

The need for change in food habits from a medical viewpoint

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I shall consider the title from the public health viewpoint and deal only with diet as a causative factor in diseases which do or could affect either most of the people or important minorities.

Of several possible approaches I think the most convenient and topical will be to start with the recent Dietary Goals for the United States (1977). These can be adapted in other countries. They may not all be accepted eventually even in the USA but they provide us with a valuable and refreshing method. This is how an expert committee thinks at present that the national diet should be modified for health reasons. It may not be necessary for all people, or economically or socially possible. These are goals or targets to aim at. They deserve to be borne in mind by legislators, civil servants, farmers, food manufacturers, health educators and housewives in their forward planning.

I propose to look at each of the six Dietary Goals for the USA and consider which fit in with British needs and attitudes. We may not agree to adopt all of them. I have found that in discussing these six, other nutritional problems and principles come to mind, of recent interest in Britain that can make a supplementary list of dietary goals. This method is very suitable for discussion and consultation. I have given them numbers for convenience and the order used here is partly thematic rather than a dogmatic order of priority. Each member of the audience may have his own different ranking order of priorities (See Appendix, p. 314). It would be possible for groups of experts to vote on the order and derive a consensus for guiding action. The list that follows is hybrid: some goals involve changing food, others aim to reduce nutritional disorders.

(1) *Increase complex carbohydrate consumption* to account for approximately 55 to 60% of the energy intake. This is the first of the US Dietary Goals. Present total carbohydrate consumption in the USA, as in Britain, is around 46% of dietary energy. The increase should be in the form of complex carbohydrates or starchy foods: vegetables and fruit, preferably lightly processed, and cereals preferably not refined. These foods contain many nutrients such as protein, vitamins and trace elements as well as carbohydrate, including different types of fibre. They are mostly relatively inexpensive. To increase their consumption is put first as a positive prescription; complex carbohydrate foods are to replace fats, sugar, and in some cases alcohol, whose consumption should be reduced. Note that starch is not unhealthy and starchy foods are not specially fattening as many laymen have believed, and perhaps even a few nutritionists!

(2) *Reduce total fat consumption* from approximately 40 to 30% of energy intake, i.e. saturated and unsaturated. Fats are the most concentrated, energy-dense foods; they appear to predispose to obesity and often contain very few other micronutrients. They thus provide the emptiest of energy. The Department of Health and Social Security (DHSS) (1974a) recommends a reduction in total fat intake in this country as a measure to reduce coronary heart disease (CHD). There are also epidemiological correlations between total fat, consumption and cancer of the colon (Wynder, 1975) and of the breast (Drasar & Irving, 1973).

I believe this goal has wide support by nutritionists around the world and it is an official recommendation in Britain (with the ideal percentage of energy not specified). But 30% of fat is rather less than was available here during and after World War II. It would require a minor culinary revolution, perhaps to traditional Mediterranean dishes with other contributions from Asia.

(3) *Reduce saturated fat and balance that with polyunsaturated and monounsaturated fats.* The present average British diet is estimated to be 21% saturated, 16% monounsaturated and 4% polyunsaturated fats, with the total fat 41% of energy (Ministry of Agriculture, Fisheries and Food, 1976).

The US proposal is 10% saturated, 10% monounsaturated and 10% polyunsaturated. This would mean halving the saturated fat, reducing monounsaturated to two-thirds and more than doubling the polyunsaturated fat. The medical basis of this goal is principally for prevention of CHD.

The first part, reduction of saturated fat would be widely supported in Britain. The DHSS report recommended this (Department of Health and Social Security, 1974a) and so did the Joint Working Party of the Royal College of Physicians and the British Cardiac Society (1976). The House of Commons Expenditure Committee (1977) in its first report on preventive medicine has recently recommended that 'information about fats should be placed before the public in order to show up clearly the risks from a high intake of saturated fats and to encourage people to moderate their fat intakes or switch to polyunsaturated fats'.

The Royal College of Physicians/British Cardiac Society (1976) recommended partial replacement of saturated fats by polyunsaturated because we have become accustomed to a diet rich in fat; this will also contribute to the lowering of plasma cholesterol. Expert committees in Scandinavia (Keys, 1968), Holland (Voedingsraad, 1973) and the Federal Republic of Germany (Editorial, 1975) have all made similar recommendations. The DHSS still adheres to the view in its 1974 report, that it 'cannot recommend an increase in the intake of polyunsaturated fatty acids as a measure intended to reduce the risk of the development of ischaemic heart disease'. This fixity has been criticized and the subject is controversial in Britain at present. In my opinion, we shall need a thorough review by a committee of experts, probably followed by some research before the clouds will clear.

(4) *Reduce dietary cholesterol to about 300 mg/d.* I do not know what the average cholesterol consumption is in Britain; we do not have cholesterol figures in our national food tables yet. Our egg consumption, 4.7 per head per week

(Ministry of Agriculture, Fisheries and Food, 1977) would supply (assuming 250 mg cholesterol/egg) 168 mg/d and the rest comes mostly from dairy produce and meat. The effect of dietary cholesterol on plasma cholesterol (the only reason for suggesting reduced consumption) appears to be smaller than that of saturated fat, to show more individual variability and to be non-linear. The first 300 mg in the diet has the most effect but this is the part of dietary cholesterol which it is difficult and not usually desirable to eliminate because it is contained in animal cell membranes in meat and fish. An egg is a good source of several nutrients, useful for making meals, not expensive and one of the few foods that we produce almost entirely at home in Britain. We cannot even be sure yet whether reducing average egg consumption from say 4.5 to 3 per week would lead to lower average plasma cholesterol. I doubt if we should support this measure (Truswell, 1976). Dr Michael Oliver (1976) argues strongly against it and reduction of dietary cholesterol was not in the main recommendations of either British report on prevention of CHD (Department of Health and Social Security, 1974a; Royal College of Physicians/British Cardiac Society, 1976).

(5) *Reduce sugar consumption to account for about 15% of total energy intake.* There are several possible ways of calculating sugar consumption depending on whether only sucrose, or all refined sugars or these plus sugars naturally present in foods are included. The US Dietary Goal would like to see a reduction of refined sugars (I presume glucose and fructose as well as sucrose) added to foods during manufacture and drinks outside the control of the consumer. This use has grown greatly in this century and is now the major part of refined sugars. Soft drinks in the USA provide 21.5 lb sugar/head per year. The consumer can seldom tell whether sugar has been added to manufactured food and how much.

Moderation of sugar consumption is desirable because refined sugars are moderately dense in energy, provide little or no micronutrients and contribute to dental caries. There are official recommendations in Britain that 'a modification of diet whereby children would eat less sticky carbohydrate between meals would undoubtedly reduce the level of dental decay (Gibb & Godber, 1973). The school meals nutritional standards report likewise says that the risk of dental caries can be reduced by avoiding between-meal snacks containing sugar (Dept. of Education and Science, 1975).

Most experts who gave evidence to the US Senate Select Committee on Nutrition and Human Needs reported that no clear links have been established between sugar and heart disease. Most member of the Nutrition Society think the same (Brown, Brown & Naismith, 1977). Both British reports on prevention of CHD advise reduction or moderation of sugar intake but only as a means of preventing obesity (Department of Health and Social Security, 1974a), or as part of its management (Royal College of Physicians/British Cardiac Society, 1976).

(6) *Reduce salt consumption to about 3 g/d.* This is a large reduction, by 50 to 85% in the USA and it is easy to get confused between sodium and sodium chloride. The US Dietary Goal refers to NaCl. 3 g/d of this means 1200 mg or 50 mmol (mEq) of Na⁺, which is described in a standard textbook as a 'moderate

low sodium diet' (Davidson, Passmore, Brock & Truswell, 1975). The requirement for normal people is probably only 0.5 g NaCl and could normally be obtained without adding salt in manufacture, during cooking or at table to any foods.

Recent measurements of urinary sodium excreted by normal men in Britain showed means of 4150 mg in London and 5190 mg/d in Glasgow. (Dauncey & Widdowson, 1972). If we take urine sodium as a rough approximation to intakes London people would thus have to reduce salt intake by 71% and Glasgow people by 77% to achieve US goals. For British application I suggest the goal should be considered separately for infants and for adults.

For infants the dangers of hypernatraemia are short-term and well established. It is now official DHSS policy that non-human baby milk powders should not contain appreciably more sodium than breast milk when properly reconstituted and caution should be exercised by manufacturers in the addition of NaCl to infant food products (Department of Health and Social Security, 1974*b*; Department of Health and Social Security, 1976).

For adults the main concern is the epidemiological correlation between sodium intake and prevalence of hypertension. Although a few British scientists have published evidence in support of the hypothesis that habitual low sodium intakes give some protection against hypertension (Truswell, 1972; Dauncey & Widdowson, 1972) and this measure could not do harm, it was discussed in both British reports on prevention of CHD but neither included it among their recommendations (Department of Health and Social Security, 1974*a*; Royal College of Physicians/British Cardiac Society, 1976). Only 30% of members of the Nutrition Society agree that a high intake of salt contributes to hypertension, 47% were undecided (Brown *et al.* 1977). The relation between salt intake in pregnancy and risk of pregnancy toxæmia/hypertension is confusing.

(7) *Steps against Obesity.* 'Obesity is a hazard to health and a detriment to well-being. It is common enough to constitute one of the most important medical and public health problems of our time.' (Department of Health and Social Security/Medical Research Council, 1976). Sooner or later, usually in moderate degree it is likely to affect one-fifth of the men and one-third of the women in this country (Baird, Silverstone, Grimshaw & Ashwell, 1974). Even 25% of women and 16% of men in the Nutrition Society admit to being overweight (Brown *et al.* 1976). But there have been few surveys, all small and there is a real need for nation-wide and well standardized measurements of its prevalence (Department of Health and Social Security/Medical Research Council, 1976).

Prevention or treatment of obesity are recommended—with diet in relation to physical activity (Department of Health and Social Security, 1974*a*) and with a combination of diet and exercise (Royal College of Physicians/British Cardiac Society, 1976) for prevention of CHD. Obesity is the most important dietary factor predisposing to diabetes (Davidson *et al.* 1975) and to several other diseases.

Management of obesity deserves national action, probably best by a combination of health education and provision of more facilities for recreational exercise. Exercise can contribute to weight reduction (Editorial, 1976) and confers

other health advantages. The House of Commons Expenditure Committee (1977, para 260) has recently recommended both national education on the value of exercise and more facilities, especially in inner cities.

It is encouraging that the Medical Research Council is providing for good research on obesity in its centres and units and the Rank Prize Funds give this priority too. Our efforts to control obesity are supported by lay organizations (Ashwell & Garrow, 1975). Fashion and food prices seem likely to help as well.

(8) *Encouragement of Breast-feeding in Infants.* This is now official DHSS policy: 'all mothers should be encouraged to breast-feed their babies for a minimum of 2 weeks and preferably for the first 4–6 months' (Department of Health and Social Security, 1976) and supported by the House of Commons Expenditure Committee (1977). This has implications for maternity allowances (Department of Health and Social Security, 1974*b*) and for the composition of non-human baby milk powders (Department of Health and Social Security, 1976). The Department of Health and the Laboratory of the Government Chemist have recently produced modern analyses of contemporary British human milk which will have several nutritional applications (Department of Health and Social Security, 1977).

Since the DHSS (1974*b*) report 'Present Day Practice in Infant Feeding', further scientific advantages of breast-feeding have been added to an already long list: demonstration that there is more obesity and accelerated growth in bottle-fed compared with breast-fed infants (Ritchie & Naismith, 1975); discovery of transfer of anti-viral (as well as anti-bacterial) material (Downham, Scott, Sims, Webb & Gardner, 1976) and the discovery of water-soluble vitamin D sulphate in human (but not cows) milk (Lakdawala & Widdowson, 1977).

The policy is in line with international nutritional opinion for developing as well as industrial countries. Britain seems to be ahead of most countries in the effort put in and results achieved. There are several indications of a change of attitude and of practice in the country. (Breast-feeding, 1976; Breast-feeding and the mother, 1976). Research is now needed on the causes of primary and secondary failure of lactation—I understand it is already starting.

(9) *Reduction of unnecessary food additives.* In a ten city survey, women shoppers in the USA were asked to talk about nutrition (Darby, 1975) 'discussion of this topic was always rambling, groping and garbled. Women know nutrition has something to do with protein. They also know that it has something to do with vitamins, but few know much about specific vitamin requirements . . .

The one point on which all were positive is that additives and processing are antithetical to nutrition: an otherwise nutritious food automatically becomes less nutritious when it had been processed, refined or had a list of strange looking chemicals added to it.'

Next, to quote Professor Jean Mayer (1972) 'under such conditions of uncertainty, persons should turn to their physicians. Unfortunately even when physicians have had some instruction in nutrition it almost never entails consideration of food, let alone food additives.'

The concern about food additives is that they can predispose, if taken over years, to cancer (an old fear) or cause allergic reactions in a minority (which is a newer realization). Satisfactory animal tests do not prove with absolute certainty that a foreign compound will be safe over 50 years in man and vice versa.

I think most people will agree that unnecessary food additives should not be used. Differences of opinion arise, however, about what is necessary and whether the same stringency should be applied to old and traditional food additives as to newer ones. The experience of a leading firm of retailers with canned peas is well known (Goldenberg, 1977). When the usual synthetic colour was not added, sales fell 50% and customers complained. Was the colour necessary? Proposed legislation in Sweden would suggest it was not. Who should make such decisions? The chairman of our Food Additives and Contaminants Committee has written that the situation may call for a very careful evaluation of the 'need' for colours in particular foods, a subject which provokes considerable differences of opinion (Weedon, 1976).

(10) *No further increase in the average alcohol consumption.* Consumption of alcohol, total and all major types, has been going up in the last 20 years (Glatt, 1977). In 1955 annual consumption per head was 140 pints beer, 2.7 pints wine and 1.8 pints (proof) spirit. There has been a steady increase and in 1975 consumption was 207 pints beer, 11.3 pints wine and 4.8 pints of spirit (D. H. Buss, personal communication). Alcohol was 3.0% of food energy in 1955; 5.6% in 1975—this is average, including babies and teetotallers!

At the same time the price of alcohol has gone down in real money terms. In 1950 an average man with two children had to work 9 minutes to buy a loaf of bread, 23 minutes for a pint of beer and 659 minutes to afford a bottle of whiskey. Last year (1976) the loaf needed 11 minutes work, but the pint of beer only 12 minutes and the bottle of whiskey 209 minutes (Hansard, 1977). Against a loaf of bread, alcohol is about a third of what it cost 25 years ago.

Diseases related to alcohol have been increasing: convictions for drunkenness, admissions of alcoholics (Glatt, 1977) and alcoholic cirrhosis of the liver (Hodgson & Thompson, 1976; Morgan & Sherlock, 1977). Alcohol provides empty energy and so can contribute to obesity.

Used in moderation, alcohol is one of the pleasures of life and makes people more sociable. People's jobs depend on it and we export important quantities. The House of Commons Expenditure Committee (1977) considered the position at some length, and agreed that the relative price of alcohol should not be allowed to go any lower and that a larger proportion of the duty raised from alcohol should be used for educating children and young people in the dangers of alcohol dependence.

(11) *Provision of drinking water with optimal fluoride concentration.* The DHSS has shown quite clearly that introduction of fluoridation of municipal water at 1 ppm leads to a significant reduction of dental caries in children. When Kilmarnock Burgh council changed its mind and stopped fluoridation after 6 years the rate of dental caries went up again (Department of Health and Social Security, 1969).

In his last annual report as Chief Medical Officer, reviewing the achievements and disappointments of 25 years of the NHS Sir George Godber wrote 'A simple preventive measure, fluoridation of water, could have effected a substantial reduction in dental caries in children and by now an advantage persisting into adult life. This fact and the safety of the procedure have been demonstrated beyond any reasonable scientific argument many times. New Zealand and Eire have gone forward on a national scale and will benefit more and more as time goes by. Additional local authorities have voted to adopt the measure in this country but we still remain in the position of giving to only about 5% of our children the kind of dental protection we should provide for them all' (Godber, 1973).

The Royal College of Physicians (1976) set up a specialist committee which reviewed the large literature on fluoride, teeth and health and concluded that fluoridation of water at 1 ppm is safe and effective. Meanwhile fluoride has been shown to be an essential nutrient for normal growth and teeth in rats (Schwartz & Milne, 1972) and, at 1.0 mg/d for adults, is now a recommended nutrient in the Federal Republic of Germany (Deutsche Gesellschaft für Ernährung, 1975).

The percentage of the British population drinking fluoridated water has now crept up to 8.6%. It is regrettable that the House of Commons Expenditure Committee (1977) which on the whole sifted very shrewdly the evidence presented to it by officials, national organizations, enthusiasts and cranks was put off by the noise of the opposition to fluoridation and ended up unable to make any recommendation on its use for the general water supply. It could only recommend more research on the long term effects of fluoride and that topical fluoride should be available on the NHS.

(12) *To devise measures to reduce iron deficiency anaemia.* Prevention of the most common deficiency, iron, remains unachieved anywhere in the world (McLaren, 1977).

There is a shortage of nation-wide survey data (as with the other commonest nutritional disorder, obesity) and estimates differ depending on the cut-off level of haemoglobin. If taken at 12.0 g/dl then about 11% (Callender, 1973) to 20% (Editorial, 1961) British women may be anaemic; if 10 g/dl is the cut-off, the prevalence in women has been found to be about 5%; if 8 g/dl, the prevalence is under 1% (Elwood, 1970).

Bread is enriched with iron (of dubious value, Elwood, Waters & Sweetnam, 1971) and each citizen has access to a general practitioner who can write out a prescription for iron tablets. The national bill for these was £6 million in 1970 (Elwood, 1970).

There has been national and international debate about the functional significance of common moderate grades of anaemia. They tend to be associated with low plasma cholesterol and correlate poorly with medical textbook symptoms of anaemia (Lock, 1977). Where anaemia is more dangerous, in pregnancy and in surgical patients, haemoglobin is measured and monitored by the medical services. As haemoglobins fall below 12 g/dl, maximum work performance declines (Viteri &

Torún, 1974) but this is not noticeable by most people in a largely sedentary, mechanized society.

These issues have been well discussed in recent years. What I want to ask is whether we should encourage retention of our recent customary amount of meat (the lean part) because haem iron in meat is better absorbed than iron in vegetable foods (Martinez-Toress & Layriss, 1971). Should we educate the public as a Lancet editorial (1977) suggests, that women should eat as much as men, even if they are slimming, because their iron requirement is greater?

But is anaemia more prevalent in British or American vegetarians? Not according to the literature, though reported samples have been very small (Ellis & Montegriffo, 1971). Since a tendency toward vegetarianism may be increasing and meat is becoming very expensive it would be useful to look into this more thoroughly.

(13) *To devise measures to prevent rickets and osteomalacia.* It is fascinating to follow the description in successive editions of a standard British textbook. In 1959 'rickets has virtually disappeared all over Great Britain, as in many other countries. Indeed it has now become a rare disease' (Davidson *et al.* 1959). In subsequent editions reports of some cases in Glasgow were added, then the concept of subclinical vitamin D deficiency (Davidson & Passmore, 1969). In the most recent edition another piece was added about cases reported in other British cities like Manchester, mostly in Indian and Pakistani immigrants; school children and adolescents as well as young children may be affected (Davidson *et al.* 1975).

At the same time there has been a surge of exciting biochemical research in which British scientists have been among the leaders. This has illuminated our understanding. Clinical rickets is continuing to occur. Subclinical vitamin D deficiency is now an officially accepted entity (Darke & Stephen, 1976) and diagnosable by plasma 25OH vitamin D. Around 25% of Asian people who have been examined in various surveys show this biochemical sign of subclinical vitamin D deficiency (e.g. Hunt, O'Riordan, Windo & Truswell, 1976).

The 'English disease' is back with us and it seems to be more prevalent here than across the Channel or across the Atlantic. What can be done? The possible measures include (a) health education, encouraging Asians to expose their skins to sunlight, eat more margarine and use welfare vitamin D, (b) enrichment of chapatti flour, (c) enrichment of milk (as in the USA), (d) enrichment of butter. None of these is without difficulties and objections, any will require money and there is a lingering fear of hypercalcaemia.

This last one on my list is certainly a challenging nutritional goal for Britain, because it is theoretically achievable.

I am grateful to Drs R. Passmore, D. H. Buss, H. Trowell, H. Fore and others for stimulating discussions which helped develop the ideas in this paper.

APPENDIX

The audience were invited to indicate, on a list circulated to each individual, their assessment of the order of priority of the thirteen goals. The 3rd and the 6th

goals were divided into two so there were fifteen to vote on: ++ for 'priority', + for 'agree, a goal but not so important' and ? for 'not yet sure'. Members of the audience were not limited to any particular number of the three possible opinions. 105 lists were returned properly marked.

The order of priority was: 1st steps against obesity; 2nd encourage breast feeding of infants, 3rd reduce refined sugar, 4th decrease total fat, 5th increase complex carbohydrates, 6th reduce salt *for infants*, 7th provide drinking water with optimal fluoride, 8th decrease the proportion of saturated fat, 9th measures to prevent rickets and osteomalacia, 10th reduce unnecessary food additives, 11th no further increase in alcohol consumption, 12th measures to reduce iron deficiency, 13th increase the proportion of polyunsaturated fats, 14th reduce dietary cholesterol, 15th reduce salt *for adults*.

This order is clearly not the definitive opinion of the whole Nutrition Society or even, necessarily, of all those who filled it in (they may have been temporarily influenced by delivery of the paper). But it illustrates a method that could be used more widely and may give an approximate idea of the present trend of opinion in the Society.

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