

FACTFILE: GCE NUTRITION & FOOD SCIENCE

NUTRIENT REQUIREMENTS



Nutrient requirements

Learning outcomes

- Describe Dietary Reference Values (DRVs) for nutrients and Estimated Average Requirements (EARs) for energy.
- Demonstrate knowledge and understanding of how DRVs and EARs should be used to evaluate diets.

Course content

In the UK, estimated nutrient and energy requirements for particular groups of the population are based on advice that was given by the Committee on Medical Aspects of Food and Nutrition Policy (COMA) back in the early 1990s. Since this time COMA has been replaced by the Scientific Advisory Committee on Nutrition (SACN). Rather than reviewing all the nutrients in one go, SACN is focusing on nutrients about which there is cause for concern, e.g. iron, folate, selenium and vitamin D and has published reports on each of these.

Dietary Reference Values (DRVs)

Meaningful estimates of nutritional requirements must take account of the distribution of requirements within a population or group. To achieve this the COMA panel used four DRVs (figure 1). DRVs should be used to assess the energy requirements for large groups of people and populations, but should not be applied to individuals due to the large variation in physical activity and energy expenditure observed between people.

Estimated Average Requirement (EAR)

This is an estimate of the average requirement for energy or a nutrient - approximately 50% of a group of people will require less, and 50% will require more. For a group of people receiving adequate amounts, the range of intakes will vary around the EAR.

Reference Nutrient Intake (RNI)

The RNI is the amount of a nutrient that is enough to ensure that the needs of nearly all the group (97.5%) are being met. By definition, many within the group will need less.

Lower Reference Nutrient Intake (LRNI)

The amount of a nutrient that is enough for only the small number of people who have low requirements (2.5%). The majority of people need more.

Safe intake

This is used where there is insufficient evidence to set an EAR, RNI or LRNI. The safe intake is the amount judged to be a level or range of intake at which there is no risk of deficiency and is below the level where there is a risk of undesirable effects. There is no evidence that intakes above this level have any benefits and in some instances they could have toxic effects.

Frequency distribution of individual requirements

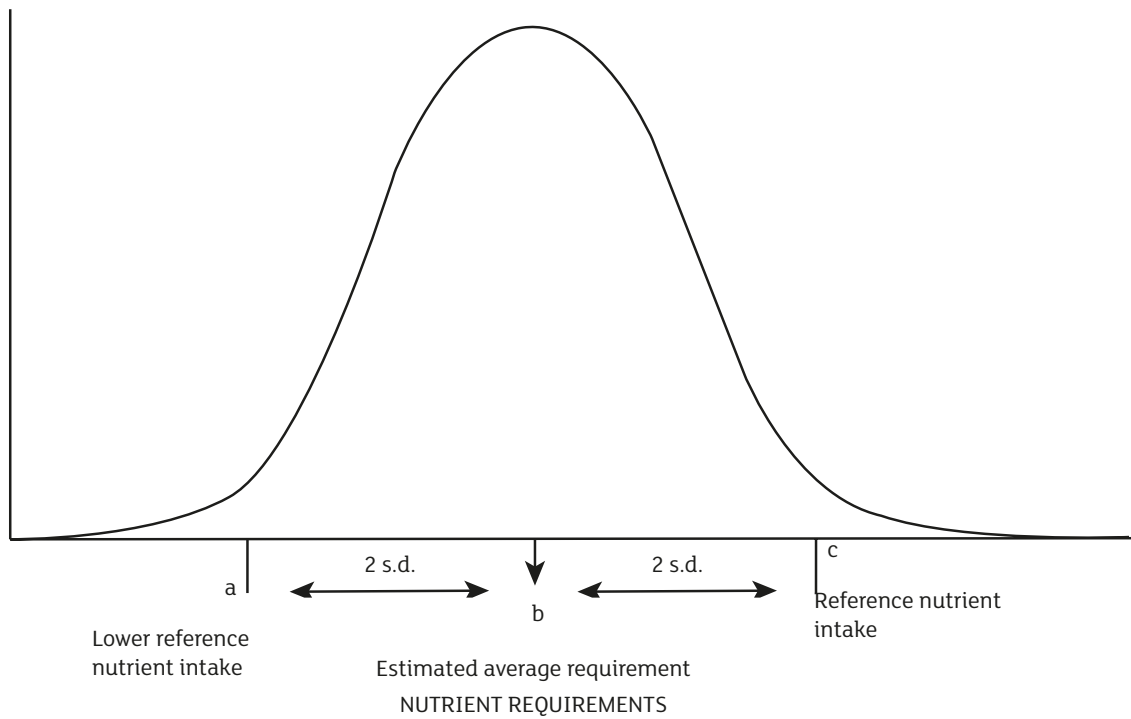


Figure 1.1 Dietary reference values-definitions

[British Nutrition Foundation – Nutrient requirements](#)

	Males		Females	
	(MJ)	(kcal)	(MJ)	(kcal)
INFANTS				
Breast fed				
1–2 months	2.2	526	2.0	478
3–4 months	2.4	574	2.2	526
5–6 months	2.5	598	2.3	550
7–12 months	2.9	694	2.7	646
Breast milk substitute fed				
1–2 months	2.5	598	2.3	550
3–4 months	2.6	622	2.5	598
5–6 months	2.7	646	2.6	622
7–12 months	3.1	742	2.8	670
Mixed feeding or unknown				
1–2 months	2.4	574	2.1	502
3–4 months	2.5	598	2.3	550
5–6 months	2.6	622	2.4	574
7–12 months	3.0	718	2.7	646
1 year	3.2	765	3.0	717
2 years	4.2	1004	3.9	932
3 years	4.9	1171	4.5	1076
CHILDREN				
4 years	5.8	1386	5.4	1291
5 years	6.2	1482	5.7	1362
6 years	6.6	1577	6.2	1482
7 years	6.9	1649	6.4	1530
8 years	7.3	1745	6.8	1625
9 years	7.7	1840	7.2	1721
10 years	8.5	2032	8.1	1936
11 years	8.9	2127	8.5	2032
12 years	9.4	2247	8.8	2103
13 years	10.1	2414	9.3	2223
14 years	11.0	2629	9.8	2342
15 years	11.8	2820	10.0	2390
16 years	12.4	2964	10.1	2414
17 years	12.9	3083	10.3	2462
18 years	13.2	3155	10.3	2462
ADULTS				
19–24 years	11.6	2772	9.1	2175
25–34 years	11.5	2749	9.1	2175
35–44 years	11.0	2629	8.8	2103
45–54 years	10.8	2581	8.8	2103
55–64 years	10.8	2581	8.7	2079
65–74 years	9.8	2342	7.7	1912
75+ years	9.6	2294	8.7	1840

Table 1: Updated Estimated Average Requirements for Energy from SACN 2011

Special note: The EAR for women who become pregnant increases by 0.8 MJ/day (200 kcal/day) but only in the final three months of pregnancy. Although energy is needed for the growth of the foetus and to enable fat to be deposited in the mother's body, pregnant women can compensate for these extra demands by becoming less active and using energy more efficiently. Breastfeeding mothers have increased requirements for energy but this will depend on the amount of milk produced, the fat stores that have accumulated during pregnancy and the duration of breastfeeding.

	Dietary Reference Value, % of daily total energy intake (including alcohol)	Dietary Reference Value, % of daily food energy intake (excluding alcohol)	Average British adult intakes, % food energy intake (Source: NDNS, 2012)	
			Men	Women
Total carbohydrate	47	50	47.5	48.3
Of which non-milk extrinsic sugars	10	11	12.8	11.8
Total fat	33	35	35.0	34.4
Of which saturated fatty acids	10	11	12.8	12.6
polyunsaturated fatty acids	6**	6.5	6.1	6.2
trans fatty acids	2	2	0.7***	0.7***
monounsaturated fatty acids	12	13	12.8	12.3

Table 2: DRVs (population averages) for adults for carbohydrate and fat as a percentage of energy intake

*NMES - free sugar not bound in foods, e.g. table sugar, honey and sugars in fruit juices, but excluding milk sugar.

** An individual maximum of 10% applies (with an individual minimum of 0.2% from linolenic acid, and 1% linoleic acid).

***Reported to be 0.8% of energy by NDNS (Bates et al. 2012)

Alcohol should provide no more than 5% of energy in the diet.

[British Nutrition Foundation – Nutrient requirements](#)



Uses of DRVs and EARs

Food labelling

DRVs also form the basis of nutrition labelling on foods, beverages and dietary supplements. The new regulation on food information to consumers makes it mandatory that food labels provide information on energy, total fat, saturated fat, carbohydrate, sugars, protein and salt per 100 g, or 100 ml if a liquid (Dec 2016). Food based dietary guidelines (BDG) translate nutritional recommendations into messages about foods and diet, and can guide consumers on what to eat and help them make healthy dietary choices.

[EFSA – Dietary reference values and dietary guidelines](#)

Policy making

Targets for nutrient intakes at population level may be set for public health planning and assessment. Nutrient recommendations are typically targets for the nutrient intakes of individuals, for example less than 10% energy for saturated fatty acids. These may not always be communicated directly to the consumer, but rather are for use by healthcare professionals and policymakers.

Healthcare (dietary planning)

In groups of people, the distribution of nutrient intakes among the population is considered more important than a fixed recommended intake level. They have been considered in setting regulations for feeding programs, setting standards for feeding in group facilities (for example, nursing homes, school cafeterias and prisons). In dietary planning for individuals or groups, the Dietary Reference Intake can be used as a goal for adequate intakes of vitamins, minerals or protein. www.eufic.org



Revision Questions

- 1** Using the data in Table 1, explain the changes in the Estimated Average Requirements (EARs) for energy throughout the lifecycle for males and females.

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- 2** Who uses nutrient requirements and what are they used for?
You could use the following as a structure to plan your response.

Potential use of nutrient requirements	Explanation
Policy making	
Healthcare (dietary planning for individuals and groups)	
Food industry (food labelling)	
Academic research	

