

## 5. Population nutrient intake goals for preventing diet-related chronic diseases

### 5.1 Overall goals

#### 5.1.1 *Background*

Population nutrient intake goals represent the population average intake that is judged to be consistent with the maintenance of health in a population. Health, in this context, is marked by a low prevalence of diet-related diseases in the population.

Seldom is there a single “best value” for such a goal. Instead, consistent with the concept of a safe range of nutrient intakes for individuals, there is often a range of population averages that would be consistent with the maintenance of health. If existing population averages fall outside this range, or trends in intake suggest that the population average will move outside the range, health concerns are likely to arise. Sometimes there is no lower limit; this implies that there is no evidence that the nutrient is required in the diet and hence low intakes should not give rise to concern. It would be of concern if a large proportion of values were outside the defined goals.

#### 5.1.2 *Strength of evidence*

Ideally the definition of an increased or a decreased risk should be based on a relationship that has been established by multiple randomized controlled trials of interventions on populations that are representative of the target of a recommendation, but this type of evidence is often not available. The recommended dietary/nutrition practice should modify the attributable risk of the undesirable exposure in that population.

The following criteria are used to describe the strength of evidence in this report. They are based on the criteria used by the World Cancer Research Fund (1), but have been modified by the Expert Consultation to include the results of controlled trials where relevant and available. In addition, consistent evidence on community and environmental factors which lead to behaviour changes and thereby modify risks has been taken into account in categorizing risks. This applies particularly to the complex interaction between environmental factors that affect excess weight gain, a risk factor which the Consultation recognized as contributing to many of the problems being considered.

- *Convincing evidence.* Evidence based on epidemiological studies showing consistent associations between exposure and disease, with little or no evidence to the contrary. The available evidence is based on a substantial number of studies including prospective observational studies and where relevant, randomized controlled trials of sufficient

size, duration and quality showing consistent effects. The association should be biologically plausible.

- *Probable evidence.* Evidence based on epidemiological studies showing fairly consistent associations between exposure and disease, but where there are perceived shortcomings in the available evidence or some evidence to the contrary, which precludes a more definite judgement. Shortcomings in the evidence may be any of the following: insufficient duration of trials (or studies); insufficient trials (or studies) available; inadequate sample sizes; incomplete follow-up. Laboratory evidence is usually supportive. Again, the association should be biologically plausible.
- *Possible evidence.* Evidence based mainly on findings from case-control and cross-sectional studies. Insufficient randomized controlled trials, observational studies or non-randomized controlled trials are available. Evidence based on non-epidemiological studies, such as clinical and laboratory investigations, is supportive. More trials are required to support the tentative associations, which should also be biologically plausible.
- *Insufficient evidence.* Evidence based on findings of a few studies which are suggestive, but are insufficient to establish an association between exposure and disease. Limited or no evidence is available from randomized controlled trials. More well designed research is required to support the tentative associations.

The strength of evidence linking dietary and lifestyle factors to the risk of developing obesity, type 2 diabetes, CVD, cancer, dental diseases, osteoporosis, graded according to the above categories, is summarized in tabular form, and attached to this report as an Annex.

### 5.1.3 **A summary of population nutrient intake goals**

The population nutrient intake goals for consideration by national and regional bodies establishing dietary recommendations for the prevention of diet-related chronic diseases are presented in Table 6. These recommendations are expressed in numerical terms, rather than as increases or decreases in intakes of specific nutrients, because the desirable change will depend upon existing intakes in the particular population, and could be in either direction.

In Table 6, attention is directed towards the energy-supplying macronutrients. This must not be taken to imply a lack of concern for the other nutrients. Rather, it is a recognition of the fact that previous reports issued by FAO and WHO have provided limited guidance on the meaning of a “balanced diet” described in terms of the proportions of the various energy sources, and that there is an apparent consensus on this aspect of diet in relation to effects on the chronic non-deficiency diseases.

This report therefore complements these existing reports on energy and nutrient requirements issued by FAO and WHO (2–4). In translating these goals into dietary guidelines, due consideration should be given to the process for setting up national dietary guidelines (5).

Table 6  
**Ranges of population nutrient intake goals**

Dietary factor	Goal (% of total energy, unless otherwise stated)
Total fat	15–30%
Saturated fatty acids	<10%
Polyunsaturated fatty acids (PUFAs)	6–10%
n-6 Polyunsaturated fatty acids (PUFAs)	5–8%
n-3 Polyunsaturated fatty acids (PUFAs)	1–2%
Trans fatty acids	<1%
Monounsaturated fatty acids (MUFAs)	By difference <sup>a</sup>
Total carbohydrate	55–75% <sup>b</sup>
Free sugars <sup>c</sup>	<10%
Protein	10–15% <sup>d</sup>
Cholesterol	<300 mg per day
Sodium chloride (sodium) <sup>e</sup>	<5 g per day (<2 g per day)
Fruits and vegetables	≥400 g per day
Total dietary fibre	From foods <sup>f</sup>
Non-starch polysaccharides (NSP)	From foods <sup>f</sup>

<sup>a</sup> This is calculated as: total fat – (saturated fatty acids + polyunsaturated fatty acids + trans fatty acids).

<sup>b</sup> The percentage of total energy available after taking into account that consumed as protein and fat, hence the wide range.

<sup>c</sup> The term “free sugars” refers to all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices.

<sup>d</sup> The suggested range should be seen in the light of the Joint WHO/FAO/UNU Expert Consultation on Protein and Amino Acid Requirements in Human Nutrition, held in Geneva from 9 to 16 April 2002 (2).

<sup>e</sup> Salt should be iodized appropriately (6). The need to adjust salt iodization, depending on observed sodium intake and surveillance of iodine status of the population, should be recognized.

<sup>f</sup> See page 58, under “Non-starch polysaccharides”.

### *Total fat*

The recommendations for total fat are formulated to include countries where the usual fat intake is typically above 30% as well as those where the usual intake may be very low, for example less than 15%. Total fat energy of at least 20% is consistent with good health. Highly active groups with diets rich in vegetables, legumes, fruits and wholegrain cereals may, however, sustain a total fat intake of up to 35% without the risk of unhealthy weight gain.

For countries where the usual fat intake is between 15% and 20% of energy, there is no direct evidence for men that raising fat intake to 20% will be beneficial (7, 8). For women of reproductive age at least 20% has

been recommended by the Joint FAO/WHO Expert Consultation on Fats and Oils in Human Nutrition that met in 1993 (3).

### *Free sugars*

It is recognized that higher intakes of free sugars threaten the nutrient quality of diets by providing significant energy without specific nutrients. The Consultation considered that restriction of free sugars was also likely to contribute to reducing the risk of unhealthy weight gain, noting that:

- Free sugars contribute to the overall energy density of diets.
- Free sugars promote a positive energy balance. Acute and short-term studies in human volunteers have demonstrated increased total energy intake when the energy density of the diet is increased, whether by free sugars or fat (9–11). Diets that are limited in free sugars have been shown to reduce total energy intake and induce weight loss (12, 13).
- Drinks that are rich in free sugars increase overall energy intake by reducing appetite control. There is thus less of a compensatory reduction of food intake after the consumption of high-sugars drinks than when additional foods of equivalent energy content are provided (11, 14–16). A recent randomized trial showed that when soft drinks rich in free sugars are consumed there is a higher energy intake and a progressive increase in body weight when compared with energy-free drinks that are artificially sweetened (17). Children with a high consumption of soft drinks rich in free sugars are more likely to be overweight and to gain excess weight (16).

The Consultation recognized that a population goal for free sugars of less than 10% of total energy is controversial. However, the Consultation considered that the studies showing no effect of free sugars on excess weight have limitations. The CARMEN study (Carbohydrate Ratio Management in European National diets) was a multicentre, randomized trial that tested the effects on body weight and blood lipids in overweight individuals of altering the ratio of fat to carbohydrate, as well as the ratio of simple to complex carbohydrate per se. A greater weight reduction was observed with the high complex carbohydrate diet relative to the simple carbohydrate one; the difference, however was not statistically significant (18). Nevertheless, an analysis of weight change and metabolic indices for those with metabolic syndrome revealed a clear benefit of replacing simple by complex carbohydrates (19). The Consultation also examined the results of studies that found an inverse relationship between free sugars intakes and total fat intake. Many of these studies are methodologically inappropriate for determining the causes of excess weight gain, since the percentage of calories from fat will decrease as the percentage of calories from carbohydrates increases and vice versa. Furthermore, these analyses do not usually distinguish

between free sugars in foods and free sugars in drinks. Thus, these analyses are not good predictors of the responses in energy intake to a selective reduction in free sugars intake.

#### *Non-starch polysaccharides (NSP)*

Wholegrain cereals, fruits and vegetables are the preferred sources of non-starch polysaccharides (NSP). The best definition of dietary fibre remains to be established, given the potential health benefits of resistant starch. The recommended intake of fruits and vegetables (see below) and consumption of wholegrain foods is likely to provide > 20 g per day of NSP (> 25 g per day of total dietary fibre).

#### *Fruits and vegetables*

The benefit of fruits and vegetables cannot be ascribed to a single or mix of nutrients and bioactive substances. Therefore, this food category was included rather than the nutrients themselves. The category of tubers (i.e. potatoes, cassava) should not be included in fruits and vegetables.

#### *Body mass index (BMI)*

The goal for body mass index (BMI) included in this report follows the recommendations made by the WHO Expert Consultation on Obesity that met in 1997 (20). At the population level, the goal is for an adult median BMI of 21–23 kg/m<sup>2</sup>. For individuals, the recommendation is to maintain a BMI in the range 18.5–24.9 kg/m<sup>2</sup> and to avoid a weight gain greater than 5 kg during adult life.

#### *Physical activity*

The goal for physical activity focuses on maintaining healthy body weight. The recommendation is for a total of one hour per day on most days of the week of moderate-intensity activity, such as walking. This level of physical activity is needed to maintain a healthy body weight, particularly for people with sedentary occupations. The recommendation is based on calculations of energy balance and on an analysis of the extensive literature on the relationships between body weight and physical activity. This recommendation is also presented elsewhere (21). Obviously, this quantitative goal cannot be considered as a single “best value” by analogy with the nutrient intake goals. Furthermore, it differs from the following widely accepted public health recommendation (22):

For better health, people of all ages should include a minimum of 30 minutes of physical activity of moderate intensity (such as brisk walking) on most, if not all, days of the week. For most people greater health benefits can be obtained by engaging in physical activity of more vigorous intensity or of longer duration. This cardio respiratory endurance activity should be supplemented with

strength-developing exercises at least twice a week for adults in order to improve musculo skeletal health, maintain independence in performing the activities of daily life and reduce the risk of falling.

The difference between the two recommendations results from the difference in their focus. A recent symposium on the dose–response relationships between physical activity and health outcomes found evidence that 30 minutes of moderate activity is sufficient for cardiovascular/metabolic health, but not for all health benefits. Because prevention of obesity is a central health goal, the recommendation of 60 minutes a day of moderate-intensity activity is considered appropriate. Activity of moderate intensity is found to be sufficient to have a preventive effect on most, if not all, cardiovascular and metabolic diseases considered in this report. Higher intensity activity has a greater effect on some, although not all, health outcomes, but is beyond the capacity and motivation of a large majority of the population.

Both recommendations include the idea that the daily activity can be accomplished in several short bouts. It is important to point out that both recommendations apply to people who are otherwise sedentary. Some occupational activities and household chores constitute sufficient daily physical exercise.

In recommending physical activity, potential individual risks as well as benefits need to be assessed. In many regions of the world, especially but not exclusively in rural areas of developing countries, an appreciable proportion of the population is still engaged in physically demanding activities relating to agricultural practices and domestic tasks performed without mechanization or with rudimentary tools. Even children may be required to undertake physically demanding tasks at very young ages, such as collecting water and firewood and caring for livestock. Similarly, the inhabitants of poor urban areas may still be required to walk long distances to their jobs, which are usually of a manual nature and often require a high expenditure of energy. Clearly, the recommendation for extra physical activity is not relevant for these sectors of the population.

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