

A New Food Guide for the Portuguese Population: Development and Technical Considerations

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ABSTRACT

The methodological approach used for the development of a new food guide for the Portuguese population is discussed. The new food guide, composed of seven groups, was achieved with the assistance of an expert panel, using existing international recommendations and nutrient composition tables. A range of recommended food portions was established for the groups of fats and oils; milk and dairy products; meat, fish, seafood, and eggs; pulses; potatoes, cereals, and cereal products; vegetables; and fruits. Posters and leaflets were produced and presented to the media with the support of health authorities and the scientific community. The dissemination materials were freely distributed to institutions and professionals responsible for health promotion.

Key Words: Portuguese food guide, Portuguese food wheel, educational materials, food education, nutrition education

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INTRODUCTION

Recommended nutrient intakes are quantitative estimates of human requirements for essential nutrients, considered to be adequate to meet the nutrient needs of almost all healthy people.¹ Dietary guidelines that were developed in the early 1980s emphasized components of food such as saturated fat, individual nutrients, or fiber. Revisions of these guidelines have placed more emphasis on food choices rather than individual nutrients; however, recommendations have become more food based.^{2,3} The reasons for this change are certainly related to the fact that diets are made up of food. Diets are more than just a collection of nutrients; nutrients interact differently when presented as foods; methods of food processing influence the final value of foods; some food components may have biological functions that science has not yet identified; and foods and diets have cultural, ethnic, social, and family aspects that individual nutrients themselves do not have.¹

Based on a wide range of scientific knowledge, food guides intend to promote healthy eating in a simple and understandable way. Although official food guides from different countries reveal several differences in their shapes, food groupings, and recommendations, it is quite noticeable that they all have the same main goal—to transform food and nutrition scientific knowledge into basic concepts in order to reach as many people as possible.² In fact, food

guides are considered as essential tools to convey food and nutrition information to a wide variety of people.

In order to plan a national food education program in Portugal, an institutional task force was created in the late 1970s. This task force brought together people from several ministries (Agriculture and Fisheries, Trade and Tourism, Education and Scientific Research, and Social Welfare) and from the Portuguese Food and Agriculture Organization Commission (FAO). During this period, the food balance sheets and household budget surveys for the years 1974 and 1975 were the most detailed data available and were used to identify the main health and food-related problems affecting the Portuguese population.

The “Knowing how to eat is knowing how to live” campaign, which included the Food Wheel guide as its symbol (Figure 1), was implemented in 1977. Several publications referring to and explaining the use of this guide were published,^{4,5} but no reference was made to its background methodology. The Food Wheel guide contained 5 food groups of different sizes, suggesting a recommended proportion between the groups, but without specifying quantity. Nutrition professionals and educators have been using this guide as a base material for more than 25 years.

A revision of the guide, however, has been regarded as essential in order to keep up-to-date with developments both in scientific knowledge and in Portuguese society. Sociodemographic and economic changes, together with differences in food availability and distribution, indicate that the Portuguese have acquired different food habits and patterns. Greater awareness of the current national food and nutrition situation would be of great importance in order to update and adjust a new food guide to the Portuguese. Unfortunately, Portugal does not have accurate and

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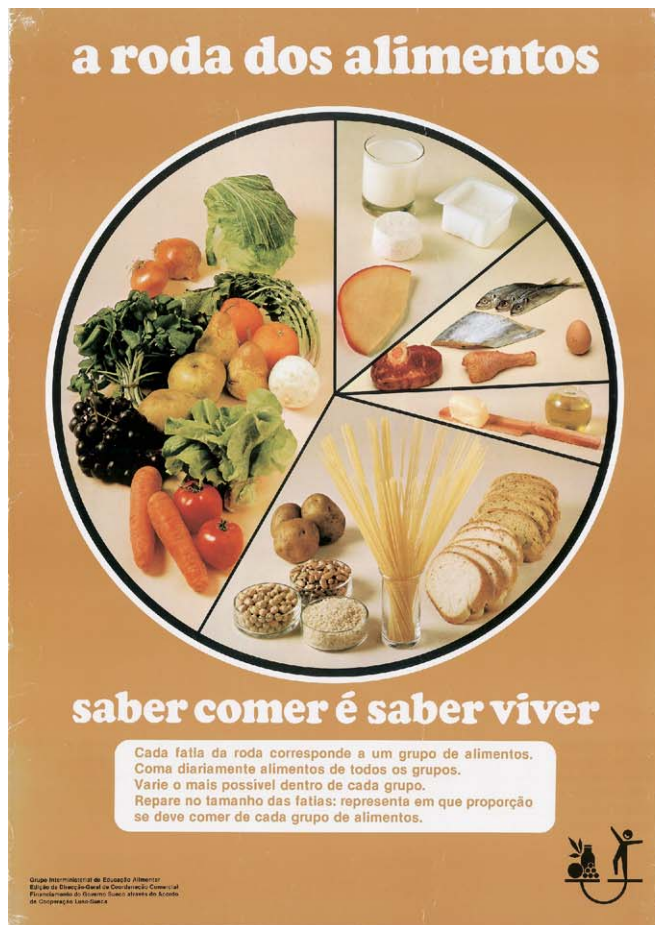


Figure 1. Previous (1977) and New (2003) Portuguese Food Guides.

updated national data on this subject. The only Portuguese National Dietary Survey was conducted in 1980, and the most recent published data on this issue are the 1990-1997 food balance sheets and the 1990-1995 household budget surveys.⁶⁻⁸ Despite its limitations, with regard to availability but not real consumption, these statistical data are still the only source of national representative information on food consumption, and they have been used by Portuguese health authorities to establish food and nutrition recommendations.

In 1982 the Centre for Nutrition Studies (CEN), through its Food Education Commission, part of the National Institute of Health, issued recommendations for the Portuguese population. These recommendations were brought up-to-date in 1997 by the National Council for Food and Nutrition (CNAN).⁹ A document to be used by health professionals was developed, and food and nutrition advice and reference values for the Portuguese adult population were published (Table 1).⁹

Taking into account the evolution in food, nutrition, and health and the existing national Food Wheel guide, the aim of the present work was to develop a new food guide for the Portuguese that would include recommended food portions.

DEVELOPMENT AND TECHNICAL CONSIDERATIONS

The development of the new Portuguese food guide followed 9 main steps:

1. Obtaining food and nutrition experts' opinion

The members of the CNAN—a Health Ministry institution in charge for the development of Portuguese food policy—were asked to give their own opinions about the definition of food groups and subgroups that were to be included in this new food guide. During their scheduled meetings, these experts, drawn from several scientific fields, were updated on the development of the new food guide; adopted criteria and preliminary results involved in the main steps were also presented and discussed.

The work in progress was also periodically discussed among a group of lecturers from the Faculty of Food Sciences and Nutrition from the University of Porto. The group included people from different areas of study: human nutrition; dietetics; public health nutrition; and food policy.

Table 1. Recommendations for the Portuguese Adult Population (National Council for Food and Nutrition - CNAN, 1997)⁹

Total carbohydrates must contribute with a total daily energy value of 50-70%

Fiber intake must be between 27-40 grams/day

Total consumption of lipids equal to or less than 30% of the total daily energy

Consumption of saturated fatty acids < 10% of the total daily energy

Cholesterol consumption < 300mg/day

Total saccharose < 20-30 g/day

Salt < 6g/day

Calcium total daily ingestion of 800 mg

Breast-feeding in the first months of a baby's life, especially during the first 6 months

Adequate consumption of cereals and cereal products

Increase the consumption of vegetable products and fresh fruit

Reduce the consumption of fats, particularly solid and overheated fats; preference given to olive oil

Increase fish consumption

Reduce consumption of sugar and sugar-like products

Reduce salt consumption

Reduce consumption of alcoholic drinks.

Pregnant women, children and those younger than 17 must not drink alcoholic beverages

Adequate consumption of milk and dairy products

Weight kept under control through a balanced food ingestion and physical activity

Eat a balanced breakfast first thing in the morning

2. Establishment of nutritional objectives

The food guide was designed to address the needs of a healthy population. People with a sedentary lifestyle, defined as individuals engaged in light to moderate activity, were taken as a reference, as this is the most common lifestyle among the Portuguese people.^{10,11}

Energy requirements were computed by taking the median of 13 age groups of both genders (infants under the age of one were excluded because of their particular needs), as recommended by both the US Recommended Dietary Allowances (RDA, 1989) and Gonçalves Ferreira (recommended dietary intakes for the Portuguese, 1982).^{12,13} The resulting median values were 2200 kcal (minimum 1300 kcal and maximum 3000 kcal) and 2300 kcal (minimum 1300 kcal and maximum 3000 kcal), respectively, by the above referenced sources.

It is important to point out that no large differences were noticed in the median and in the extreme values of the comparison. However, as the RDAs were the most recent ones, it was decided that the food guide would be based on their values. Thus, within a range between 1300 kcal and 3000 kcal, 2200 kcal was considered as a reference value for the general population.

The proportions of the macronutrient energy distribution were established taking into consideration the Eurodiet Core Report 2000 and the FAO/WHO 1990 recommendations: 55% to 75% from carbohydrate, 15% to 30% from lipids, and 10% to 15% from protein.^{14,15} The same references were also considered for the recommended daily values of fiber, sodium, and cholesterol, > 25g, < 2.4g, and < 300mg, respectively.^{14,15} With regard to vitamins and minerals, referenced daily intake values from the RDA 1989 and DRI 2000 were considered for vitamins A and C and for calcium, phosphorus, iodine, and iron.^{12,16}

3. Establishment and definition of the food groups and their subgroups

Seven food groups and 21 subgroups (Table 2) were established to be included in the new food guide after taking into account the following: similarities in nutritional composition of food items; common usage in Portuguese food habits; and the 5 food groups used in the previous food guide (fats and oils; milk and dairy products; meat, fish, seafood, and eggs; potatoes, dried pulses, cereal and cereal products; vegetables, fresh pulses, and fruit).

It was decided to separate vegetables and fruits because their differences in energy and nutrient content and for their diverse use in meals. The choice of adding a new group only for pulses was both an attempt to bring back their importance to Portuguese food habits and to substitute vegetable protein for animal protein, thus reducing saturated fat consumption. Dried and fresh pulses were placed together, because their nutritional compositions per 100 g become very similar when weight after soaking is considered for dried pulses.

In order to obtain the average nutritional composition for each food group and subgroup (Table 2), the Portuguese food composition table was used for the raw items, and the British food composition table was used for the cooked items.^{17,18} Some related references were also used in the case of yogurts,¹⁹ as the information was considered more recent, and of some tropical fruits,²⁰ where data could not be found on the above referenced tables.

The way (raw, cooked, or both) foods are usually consumed was also considered (Table 2). Fried items were excluded from the average nutritional composition because of their high and overheated fat content, which makes them inadvisable as part of a healthy daily diet plan.

4. Definition of the standard food portion in each food group

The standard food portion sizes were based on the average weight of current household measures (eg, a cup of milk, a tablespoon of olive oil) or of usual consumption units (eg, one egg, one bread roll) (Table 3). The average weight of the standard portion was calculated when data were not available in the national references used.^{21,22} When necessary, the obtained portion weights

Table 2. Food Groups and Subgroups of the New Portuguese Food Guide, Number of Food Items Included (Raw or Cooked) and Mean Nutrient Content by 100g

Food Group	Number of Items and Subgroups Included	Macronutrient Content (mean)			
		Protein (g)	Lipid (g)	Carbohydrate (g)	Energy (kcal)
Fats and Oils	13 items (all raw); 4 subgroups: olive oil/other vegetable oils, lard, butter/margarines, cream	1.4	76.3	1.0	696
Milk and Dairy Products*	30 items (all raw); 5 subgroups: milk, yogurts, hard cheese, fresh cheese, curd cheese	19.7	19.8	1.8	264
Meat, Fish, Seafood, and Eggs	72 items (all cooked); 2 subgroups: meat (pork, beef, lamb, veal, rabbit, chicken, duck, turkey, game)/fish/seafood (mollusks and crustacean), and eggs	23.9	11.9	0.0	203
Pulses	12 items (all cooked); 2 subgroups: fresh and dried pulses	7.8	1.6	14.1	99
Potato, Cereal, and Cereal Products	64 items (cooked values for potato, rice and pasta, raw values for all others); 6 subgroups: bread, maize bread, potato, ready-to-eat breakfast cereals, semi-sweet biscuits, and rice/pasta	6.5	2.3	57.6	268
Vegetables	34 items (raw values for lettuce, garlic, carrots, cucumbers, onions, and tomato; cooked values for all others); no subgroups	1.7	0.5	3.5	24
Fruits	20 items (all raw); no subgroups	0.8	0.7	12.1	59

*For this group, calcium values were also considered (mean = 610.7 mg).

were slightly adjusted in order to adopt portions that could easily be divided or multiplied.

5. Establishment of equivalent portions in each food group

In accordance with the established standard portion size, the quantity of the main nutrient supplier for each food group was calculated (Table 3). The weight of the equivalent portions was determined after taking into account the nutrient quantity of the respective standard portion and the mean nutritional values of the defined subgroups (Table 4). The obtained values were rounded up in order to adopt portions that could easily be divided or multiplied.

As for those people who cook, it would be essential to have the equivalent portions in raw weight, as well;

the conversion into raw quantities was also done for rice and pasta; vegetables; meat, fish, and seafood; and dried pulses (Table 4). The equivalent raw weight values were taken from published references^{21,22} or weighted in order to find an average portion when the necessary data were not available.

6. Establishment of the recommended number of daily food portions for each food group

Based on the mean nutritional values previously obtained for each food group and not forgetting the recommended range for macronutrient distribution, 3 dietary plans were calculated for the energy values established in Step 1 (1300 kcal, 2200 kcal, and 3000 kcal). The numbers of portions obtained in each group

Table 3. Standard Food Portion Size and Nutrient Quantity for the Establishment of Equivalent Portions

Food Group	Standard Portion (Weight)	Nutrient Quantity
Fats and Oils	one tablespoon of olive oil (10 g)	10 g of lipid
Milk and Dairy Products	one cup of milk (250 mL)	8 g of protein and 300 mg of calcium
Meat, Fish, Seafood, and Eggs	one medium chicken egg (55 g)	6 g of protein
Pulses	1 tablespoon of raw dried pulses (25 g) (average weight of 4 different items)	6 g of protein
Potato, Cereal and Cereal Products	one bread roll (50 g)	28 g of carbohydrate
Vegetables	1 cup of cooked vegetables (140 g) (average weight of 6 different items)	6 g of carbohydrate
Fruits	1 medium piece of raw fruit (160 g) (average net weight of 5 different units)	14 g of carbohydrate

Table 4. Equivalent Food Portions in Each Food Group

Food Group	Equivalent Portions
Fats and Oils	1 tablespoon of olive oil or other vegetable oils (10 g) 1 teaspoon of lard (10 g) 4 tablespoons of cream (30 mL) 1 dessert spoon of butter/margarine (15 g)
Milk and Dairy Products	1 cup of milk (250 mL) 1 and a half cup of yogurt or 1 bottle of drinking yogurt (200 g) 2 thin slices of cheese (40 g) a quarter of a medium-sized fresh cheese (50 g) a half of medium-sized curd cheese (100 g)
Meat, Fish, Seafood, and Eggs	Raw meat, fish, seafood (30 g) Cooked meat, fish, seafood (25 g) 1 egg (55 g)
Pulses	1 tablespoon of raw dried pulses (25 g) 3 tablespoons of raw fresh pulses (80 g) 3 tablespoons of cooked dried/fresh pulses (80 g)
Potato, Cereal and Cereal Products	1 bread roll (50 g) 1 thin slice of maize bread (70 g) 1 and a half potato (125 g) 5 tablespoons of ready-to-eat breakfast cereal (35 g) 6 semisweet-type biscuits (35 g) 2 tablespoons of raw rice/pasta (35 g) 4 tablespoons of cooked rice/pasta (110 g)
Vegetables	2 cups of raw vegetables (180 g) 1 cup of cooked vegetables (140 g)
Fruits	1 piece of fruit, medium size (160 g)

for the 1300 kcal plan and for the 3000 kcal plan were taken as extreme values in order to give a range of possible portions. The minimum value of 1300 kcal was considered for children between the ages of 1 and 3 years, whereas the maximum value (3000 kcal) was for active men and male adolescents. The middle value of 2200 kcal was used for the rest of the population (Table 5).

7. Checking the supply of some components

Despite the limited number of nutrients analyzed in

Table 5. Established Range of Recommended Daily Food Portions for Each Group in Accordance with the Established Range of Energy Values (1300 kcal to 3000 kcal; intermediate values correspond to 2200 kcal)

Food Group	Daily Food Portions
Fats and Oils	1 to 3
Milk and Dairy Products	2 to 3
Meat, Fish, Seafood, and Eggs	1.5 to 4.5
Pulses	1 to 2
Potato, Cereal, and Cereal Products	4 to 11
Vegetables	3 to 5
Fruits	3 to 5

the Portuguese food composition table and the different analytical methods used on the British food composition table, an attempt was made to check if the proposed food portion range would supply the recommended daily intakes of some nutrients, other than macronutrients. The average content of vitamins A and C, calcium, phosphorus, iodine, iron, fiber, sodium, and cholesterol were obtained for the 3 established dietary plans and compared with recommended daily values (Table 6).^{12,16}

Only values for iodine and sodium did not meet the recommendations. The high sodium value was probably due to the use of cooked item values from the British Composition Food Table. Individual-based dietary data from the United Kingdom showed higher sodium intake values than in Portugal, which may indicate higher added salt values in British cooking habits and thus higher sodium values in British cooked foods.²³⁻²⁵ The importance of reducing the use of salt and its possible substitution with herbs and spices is one of the points emphasized in the produced dissemination materials described in Step 9.

Table 6. Daily Recommended Values in Comparison with Mean Nutrient Supply

Nutrients	Daily Recommendations	Mean Nutrient Supply
Vitamin A (μg) RE [†]	800*	1899
Vitamin C (mg)	75*	267
Calcium (mg)	800*	1220
Phosphorus (mg)	700*	3927
Iodine (μg)	150*	82
Iron (mg)	10*	35
Fiber (g)	> 25	37
Sodium (g)	< 2.4	2.9
Cholesterol (mg)	< 300	204

*Median of the values from all age groups including both men and women (excluding children until the age of one).

[†]Retinol equivalents: 1 ret eq = 1 μg retinol or 6 μg β -carotene.

8. Transforming results into a captivating and easy to understand food guide

The circle format was adopted, because it can be associated with the image of a plate and because people already recognize it from the previous food guide. The serving dish is an important symbol of Portuguese culture, where eating around the table is still commonplace and very important. Its use also highlights and promotes the relevance of social interaction within food habits. Furthermore, it is our opinion that the groups in the circle format acquire similar importance as they visually complement each other. On the contrary, the pyramid format ranks groups, giving an idea of hierarchy.

It was decided that the whole circle would represent the maximum possible food weight that could be achieved in accordance with the dietary plans and number of food portions established in Step 6. This representation was made by multiplying the obtained number of recommended portions by the weight of the heaviest portion of each group; the maximum food weight that would be possible to reach in each food group was obtained. The total maximum food weight was achieved by adding the results of the 7 food groups. These procedures were done for the 3 dietary plans previously established, and the results were 2213 g for the 1300 kcal plan, 3205 g for the 2200 kcal plan, and 4323 g for the 3000 kcal plan.

In order to obtain each group contribution in percentage, the maximum weight of each food group was divided by the total food weight of all the groups. The same procedure was used for each dietary plan. The final size of the circle slices resulted from a mean of the obtained proportions: 2% for fats and oils; 18% for milk and dairy products; 5% for meat, fish, seafood and eggs; 4% for pulses; 28% for potato, cereal, and cereal products; 23% for vegetables; and 20% for fruits.

9. Elaboration of dissemination materials

For this task, the help of graphic designers was enlisted, so as to ensure that captivating and appealing educational materials were produced (Figure 1).

A poster based on photos for which we mainly selected available national foods was conceived for the new food wheel guide. A slogan and some general recommendations were associated with the final, printable version. "Eat well, live better!" appeared with the sentences "eat food from each slice every day," "eat more from the bigger slices and less from the smaller ones," and "eat a variety of foods within each slice, vary them daily, weekly and seasonally." At this stage it was decided that, in order to highlight the importance of the hydration balance, the image of drinking water would be included in the center of the food circle. Two different sizes of postcards with the poster image were also produced.

To simplify the dissemination of the new food guide, an informative leaflet was developed. The image of the new food wheel was included on the front page, and the text was divided into 5 main topics. The first one is *What*

is it?, including a quick reference to the previous food guide and to the main changes that have been introduced. *How is it made?* refers to the constitution and proportion of each food group or slice and the importance of its daily consumption. The importance of water is also highlighted. *How is it used?* includes a table that explains what is considered an equivalent portion within each group and with the recommended daily food portions. The number of recommended portions depending on individual energy needs is also stated, as well as the fact that children between the ages of 1 and 3 should follow the lower values, whereas male adolescents and active men should follow the upper ones. *Other important aspects to remember . . .* includes some topics on alcoholic and nonalcoholic beverages, sugar and sugary products, salt and salty foods, physical activity, and body weight. Finally, *What does it teach?* summarizes what is considered as healthy eating: a complete diet, eating food items from each group daily; a balanced diet, which entails eating more from the bigger groups and less from the smaller ones; and a varied diet that requires eating different food items within each group and varying them daily, weekly, and seasonally.

A 50-page booklet in A5 format with detailed information concerning food, nutrition, and healthy eating in general was also drawn up and distributed. The main nutritional characteristics and functions of each food group's were highlighted together with some guidance on other basic topics such as cooking methods and the importance of avoiding frying, substituting salt, etc.²⁶

DISCUSSION AND IMPLICATIONS FOR RESEARCH AND PRACTICE

Although there is no information on the methodological approach used for the development of the previous food guide, and despite the existing time lag, it is interesting to note that the final proportions achieved for each food group in the new Portuguese Food Wheel guide are not very much different from those of the previous one (Figure 1).

The development of the present project has once again revealed the importance of implementing and updating some fundamental resources for national food and nutrition research. Updating daily energy and nutrient needs of the Portuguese population, information that dates from 1982,¹³ would be a useful task. Updating the Portuguese food composition table, which dates from 1985,¹⁷ and directing research on the analytical composition of cooked food and traditional food dishes would also be of great use. Another issue, and probably the most relevant one, as the only dietary survey was conducted in 1980,⁶ would be the implementation of a periodic dietary survey comprising individual nutritional evaluation and food habits. Such a survey would allow the identification of Portuguese food consumption patterns at a national representative level. Health authorities should be aware that the lack of this data

compromises public health nutrition research and the development of a precise and detailed national food and nutrition policy.

Despite the methodological constraints, with the available national data and using some other international recognized references, it was possible to develop an updated Food Wheel guide with quantified recommended food portions. The inclusion of 7 food groups, instead of the previous 5, the establishment of daily recommended food portions, and the produced dissemination materials will make this new educational guide easy to understand and follow. The dissemination materials were presented in December 2003 to the Portuguese health authorities, the scientific community, and the media. They are currently being freely distributed to the main institutions and professionals responsible for health promotion: health centers, schools, canteens, nutritionists, and teachers. Its soaring demand called for a second edition after an initial run of 139 500 posters and 159 000 leaflets.

With regard to food and nutrition education, it is expected that this new Food Wheel guide will reach at least as many people as the previous one did, and that it will carry out the important task of teaching people how to make better food choices as part of a healthy diet. Furthermore, it is believed that the new Portuguese Food Wheel guide will help nutritionists and other health professionals in the never ending task of promoting a healthy lifestyle.

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