

Nutrition Requirements

Who is responsible for setting nutrition requirements in the UK?

- In the UK we have a set of Dietary Reference Values (DRVs).
- DRVs are a series of estimates of the energy and nutritional requirements of different groups of healthy people in the UK population. They are not recommendations or goals for individuals.
- These were set by the Committee on Medical Aspects of Food and Nutrition Policy (COMA) in 1991.
- COMA used four types of Dietary Reference Values:

Estimated Average Requirements (EARs)

The **EAR** is an estimate of the average requirement of energy or a nutrient needed by a group of people (i.e. approximately 50% of people will require less, and 50% will require more).

Reference Nutrient Intakes (RNIs)

The **RNI** is the amount of a nutrient that is enough to ensure that the needs of nearly all a group (97.5%) are being met.

Lower Reference Nutrient Intakes (LRNIs)

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

Safe Intake

The **Safe intake** is used where there is insufficient evidence to set an EAR, RNI or LRNI. The safe intake is the amount judged to be enough for almost everyone, but below a level that could have undesirable effects.

- For most vitamins and minerals, DRVs are given as Reference Nutrient Intakes (RNI). Most vitamins and minerals also have Lower Reference Nutrient Intakes.
- COMA has since been disbanded and replaced by the Scientific Advisory Committee on Nutrition (SACN) that advises the government on diet and health.
- SACN revised the population recommendations for estimated energy requirements in 2011 and in its report *Carbohydrates and Health* 2015 made new recommendations for free sugars and fibre.
- SACN made new recommendations for vitamin D in its report *Vitamin D and Health* 2016.
- The DRVs are reflected in the UK's food based guidelines, *the eatwell plate*, a visual illustration of the types and proportions of foods that contribute to a healthy and well-balanced diet.

Nutrition Requirements

Macronutrients - Energy, fat, carbohydrates and protein

Estimated Average Requirements for Energy Infants

Age	Males		Females	
	MJ	kcal	MJ	kcal
Breastfed				
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

Age	Males		Females	
	MJ	kcal	MJ	kcal
Formula-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

Age	Males		Females	
	MJ	kcal	MJ	kcal
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

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Estimated Average Requirements for children

Age (years)	Males		Females	
	MJ/d	kcal	MJ/d	kcal
4	5.8	1386	5.4	1291
5	6.2	1482	5.7	1362
6	6.6	1577	6.2	1482
7	6.9	1649	6.4	1530
8	7.3	1745	6.8	1625
9	7.7	1840	7.2	1721
10	8.5	2032	8.1	1936
11	8.9	2127	8.5	2032
12	9.4	2247	8.8	2103
13	10.1	2414	9.3	2223
14	11.0	2629	9.8	2342
15	11.8	2820	10.0	2390
16	12.4	2964	10.1	2414
17	12.9	3083	10.3	2462
18	13.2	3155	10.3	2462

Estimated Average Requirements for adults

Age (years)	Males		Females	
	MJ/d	kcal	MJ/d	kcal
19-24	11.6	2772	9.1	2175
25-34	11.5	2749	9.1	2175
35-44	11.0	2629	8.8	2103
45-54	10.8	2581	8.8	2103
55-64	10.8	2581	8.7	2079
65-74	9.8	2342	7.7	1912
75+	9.6	2294	8.7	1840

UK Energy requirements are based on the average energy required for people of a healthy weight who are moderately active

- We can measure energy in calories (kcal) or in joules (MJ).
- Estimated energy requirements will be greater in more active people, and lower in those that are more sedentary. These will differ depending on size and gender.
- Energy requirements for pregnant women increase by 0.8 MJ/day or 200 kcal/day, but only in the final three months of pregnancy.

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Carbohydrate and Fat

- DRVs have been set for fat and carbohydrates (including sugars and dietary fibre) for the population.
- DRVs for total fat, saturated fat, total carbohydrates and sugars are given as a percentage of daily energy intake.

DRVs for carbohydrate and fat as a percentage of energy intake	
	% Daily Food Energy
Total Carbohydrate*	50%
<i>of which free sugars*</i>	Not more than 5%
Total Fat [†]	Not more than 35%
<i>of which Saturated Fat[†]</i>	Not more than 11%

*based on SACN 2015 recommendations for population aged 2 years and above

[†]based on COMA 1991 recommendations for population aged 5 years and above

- **Total carbohydrate** includes all starch, sugars and dietary fibre.
- **Free sugars** are sugars added to foods and drinks by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juice.
- **Total fat** includes all saturated and unsaturated fat (mono- and polyunsaturated).
- **Saturated fat** - Several studies have shown a high saturated fat intake to be linked with high blood cholesterol. Elevated blood cholesterol is a risk factor for coronary heart disease. Studies have shown that replacing saturated fat with unsaturated fat in the diet reduces blood cholesterol and lowers the risk of heart disease and stroke.
- On average in the UK we currently eat too much saturated fat and added sugar, but not enough fibre.
- **Dietary Fibre** – new recommendations were made by SACN in 2015 for the population aged 2 years and over:

Age group	Recommended intake per day (g)
2-5 years	15
5-11 years	20
11-16 years	25
17 years and over	30

Salt

Age group	Maximum salt intake per day (g)
0-6 months	<1
6-12 months	1
1-3 years	2
4-6 years	3
7-10 years	5
11 years and above	6

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The target salt intakes set for adults and children do not represent ideal or optimum consumption levels, but achievable population goals.

Protein

Reference Nutrient Intake for children

Age group	RNI per day (g)
0-3 months	12.5
4-6 months	12.7
7-9 months	13.7
10-12 months	14.9
1-3 years	14.5
4-6 years	19.7
7-10 years	28.3

Adults

- The Reference Nutrient Intake (RNI) is set at 0.75 g of protein per kilogram bodyweight per day in adults.

For example:

- if an adult weighs 60 kg, they will need:

$$60 \times 0.75 \text{ g/d} = 45 \text{ g protein a day}$$

- if an adult weighs 74 kg, they will need:

$$74 \times 0.75 \text{ g/d} = 55.5 \text{ g protein a day}$$

- Protein requirements increase in pregnancy (an additional 6 g/d) and lactation (an additional 11 g/d 0-6 months and 8 g/d 6+ months)

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Reference Nutrient Intakes for Vitamins



Age	Thiamin mg/d	Riboflavin mg/d	Niacin mg/d	Vitamin B6 mg/d	Vitamin B12 µg/d	Folate µg/d	Vitamin C mg/d	Vitamin A µg/d	Vitamin D µg/d
0-3 months	0.2	0.4	3	0.2	0.3	50	25	350	8.5-10***
4-6 months	0.2	0.4	3	0.2	0.3	50	25	350	8.5-10***
7-9 months	0.2	0.4	4	0.3	0.3	50	25	350	8.5-10***
10-12 months	0.3	0.4	5	0.4	0.4	50	25	350	8.5-10***
1-3 years	0.5	0.6	8	0.7	0.5	70	30	400	10
4-6 years	0.7	0.8	11	0.9	0.8	100	30	400	10
7-10 years	0.7	1.0	12	1.0	1.0	150	30	500	10
Males									
11-14 years	0.9	1.2	15	1.2	1.2	200	35	600	10
15-18 years	1.1	1.3	18	1.5	1.5	200	40	700	10
19-50 years	1.0	1.3	17	1.4	1.5	200	40	700	10
50+ years	0.9	1.3	16	1.4	1.5	200	40	700	10
Females									
11-14 years	0.7	1.1	12	1.0	1.2	200	35	600	10
15-18 years	0.8	1.1	14	1.2	1.5	200	40	600	10
19-50 years	0.8	1.1	13	1.2	1.5	200	40	600	10
50+ years	0.8	1.1	12	1.2	1.5	200	40	600	10
Pregnancy	+ 0.1**	+ 0.3	*	*	*	+ 100	+ 10**	+ 100	10
Lactation:									
0-4 months	+ 0.2	+ 0.5	+ 2	*	+ 0.5	+ 60	+ 30	+ 350	10
4+ months	+ 0.2	+ 0.5	+ 2	*	+ 0.5	+ 60	+ 30	+ 350	10

† Based on protein providing 14.7% of EAR for energy *No increase **For last trimester only *** Safe intake. For more information on vitamin D recommendations, visit our webpage <https://www.nutrition.org.uk/healthyliving/basics/vitaminD.html>

Sources: Department of Health, Dietary Reference Values for Food Energy and Nutrients for the United Kingdom, HMSO, 1991. SACN Vitamin D and Health, 2016.

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Reference Nutrient Intakes for Minerals



Age	Calcium mg/d	Phosphorus ¹ mg/d	Magnesium mg/d	Sodium mg/d ²	Potassium mg/d ³	Chloride ⁴ mg/d	Iron mg/d	Zinc mg/d	Copper mg/d	Selenium µg/d	Iodine µg/d
0-3 months	525	400	55	210	800	320	1.7	4.0	0.2	10	50
4-6 months	525	400	60	280	850	400	4.3	4.0	0.3	13	60
7-9 months	525	400	75	320	700	500	7.8	5.0	0.3	10	60
10-12 months	525	400	80	350	700	500	7.8	5.0	0.3	10	60
1-3 years	350	270	85	500	800	800	6.9	5.0	0.4	15	70
4-6 years	450	350	120	700	1100	1100	6.1	6.5	0.6	20	100
7-10 years	550	450	200	1200	2000	1800	8.7	7.0	0.7	30	110
Males											
11-14 years	1000	775	280	1600	3100	2500	11.3	9.0	0.8	45	130
15-18 years	1000	775	300	1600	3500	2500	11.3	9.5	1.0	70	140
19-50 years	700	550	300	1600	3500	2500	8.7	9.5	1.2	75	140
50+ years	700	550	300	1600	3500	2500	8.7	9.5	1.2	75	140
Females											
11-14 years	800	625	280	1600	3100	2500	14.8 ⁵	9.0	0.8	45	130
15-18 years	800	625	300	1600	3500	2500	14.8 ⁵	7.0	1.0	60	140
19-50 years	700	550	270	1600	3500	2500	14.8 ⁵	7.0	1.2	60	140
50+ years	700	550	270	1600	3500	2500	8.7	7.0	1.2	60	140
Pregnancy	*	*	*	*	*	*	*	*	*	*	*
Lactation:											
0-4 months	+ 550	+ 440	+ 50	*	*	*	*	+ 6.0	+ 0.3	+ 15	*
4+ months	+ 550	+ 440	+ 50	*	*	*	*	+ 2.5	+ 0.3	+ 15	*

mg/d – milligram per day. A milligram is one thousandth of a gram

µg/d – microgram per day. A microgram is a millionth of a gram

¹Phosphorus RNI is set equal to calcium in molar terms; ²1mmol sodium = 23 mg; ³1 mmol potassium= 39 mg; ⁴Corresponds to sodium 1 mmol= 35.5 mg; ⁵Insufficient for women with high menstrual losses where the most practical way of meeting iron requirements is to take iron supplements

Sources: Department of Health, Dietary Reference Values for Food Energy and Nutrients for the United Kingdom, HMSO, 1991. SACN Vitamin D and Health, 2016.

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Factors affecting requirements

- **Age**
e.g. the RNI for vitamin C for a child aged 1 year and under is 25 mg/d, and for an adult is 40 mg/d
- **Gender**
e.g. the RNI for iron in women aged 19-50 years is 14.8 mg/d, which is higher than for men (8.7 mg/d) to cover menstrual losses
- **Growth**
e.g. adolescents have higher calcium requirements to cover their bone growth
- **Pregnancy and Lactation**
e.g. The RNI for calcium in women that are breastfeeding is 550 mg/d more than adult females who are not breastfeeding.

Reference Intakes (RIs) for labelling

Helping the consumer make better choices for a healthier diet

- Reference Intakes (RIs) are used on nutrition labels on packaged food.
- Reference intakes are set by European law, as a guide for the amount of energy and key nutrients that can be eaten on a daily basis in order to maintain a healthy diet.
- The values are maximum amounts based on an average female adult. They are not individual recommendations and your needs may well be different to the RI, depending on your age, gender and how physically active you are.
- There are currently no RIs that can be used specifically for children.
- Food labels show the percentage of the RIs that is provided per 100 g/100 ml and/or per portion of the food item.

Energy or Nutrient	Reference Intake
Energy	8400 kJ/2000 kcal
Fat	70 g
Saturates	20 g
Carbohydrate	260 g
Total sugars	90 g
Protein	50 g
Salt	6 g

To find out more information about food labels why not visit

<http://www.nutrition.org.uk/healthyliving/healthyeating/labels.html>

For more information on the sources used in this text, please contact postbox@nutrition.org.uk

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