Practical and realistic approaches to healthier diet modifications¹,²

A Stewart Truswell

ABSTRACT Nutrition research cannot improve people’s health until the results influence their purchases and consumption of food and drink. There is much noise in the food information system. The most efficient solution to the problem of insufficient or conflicting public information is for all the data to be critically evaluated by a well-balanced expert committee convened by an authoritative body to produce dietary guidelines for wide publication. Such guidelines in different countries have many similar elements. Guidelines cannot be revised every year, but should be adapted only in response to major new research findings rather than to reports about nutrition in the media, which are no more than trivial distractions. The problems of family physicians giving one-on-one nutritional advice are discussed. For public health nutrition work, dietary guidelines have a range of products such as food guides and health claims on foods that are the tools of nutrition education. In developed countries, consumption of some foods has changed along with the guidelines; consumption of other foods has not. Coronary artery disease mortality has declined but obesity has increased. A more food-based approach to nutrition education is to use ideal diets as the model, such as the traditional Mediterranean diet, Japanese diet, or “hunter-gatherer” diets. These ideal diets would then need to be adapted to our present food preparation technology.

KEY WORDS Dietary guidelines, nutrition education, primary care physicians, Mediterranean diet, Japanese diet, hunter-gatherer diet, changes in food consumption, public health

FROM RESEARCH RESULTS TO CONSENSUS ON RECOMMENDATIONS All the research results and interpretations in this supplement—and elsewhere—cannot help the overwhelmingly nonspecialist majorities in any of the countries represented herein until the nutrition establishment converts the research results into agreed recommendations. Doing this involves three processes: 1) achieving a consensus as to the meaning of all the data combined, ie, a reasoned compromise of the different interpretations, 2) providing authority and the means of publication and promotion, and 3) expressing the recommendations in nonspecialist language and ultimately translating them into foods, menus, recipes, and eating behavior modification guidelines.

The work requires a committee of experts convened by an authoritative governmental agency, a national academy of science, or a professional association. Membership in the committee should have broad coverage (of scientific area and constituency), adequate independence, and minimal commercial bias. Their recommendations are likely to be influenced by scientific fashion (one can see this, looking back through earlier recommendations), and will differ depending on the focus of the committee, eg, whether it is on heart disease, diabetes, obesity, cancer, or general nutrition.

The first sets of dietary guidelines, published in Scandinavia in 1968 (1) and then in North America in the late 1970s (2, 3) were produced because it was realized that most of the nutritional problems and opportunities in affluent countries were not related to essential nutrients and that the recommended dietary allowances did not give enough information. The guidelines were intended to reduce nutritional information anarchy (4) and the babel of nutritional breakthroughs and threats. In a democracy, food companies advertise their products, nutrition researchers publicize their latest results, and the media (including some scientific journals) are more interested in a controversial story than motherly advice like “Eat plenty of vegetables.”

There are several current sets of general dietary guidelines in the United States, including the 1988 Surgeon General’s Report on Nutrition and Health (5), the National Research Council’s 1989 Diet and Health (6), and the latest edition of Dietary Guidelines for Americans (7) (1995) from the US Department of Agriculture and the US Department of Health and Human Services (printed for use by the general public). Most of the major countries in the world now have their own sets of dietary guidelines (4), including Australia, Canada, Denmark, Ireland, Finland, France, Germany, Hungary, India, Italy, Japan, South Korea, Netherlands, New Zealand, Norway, Singapore, Sweden, and the United Kingdom, as well as the World Health Organization and the Food and Agriculture Organization.

These sets of recommendations vary in the amount of background documentation provided. Some are written for the general public with minimal references (7) and others have background chapters with key references, the most thoroughly documented resource being the National Research Council’s 750-page Diet and Health (6), with 33 experts on the main committee and another 76 specialists providing input.

The recommendations (headings only) of the National Research Council are as follows: 1) Reduce total fat intake to 30% or less of total energy. Reduce intake of saturated fatty acids to < 10% of energy and that of cholesterol to < 300 mg/d.

¹ From the Department of Biochemistry, Human Nutrition Unit, University of Sydney, Australia.
² Address reprint request to AS Truswell, Department of Biochemistry, Human Nutrition Unit, The University of Sydney, NSW 2006, Australia.
2) Eat five or more servings of a combination of vegetables and fruit, especially green and yellow vegetables and citrus fruit, daily. Also, increase intake of starches and other complex carbohydrates by eating six or more servings of a combination of breads, cereals, and legumes daily. 3) Balance food intake and physical activity to maintain appropriate body weight. Six other recommendations deal with protein, alcohol, salt, calcium, supplements, and fluoride. The other sets of general dietary guidelines, current in the United States and in other countries, agree broadly and often coincide with the recommendations in *Diet and Health* (6).

To produce a thorough and balanced overview of nutrition research and well-reasoned recommendations requires a lot of work and cannot practically be done every year. Dietary guidelines have to be disseminated and used, and they must be looked after: defended when trivial research findings seem to negate them and added to or revised if major research findings change the underlying theories.

We will not all agree on which new research results are significant and which are trivial. But the following topics and recent findings not found in *Diet and Health* are, I think, of major concern and will probably have to be considered in an update to current dietary guidelines: the LDL-oxidation hypothesis of atherosclerosis (8), nonnutrient antioxidants (9), different effects of individual saturated fatty acids on plasma cholesterol (10), *trans* fatty acids (11), the protective effect of moderate alcohol intake against coronary artery disease (12), the effect of coffee consumption on plasma cholesterol (13), the extent of underreporting of individual food intakes (14), results from research using the doubly labeled water technique (15), the role of fat intake in obesity (16), the development of the glycemic index of foods (17), resistant starch (18), phytoestrogens in foods (19), *Helicobacter pylori* and gastric pathology (20), the INTERSALT Study (21) and the chimpanzee salt trial (22), the preventive effect of folate against neural tube defects (23), hyperhomocysteinemia as a risk factor of cardiovascular disease (24), and bovine spongiform encephalopathy.

The trivial reports, sometimes called breakthroughs by the media, cause confusion among consumers but can usually be recognized by nutritional scientists. They may be: a hypothesis with minimal research data; a single case-control study with unexpected result; prospective (cohort) study results not corrected for confounding or with a relative risk of 1.3; or an animal experiment using unrealistically high doses of a food component. It is difficult for most journalists and consumers to tell the difference between a major research advance and a trivial report. Only a very small number of quality newspapers in the world have their nutrition research stories reported by journalists with experience in our field.

The influence of recent research findings can be seen in the evolution of *Dietary Guidelines for Americans* (7) (Table 1). Guideline 2 has developed from “Maintain ideal weight” to “Balance the food you eat with physical activity. Maintain or improve your weight.” which is much more realistic and practical. The booklet has a table with sensible and up-to-date advice for decreasing energy intake (Table 2) and another with suggestions for increasing energy expenditure with physical activity. Guideline 4 has evolved from “Eat foods with adequate starch and fiber” to “Choose a diet with plenty of grain products, vegetables, and fruit” and it has moved up to position 3. *Dietary Guidelines for Americans* now expresses the guidelines more in foods than in nutrients, acknowledges that there is more to plant foods than merely fiber and starch, and puts the recommended foods before the foods to reduce (the fats, now in fourth position) (Table 1). Guideline 5 on sugar has been moderated: “Choose a diet moderate in sugars” contrasts with the heading immediately above, “Choose a diet low in fat, saturated fat, and cholesterol” (guideline 4).

There are other well-based dietary recommendations not included in the headings of the dietary guidelines. Some of these are specialized, eg, for infant feeding or for people with a prevalent disease such as diabetes. Others focus on particular food components, eg polyunsaturated fatty acids, calcium, iron, or folic acid. These published recommendations are generally compatible with the main dietary guidelines and are sometimes incorporated in the detailed text of dietary guidelines reports.

These various dietary guidelines presents the big picture, but converting the data to individual food recommendations is difficult. For example, we cannot at present say which is the healthiest of all margarines. There are at least four formulas for calculating the effects of dietary fatty acids on plasma cholesterol, none of which is completely satisfactory. The formulas do not include *trans* fatty acids or differentiate their effects on LDL and HDL cholesterol in addition to total cholesterol. The Keys equation (26), the simplest and most widely used, overlooks different effects within the saturated and polyunsaturated fatty acid classes and ignores dietary cholesterol. Hegsted’s equation (27, equation 4) includes individual fatty acids and is well confirmed by modern experiments. The cholesterol–saturated fat index (28) overemphasizes dietary cholesterol and ignores unsaturated fatty acids. Ulbricht and Southgate (29) proposed a method that calculates thrombogenicity as well as atherogenicity; this probably captures the true complexity of the issue, but is not yet ready for use because there aren’t enough data to estimate the exact coefficients for the different fatty acids. Yet more considerations are that dietary fats and oils are more than a mix of fatty acids and cholesterol, that the position of fatty acids (1, 3, or 2) on the oil’s triacylglycerol may make a difference biologically, and that individual oils also contain other active substances, including tocopherols, other antioxidants, and phytosterols. It is likely, for example, that the predominantly monounsaturated oils—olive, canola, and sunola—do not have exactly the same effect on plasma cholesterol.

FROM RECOMMENDATIONS TO AN INFORMED PUBLIC

Clinical approaches

There are two major ways to spread our understanding about healthier diet modifications, one through the clinical approach, in which advice is usually given one-to-one and personalized, the other with a public health approach, discussed later in this article. Primary care physicians, also called general practitioners or family doctors, are the most frequently consulted professional group for advice about nutrition, as with other health matters (30). Speakers at the first International Workshop on Nutritional Attitudes and Practices of Primary Care Physicians held in Heelsum, Netherlands (31) confirmed this. A survey of Dutch consumers found that primary care physicians were perceived to have a high level of expertise (nearly as high as dietitians and the National Nutrition Education Bureau) and were consulted much more frequently than any other groups for nutritional advice.
TABLE 1
Comparison of recommendations from the four editions of Dietary Guidelines for Americans1

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Eat a variety of foods.</td>
<td>Eat a variety of foods.</td>
<td>Eat a variety of foods.</td>
<td>Eat a variety of foods.</td>
</tr>
<tr>
<td>3. Avoid too much fat, saturated fat, and cholesterol.</td>
<td>Avoid too much fat, saturated fat, and cholesterol.</td>
<td>Choose a diet low in fat, saturated fat, and cholesterol.</td>
<td>Choose a diet with plenty of grain products, vegetables, and fruits.</td>
</tr>
<tr>
<td>4. Eat foods with adequate starch and fiber.</td>
<td>Eat foods with adequate starch and fiber.</td>
<td>Choose a diet with plenty of vegetables, fruit, and grain products.</td>
<td>Choose a diet low in fat, saturated fat, and cholesterol.</td>
</tr>
<tr>
<td>5. Avoid too much sugar.</td>
<td>Avoid too much sugar.</td>
<td>Use sugar only in moderation.</td>
<td>Choose a diet moderate in sugars.</td>
</tr>
<tr>
<td>6. Avoid too much sodium.</td>
<td>Avoid too much sodium.</td>
<td>Use salt and sodium only in moderation.</td>
<td>Choose a diet moderate in salt and sodium.</td>
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<tr>
<td>7. If you drink alcohol, do so in moderation.</td>
<td>If you drink alcoholic beverages, do so in moderation.</td>
<td>If you drink alcoholic beverages, do so in moderation.</td>
<td>If you drink alcoholic beverages, do so in moderation.</td>
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They are trusted, have no commercial bias about foods, and understand physiology better than other professionals who may give advice on nutrition. But whereas 70% of 1000 primary care physicians surveyed by Hiddink (32) in the Netherlands expressed considerable interest in the role of nutrition in health, they said there are strong barriers to involving themselves in nutrition issues with their patients. These barriers are 1) a lack of training in nutrition, 2) a lack of time to give nutritional advice, and 3) an impression that most patients lack motivation to change their dietary patterns or lifestyles.

In a survey of health promotion efforts by 418 physicians in Massachusetts (33), 55% thought it was very important for the average person to “avoid foods high in saturated fats.” Corresponding scores for other diet-related advice were 63% for “moderation in alcohol drinking,” 52% for “avoid excess calories,” 49% for “moderate daily physical activity,” 47% for “eat a balanced diet,” 13% for “decrease salt consumption,” and 6% for “minimize sugar intake.” The authors noted that physicians were less attentive to their patients’ diets than in a similar 1981 survey, and suggest that this “may be attributable in part to the lack of valid and consistent data to support many official dietary recommendations.”

The lack of practical nutrition teaching in medical schools is well known and not easily remedied. Other aspects of family medicine are also neglected in medical schools. The participants in the Heelsum workshop thought it best to accept the prequalifying medical course as a basic one which has to be supplemented with personal study and followed by continuing medical education while working in general practice (31).

Giving nutritional advice takes much more time than writing a prescription for a drug, and time is money in a medical practice. In practices with a nurse, the nurse is likely to give more nutritional advice than the doctor (34). Some practices work with an associated dietitian. But some physicians want to give the summary nutritional advice themselves to support and harmonize with the advice given by their paramedical colleagues.

For these interested family doctors the best solution seems to be to find, acquire, and use sets of nutritional guidelines that include general dietary guidelines for patients inquiring about healthy diets, recommendations for patients with coronary problems from an authoritative source [such as a national heart association (35, 36) or a government department of health (37)], recommendations for nonpharmacologic management of hypertension (38, 39), and current dietetic information for patients with diabetes (40–42).

Knowledge of nutrition is also useful in other clinical situations (eg, infant feeding, celiac disease, and food sensitivities). There is a book, ABC of Nutrition (43), written especially for primary care physicians. It is the representative of nutrition in the British Medical Journal’s series of ABC titles. The first chapter starts straightaway, with no introductory biochemistry, in the doctor’s office with a patient with coronary artery disease. Each chapter deals with common clinical situations for which nutrition is useful. Each chapter has as much space for pictures as for text.

Although time is short for each consultation in a family practice, patients can usually return several times to see the doctor. This structure provides a favorable setting in which to advance a change of diet, step by step, with monitoring, encouragement, and advice available at each visit. If the doctor is taking the trouble to help the patient reduce intake of total fat (for overweight) or saturated fatty acids (for coronary artery disease), the doctor needs a clear, up-to-date list of the major sources of fat and saturated fatty acids that is relevant for the local population.

There remains the problem for the family physician of keeping up with new ideas, both substantial and distracting. Patients may hear about one of these from the television, newspaper, or health food shop before the doctor reads about it in a medical journal. One solution is to ask the patient to bring or send in the piece he or she saw in print media, if it includes the method and original publication information, for an opinion. Another answer is to ask a collaborating dietitian for an opinion. A third response, which is not likely to do harm and may be the most common response, is conservative skepticism. When questioned, primary care physicians show or admit to some confusion about the more detailed aspects of current nutritional recommendations (34, 44) (Table 3).

Public health approaches

Published dietary goals and guidelines have stimulated the appearance of a range of products, some on paper and others as modified or new foods, as follows:
TABLE 2
Advice for decreasing energy intake1

<table>
<thead>
<tr>
<th>Advice for decreasing energy intake</th>
</tr>
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<tbody>
<tr>
<td>Eat a variety of foods that are low in energy and high in nutrients—check the Nutrition Facts label.</td>
</tr>
<tr>
<td>Eat less fat and fewer high-fat foods.</td>
</tr>
<tr>
<td>Eat smaller portions and limit second helpings of foods high in fat and energy.</td>
</tr>
<tr>
<td>Eat more vegetables and fruit without fats and sugars added in preparation or at the table.</td>
</tr>
<tr>
<td>Eat pasta, rice, breads, and cereals, without fats and sugars added in preparation or at the table.</td>
</tr>
<tr>
<td>Eat less sugar and fewer sweets (like candy, cookies, cakes, and soda).</td>
</tr>
<tr>
<td>Drink less or no alcohol.</td>
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1 From the US Department of Agriculture (7).

1) A national food and nutrition policy. The Norwegian Nutrition and Food Policy (45) may be the only one such successful project at the whole-government level. In the United Kingdom a major strategy document (government white paper), The Health of the Nation (46), prominently features nutritional targets and has led to increased activity in public health nutrition work.

2) Health targets for health promotion and disease prevention. Chapter 2 of Healthy People 2000 (47) for the United States is on nutrition, with 21 objectives consistent with the dietary guidelines. Nutritional objectives recur elsewhere in the 690-page book in chapters on alcohol, food safety, oral health, maternal and infant health, heart disease and stroke, and cancer, and diabetes.

3) Food guides. The Food and Agriculture Organization and the World Health Organization consulted on The Preparation and Use of Food-based Dietary Guidelines in Nicosia, Cyprus, in March 1995 (48). The underlying idea of the report was that dietary guidelines need to be expressed in foods and in ordinary language. Meanwhile, new food guides, centered on a colored diagram, have been produced in Canada (49), the United Kingdom (50, 51), and the United States ([52] this being very similar to an earlier Australian food guide (53)]. These aim to show the groups of foods, to provide the recommended dietary allowances, and convey the dietary guidelines in the same picture. The spaces in a food guide pyramid can have, instead of the standard pictures, names of foods from cultures and cuisines that are not mainstream, but the food guides cannot serve all purposes. They can be criticized and alternative food guide pictures proposed.

4) Corporate nutrition policies. Some major food companies have included references to dietary guidelines in their company’s corporate policies.

5) Nutrition labeling of processed foods. These labels (Nutrition Facts in the United States) give the food components (ie, energy, fat, saturated fat, sugar, and sodium) as they relate to the dietary guidelines.

6) Modified foods. These are widely available, with reduced total fat, saturated fat, salt, or sugar, or enriched with added fiber, calcium, iron, or folic acid.

7) Food standards. These have had to be revised to include standards for modified foods in line with dietary guidelines (eg, to include definitions of reduced fat and low fat food products).

8) Specified health claims. These are allowed by the US Food and Drug Administration (54) on foods with reduced total fat (claiming that the product may reduce risk of some cancers); foods with reduced saturated fat and cholesterol (claiming that the product may reduce the risk of heart disease); low fat and high-fiber-containing grain products, fruit, or vegetables (claiming that the product may reduce the risk of some cancers, of coronary artery disease, or all); and reduced sodium (claiming that the product may reduce the risk of high blood pressure). Other health claims concern calcium, folic acid, and oat fiber. Health claims on foods are also operating in Sweden.

As consequences of dietary guidelines and products, there have been changes in food intake in the West (North America, northwestern Europe, and Australasia). Our diets have changed in the past 10–20 y (55). In general, the following changes have taken place: 1) Consumption of whole milk is down, and that of reduced fat milk is up (but consumption of cheese has increased). 2) Consumption of eggs is down. 3) Consumption of red meat, which is now leaner, is down, and more people avoid eating the visible fat; chicken consumption is up. 4) Vegetarianism is more common. 5) Butter consumption is much reduced, replaced by soft (unsaturated) margarine. 6) Unsaturated oils are used more often for frying. 7) Fat substitutes (ie, sucrose polyester) can now be used for frying snack foods. 8) Consumption of bread is down, but more of it is whole meal; consumption of breakfast cereals and pasta has increased. 9) Potatoes are consumed more as French fries and chips (crisps). 10) Table sugar consumption is down, but sugar consumption in the form of soft drinks is up. 11) Fruit consumption has increased but mostly as fruit juices. Total fat consumption has declined, but total energy intake has come down too (because of reduced energy expenditure) (55), so national average percentages of energy from fat have come down little (56) if at all (55). However, saturated fatty acid consumption has fallen while polyunsaturated fatty acid consumption has risen (37, 56).

Accompanying these changes in dietary fat, age-standardized mortality from coronary artery disease has declined in most Western countries (37, 57), with the greatest reduction in the United States and Australia (where the trend appeared first, in the mid 1960s). Improved treatments and coronary artery surgery have obviously contributed to the reduced mortality (58); however, incidences of acute myocardial infarction and sudden cardiac death have also declined. Several experts interpreting these trends conclude that the most likely environmental change responsible for this has been the increased intake of polyunsaturated fatty acids, the decreased intake of saturated fatty acids, or both (59–61).

Mortality from strokes, as well as total mortality (age standardized), has declined in most Western countries but the prevalence of obesity is on the rise (62). Dietary guidelines and their products would seem therefore to have reduced the risk of coronary artery disease mainly by influencing people to change the type rather than the amount of fat eaten. Guidelines for reduction of total fat and for body weight control have not counterbalanced our increasingly sedentary lifestyle. Experience shows that it is difficult to persuade most affluent people to keep their total fat intake down to ≤30% of energy (63).

TRANSLATION OF DIETARY GUIDELINES INTO FOODS

One reason for this failure to bring down the percentage of energy consumed as fat may be that fat is not only the most concentrated source of food energy, but is also the most difficult nutrient to quantify in foods in which it is present invisibly, such
TABLE 3
Some uncertainties arising from recent research results

| More polyunsaturated or monounsaturated fatty acids? |
| Is a low-fat diet really desirable? |
| Are trans fatty acids the same or worse than saturated fatty acids? |
| Are we getting enough n-3 polyunsaturated fatty acids? |
| What can antioxidants really do? |
| Is β-carotene good or bad? |
| Which type of fiber is best? |
| Is starch good or bad for you? |
| Are sugars OK now? |
| Does calcium really prevent osteoporosis? |
| Is red meat (with the fat off) really harmful? |
| Should vitamin C or E supplements be recommended? |
| Where does folic acid fit in? |

1 From personal observations, 1997.

as lean meat, sausages, fish, milk, cheese, cakes, cookies, pastries, snack foods, and chocolates (64). The current food guides—in the forms of pyramids, plates, and quarter rainbows—are of no help here. They show food groups such as meats and cereals but do not show the low-fat foods within these groups. If someone were to take the serving recommendations seriously and eat 6 to 11 servings of bread or cereal, that person might well consume as much energy from fat as margarine or butter spread on the bread as from carbohydrate. Nor do these food group pictures make clear that predominantly unsaturated fats (oils) should replace predominantly saturated fats, and where the former can be found. Written dietary guidelines, such as the current Dietary Guidelines for Americans (7) give more information but do not deal adequately with invisible fats and cannot be used to estimate one’s total or saturated fat intake.

An average American in his or her 20s consumes ≈10.5 MJ/d (≈2500 kcal) (65). To match guidelines of just under 30% of energy from total fat and 10% of energy from saturated fatty acids, this person should eat ≈80 g total fat and 25 g saturated fatty acids daily. Commercial fat counter booklets do not seem to be helpful because they are too inconvenient to use in the supermarket, in the kitchen, and at the table. A diligent person with angina or a strong family history of heart disease might use a patient-friendly, simplified, up-to-date fat counter if it was available. Still, nutrition facts on food labels can only help ordinary people choose lower or reduced total or saturated fat options within each category of food.

At present, the feasibility of increasing the amount of healthier fats in the main food sources of fat can be put into three categories: 1) a palatable reduced-fat version has been achieved (eg, milk, yogurt, and red meat), 2) a reduced fat version with substitution of unsaturated for predominantly saturated fat is not as palatable but is successful (eg, polyunsaturated or monounsaturated margarines, unsaturated frying oils, and snack foods fried in relatively unsaturated oils, or 3) reduced fat version unpalatable and replacement of saturated with unsaturated fat is not technically feasible (eg, cheese, some baked goods, and chocolate). It seems we shall have to limit our consumption of foods in this third group. This is hard because cheese and chocolate (66) are perhaps the most irresistible of foods, and it is difficult to monitor our intake of them (the cheese slicer, used in Holland and Scandinavia, is a useful tool for this purpose).

We must try to find answers to our inappropriate intakes of fat and our insufficient intakes of vegetables and fruit. A source of hope is that there are a few prosperous nations whose populations eat < 35% of energy as fat and eat more vegetables: the Japanese, South Koreans, and some people (more in the past) in the Mediterranean region. Elisabeth Helsing of the World Health Organization Regional Office for Europe claimed at the 7th European Nutrition Conference in Vienna in 1995 that the Mediterranean diet is a much better educational concept than dietary guidelines (E Helsing, personal communication, 1995). The big question is, which Mediterranean diet? The diet of which group of which region of which Mediterranean country at which time in history? These diets go back to classical antiquity but were changed by the introduction of the tomato, maize, and other foods from the Americas in the 16th century. In Italy and Spain, authorities are now concerned that intakes of fat and of fast foods are increasing, and the Italian National Institute of Nutrition decided it was necessary to publish dietary guidelines (67). The sort of food offered in Italian restaurants and pizza bars in North America, the United Kingdom, and Australia is certainly not what nutritionists are thinking of when they promote a Mediterranean diet.

The concept of an ideal, preserved, Mediterranean diet has interested nutritional scientists lately, and excellent symposia have been published (68–72). The dietary characteristics have been well presented and include plenty of vegetables (including legumes), cereals (eg, bread and pasta), fresh fruits, a variable amount of olive oil (which is the dominant visible fat), some fish, cheese, nuts, and a little meat. The food is fresh and flavored with garlic and other herbs. There is little sugar, and inexpensive red wine accompanies afternoon and evening meals. The concept has also excited food writers in the media. Italian, Greek, and Spanish cuisines are romantic, have deep historical associations, are pleasant to eat, and are not too difficult to prepare. Life expectancy (at birth) is among the best in the world in Greece, Spain, Italy, and France (Table 4) (73). The nutritional virtues of the ideal Mediterranean diet were first drawn to the attention of the rest of the world by Ancel Keys (74), and major support for this group of diets comes from the classic Seven Countries Study that he headed (75). [Incidentally, Keys was also the first to draw the attention of the rest of the world to the Nordic dietary guidelines (76)]. For those who want to make their Western diet more Mediterranean there are good books that describe authentic food preparation. For Italian cuisine, cookbooks by Elizabeth David (77), Marcella Hazan (78, 79), and Lorenza de Medici (80) are the favorites in my home.

But there are two other ideal diets that should be considered in helping to make nutrition research palatable. One is the Japanese diet, a variant of the classic Chinese cuisine but now distinct and associated with the best life expectancy in the world (Table 4) and little obesity. This diet is low in fat and sugar and includes ingredients that are less familiar in Western cuisines such as soy, seaweeds, and raw fish, and includes a predominant use of rice. It is traditionally high in salt but following guidelines from the Japanese Ministry of Health (81) the sodium content is decreasing. The whole Japanese diet is not as easy to adopt in Western homes as is the Mediterranean diet. There are not enough fish in the sea to go around, and some of the flavors are difficult for Westerners to enjoy. But there are Japanese restaurants and food shops in Western cities. Japanese dishes—and appropriate dishes from other Asian cuisines—can help us find low-fat, palatable meals.

The third healthy diet concept is the hunter-gatherer diet. Our
ancestors for the past million years, *Homo erectus* and *Homo sapiens*, ate food obtained by gathering and hunting, with a range of energy coming from animals—land animals, fish, or shellfish—depending on location and season (82). At high latitudes animal foods predominated (83). Our ancestors presumably had time (50,000 generations) for genetic adaptation to diets of this type, which all humans ate until agriculture started only 10,000 years ago. These hunter-gatherer diets contained many different parts of plants and animals but did not include cereals, milk (after early childhood), refined sugar, salt, or alcohol (84, 85). A popular interpretation of the hunter-gatherer diet and lifestyle was published by Boyd Eaton et al (86). Note that the meat of wild bovid was and is in saturated fat [concentrations of plasma cholesterol were very low in 1960s hunter-gatherers (87)], and that the unsaturated fatty acids include major proportions of arachidonic and docosahexaenoic acids (88), which are important fatty acids in the human brain.

Historical or prehistoric foods were often time-consuming to collect and prepare and required skills handed down from generation to generation. Today we have to adapt these different traditional cuisines to contemporary ingredients, kitchen equipment, and haste. Some chefs and food writers are leading the way in adapting local and national cuisines to contemporary ingredients, kitchen equipment, and haste. Some chefs and food writers are leading the way in

<table>
<thead>
<tr>
<th>Country</th>
<th>Life expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>79</td>
</tr>
<tr>
<td>Greece, Hong Kong, Spain, Sweden, Switzerland</td>
<td>78</td>
</tr>
<tr>
<td>Austria, Canada, France, Israel, Italy, Netherlands, Norway</td>
<td>77</td>
</tr>
<tr>
<td>Austria, Belgium, Costa Rica, Cuba, Denmark, Finland, Germany, New Zealand, United Kingdom, United States</td>
<td>76</td>
</tr>
<tr>
<td>Ireland, Kuwait, Portugal, Singapore</td>
<td>75</td>
</tr>
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*Life expectancy calculated for birth in 1993. From UNICEF (73).*

In conclusion, I can only agree with Tudge when he says, “Above all, Westerners need a new cuisine. It must be based on the foods that should be eaten and which are liable to be available. It should borrow and adapt all relevant techniques from all the cooks of history, who had often faced and overcome the problems that we now face” (90).

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