



Public Health  
England

Protecting and improving the nation's health

## External reference group – eatwell plate

**Background paper for information:** 'Food portion size recommendations in national food-based dietary guidelines'.

**Agenda item 6**

This paper draws together available information on a selection of food based dietary guidelines and the rationale for portion size information provided (where available).

The reference group is invited to:

- note and discuss the available evidence

# ‘Food portion size recommendations in national food-based dietary guidelines’ – background

## Background

1. The main purpose of food-based dietary guidelines (FBDG) is to help consumers achieve health and wellbeing through a healthy diet. They attempt to translate the complexities of national dietary reference values and food based recommendations for the prevention of chronic disease into practical examples of how different foods can be combined to achieve a healthy balanced diet. Many countries present this information as a set of qualitative recommendations based on the proportion of foods that should be consumed from each food group, supported by a graphic illustration such as a pyramid or plate. Some countries, such as the USA<sup>1</sup> and Canada<sup>2</sup> have attempted to quantify the amount of food that population groups with differing energy requirements should consume in order to achieve stated nutrient intakes, without excessive calorie intake.
2. The objectives of this paper are to identify the basis and coherence of messages used in this manner.

## Method

3. Five sets of quantitative FBDG from countries with a prevailing ‘western style’ diet were selected for inclusion and their recommendations for frequency and serving size of foods from the different food groups were compared. This convenience sample was chosen based on availability of some information relevant to the objective of this paper. Total food quantities for key foods were calculated and converted to a standardised measurement language where necessary.<sup>3,4</sup>

## Results

### Serving size and number of servings

4. Differences in the recommended levels of consumption within food groups between countries are a consequence of many factors including the food and nutrient targets they are designed to achieve, prevailing consumption patterns of the country in question and the constraints used in the dietary modelling process. The total amounts of different foods that should be consumed in order to achieve a healthy balanced diet are often expressed as a recommended number of

<sup>1</sup> MyPlate USDA Centre for Nutrition Policy and Promotion. Available from: <http://www.choosemyplate.gov/about.html>

<sup>2</sup> Eating Well with Canada’s Food Guide. Available from: <http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/order-commander/index-eng.php#a1>

<sup>3</sup> Conversions applied using USDA National Nutrient Database for Standard Reference (Release 27) for USA and Canada

Available from: <http://www.ars.usda.gov/Services/docs.htm?docid=8964>

<sup>4</sup> Conversions applied using Food Standards Agency Food Portion Sizes Food Standards Agency (1988). *Food Portion Sizes*. London: The Stationery Office.

servings per day and an approximate serving size and are supported by guidance on how much of different foods within the food group, constitutes a serving.

5. A serving is a reference amount of a food that is used along with frequency of serving to describe the total amount of food recommended daily from each of the food groups. It is a guide to allow consumers to determine how many servings the portion of food they typically consume contains and to plan their meals to achieve the stated daily total. Portion size is the actual amount that you eat at one eating occasion and may be bigger or smaller than the serving sizes stated. For example, medium sized fruits such as apples and oranges may be considered by most people to be a portion and are also considered by many of the FBDG included, to be equivalent to one serving; however, one slice of bread, which is a stated serving size in some of the guidelines included, may be about half the size of the portion typically eaten and so the amount consumed would count as 2 servings.
6. Serving sizes are not directly comparable across countries as different units of measurement including specific ounce or gramme weights, household measures such as cups and spoons and comparative measures such as a handful have been used. Differences are further compounded by the fact that even where approximate serving sizes may be the same between countries, the amounts of different foods within the food group that are considered equivalent to a serving differ. These differences are more pronounced in some food groups than in others, for example, the range of serving sizes for milk varies from 200-250ml whilst the range of serving sizes for bread ranges from 32-125g (see table 1). Inconsistencies in serving size also exist between the guidelines prepared for consumers and those prepared for health professionals and policy makers within the same country.<sup>5,6</sup>

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<sup>5</sup> Department for Health .Your Guide to Healthy Eating using the Food Pyramid. Available from:: [https://www.fsai.ie/news\\_centre/healthy\\_eating\\_guidelines\\_booklet/13062012.html](https://www.fsai.ie/news_centre/healthy_eating_guidelines_booklet/13062012.html)

<sup>6</sup> Food Safety Authority of Ireland (FSAI) Healthy Eating and Active Living for Adults, Teenagers and Children over 5 years. Available at: [https://www.fsai.ie/science\\_and\\_health/healthy\\_eating.html](https://www.fsai.ie/science_and_health/healthy_eating.html)

**Table 1. Examples of recommended food serve size and frequency range for key products**

Product category	Product equivalent for comparison	Country	Recommended serving size	Recommended serving frequency	Total per day (g or ml) standardised
Meat, fish, eggs, poultry, legumes, beans, meat alternatives	All serves as poultry	Ireland <sup>5</sup>	50-75g	2	100-150
		America <sup>1</sup>	1 ounce (28.3g)	5	142
		Australia <sup>7</sup>	80g	2.5	200
		<b>NDNS typically consumed portion size 110g<sup>8</sup></b>			
Milk, yoghurt, cheese	All serves as milk	America <sup>1</sup>	1 cup (240ml)	3	720
		Canada <sup>2</sup>	1 cup (250ml)	2	500
		Switzerland <sup>9</sup>	200 ml	3	600
		<b>NDNS typically consumed portion size 172g<sup>8</sup></b>			
	All serves as cheese	Ireland <sup>5</sup>	25 g	3	75
		America <sup>1</sup>	1.5 ounces (42g)	3	126
		Canada <sup>2</sup>	50g	2	100
		<b>NDNS typically consumed portion size 38g</b>			
	All serves as yoghurt	Ireland <sup>5</sup>	1 small carton (125ml)	3	375
		America <sup>1</sup>	1 cup (240ml)	3	720
		Canada <sup>2</sup>	¾ cup yoghurt (188ml)	2	376
		<b>NDNS typically consumed portion size 125ml<sup>8</sup></b>			
Fruit and vegetables total	All serves as apples and carrots	Ireland <sup>5</sup>	1 medium apple, 4 dessertspoons of cooked carrots (107g,100g)	5+ fruit and veg (assumes 50% fruit and 50% veg)	517
		Australia <sup>7</sup>	Fruit 150g, veg. 75g	2 fruit, 5 veg.	675
		Canada <sup>2</sup>	1 medium apple, 1 large carrot (72g,182g)	7-8 (assumes 50% fruit and 50% veg.)	889-1016
		<b>NDNS typically consumed portion size: fruit 107g, vegetables 57g</b>			
Bread, cereals, pasta, rice	All serves as wholemeal bread, sliced	America <sup>1</sup>	1 ounce equivalent (1 slice bread) (32g)	6	192
		Australia <sup>7</sup>	1 slice bread (40g)	6	240
		Switzerland <sup>9</sup>	75-125g	3	225-375
		<b>NDNS typically consumed portion size 72g<sup>8</sup></b>			

For America, Australia and Canada, the foods selected for the food patterns used as the basis for these recommendations are in less energy dense forms, for example lower fat milks and lean meat. The energy targets used can therefore only be expected to be achieved where consumers select these foods.

<sup>7</sup> National Health and Medical Research Council (2013) Healthy eating for Adults. Available from: [https://www.nhmrc.gov.au/files\\_nhmrc/publications/attachments/n55g\\_adult\\_brochure.pdf](https://www.nhmrc.gov.au/files_nhmrc/publications/attachments/n55g_adult_brochure.pdf)

<sup>8</sup> Food Standards Agency (2005) Calculation and collation of typical food portion sizes for adults aged 19-64 and older people aged 6 and over. Available at: [http://www.foodbase.org.uk/results.php?f\\_report\\_id=82](http://www.foodbase.org.uk/results.php?f_report_id=82)

<sup>9</sup> Swiss Society of Nutrition (2011) Swiss Food Pyramid. Available from: <http://www.sge-ssn.ch/de/ich-und-du/essen-und-trinken/ausgewogen/lebensmittelpyramide/>

Foods within the same category can vary considerably in the content of specific nutrients. Such discrepancies, if not addressed, have the potential to result in large differences in nutrient intake. Some serving recommendations attempt to compensate for these differences. For example, the American guidelines break the fruit and vegetables category down into sub-categories with a similar nutrient profile and make serving recommendations for each sub-category.<sup>1</sup>

### Rationale for serving size used

7. The basis for the serving size used in each of the dietary guidelines considered differs and in many cases, is not clearly stated. The clearest indications of the origins of serve size are given in the Australian Dietary Guidelines<sup>10</sup> where serve size could be based on what is considered a standard Australian portion size as determined by national food intake surveys; an amount of a food considered as nutritionally equivalent to a sentinel (we understand the word sentinel to mean a food that is consumed in greatest quantity within the group) food within a group (eg, a 40g serve of bread (1 slice) or a reduced fat milk serve of 250ml (1 cup); or the calculated composite serve size for the group as a whole. In the American guidelines<sup>11</sup> serve size may also be based on what is considered a standard size as determined by national food intake surveys but may also be defined as an amount of a food considered to contribute an equivalent amount of energy as other foods within the group, for example, the portion size of nuts within the protein foods group

### Evidence

8. There is no clear evidence that any of the guidance used to communicate quantitative advice on desirable food consumption patterns improves understanding of, or adherence to, the recommendations. Results from consumer research conducted as part of the review of the Irish Food Pyramid<sup>12</sup> and the American Dietary Guidelines<sup>13</sup> suggest that consumers do not consider the small serving sizes typical of the American Pyramid (on which the Irish Pyramid is based), to be meaningful; have difficulty interpreting the information provided around serving size and do not always understand the difference between servings and portions.

<sup>10</sup> National Health and Medical Research Council 92013) Australian Dietary Guidelines: Providing the scientific evidence for healthier Australian diets. Available from:

[https://www.nhmrc.gov.au/files/nhmrc/publications/attachments/n55\\_australian\\_dietary\\_guidelines\\_130530.pdf](https://www.nhmrc.gov.au/files/nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf)

<sup>11</sup> Marcoe K, Tuan WY, Yamini S, Carlson A & Britten P (2006) Development of Food Group Composites and Nutrient Profiles for the MyPyramid Food Guidance System. Available from:

[http://www.cnpp.usda.gov/sites/default/files/myplate\\_miplato/JNEBDevelComposites.pdf](http://www.cnpp.usda.gov/sites/default/files/myplate_miplato/JNEBDevelComposites.pdf)

<sup>12</sup> Food Safety Authority of Ireland (FSAI) Scientific Recommendations for Healthy Eating Guidelines in Ireland (2011). Available from: [https://www.fsai.ie/science\\_and\\_health/healthy\\_eating.html](https://www.fsai.ie/science_and_health/healthy_eating.html)

<sup>13</sup> Britten P, Haven J & Davis C. Consumer Research for Development of Educational Messages for the MyPyramid Food Guidance System (2006). Available from:

[http://www.cnpp.usda.gov/sites/default/files/myplate\\_miplato/JNEBConsumerRes.pdf](http://www.cnpp.usda.gov/sites/default/files/myplate_miplato/JNEBConsumerRes.pdf)

## Conclusions

9. The five sets of quantitative FBDG around how much food from each of the different food groups should be consumed to achieve a healthy balanced diet included in this study, differ in respect of the recommended number of servings, serving size and size of serving equivalents. This may be the result of a combination of factors inherent in the modelling process. Comparison between different national guidelines is limited by the mix of different units of measurement used both between and within guidelines.
10. With the exception of total fruit and vegetables, there is no apparent evidence base underpinning the use of either the serving size or frequency used in national dietary guidelines.

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