

# Developing and Implementing Science-based Dietary Guidelines

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**Dietary changes is occurring in both developed and developing countries, but with different consequences. Many developing countries are going through a rapid transition from "undernutrition" to "overnutrition". Thus health policies need to address malnutrition and chronic disease at the same time. Dietary guidelines cannot simply be imported because there are contrast among countries in the origin of nutritional problems. It is important that the origins of nutritional problems be clearly understood within each country prior to the development of dietary guidelines. This requires application of the best scientific knowledge and input from all groups that can contribute to the decision making prices within a country. These groups include government, health professionals and the food industry. It is only through cooperation among these groups that the most effective allocation of resources will be achieved and that the guidelines will be communicated within an appropriate sociocultural context.**

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Solving nutritional problems at a societal level requires cooperation among government, health professionals, researchers and the food industry. Food guidance and nutrition policies must take into account sound, current, and scientific knowledge. To have impact, however, they must also have the support of all sectors that have a role in their implementation. These food and nutrition policies cannot be simply imported by a country, but require development within. Each country is going through its own nutrition transition.

## Nutrition Transition

Dietary change is occurring in both developed and developing countries, but with different consequences. In developed countries the primary focus is on chronic diseases stemming from "overnutrition", and the role of the diet in addressing them. In developing countries with an increase in the standard of living, people are able to purchase a greater variety of foods and shift from a dependence on grains, with a consequent improvement in nutrient intake. Such dietary change decreases the incidence of nutrition-deficiency diseases. But, as malnutrition decreases, "overnutrition" and the resultant chronic diseases tend to increase. Thus, health policies need to address malnutrition and chronic disease at the same time.

Diet and disease pattern will continue to change. It is predicted that deaths from communicable, perinatal, maternal and nutritional conditions will decrease by one-third, globally, between 1990 and 2020<sup>1</sup>. Deaths from non-communicable diseases, including heart disease and depression, will increase two-fold, as will deaths from injuries (accidents). By 2020, tobacco is expected to cause more premature deaths and disability than any other single factor. As birth rate falls, the number of adults relative to children increases, and the

commonest health problems become those of adults, not children. This fact must be kept in mind as countries develop public health priorities and deal with the nutrition transition.

## Dietary Guidelines

Science-based dietary guidelines are generally expressed in scientific terms, with quantitative recommendations on nutrients and food components. They are based on the best available scientific evidence of associations between diet and health, evidence that is available worldwide. They are appropriate for use by policy makers, health professionals and the food industry. However, most people need science-based dietary guidelines translated into food-based dietary guidelines that specify foods and serving sizes. Because of the importance of dietary practices in nutrition-related diseases, it is important that food-based guidelines be developed for specific countries. Such guidance must communicate within a socio-cultural context to be effective.

As well, the origin of chronic disease must be understood within each country during the development of food-based dietary guidelines and prior to setting public health priorities.

The importance of a wide consultative process in developing science-based and food-based dietary guidelines has been emphasized in a recent FAO/WHO consultation report<sup>2</sup>.

## Science-based Dietary Guidelines

Dietary guidelines are advisory statement about diet for the population, and are aimed at prevention of diet-related diseases. They provide advice about components of foods (eg. fat, salt and fibre) that are important public health issues.

These guidelines are science-based in that they are based on scientifically derived associations between diet and disease and recognize that to infer causality in associations between diet and chronic disease, six empirical criteria must be met. They are: strength of the association, dose-

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response relationship, temporally correct association, consistency of association, specificity of association and biological plausibility<sup>3</sup>.

Strength of association is usually expressed as the ratio of disease rates for people exposed to the hypothesized risk factor to those not exposed. The existence of a dose-response relationship in which greater exposure brings greater risk strengthens the inference that the association is causal. If the observed association is causal, exposure to the putative risk factor must precede the onset of disease by at least the duration of disease induction and latency. For consistency of the association, one expects to find the hypothesized association in a variety of studies, in more than one study population and when more than one method is used. The specificity of the association describes the degree to which one factor predicts the frequency or the magnitude of the disease. Finally, biological plausibility require that the putatively causal association fit existing biologic or medical knowledge. This association is very hard to find with chronic disease, given their complex nature.

The first national dietary guideline appeared in Scandinavia

**Table 1. Canada's guidelines for healthy eating 1991**

- Enjoy a VARIETY of foods
- Emphasise cereals, breads other grain products, vegetables and fruits.
- Choose lower-fat dairy products, leaner meats and foods prepared with little or no fat.
- Achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating.
- Limit salt, alcohol and caffeine.

Source: Reference 11

**Table 2. Comparison of the 1990 and 1995 Dietary Guidelines for Americans**

1990 guidelines	1995 guidelines	Rationale for proposed change
1. Eat a variety of foods	1. Eat a variety of foods	No change
2. Maintain healthy weight	2. Balance the food you eat with physical activity. Maintain or improve your weight.	New emphasis on energy balance
3. Choose a diet low in fat, saturated fat and cholesterol	3. Choose a diet low in fat, saturated fat and cholesterol	No change in wording. Moved down from third to fourth in 1995.
4. Choose a diet with plenty of vegetables, fruits and grain products	4. Choose a diet with plenty of grain products, vegetables and fruits	Increased focus on plant foods, consistent with Food Guide Pyramid. Moved up from fourth to third in 1995.
5. Use sugars only in moderation	5. Choose a diet moderate in sugars	Remove negative connotation of "only" focus on total diet.
6. Use salt and sodium only in moderation	6. Choose a diet moderate in salt and sodium.	Emphasise that foods themselves are the source of most dietary sodium.
7. If you drink alcoholic beverages do so in moderation.	7. If you drink alcoholic beverages do so in moderation.	No change

Source: Reference 12

in 1968<sup>4</sup>. Canada's first authoritative statement emerged in 1976, and the first edition for the United States appeared in 1977. By the early 1980s, government-generated dietary guidelines were common place in affluent countries. Dietary guidelines produced between 1981 and 1989 in 17 industrialized and developing countries were summarized by a World Health Organization study group in 1990<sup>5</sup>.

The nutrition recommendations for Canadians<sup>6</sup> now suggest that the goal of healthy body weight be achieved by a combination of healthy eating and physical activity. This important change recognizes that the increase in obesity in the Canadian population is more likely due to low levels of physical activity rather than to any specific food or dietary patterns. They no longer recommend a reduction in free sugar intake (Table 1). This change arose from evaluations showing that intake of added sugars (10-12% of energy) were consistent with the selection of healthy diets<sup>7,8</sup>.

The nutrition recommendations for Canadians now suggest that the goal to reduce fat to 30% or less of energy be gradually implemented so that it is achieved by the time adulthood is reached<sup>9</sup>.

The recent Dietary Guidelines for Americans<sup>10</sup> emphasise the maintenance of healthy body weights, but also include the notion that energy balance is determined both by food intake and physical activity. They continue to recommend that fat provide no more than 30% of dietary energy, but instead of saying that this recommendation applies to all above two years of age, they now suggest reaching the goal by the time the child is five years of age. They recommend that sugars be used in moderation, but also state that current intakes of sugars are not associated with chronic disease, except for dental caries. The rationale for the changes occurring from 1990 to 1995 is shown in Table 2.

Dietary guidelines are expected to change with new knowledge. Fortunately, the changes are not of sufficient

magnitude to threaten the credibility of dietary guidelines. But because changes in knowledge are inevitable, committees given the responsibility of developing guidelines must pay close attention to the criteria for evaluating information on the diet-health relationship.

### Food-based Dietary Guidelines

Food-based dietary guidelines (FBDG) are needed, because consumers focus on foods, not nutrients, in choosing what to eat<sup>13</sup>. They must provide individuals with guidance to prevent both nutrient deficiencies and chronic disease. The development of FBDG is not a simple matter. It should be informed by public health issues (the science-based dietary guidelines); the social, economic, agricultural and environmental factors affecting food availability; and eating patterns and food patterns (not numerical goals). FBDG should provide positive messages encouraging enjoyment of appropriate dietary intakes while acknowledging that a wide range of dietary patterns can be consistent with good health<sup>2</sup>.

Eight steps are suggested for developing FBDG: (1) form a working group of representatives of agriculture, health, food science, nutritional science, consumers, food industry, communications and anthropology; (2) gather information on nutrition-related diseases, food availability, and food intake patterns in the country; (3) identify, through full discussion, a set of major nutrition-related health problems for which dietary guidelines could be useful; (4) evaluate the general food production and supply situation through consideration of current practices, subsidies and other governmental policies and problems, to see if FBDG can be implemented under the present situation; (5) prepare a set of draft food-based guidelines, followed by background statements for each guideline and circulate them to all working-group members; (6) pilot test the wording of the guideline statements with consumer groups; revise and check; (7) finalise the background statements and send them to special-interest groups in the country (and possibly internationally) for comment. Once again, meet to consider changes, in view of the responses, and put together a draft of the final report; (8) conclude the draft, adopt, publish and disseminate the final report, and finally begin implementation<sup>2</sup>.

Clearly, each country developing FBDG will have to spend considerable effort, organization, and time. The same process could logically be applied to the development of all nutrition and food policies. If these steps are taken, the outcome of the deliberations is more likely to be effectively implemented by the food industry and nutrition educators.

Food guides are an example of FBDG. Both Canada and the US have developed new Food guides that incorporate their national science-based dietary guidelines. In the past, the Food guides have concentrated on expressing a dietary pattern that would provide the individual with the essential nutrients in recommended amounts. The new Food guides recommended a dietary pattern aimed not only at meeting the requirements for essential nutrients, but also at preventing chronic disease. Both the Canadian and American Food Guides are centered on food groups and both have a new category: foods that include sugars, fats and oils.

Food guides should be a national product. To illustrate, even though the foods available to Canadians and Americans are similar, one can look at the differences in the countries food guides. The Canadian Food Guide<sup>6</sup> incorporates the four food groups in a rainbow design. Meat and alternatives are arranged along the small, inner arc. Next come the milk products, then vegetables and fruits and finally grain products along the large, outer arc. The design gives the visual cue that the greatest quantity of food should be selected from the grains group. A category of "Other Foods" is identified as not part of any food group, and includes foods that are mostly fats and oils, mostly sugar, high fat or high salt snack foods, beverages, herbs, spices and condiments. The guide acknowledges that "These foods can be used in making meals and snacks and are often eaten with foods from the four food groups", but recommends that they be consumed in moderation. Instructions on using the Food guide include advice on reducing fat; no mention is made of sugar.

The US food guide<sup>10</sup> is in the form of a pyramid, showing five good groups, with the grain group at the base. The vegetable group and the fruit group share the next level of the pyramid and on top of these are the milk group and the meat group, again sharing equally the next level in the pyramid. The visual impression is that one should consume less of those foods higher up the pyramid. At the very top is the category of fats, oils and sweets. The consumer is advised that "These foods supply calories, but little or no vitamins and minerals".

The scientific basis for the food guides has changed over the past twenty years and the new Food Guides capture these changes. For example, evidence that excess fat intake is a problem in both Canada and the US has become more convincing, although there is no total agreement on the need to apply fat reduction goals to children. In Canada, it is recommended that fat intake be reduced gradually to 30% or less of energy by the time adulthood is reached. By contrast, the US recommends that this goal be achieved earlier, by children of five years of age or older.

In earlier guidelines and food-based dietary guidance, added sugar was viewed negatively. It has been recognised, however, that this guidance was based on an incomplete understanding of sugar intakes and of the relationship between sugar intake and health. Best estimates show that the intake of sweeteners, primarily carbohydrate sweeteners such as sucrose and high-fructose corn syrup, averages 10-12% of the dietary energy and is consistent with healthy diets. Several recent reviews have concluded that other than the contribution of sugars to dental caries, there is no evidence that sugars at the levels currently consumed are the cause of sugar intolerance, diabetes mellitus, high blood lipids, cardiovascular disease, hypertension, hyperactivity in children, obesity or nutrient-deficient diets<sup>8,14,15</sup>.

Food-based dietary guidelines must focus on creating healthier diets and not create "good food/bad food" categories. As yet, science does not support a reductionist approach to inclusion and exclusion of specific foods.

To solve nutritional problems and implement FBDG, effective partnerships are needed among industry, government and academia. As emphasised by the FAO/WHO consultation group that met in 1995 to evaluate development of FBDG,

each country should engage in planning, with all the main partners: government, academic institutions, and industry. A call for increased collaboration among these three partners in solving nutrition problems was recognised at the International Conference on Nutrition through the World Declaration on Nutrition which was adopted unanimously by 159 governments<sup>16</sup>. The role of industry in connecting micronutrient deficiencies was also recognised at the Ottawa forum held in 1995<sup>17</sup>. This recent recognition of the role of the food industry as an essential partner in solving nutritional problems requires understanding and consideration by the government and academic sectors.

### **The Role of the Food Industry in Nutrition Transition**

The food industry contributes to the economic advancement of a country. It can be a key partner with government and health professionals in improving nutritional status, acting as a resource in both the development and the translation of dietary goals and policies<sup>18,19</sup>. The food industry is estimated to have accounted for fifty percent of the economic advancement of England since the Industrial Revolution. It has delivered improved nutrition as well as wealth<sup>20</sup>.

The food industry contributes to economic development by increasing the productivity of agricultural crops, decreasing losses and wastage, increasing food availability, reducing seasonality, making high-nutritive-value foods available, and providing employment and higher incomes<sup>21</sup>. Marketing strategies may help to achieve nutritional goals, because they include providing nutrition information on labels. Informative labels support nutrition educators' attempts to make people more aware of the importance of nutritional quality and food safety<sup>21</sup>. In addition, marketing strategies create distribution channels for food commodities<sup>22</sup>.

Multinational companies contribute to the advancement of the food industry sector of developing countries through several activities. They (a) bring modern applications of food technology, including biotechnology; (b) bring internationally recognised standards in the areas of food toxicology and safety; and (c) participate in, and respond to, the development of dietary guidelines and regulations. In developing countries, however, multinational companies often have difficulty in finding the necessary quantity and quality of raw materials, including the human resources needed to manage the food system. Often their ventures depend on future development and require large investments to secure raw materials, train personnel, work with government food and drug authorities, and develop markets.

The food industry is an essential partner with government and health professionals in changing dietary patterns and achieving dietary goals. Its effectiveness is enhanced if government provides the educational and regulatory framework that will influence consumers to create and pay for health-supporting products the industry produces. For the most part, the industry is consumer driven, responsive to the purchasing power and health knowledge of the population.

Given the right support, the food industry is a major force in changing the composition of the food supply, as illustrated by its response to the goal of reducing fat consumption, from 40% of energy toward the dietary goal of 30% of

energy in the North American population. In 1995, 80% of the new food products were fat reduced. The fat substitute Olestra has been approved by the United States Food and Drug Administration and the use of such products will likely lead to a reduction in fat intake<sup>14,23</sup>. Another example is the food industry's response to the recommendation that North Americans increase fibre intake. Many food products with enhanced fibre content have been developed. Recently in the United States, the government has approved a health claim that oat fibre consumed in ready-to-eat breakfast cereal can lead to a decrease in blood lipid levels and, presumably, cardiovascular disease. Currently, a great deal of interest is being expressed in functional foods sometimes called nutraceuticals. These are foods that have been modified to have biological or physiological (functional) effects that exceed those related to nutrition, in terms of providing energy and essential nutrients<sup>7</sup>.

In developing countries, the serious problem of nutrient-deficiency diseases remains. Yet, the food industry has the ability to add essential nutrients to food products that are commonly consumed. It has been well proven that the food industry can respond in this way to the health needs of a nation and can be an effective partner with government in the process<sup>24</sup>.

In developed countries, over the last 40-50 years, food fortification has played a major role in eliminating several nutritional deficiencies. Fortification does not require changes in the diet, hence it can be implemented and sustained over a long period. Further, it can be a cost-effective means of reducing micronutrient malnutrition<sup>24</sup>.

Developing countries have been slow to embrace the food industry as a partner in solving micronutrient malnutrition.

Thus, the forum on Food Fortification<sup>25</sup> held in Ottawa, Canada in 1995 emphasised the importance of public-private sector collaboration to eliminate micronutrient malnutrition. The report notes that "Collaboration involves both sides taking ownership of the issue and searching for solutions together. Advocacy to eliminate micronutrient malnutrition cannot simply be targeted to industry but must also originate from industry".

A number of ways for industry to contribute to collaborative activities were suggested, including clear advocacy of industry needs to government; assistance to public sector in assessment of national needs; participation in education, research and health assessment; assistance in market research and promotional materials; development of business-to-business channels to transfer technology; development of joint ventures among fortificant and pre-mix suppliers and food processors; provision of training and methodologies for quality assurance programmes; creation of "Industry Best Practices" code for production and marketing of fortified products; development of special investment criteria for fortified products; and collaboration to expand current market niches for fortified foods.

Several reasons have been given for the difficulty that developing countries have solving nutrition problems<sup>22</sup>. First, where education has been overlooked, there is a high level of illiteracy. Illiteracy greatly limits the efficiency of people producing food, and hinders their ability to improve diets. Second, there is too little emphasis on the training of

food scientists and nutritionists. Third, political systems often change and public health policies get inconsistent attention.

Developing countries that fail to emphasise the training of food scientists, nutritionists, and dietitians and do not harness the capabilities of the multinational food industry will continue to struggle in vain to achieve health goals for their populations<sup>26</sup>. As noted, the benefits to be derived from food fortification have not been realised. For the future, the advances in and application of biotechnology have potential to be overlooked, leaving behind the very countries that could benefit the most. Biotechnology should be given a top priority in many developing countries, because it can improve raw material as well as improved and new plants or animals through genetic engineering<sup>22</sup>. Increased indigenous capacity in biotechnology would help a developing country move from its status of recipient to that of active player in the global arena and marketplace<sup>27</sup>. Unfortunately, mechanisms that promote and facilitate technology transfer either do not exist or are poorly developed, and economic, legal and social barriers prevent university-industry cooperation. Little communication between research establishments and the applied sector has been noted<sup>28</sup>.

The ability of the food industry to assist with economic development and the improvement of a population's health is clear. For this reason, the food industry should be included as a partner with government scientists, academics and health professionals in developing and implementing food and nutrition policies and dietary guidelines.

## CONCLUSION

**To cope with modernisation and the appearance of chronic disease while addressing nutrient deficiencies requires effective partnership among government, health professionals, academia, and the food industry. Science-based dietary guidelines are essential to the improvement of the health of a nation's people, but they must be communicated through FBDG that take into account public health issues, the social economic, agricultural and environmental factors affecting food availability, and eating patterns within a country. And they must be developed by all partners.**

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## مجلة البحرين الطبية التعريف والأهداف

مجلة البحرين الطبية هي دورية علمية هدفها تطوير وتقديم العلوم الطبية البيولوجية والأكلينيكية والصحية وتقوم بإصدارها هيئة تحرير مستقلة وتطبع في وزارة الأعلام ، دولة البحرين . تنشر المجلة مقالات باللغتين العربية والإنجليزية.

تشمل مجالات النشر بالمجلة مقالات البحوث الأصلية ، المراجعات ، تقارير الحالات ، المقتطفات القصيرة ، رسائل للمحرر ، الأختبارات الطبية ، الأفتتاحيات ، الآراء والأخبار، مراجعات الكتب والدوريات ، التقارير العامة ، أخبار المؤتمرات والاجتماعات ، مقالات التعليم الطبي ، تقارير صحية ، تاريخ الطب والآراء الشخصية.

تخضع جميع الأعمال المقدمة للنشر في مجلة البحرين الطبية إلى المراجعة من قبل المحررين ومن محكمين مختصين ، يرسل إشعار إستلام الأعمال المقدمة إلى المؤلف الرئيسي . تكون هذه المقالات من ممتلكات المجلة في حالة الموافقة على نشرها . يقوم محرر المجلة بقراءة المقالات المعدة للطبع . تخضع جميع الأعمال المقدمة للنشر بما في ذلك الإعلانات إلى القواعد الأخلاقية للمهنة .

يقرر المحررون و المحكمون قبول أية مقال إلى أي من مجالات النشر بمجلة البحرين الطبية ويبلغ المؤلفين بهذا القرار قبيل النشر .

ينظر في الأعمال المقدمة للنشر في مجلة البحرين الطبية على أساس أنها مقدمة للمجلة فقط والأ تكون قد نشرت أو قيد النشر في مجلة أخرى و ألا تكون قد نشرت من قبل . وأن تكون المواد المقدمة للنشر متفق عليها من جميع المؤلفين ، لا يعتبر التخليص المنشور مسبقاً للمقالات الكاملة المقدمة للمجلة نشرًا مزدوجًا .

تشجع مجلة البحرين الطبية الأبحاث العلمية عن طريق تنظيم دورات وورش عمل عن أساليب البحث و ما يمت لها بصلة مثل طرق الكتابة و أعمال التحرير و للمجلة هيئة استشارية للبحوث لمساعدة الباحثين في أبحاثهم . كما و تواصل المجلة دورها الاجتماعي عن طريق إقامة المحاضرات الدورية للمواضيع التي تهم الرأي العام .

المجلد ٢٠ العدد ٣ سبتمبر (أيلول) ١٩٩٨

# مجلة البحرين الطبية

## هيئة التحرير

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تصدر مجلة البحرين الطبية كل ثلاثة شهور في مارس ، يونيو ، سبتمبر و ديسمبر. وهي مدرجة في الفهرس الطبي لمنظمة الصحة العالمية لمنطقة شرق المتوسط، اكستر امد في المملكة المتحدة و أنظمة الايداع العالمية بفرنسا.

تحتفظ المجلة بحقوق الطبع و لايجوز إعادة طباعة أو ترجمة المواد المنشورة بها بأي شكل وبأية وسيلة دون ما الحصول على إذن كتابي من رئيس التحرير. الآراء والمعلومات المنشورة في المجلة تعبر عن رأي أصحابها و هي لا تمثل وجهة نظر هئية تحرير مجلة البحرين الطبية.

الاشتراك في المجلة ثمانية دنانير بحرينية (٢٠ دولاراً أمريكياً) سنوياً. المجلة لا توفر اصدارات مجانية للمطبوعات المنشورة بها و يجوز طلب أعداد إضافية من المجلة.

يمكن الحصول على رسوم الاعلانات من مكتب تحرير المجلة. توزع المجلة لجميع مناطق العالم وبالأخص منطقة الخليج العربي والشرق الأوسط.

ترسل جميع المراسلات وطلبات الاشتراك و الاعلانات إلى :

مكتب التحرير :  
مجلة البحرين الطبية  
ص . ب : ٢٢١٥٩  
دولة البحرين

هاتف : ٢٦٥٢٥٨ (٩٧٣+)  
فاكس : ٢٧٧٠٣٦ (٩٧٣+)