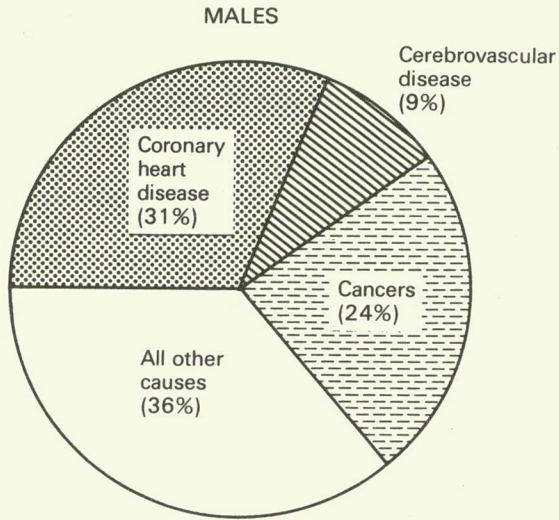
3.1.3 Mortality from strokes has been declining in Britain since the 1950s and more recently this decline has probably been accelerated by the widespread treatment of hypertension.

3.1.4 Time-trends in coronary heart disease mortality are presented age-specifically in Table 3.1, and for all ages (standardized) in Figure 3.2. Rates are throughout much higher in Scotland and Northern Ireland than in England and Wales, both for men and women. In the 1950s the rates in men were rising in all three countries. Latterly they have tended to decline a little (except for older men in Northern Ireland). Rates in women have been generally stable at ages under 65 but when all ages are included (Figure 3.2) rates overall appear to have been declining throughout the period.

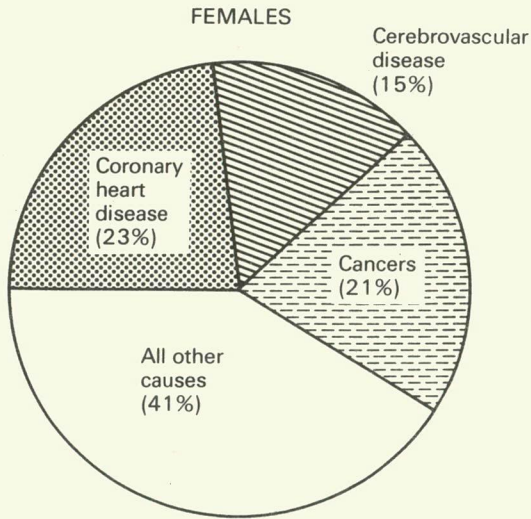
3.1.5 The United Kingdom has not yet experienced the dramatic declines in mortality from coronary heart disease enjoyed by a number of other countries (USA, Canada, Australia, New Zealand, Belgium, Finland). As a result, the United Kingdom's position in comparison with other countries is increasingly conspicuous. In a world ranking of mortality from coronary heart disease in 1978, countries of the United Kingdom occupied three of the top five positions for men and two of the top five positions for women (Table 3.2).



**Figure 3.1:** Proportion of all deaths in England and Wales (1982) attributed to coronary heart disease (ICD 410-414), cerebrovascular disease (ICD 430-438), cancers (ICD 140-239) and all other causes. Source: Office of Population Censuses and Surveys.



Total number of deaths: 290 166  
 Death rate (all ages) per million: 12 017



Total number of deaths: 291 695  
 Death rate (all ages) per million: 11 456

**Figure 3.2:** Age adjusted death rates/100 000 for arteriosclerotic and degenerative heart disease (predominantly coronary heart disease) for males and females in England and Wales, Scotland and Northern Ireland. Source: International mortality statistics<sup>14</sup> and Office of Population Censuses and Surveys.



**Table 3.1:** *Death rates from coronary heart disease/100 000 for males and females aged 35-44, 45-54 and 55-64 years in England and Wales, Scotland and Northern Ireland in the years 1950-51 to 1980-81 (1950-67: ICD(7) 420-422; 1968-1978: ICD(8) 410-414; 1979-1981: ICD(9) 410-414).*<sup>1</sup> Source: Office of Population Censuses and Surveys.

Year	England and Wales						Scotland						Northern Ireland					
	35-44		45-54		55-64		35-44		45-54		55-64		35-44		45-54		55-64	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
50-51	33	9	166	43	572	217	55	18	256	74	741	337	49	19	227	82	624	309
52-53	34	7	167	40	557	198	56	17	234	70	760	300	45	18	225	71	642	291
54-55	40	8	180	38	574	190	64	17	267	72	775	304	51	17	214	78	657	316
56-57	42	7	190	36	592	188	60	15	276	69	810	309	52	17	240	67	724	280
58-59	46	7	199	37	613	188	69	19	278	65	821	307	66	15	267	75	784	307
60-61	51	8	212	38	641	192	75	14	311	72	892	323	73	13	266	68	810	293
62-63	59	9	233	42	691	202	82	17	335	79	924	329	78	20	302	81	876	295
64-65	66	11	249	43	700	197	92	17	360	89	959	326	88	17	300	76	830	282
66-67	65	10	247	44	698	196	88	18	337	81	896	316	78	17	302	60	825	276
68-69	62	11	253	43	697	187	82	14	328	77	875	306	79	13	288	61	816	276
70-71	66	10	268	44	702	189	80	19	348	82	891	308	85	15	312	71	889	285
72-73	65	11	288	51	733	196	91	17	366	90	966	330	70	17	366	60	904	323
74-75	63	11	290	51	728	208	85	18	356	84	928	336	84	8	362	70	925	267
76-77	60	10	272	50	721	201	71	19	342	80	915	317	75	13	336	70	906	313
78-79	59	10	278	53	731	202	72	17	359	85	910	313	55	12	332	70	902	320
80-81	53	9	256	46	697	197	69	13	347	77	870	305	66	13	291	64	951	289

**Table 3.2:** *Death rates for coronary heart disease (ICD 410-414) for the fifteen highest ranking countries in 1978 (age standardized rates/100 000; 35-74 year age group).*<sup>15</sup>

Males		Females	
Finland	664	Scotland	256
Scotland	656	Northern Ireland	233
Northern Ireland	653	Israel	207
Ireland	542	Ireland	200
England and Wales	533	New Zealand	196
New Zealand	529	USA	187
USA	506	Australia	186
Australia	499	Finland	177
Canada	457	England and Wales	173
Denmark	443	Hungary	168
Sweden	436	Bulgaria	162
Hungary	420	Canada	155
Norway	414	Denmark	141
Israel	395	Sweden	132
Netherlands	379	Austria	119

## 3.2 Diet in the United Kingdom

3.2.1 Tables 3.3 and 3.4 give data from the Food Consumption Level Estimates (from 1952) and from the National Food Survey<sup>16</sup> (from 1950). The Consumption Level Estimates are based on the total national production of food in the United Kingdom, together with allowances made for imports and exports, whereas the National Food Survey is derived from foods entering households in Great Britain. The National Food Survey estimate is not complete because it does not include alcoholic drinks, sweets or chocolates and does not make full allowance for food eaten outside the home.



**Table 3.3:** *The mean energy (excluding alcohol) and the protein, fat and carbohydrate content of the total food supplies of the United Kingdom (Food Consumption Level Estimates) from 1952 to 1982 expressed as the amount per person per day, and the percentage of the total food energy supplied by protein, fat and carbohydrate. In 1980 changes in methods resulted in two estimates. Source: Ministry of Agriculture Fisheries and Food.*

Year	Energy		Protein		Fat		Carbohydrate	
	kcal	MJ	g	% energy	g	% energy	g	% energy
1952	3030	12.7	82	10.8	124	36.8	424	52.4
1953	3100	13.0	82	10.6	130	37.8	425	51.5
1954	3190	13.3	82	10.3	138	38.9	431	50.7
1955	3170	13.3	82	10.4	139	39.5	425	50.3
1956	3170	13.3	83	10.5	139	39.5	422	49.9
1957	3180	13.3	83	10.5	140	39.6	422	49.8
1958	3180	13.3	83	10.5	141	39.9	423	49.9
1959	3130	13.1	84	10.7	138	39.6	415	49.8
1960	3140	13.1	85	10.8	138	39.6	416	49.7
1961	3150	13.2	85	10.8	140	40.0	413	49.2
1962	3170	13.3	87	11.0	144	40.9	408	48.3
1963	3180	13.3	87	10.9	143	40.5	412	48.6
1964	3160	13.2	87	11.0	144	41.0	405	48.1
1965	3140	13.2	87	11.1	140	40.1	404	48.2
1966	3160	13.2	86	10.9	144	41.0	403	47.8
1967	3080	12.9	85	11.1	143	41.8	387	47.1
1968	3090	12.9	85	11.0	144	41.9	387	47.0
1969	3110	13.0	86	11.0	146	42.3	389	46.9
1970	3110	13.0	86	11.1	145	42.0	390	47.0
1971	3080	12.9	85	11.0	144	42.1	385	46.9
1972	3070	12.8	85	11.1	143	41.9	386	47.1
1973	3040	12.7	84	11.1	141	41.6	384	47.3
1974	2960	12.4	84	11.3	132	40.2	383	48.5
1975	2920	12.2	84	11.5	130	40.1	376	48.4
1976	2920	12.2	83	11.4	130	40.1	378	48.5
1977	2930	12.3	83	11.3	131	40.3	378	48.4
1978	2920	12.2	83	11.3	130	40.0	379	48.7
1979	2950	12.3	85	11.5	134	40.8	375	47.7
1980	2850	11.9	82	11.5	128	40.6	363	47.9
1980	2780	11.7	82	11.6	125	40.5	364	47.9
1981	2770	11.6	81	11.6	126	40.9	359	47.5
1982	2800	11.8	81	11.3	128	41.1	364	47.6

3.2.2 Before 1950, such data as are available suggest that the average intake of energy per person increased by about 300–400 kcal/day (1.3–1.7 MJ) from the early 1920s up to 1950. The proportion of protein in the diet remained fairly constant (at 11 to 12 per cent of total energy). The percentage energy from fat in the diet remained comparatively constant at about 36–37 per cent. The proportionate quantity of carbohydrate decreased until the 1930s and then rose a little during and immediately after the 1939–1945 war to 52–54 per cent of the energy intake.

3.2.3 The equivalent data for the average diet since 1950 are recorded in Table 3.4. These data suggest that the total energy content of the diet per head in the average household continued to rise slightly until the mid 1950s. Since then it has declined gradually but consistently so that it is now about 400 kcal/day (1.7 MJ) less than it was in 1960. Protein has remained fairly constant

with perhaps a small increase in the last 10 years. The percentage of energy from fat in the diet increased from about 37 per cent in 1950 up to 42 per cent since the late 1960s. The National Food Survey data show no sign that this has been decreasing in the past few years. Carbohydrate intakes show the opposite trend; as fat has been increasing so carbohydrate has occupied a steadily decreasing proportion of the total energy—from about 51 per cent in the early 1950s to about 45 per cent in recent years. Within the total for carbohydrate, consumption of sucrose has decreased. It remained relatively steady until the early 1970s with a sudden drop of about 12 per cent in 1974–1975 and a further fall within the past 4 or 5 years. Intake per head is now about 20 per cent less than in 1974.

**Table 3.4:** *The mean energy (excluding alcohol) and the protein, fat and carbohydrate content of the diet of the average household in Great Britain from 1950–1982 expressed as the amount per person per day, and the percentage of the total food energy supplied by protein, fat and carbohydrate. In 1960 and 1974 changes in methods resulted in two estimates. Source: National Food Survey.<sup>16</sup>*

Year	Energy		Protein		Fat		Carbohydrate	
	kcal	MJ	g	% energy	g	% energy	g	% energy
1950	2470	10.3	78	12.5	102	36.8	315	50.6
1951	2470	10.3	76	12.3	100	36.4	318	51.4
1952	2450	10.2	77	12.6	94	34.5	324	52.9
1953	2520	10.5	78	12.4	101	36.0	325	51.6
1954	2630	11.0	77	11.7	107	36.5	340	51.8
1955	2640	11.0	77	11.6	107	36.6	342	51.7
1956	2620	11.0	76	11.5	108	37.1	337	51.4
1957	2590	10.8	75	11.6	110	38.1	325	50.3
1958	2600	10.9	75	11.5	111	38.3	325	50.2
1959	2580	10.8	74	11.5	110	38.3	324	50.3
1960	2590	10.8	76	11.7	112	38.9	320	49.4
1960	2630	11.0	75	11.4	115	39.3	345	49.3
1961	2630	11.0	75	11.4	116	39.6	343	49.0
1962	2640	11.0	75	11.4	117	40.0	342	48.6
1963	2650	11.1	76	11.5	118	39.8	343	48.5
1964	2600	10.9	75	11.6	116	40.3	333	48.0
1965	2590	10.9	75	11.6	116	40.4	332	47.9
1966	2560	10.7	76	11.8	117	41.0	321	47.0
1967	2590	10.8	76	11.7	119	41.3	324	47.0
1968	2560	10.7	75	11.8	118	41.5	318	46.6
1969	2570	10.8	74	11.6	120	42.0	317	46.3
1970	2600	10.9	75	11.5	121	41.8	322	46.5
1971	2530	10.6	74	11.6	119	42.3	310	46.0
1972	2430	10.2	73	11.9	112	41.5	301	46.4
1973	2400	10.0	71	12.0	111	42.0	293	46.0
1974	2360	9.8	70	11.9	110	41.9	288	46.1
1974	2320	9.7	71	12.3	106	41.3	287	46.4
1975	2290	9.6	72	12.6	107	42.2	275	45.2
1976	2280	9.6	72	12.7	105	41.7	277	45.7
1977	2260	9.5	72	12.8	105	41.9	273	45.3
1978	2260	9.5	73	12.9	106	42.0	272	45.1
1979	2250	9.5	73	13.0	106	42.4	268	44.6
1980	2230	9.4	73	13.0	106	42.6	264	44.4
1981	2210	9.3	72	12.9	104	42.2	264	44.9
1982	2180	9.1	70	12.9	103	42.6	258	44.5

3.2.4 The ratio of polyunsaturated to saturated fatty acids (the P/S ratio) has altered since 1959. Table 3.5 shows a decline in the saturated fatty acids from 53 g/head/day in 1959 and 57 g/head/day in 1969 down to 44 g/head/day in 1982. Polyunsaturated fatty acids increased from 9 g in 1959 and 11 g/head/day in 1969 to 12 g in 1982; the two effects combined have resulted in a P/S ratio of 0.17–0.19 in 1959–69 being increased to 0.27 in 1982.

**Table 3.5:** *Fatty acids (g/person/day) and ratio of polyunsaturated/saturated fatty acids (P/S ratio) in the average household diet.<sup>2,16</sup> In 1974 changes in methods resulted in two estimates.*

Year	Saturated	Monounsaturated	Polyunsaturated	P/S ratio
1959	53.0	43.0	9.2	0.17
1969	56.7	46.5	11.0	0.19
1972	52.0	42.9	11.5	0.22
1973	51.5	41.9	11.5	0.22
1974	51.4	41.2	10.8	0.21
1974	50.7	39.8	10.6	0.20
1975	51.7	39.8	10.1	0.19
1976	50.1	39.7	10.5	0.20
1977	47.5	39.0	10.4	0.21
1978	47.2	39.3	10.6	0.22
1979	47.8	39.7	10.7	0.22
1980	46.8	39.6	11.3	0.24
1981	45.6	38.9	11.4	0.25
1982	44.4	38.7	12.1	0.27

3.2.5 In addition to saturated fatty acids being reduced by about 10 g/head/day, monounsaturated fatty acids also were less by about 5–8 g/head/day giving the impression that an appreciable decline in total fat intake has coincided with an obvious increase in the proportion of fat in the diet. The explanation is that the total energy content of the diet has fallen. In other words less fat is being eaten now, on average, but it constitutes a higher proportion of the total energy relative to 25–30 years ago. A likely explanation for the decline in energy consumption is a decline in physical activity.

**Table 3.6:** *Dietary fibre in the British household diet (g/person/day) between 1956 and 1982.<sup>17,18,19</sup> Changes in methods resulted in two estimates for 1982.*

Year	Hexoses	Pentoses	Uronic acids	Non-cellulose poly-saccharides	Cellulose	Lignin	Total dietary fibre
1956	9.9	2.4	3.4	15.7	5.7	1.1	22.5
1961	9.5	2.3	3.3	15.1	5.6	1.0	21.7
1966	9.0	2.4	3.3	14.8	5.3	1.1	21.2
1971	8.9	2.5	3.3	14.8	5.2	1.0	21.2
1972	8.7	2.4	3.3	14.5	5.1	1.0	20.6
1973	8.6	2.4	3.2	14.4	5.1	1.0	20.5
1974	8.6	2.4	3.2	14.3	5.1	1.0	20.4
1976	8.2	2.5	3.1	13.9	4.8	1.0	19.7
1982	8.2	2.7	2.2	13.2	5.6	1.0	19.8
1982	8.7	4.1	2.1	14.9	5.7	1.7	22.2



3.2.6 The fibre content of the British household diet since 1956 is given in Table 3.6. Remarkably little alteration in absolute quantities seems to have taken place although, since total energy has fallen, the proportion of fibre in the diet must have increased.

3.2.7 To the best of our knowledge there is no adequate information on trends in consumption of common salt.

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## 4. Summary of the Basis of the Recommendations

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This brief summary of the lines of evidence which form the basis of our major recommendations is included mainly for the benefit of those who may wish to evaluate the report but are not familiar with the scientific background. We have not attempted to give a comprehensive account because such an account must either be inappropriately long, or else selective and hence subject to bias. There are a number of recent reviews of the subject matter summarized below and references to some of them are appended to each subsection.

### 4.1 Fat and fatty acids

4.1.1 The recommendations concerning dietary fat in this report are based on several lines of evidence relating dietary intake of saturated fatty acids to the incidence of coronary heart disease. The most direct evidence is given in 4.1.2. The other lines of evidence are indirect.

4.1.2 Comparisons between countries have shown a strong positive relationship between the proportion of dietary energy derived from saturated fatty acids and mortality from coronary heart disease. There is also some evidence for an inverse (or negative) relationship between both dietary intake and blood and adipocyte lipid contents of linoleic acid (a polyunsaturated fatty acid) and mortality from coronary heart disease. Within any one country there is no convincing evidence for such relationships, except possibly for blood and adipocyte lipid contents of linoleic acid.

4.1.3 Within any one of several countries a strong positive but curvilinear relationship has been established between total plasma cholesterol and the incidence of coronary heart disease. Inherited forms of hypercholesterolaemia have provided the strongest evidence for this relationship. Not only is the incidence of coronary heart disease increased grossly in these disorders, but clinical manifestations appear at a much earlier age.

4.1.4 Isocaloric and other dietary studies in man have shown that dietary saturated fatty acids increase plasma total cholesterol whereas dietary polyunsaturated fatty acids decrease plasma total cholesterol.

4.1.5 Studies in primates other than man have shown that diets high in saturated fatty acids can lead to cholesterol-rich atherosclerotic lesions in coronary arteries. The relevance of such studies to man is not known.



4.1.6 There is emerging evidence, requiring more evaluation, that reduction of plasma cholesterol in man may be associated with slower progression—or possibly regression—of partly obstructing atherosclerotic lesions in femoral and coronary arteries.

4.1.7 There is evidence in animal species that coagulation indices and the development of intravascular thrombosis may be increased by dietary intake of saturated fatty acids and decreased by dietary intake of polyunsaturated fatty acids. Evidence in man is insufficient for such a conclusion.

4.1.8 In controlled clinical trials in which total plasma cholesterol has been decreased by diet, or diet plus cholesterol-lowering drugs, or cholesterol-lowering drugs alone *in people with initially high total plasma cholesterol* the incidence of coronary heart disease has been reduced.

4.1.9 There has been no controlled clinical trial of the effect of decreasing dietary intake of saturated fatty acids on the incidence of coronary heart disease nor is it likely that such a trial will be undertaken. The cost, with sufficient numbers over a sufficient period of time, is prohibitive. Multiple risk factor intervention trials (directed mainly at diet and smoking) have not shown convincing evidence of benefit but most of the participants in these trials have been middle-aged.

4.1.10 In some countries national dietary recommendations have included substantial increases in the P/S ratio possibly for reasons given in 4.1.2, 4.1.4 and 4.1.7. The Panel does not regard the evidence as sufficient grounds for recommending a substantial increase for the general population in the United Kingdom. The P/S ratio that we recommend is common in many countries with a lower incidence of coronary heart disease and carries no obvious disadvantages. The population effects of P/S ratios of 1 and beyond are unknown.

4.1.11 Nine of the ten members of the Panel have concluded individually that there is sufficient consistency in this evidence to make it more likely than not that the incidence of coronary heart disease will be reduced, or its age of onset delayed, by decreasing dietary intake of saturated fatty acids and total fat. We are all agreed that the evidence falls short of proof. The tenth member believes that this evidence is insufficient but that benefit may accrue insofar as the recommended change in diet contributes to the avoidance of obesity.

4.1.12 A more detailed account of evidence may be found in a recent monograph on cholesterol<sup>20</sup> and in the Rationale of the Diet-Heart Statement of the American Heart Association.<sup>13</sup>

## 4.2 Common salt

4.2.1 High salt intakes have frequently been linked with the prevalence of high blood pressure in communities but a mechanism whereby salt could lead to the development of essential hypertension has not been established.

4.2.2 Cross-cultural studies show a statistical association between estimates of salt intake and the average blood pressure of a community but detailed investigations within a single community frequently fail to demonstrate such a relationship. Complicating factors may be the difficulty in establishing the habitual salt intake of individuals, the presence of only a minority of salt-sensitive individuals within a population, and the possible effects of weight gain, high fat and low potassium intake in promoting a rise in blood pressure. Reducing fat intake leads to a fall in blood pressure in some studies and an increase in potassium intake sometimes has a similar effect. Prolonged studies with these dietary manipulations are rarely performed but community studies in Finland and Belgium suggest that a variety of dietary changes do lead to a fall in average blood pressure.

4.2.3 Some feeding trials on normotensive and hypertensive adults show small reductions in blood pressure when salt intake is deliberately reduced, the effect being greater in those with high blood pressure.

4.2.4 Recently it has been suggested that the hormonal response to manipulating sodium intakes (i.e. changes in renin and aldosterone secretion) depends on the chloride rather than the sodium moiety of salt. This observation and animal studies showing chloride sensitivity in some of the genetic models for hypertension suggest that the sodium content of salt is not necessarily responsible for change in blood pressure.

4.2.5 A more detailed account of evidence may be found in the World Health Organization's Report on the Primary Prevention of Essential Hypertension.<sup>21</sup>

### **4.3 Dietary fibre and complex carbohydrates**

4.3.1 Epidemiological studies carried out in the United Kingdom, Puerto Rico, Hawaii, and Holland suggest that high intakes of dietary fibre or complex carbohydrates are associated with a reduced incidence of coronary heart disease. It is not possible to establish conclusively that this effect is independent of all other dietary variables. In each of these studies dietary fibre or complex carbohydrates is either one of the strongest or the only dietary variable related to coronary heart disease.

4.3.2 Dietary fibre favourably influences blood concentrations of cholesterol and glucose, and there is some evidence of favourable influence on certain haemostatic variables shown to be associated with an increased risk of coronary heart disease. It is difficult to disentangle separate effects of dietary fibre and complex carbohydrate because they are usually present together in food.

4.3.3 The various components of dietary fibre may exert different effects. The gel types appear to have the most marked effects on blood cholesterol and glucose. However, epidemiological data suggest that cereal fibre is protective against coronary heart disease.



4.3.4 No specific dietary intervention studies have been undertaken, though an increase in fibre-rich carbohydrate was part of the overall diet strategy in the Oslo Prospective Heart Disease Study.

4.3.5 The present United Kingdom diet in adults contains approximately 20 g fibre/day (see Table 3.6). An increase in intake of approximately 50 per cent could be beneficial in other respects, but the protective effect in relation to coronary heart disease has not been adequately tested. An increase in intake of some foods containing cereal fibre (especially commercially available breads) may increase intake of common salt.

4.3.6 A more detailed account of the evidence (including effects of fibre in other diseases) may be found in the Report of the Royal College of Physicians on Medical Aspects of Dietary Fibre.<sup>22</sup>

## 4.4 Obesity

4.4.1 Obesity has traditionally been defined as present when weight is more than 20 per cent above the upper level of the desirable weight for height (calculated from data collected for the Build and Blood Pressure Study in the pre-war period and presented by the Metropolitan Life Insurance Company of New York). In the same terms overweight refers to those who exceed the upper level.

4.4.2 More recent insurance statistics have led to the proposal that an upward revision of the weight standard is warranted, but when the excess mortality of the thinner smokers is taken into account then the original tables are seen to be appropriate for both smokers and non-smokers of both sexes. These standards are derived from data on very large numbers of insured adults in the United States, and are consistent with smaller scale British epidemiological surveys and with a large recent independent USA study of smokers and non-smokers.

4.4.3 There has been a progressive increase in the average weight for height of adults in Britain over the last 40 years and by 1981 over 40 per cent of middle-aged men and women were overweight.<sup>23</sup> The environmental factors accounting for this weight increase are many including a decline in physical activity and change in dietary patterns. Diets rich in fat and simple sugars and with little dietary fibre are considered conducive to weight gain.

4.4.4 There is an increased risk of coronary heart disease in the overweight especially in younger men. In this group mortality from coronary heart disease was, for example, approximately 30 per cent higher in those with a relative weight excess of 10 per cent.

4.4.5 Overweight is associated with an increased risk of hypertension, increased plasma cholesterol and diabetes mellitus. These may account for at least part of the increased risk of coronary heart disease. Most studies have shown no residual effect of weight on risk once age, sex and the above risk factors have been taken into account.

4.4.6 A more detailed account of evidence may be found in the Report on Obesity of the Royal College of Physicians.<sup>6</sup>

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## 5. Achieving the Recommendations for Dietary Change

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5.1 Our recommendations, especially those for fat, were formulated to take account of practical considerations in the United Kingdom and to provide a diet capable of satisfying all relevant age groups (2.1.1 and 2.1.1.3; 1.4.4 and 1.5.6). The purpose of this section is to show the credibility of these statements and to give general guidance (in quantitative terms where possible) as to how the recommendations may be implemented.

5.2 It was not part of our remit to provide detailed information about the various dietary changes which individuals or families could adopt in implementing the recommendations. We recognize that this information is an essential requirement and we have recommended that means should be found of providing it (2.3.1). Simple methods are needed so that individuals who wish to follow the recommendations can assess their present diet and determine what changes are required.

5.3 Table 5.1 shows the major sources of saturated and polyunsaturated fatty acids, and of total fat in the diet in Great Britain in 1981. The table shows also total intakes (inclusive of trans fatty acids), and the intakes and associated changes required to implement the recommendations. The data are from Tables 33 and 34 of the Annual Report for 1981 of the National Food Survey Committee<sup>3</sup> except for trans fatty acids which are taken from a recent study on fatty acids and sterols in the British diet.<sup>4</sup> The major sources of saturated fatty acids are milk and cream (approximately one-fifth), meat and meat products (approximately one-quarter), butter, margarines and cheese (approximately one-third) and cooking fats and oils (approximately one-tenth).

5.4 Milk and cheese are foods available in alternative forms with lower contents of saturated fatty acids and fats. These constituents are about halved in semi-skimmed milk and largely absent from skimmed milk. Cheeses are available (both hard and soft) with contents of saturated fatty acids and fat which are about two-thirds of those of cheeses currently consumed in the average diet.<sup>3</sup> About 40 per cent of the decreases in saturated fatty acids and fat recommended nationally could be achieved by avoiding cream, replacing whole milk with semi-skimmed milk and switching to the lower fat cheeses. If skimmed milk was used approximately 80 per cent of the decreases recommended nationally could be accomplished.

5.5 Meat and meat products are foods for which alternative forms with lower contents of saturated fatty acids and fat are becoming more widely available as



a result of changes in husbandry or in manufacturing processes. Consumption of saturated fatty acids could be decreased now by substituting, for example, some non-fatty fish (relative content of saturated fatty acids about 5 per cent) or poultry e.g. chicken (relative content about 30 per cent).

**Table 5.1:** Major sources of fat and of saturated and polyunsaturated fatty acids in the diet in Great Britain. National averages 1981.<sup>3</sup>

Food item	Fat		Fatty acids			
	g/day	% total	Saturated g/day	% total	Polyunsaturated g/day	% total
all milk, cream	14.5	14.0	8.5	18.8	0.4	4.0
cheese	5.0	4.9	3.0	6.6	0.1	1.2
all meat	28.0	27.0	11.5	25.3	2.0	17.2
butter	12.3	11.9	7.3	16.0	0.3	3.0
margarine	13.5	13.1	4.5	9.9	2.6	23.1
other fats	12.1	11.7	4.3	9.4	2.3	20.3
biscuits	4.5	4.4	2.3	5.0	0.5	4.4
<b>Total of items</b>	<b>89.9</b>	<b>87.0</b>	<b>41.4</b>	<b>91.0</b>	<b>8.2</b>	<b>73.2</b>
Overall total with trans fatty acids*	104		49		11.4	
Recommended total	87		37		up to 16.7	
Recommended change	-17		-12		up to +5.3	

\*Trans fatty acids, 4.3 per cent of all fatty acids.<sup>4</sup> Total energy 9.3 MJ (2210 kcal). Meat includes poultry, offal, other meat products.

5.6 Butter, margarine and other fats (lard, compound cooking fats and oils) are foods where substitutes (for butter) or alternatives (for other categories) with a lower content of saturated (plus trans) fatty acids, are available. It is in this group that there is major scope for increasing polyunsaturated fatty acids to assist in implementation. Relative concentrations of saturated plus trans, and polyunsaturated fatty acids (g/100 g food) are shown in Table 5.2. The scope for change in these categories is limited mainly by the recommended P/S ratio of 0.45.

**Table 5.2:** Fatty acids in some edible fats and oils

Food item	Fatty acids (g/100 g food item)	
	Saturated plus trans	Polyunsaturated
butter	59-63	2-3
margarines [1]	39-57	3-10
margarines [2]	21-23	37-46
margarines [3]	30-49	10-28
lard	39-48	9-11
compound cooking fat	46-68	10-14
cooking oils	8-23	35-66

[1] hard (block) margarines; [2] soft margarines low in saturated plus trans fatty acids; [3] other soft margarines. Source: Ministry of Agriculture Fisheries and Food.

5.7 One method of implementing the recommendation for saturated fatty acids and for total fat in the United Kingdom diet is to decrease consumption of fat from each food item in Table 5.1 by about one-quarter. The energy loss (about 1 MJ or 225 kcal) could be made good by increased consumption of bread, other cereals, fruit and vegetables. With wholemeal bread alone the additional consumption needed would be about 105 g/day. The overall effect on other constituents would increase fibre by about 9 g and common salt by about 1 g (simple sugars would be unchanged). The increase in fibre approximates to that which may confer benefit (2.1.7 and 4.3.5). The increase in common salt could be corrected by a decrease of about one-third in salt used in cooking or at table.

5.8 An alternative approach, likely to be more acceptable and therefore to be recommended, requires a smaller decrease in fat through an increase in polyunsaturated fatty acids. For most people this will necessitate shifts in consumption between butter, margarines and other fats and cooking oils (see 5.6). The energy loss occasioned by this approach is about 0.7–1 MJ or 150–220 kcal depending upon the food items that are changed. This loss may be made good as described in 5.7.

5.9 We have satisfied ourselves that the recommended total intakes and the recommended changes in intake of fat, saturated plus trans fatty acids, and polyunsaturated fatty acids (bottom of Table 5.1) conform with practical considerations in the United Kingdom (see 5.1). We have tested this by constructing diets based on the principles in 5.4, 5.5, 5.6 and 5.8, and recording quantities, as in Table 5.1. No record is given here because some members of the Panel believe that such a record may be taken as a recommendation, and it is not part of our task to make such recommendations (see 5.2).

5.10 If the recommendations contained in this report are implemented by a substantial proportion of the general population then there will be implications for agriculture and food manufacture. Consideration of these implications was not part of our remit although we are sensitive to their importance. The implications for agriculture and food manufacture of more extensive dietary changes than we have recommended here have been considered in detail in a report entitled *Coronary heart disease prevention, plans for action*.<sup>24</sup>

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## 6. Appendices

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### Appendix A: Affiliations of Members of the Panel

#### Chairman

Professor P J Randle      Department of Clinical Biochemistry, University of Oxford

#### Members

Professor C W M Adams      Department of Pathology, Guy's Hospital Medical School, University of London

Professor J V G A Durnin      Institute of Physiology, University of Glasgow

Professor W P T James      The Rowett Research Institute, Aberdeen

Professor H Keen      Department of Medicine, Guy's Hospital Medical School, University of London

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#### Observers

Dr M Ashley-Miller      Scottish Home and Health Department

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Dr D H Buss      Ministry of Agriculture, Fisheries and Food

Mrs M M Disselduff      Department of Health and Social Security, London

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Dr D M D Lambert  
(until March 1984)      Department of Health and Social Security, London



Dr W C D Lovett (until July 1983)	Welsh Office
Dr D J Anderson (from October 1983)	Welsh Office
Dr D J Sloan	Department of Health and Social Services, Northern Ireland
Dr A Yarrow	Department of Health and Social Security, London

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Dr R K Skinner (Scientific)	Department of Health and Social Security, London
Mr K L G Follin (Administrative)	Department of Health and Social Security, London
Mrs N A McAfee (Administrative)	Department of Health and Social Security, London

### **Appendix B: Acknowledgements**

We wish to record our indebtedness to the following colleagues who have assisted us by contributing evidence and to express our thanks for their helpfulness.

Dr M R Alderson	Dr B W Nichols
Dr R Burt	Professor T E Oppé
Professor J Dobbing	Mr C Robbins
Mr C J W Foy	Professor A G Shaper
Dr M I Gurr	Miss Caroline Walker
Professor June K Lloyd	Dr G C M Watt
Dr M G Marmot	Dr R J Wawman
Miss Jean Marr	Dr D R R Williams

### **Appendix C: Major topics reviewed by the Panel in relation to cardiovascular diseases and diet.**

Mortality rates in the United Kingdom and in England and Wales, Scotland and Northern Ireland.

Diet in the United Kingdom.

Trends in coronary heart disease mortality: sudden cardiac death.

Reports on diet and cardiovascular diseases in other countries.

The role of classes of lipids in the diet, in the circulation and in the tissues: lipids



and thrombosis: polyunsaturated fatty acids: oxysterols, trans fatty acids.  
Serum cholesterol and non-cardiovascular mortality.  
Proteins, carbohydrates, dietary fibre, vitamins, trace elements.  
Alcohol.  
Smoking.  
Minerals and blood pressure.  
Obesity, exercise.  
Oral contraceptives and diet.  
Clinical trials of dietary manipulation and of clofibrate and cholestyramine.  
Diabetes mellitus and diet.  
The natural history of cardiovascular diseases, including immunological aspects and the regression of atherosclerosis.

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