



Dietary aspects of a health strategy for England

S Bingham

Diet has a key role in the prevention of the major life threatening conditions of middle and later life, especially cardiovascular disease and probably cancer. Its role in the aetiology of diabetes, osteoporosis, arthritis, inflammatory bowel disease, and dementia is also under investigation. The benefit of a correct diet in preventing constipation, obesity, and dental caries has been proved. All this is in addition to its classic roles in growth, maintaining normal physiological functions, and preventing deficiency diseases such as anaemia, rickets, and pellagra. In cardiovascular disease and cancer alone, conditions which account for over 60% of deaths in the United Kingdom, about 30% of attributable risk can probably be ascribed to diet.

With this substantial contribution to health and prevention of disease, it is not surprising that diet is a recurring theme throughout the recent green paper *The Health of the Nation*.¹ However, political acceptance of the potential for good health through food represents a remarkable change of emphasis that should have wide ranging consequences for agriculture, the food industry, advertising, food science, departments of public health, and ultimately the consumer.

The case for diet as a key target in the health strategy is easy to justify. Mortality from coronary heart disease in the United Kingdom is among the highest in the world, accounting for more deaths and more premature deaths than any other single cause. Though genetic variation in apolipoproteins is important in determining susceptibility to coronary heart disease, about half the risk is attributable to smoking, high blood pressure, and raised serum cholesterol concentrations, with the last two being profoundly affected by diet. Hypertension, which is a risk factor for stroke, is related to alcohol consumption, obesity, high dietary sodium intake, and reduced intakes of potassium and possibly calcium and magnesium²; relative risk of stroke is increased fourfold in people with usual diastolic blood pressures of 105 mm Hg and above.³

Consumption of fatty acids

The effect of different saturated fatty acids on serum cholesterol concentrations and associated coronary heart disease risk is well established.^{4,5} Genetic control means that there are substantial individual differences in serum cholesterol responses and this partly accounts for the low correlation between single estimates of diet and serum cholesterol measurements.⁶ Other dietary

factors associated with coronary heart disease include obesity, alcohol, and the protective effect of antioxidant vitamins, dietary fibre, and minerals. These may explain some anomalies in the epidemiology but do not negate the substantial case against saturated fats. Saturated fatty acids and dietary cholesterol suppress low density lipoprotein receptor activity, and controlled metabolic studies have repeatedly confirmed that they raise serum cholesterol concentrations.²

Sixty seven per cent of the variance in plasma cholesterol concentration is attributable to myristic acid (C14) which is found in dairy fats and meat, with palmitic acid (C16) having a lesser effect. There is no evidence that stearic acid (C18) or shorter chain saturated fatty acids (less than C14) raise serum cholesterol concentrations.⁴ Another role for dietary fat is that of the ω 3 polyunsaturated fats (fish oils), which inhibit thromboxane A₃ and hence reduce blood clotting.⁷ The role of monounsaturates (in olive oil) characteristic of the Mediterranean diet in the prevention of coronary heart disease and of stroke is less clear. Populations at low risk of coronary heart disease with a high intake of monounsaturated fatty acids also consume low amounts of saturated fatty acids.³

Given the weight of evidence that consumption of saturated fat is related to risk of coronary heart disease, how much should we be eating? The average serum cholesterol concentration in British adults is currently 5.8 mmol/l, and about two thirds of the population have concentrations above the desirable level of 5.2 mmol/l.⁸ Average intake of saturated fatty acids is 36.5 g/day, or 16% of total dietary energy. The recently published dietary reference values recommend a reduction of saturated fat to 10% of total dietary energy,⁴ which should result in an average lowering of cholesterol concentrations by 0.4 mmol/l to 5.4 mmol/l. A greater reduction in coronary heart disease will be achieved if these changes are confined to C14 and C16 fatty acids and if consumption of soluble non-starch polysaccharide (dietary fibre) is increased.⁴

The green paper targets are set in terms of population distributions for food energy (excluding alcohol) (table 1) but are consistent with the average recommended dietary reference values. The ultimate goal of the green paper proposals is for a 30% reduction in premature deaths from coronary heart disease between 1988 and 2000, to be achieved partly by the above dietary change, together with a reduction in smoking, increased physical activity, and reduction in hypertension. If the reduction in saturated fat intake is achieved, the goal is theoretically achievable as the relation between serum cholesterol concentration and mortality from coronary heart disease alone predicts about a 20% fall in mortality with a reduction of serum cholesterol concentration from 5.8 to 5.4 mmol/l.⁵

Other targets

The second target is that at least 50% of the population should derive less than 35% of their food energy from total fat by the year 2005. This is equivalent to a population average for total fat consumption of 35% compared with present day levels of

Medical Research Council
Dunn Clinical Nutrition
Centre, Cambridge
CB2 1QL
S Bingham, PHD, scientific
staff

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TABLE 1—Government population distribution targets for food consumption and obesity related to present distributions, and present and recommended consumption of saturated and total fat

	Proportion of population (%)		Population average consumption as proportion of food energy (%)	
	Target distribution for 2005	Present distribution	Present	Dietary recommended value ⁴
Derive <15% food energy from saturated fat	60	29	17	11
Derive <35% food energy from total fat	50	14	40	35
Obesity	<7	10		
Men drinking >21 units alcohol/week	17	34		
Women drinking >14 units alcohol/week	6	11		

40%. Present evidence is that intakes of other fatty acids should not increase to compensate for the reduction in saturated fatty acids so that total fat has to decrease.

Currently, 10% of the adult British population is obese, a proportion which has increased from 7% in 1980.^{8,9} For its third target, the green paper proposes a reversal of this trend so that the proportion of obese adults should again return to 7% by 2005. This is equivalent to about a 2 kg reduction in average weight, which could easily be achieved by a few extra minutes a day spent walking. The proposed reduction in total fat consumption alone would be more than sufficient to provide the daily 16 kJ energy deficit necessary to achieve the targeted weight reduction within 10 years as low fat diets do not favour fat storage and the energy cost of storage is higher.¹⁰

The fourth goal is for a reduction in alcohol consumption towards the recommended safe levels of 14 units a week for women and 21 units for men. Alcohol may account for hypertension in 10-15% of patients,³ and alcoholic drinks have been graded by the WHO International Agency for Research on Cancer as a group 1 carcinogen in cancer of the oral cavity, pharynx, larynx, oesophagus and liver.¹¹

Overall, the dietary goals set out in the green paper are based on credible data, and they will be widely welcomed by all who have an interest in improving health. They are open to amendment in the light of recently published recommendations on starch, non-starch polysaccharides, salt, and sugars.⁴ Adoption of these recommendations will assist in reaching other targets such as the control of diabetes and its complications, reduction in dental caries, and an increase in fruit and vegetable consumption. A healthy diet including fruits and vegetables is acknowledged to be important in reducing preventable deaths and ill health in pregnant women, infants, and children.¹

No dietary goals have been set for prevention of cancer, with reliance instead placed on screening for breast and cervical cancer and stopping smoking to reduce mortality and ill health. The green paper acknowledges that diet is responsible for at least 10% of cancers, although attributable risk is presently put at 35%, with a maximum of 75%.¹² The recent Committee on Medical Aspects of Food Policy report recommends a 50% increase in consumption of non-starch polysaccharides, which fits well with current recommendations, based on preliminary data, to increase fruit, vegetable, cereal, and fibre consumption. In case-control studies these foods all seem to reduce the risk of bowel, oesophageal, lung, and gastric cancer. The effects of fat, meat, and salt remain uncertain, but recommendations to reduce saturated and total fat may also help to reduce the risk of cancers.¹³

Meeting the targets

What are the consequences of these targets on the nation's choice of food? Table II sets out possible ways in which average diets could be altered to meet these goals and the dietary recommended values. To achieve the recommended values for non-starch polysaccharides, starch, and sugar vegetable consumption needs to be doubled and fruit, bread, and potato consumption needs to be increased by at least 50%. Towards reducing intake of saturated fatty acids by about 13 g a simple change from full fat to semi-skimmed milk and from full fat to low fat spreads will reduce fat consumption by 6 g. A change from average fat to lean meat might achieve a further 3 g reduction, and halving consumption of biscuits, cakes, puddings, chips, crisps, and chocolate (which currently supply 24% of the total intake of saturated fatty acids) would achieve the remaining 4 g. Consumption of soft drinks and table sugar would need to be halved to make the necessary 25 g reduction in non-milk extrinsic sugars. By definition, half the population will need to make more and half make less than these changes, with older age groups requiring greater changes because serum cholesterol concentrations, body weight, and saturated fat consumption are all greater in these groups than in 25-34 year olds.⁸

Changing eating habits

Are such changes achievable? Present evidence suggests that their adoption is unlikely to be achieved by dissemination of information from guidelines, booklets, and advice by health educators alone. There have been some recent changes in the British diet, such as increased sales of skimmed milk, low fat spreads, and wholemeal bread, yet intakes of fat as a percentage of total energy have apparently not decreased.¹⁴ A system of nutritional surveillance of individual dietary intakes is now in place, and this will be invaluable in monitoring any progress after the adoption of these proposals.

The political acceptance of the need to change food habits in England does, however, mean that progress is possible in making sure these goals are met. Rationing of the food supply, or taxation of saturated fats and sucrose is hardly a political alternative, but there are less oppressive ways in which legislation could effect changes in food habits.

Firstly, the importance of nutrition must be re-established in the nation's mind, from schoolchildren onwards. The national palate needs re-educating, and healthy cooking and food choice must be taught. Low fat cookery needs special skills in, for example, the use of herbs and spices and low fat sauces and in vegetable cookery; a wide variety of fresh, different, healthy, and inexpensive foods have become available in recent

TABLE II—Possible change in average consumption of foods to achieve government targets for 2005 and dietary recommended values^a

Food	Present intake ^b (g)	Possible future intake (g)	Contributions to required alterations in				Proportional change in intake
			Saturated fatty acids (g)	Non-milk extrinsic sugars (g)	Non-starch polysaccharides (g)	Starch and other sugars (g)	
Wholemeal and other bread	43	110			2.2	50	2.5
White bread	65	85			0.3	10	1.3
Vegetables	135	270			3.0	11	2.0
Fruit	73	110			0.3	4	1.5
Potatoes	132	200			0.8	13	1.5
Biscuits, cakes, puddings	80	40	-2.4	-8			0.5
Whole to semi-skimmed milk	164	164	-2.0				1.0
Saturated to low fat spreads	10	10	-4.0				1.0
Meat to leaner meat	150	150	-3.0				1.0
Chips, crisps and change to lower fat products	62	31	-1.2				0.5
Chocolate	9	5	-0.7	-2			0.5
Sugar, preserves	23	12		-12			0.5
Beverages, soft drinks	100	50		-3			0.5
Total			-13	-25	6.5	88*	

^aIncludes allowance for the reduction in sources of non-milk extrinsic sugars.

years. Curricula in schools and for caterers should devote more attention to this and less to traditional cookery methods, which usually require a lot of fat. Catering contracts to hospitals and possibly educational institutions could include legal requirements to provide food which meets the target levels, on a par with current regulations on food hygiene.

The consumer also needs to know what is in packaged food. Food labelling should become mandatory and include ready made and possibly restaurant meals. Supermarkets can assist consumers by displaying low fat foods in prominent areas and by possibly introducing designated "healthy shopping" areas. More dietitians need to be trained and available to assist food manufacturers, retailers, the media, and caterers in changing eating habits, and sufficient dietitians must be available to talk directly to patients and the public. Reliance on the dissemination of advice by other health professionals is unsatisfactory because their training in nutrition has been neglected. In one survey, 90% of medical students and doctors thought that their present education in nutrition was inadequate.¹⁵

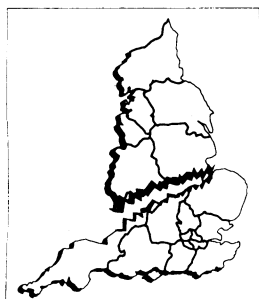
Lastly, the possibility of curbing or opposing the massive amount of advertising for unhealthy food and drink must be considered. Regular television screening within the home goes a long way to overturning the hard work of all those presently participating in health education.

Future targets

And what of the future? There are enormous gaps in

our knowledge of exactly how much and how diet contributes to the cause and prevention of many other diseases, such as cancer. These gaps exist because nutrition research has been neglected since its heyday in the 1920s and 1930s. Only about 3% of the Medical Research Council's budget is currently allocated to nutrition related research. It is to be hoped that a political decision to invest in improved health through dietary measures will increase our knowledge of the effects of diet through adequate funding for medical aspects of nutrition.

- 1 Department of Health. *The health of the nation*. London, HMSO, 1991.
- 2 Department of Health and Human Science. *Surgeon General's report on nutrition and health*. Washington, DC: DHHS, 1988. (Publication 88-50210.)
- 3 World Health Organisation. Diet, nutrition and the prevention of chronic diseases. *WHO Tech Rep Ser* 1990, No 797.
- 4 Committee on Medical Aspects of Food Policy. *Dietary reference values for food energy and nutrients for the United Kingdom*. London: HMSO, 1991.
- 5 Shaper AG. *Coronary heart disease, risks and reasons*. London: Current Medical Literature, 1988.
- 6 Willett W. *Nutritional epidemiology*. New York: Oxford University Press, 1990.
- 7 Leaf A, Weber PC. Cardiovascular effects of n-3 fatty acids. *N Engl J Med* 1988;318:549-57.
- 8 Gregory J, Foster K, Tyler H, Wiseman M. *The dietary and nutritional survey of adults*. London: OPCS, 1990.
- 9 Knight I. *The heights and weights of adults in Great Britain*. London: HMSO, 1984.
- 10 Lean MEJ, James WPT. Metabolic effects of isoenergetic nutrient exchange over 24 hours in relation to obesity in women. *Int J Obes* 1988;12:15-27.
- 11 International Agency for Research on Cancer. *Monograph on evaluation of carcinogenic risks to humans*. Vol 44. *Alcohol drinking*. Lyons: IARC, 1988.
- 12 Doll R, Peto R. Quantitative estimates of avoidable risks of cancer in the US today. *J Natl Cancer Inst* 1981;66:1192-308.
- 13 Bingham S. *Diet and cancer briefing paper*. London: Health Education Authority, 1990.
- 14 Buss DH. Is the British diet improving? *Proc Nutr Soc* 1988;47:295-306.
- 15 Brett A, Godden DJ, Keenan R. Nutritional knowledge of medical staff and students. *Human Nutrition Applied Nutrition* 1986;40A:217-22.



Rehabilitation

D L McLellan

Rehabilitation is a very large subject for this small article. The case that it should be a key area in the government's strategy may be summarised as follows:

- People with disabilities are numerous and their needs great
- The benefits of appropriate intervention are an improvement in the duration and quality of life
- Intervention also improves the contribution that people with disabilities can make to their community and reduces the needs of informal carers
- The government's criteria in *The Health of the Nation*¹ specifically justify including rehabilitation (box).

The recent surveys by the Office of Population Censuses and Surveys have shown that disability is common and has a profound effect on disposable income, employment, and quality of life.⁴ The most common disabling conditions affect the musculo-skeletal system and the special senses, but the greatest dependency results from neurological disorders, especially those that cause impaired cognitive function and behaviour in addition to physical disability. Although 10% of the general population have a disability of some kind, rehabilitation medicine services concentrate mainly on people with severe disabilities. These people include the 1000 or so in each health district between the ages of 16 and 65 who are unable to live at home for 24 hours or more without the physical help of another person—a group I shall subsequently refer to as people with appreciable dependency.⁵ This group probably has the greatest risk of avoidable complications and deterioration such as deformities, accidental

injury, intercurrent infection, pressure sores, and poor levels of physical fitness. They are also prone to excess psychological stress, as are their informal carers and families. At the other end of the scale are people who have a considerable health related handicap despite successful medical or surgical treatment, the most notable example being people with epilepsy, whose difficulty in obtaining employment is out of all proportion to the disability experienced.⁶

Some of the interventions of rehabilitation medicine are self evidently effective, such as training wheelchair users in the prevention of pressure sores and the skilled use of communication aids for people who cannot talk. Despite the lack of resources allocated to research in rehabilitation there is increasing evidence of effectiveness in its whole range from the outcomes of coordinated programmes for people with spinal cord injuries⁷ and the effects of neglect on disabled teenagers⁸ to the impact of specific measures to improve communication and develop cognitive strategies that circumvent the effects of cognitive impairment.^{9, 10}

The case against rehabilitation being a key area

Neglect sets a precedent. Most medical graduates are profoundly ignorant of rehabilitation medicine and will readily identify priorities in other medical disciplines. Little research is funded by the government or by major charities in rehabilitation despite the difficulties of conducting research in this subject. It would be nice to think that this is because the problems of rehabilitation medicine have all been sorted out—but regrettably, it is simply evidence of marginalisation and neglect.

Rehabilitation Research Unit, University of Southampton, Level C, West Wing, Southampton General Hospital, Southampton SO9 4XY
D L McLellan, FRCP,
Europe professor of rehabilitation

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