

Module 2: Fibre in our diet

Objectives

This module will help you understand:

- The place of fibre in healthier dietary patterns and dietary guidelines.
- Food sources of dietary fibre.
- Dietary recommendations for fibre.
- The challenges of meeting current recommendations and tips to increase fibre intake.



Fibre in healthy dietary patterns

- Plant-rich and high in fibre are characteristics of healthier dietary patterns (i.e. those associated with reduced risk of disease) and include plenty of fruit and vegetables, wholegrains, legumes, nuts and seeds.
- Such dietary patterns are recommended in food based dietary guidelines globally.

High consumption of **vegetables, fruit and wholegrains**

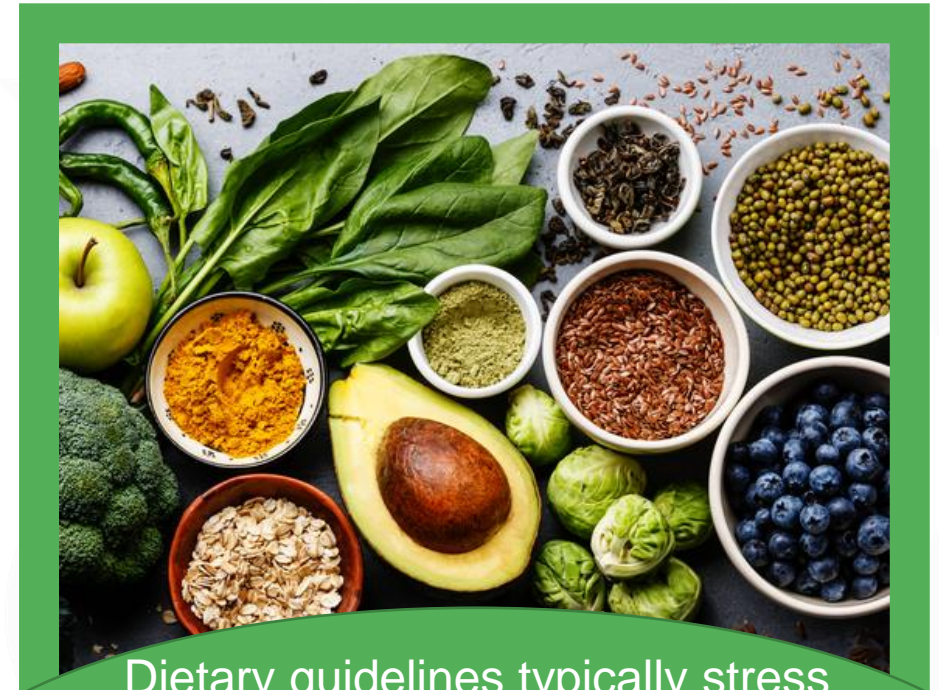
Including sources of protein: some low-fat dairy products (or dairy alternatives), seafood, and plant based sources like **nuts, seeds, legumes**

Some unsaturated fat

Lower intakes of fatty/processed meats, refined grains, sugar-sweetened foods and beverages

Lower salt and lower saturated fat

Dietary guidelines typically stress intake of a variety of foods that are good sources of fibre in the diet – **fruit and vegetables, wholegrains, legumes, nuts and seeds.**



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Why is eating a plant-rich diet important?

- Plant foods provide essential micronutrients and **dietary fibre**.
- Plant based diets are also advised to reduce the environmental impact of our diets.



1. Eat a more plant-rich diet

Following healthy eating guidelines such as the UK's Eatwell Guide can help us get more vegetables, fruit, wholegrains, beans and other pulses, nuts and seeds into our diets and help meet our nutrient needs. This style of diet can still include some meat, fish, dairy products and eggs, and is likely to improve our health while also reducing the environmental impact of our diets

2. Eat more fruit and vegetables

Eating at least five portions (80 g each) of a variety of fruit and vegetables every day is important for health and these foods also tend to have a lower environmental impact than some other types of food.





3. Diversify your protein sources

Diversify and rebalance! Expand your choice of protein-containing foods to include more beans and other pulses, nuts, seeds and other plant-derived sources of protein (e.g. plant-based meat alternatives that are not high in saturated fat or salt), alongside some lean meat, fish, eggs and lower fat dairy products. It's all about balance – you don't need to cut out animal-based foods entirely to eat a more sustainable diet.

4. Limit foods high in fat, salt and sugar

We all know foods such as cakes, biscuits, pies, and pastries are less healthy choices, but limiting these foods in line with healthy eating guidance can also reduce the environmental impact of our diets.





5. Choose sustainable sources of fish

If you eat fish, choose two portions (140 g each) a week and make one of these an oily fish (e.g. mackerel, salmon or sardines). Currently, one third of global fish stocks are overfished, so choose more sustainable options in the Good Fish Guide, or those labelled as from sustainable sources (e.g. the blue MSC logo).

6. Waste less food

Food losses and waste are estimated to contribute 10% of all greenhouse gas emissions globally, but less than a third of people in the UK make the link between wasting food and climate change. Finding ways to waste less food (e.g. storing food correctly, using leftovers, planning) can help the environment and save you money at the same time – a win-win.



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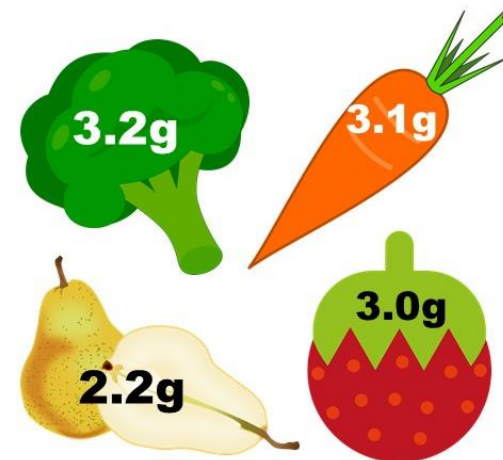


Fibre providers: Fruit & vegetables

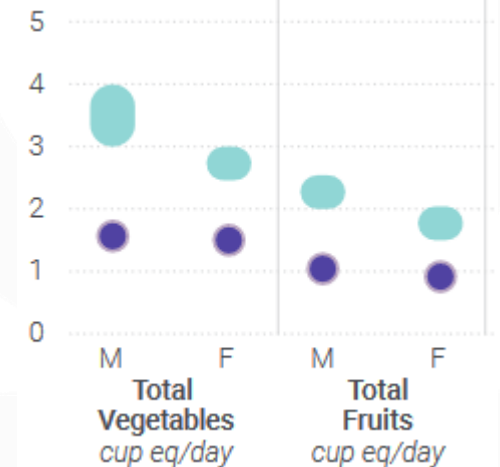
Low global consumption of fruit and veg

	Fibre (g)/100 g	Fibre (g)/portion
Fruit and vegetables		
Broccoli	4.0	3.2 (80g)
Carrots	3.9	3.1 (80g)
Green beans	3.4	2.7 (80g)
Pears	2.7	2.2 (80g)
Strawberries	3.8	3.0 (80g)
Dried fruit		
Apricots	5.3	1.6 (30g)
Dates	7.5	2.3 (30g)
Figs	10.0	3.0 (30g)

On average, only 33% of adults in the UK achieve the 5 A DAY fruit and vegetable recommendation.



Average Daily Intake of Fruit & Veg in US adults aged 19-30 y



● Recommended Intake Ranges ● Average Intakes

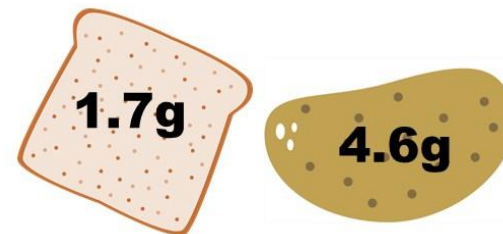


Fibre providers:

Higher fibre starchy carbohydrates

	Fibre (g)/ 100 g	Fibre (g)/ portion
Wholegrain breakfast cereals		
- shredded wheat	12.2	5.5 (45g)
- wheat biscuits	9.7	3.7 (38g)
- bran flakes	13.4	4.0 (30g)
Wholewheat pasta	4.2	8.4 (200g)
Wholemeal bread, 1 medium slice	7.0	1.7 (24g)
Oats	7.8	3.1 (40g)
Baked potato in skins	2.6	4.6 (175g)

In the Food Standards Agency's (FSA) consumer attitudes survey 2014, Food and You, **only 26%** of Scottish participants thought starchy foods were very important to eat for a healthy lifestyle.



Fibre providers: Legumes, nuts and seeds

	Fibre (g)/ 100 g	Fibre (g)/ portion
Green peas	5.3	4.2 (80g)
Chickpeas	7.1	8.5 (120g)*
Red kidney beans	6.8	8.2 (120g)*
Green lentils	7.4	8.9 (120g)*
Almonds	12.5	3.8 (30g)
Hazelnuts	6.9	2.1 (30g)
Peanut butter	6.6	1.0 (15g)
Sunflower seeds	8.0	2.0 (25g)

*about half a can,
drained

“Transformation to healthy diets by 2050 will require substantial dietary shifts. Global consumption of fruits, vegetables, nuts and legumes will have to double....” EATLancet



In ‘optimised modelling’ looking at how the UK could change its diet to meet current recommendations, Scarborough *et al.* estimated intake of legumes would need to increase by around 85% (14g to 26g/d)

What foods contribute fibre in our current diet?

- On average, the food groups that currently contribute most to fibre in our diet are cereal & cereal products, fruit, vegetables and potatoes.
- In the UK these foods provide around 75 – 80% of total fibre intake



Contribution of vegetables, potatoes, cereals & cereal products and fruit to total fibre intake in UK by age

78% (1.5-3 yrs)



76% (19-64 yrs)



78% (4-10 yrs)



80% (65-74 yrs)



75% (11-18 yrs)



79% (75+ yrs)



How much fibre should we be eating?

- Countries that have recommendations for fibre intake generally refer to total fibre, rather than specific fibre types.
- Where fibre recommendations are made, these are typically around 25–35 g/day for adults.
- Recommendations can be described as amount per day (g per day) or amount in relation to energy intake (g per 1000 kcal).



See supplementary material for more on
Recommendations for dietary fibre intake as described by food- and health- related organisations

How much fibre are we consuming?

- On average, not enough! In general most people do not eat enough fibre.
- Some average figures for fibre intake for adults are given below.

US (2017-18)
17 g/day



China (2011)
19 g/day



Europe (1997-2012)
16–24 g/day



Japan (2015)
15 g/day



Total dietary fibre intakes for UK compared to recommendations

Age (y)	Mean total fibre intake (g/day)	Dietary recommendation (g/day)	% meeting the recommendation
1.5-3	10.4	15	12%
4-10	14.3	20	14%
11-18*	16.0	25	4%
19-64	19.7	30	9%
65+	18.7	30	6%

* Fibre recommendations are 25g/d for 11-16 and 30g for 17-18 year olds

Large increases in fibre intake are needed to help the population meet recommendations



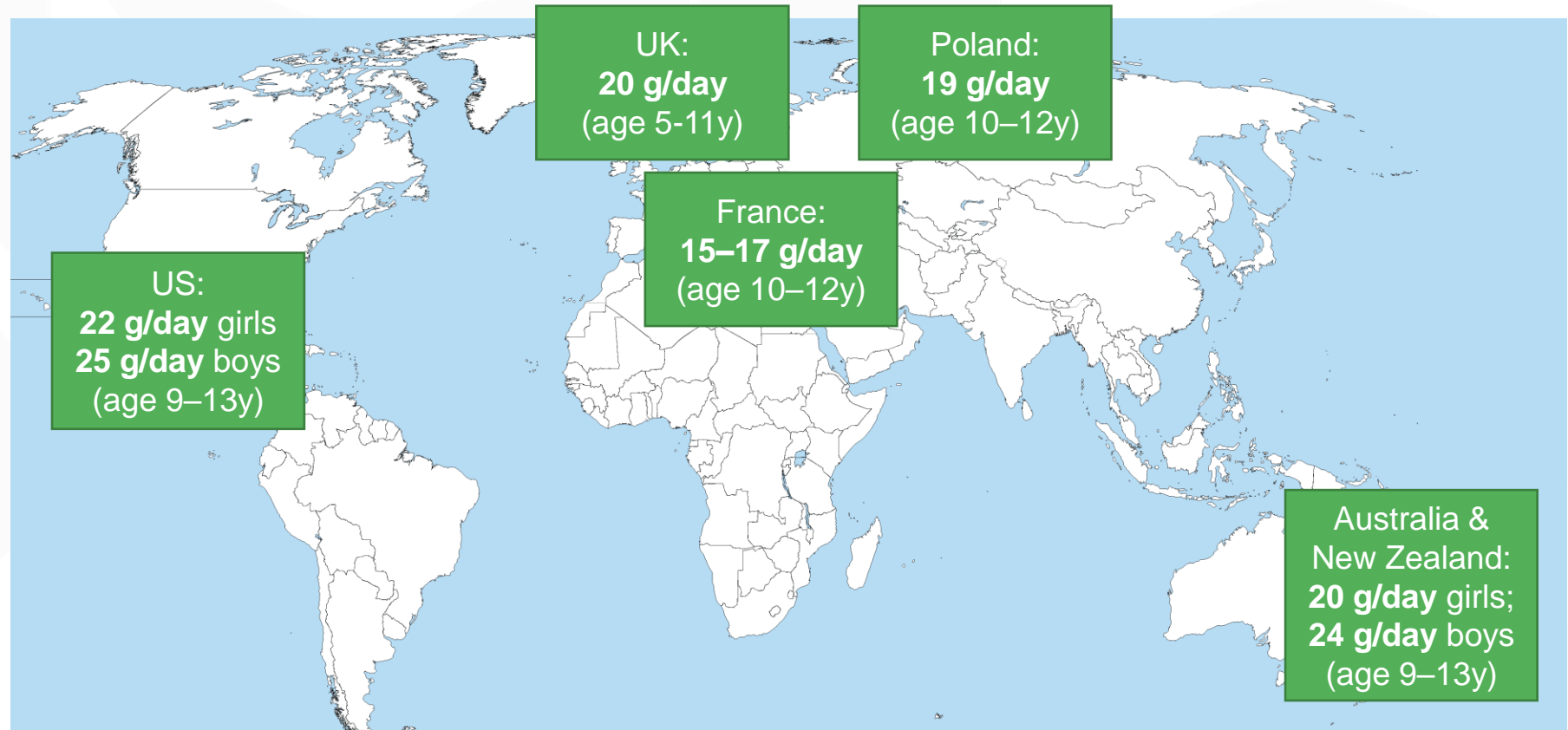
What about recommendations for children?

- In the past there was concern around high-fibre diets for young children and the possible negative effect on their growth and nutrient absorption.
- But there is a lack of evidence regarding adverse effects of high-fibre diets on growth in children.
- Rather there have been some suggestions that higher fibre foods may be helpful in the prevention of childhood obesity.



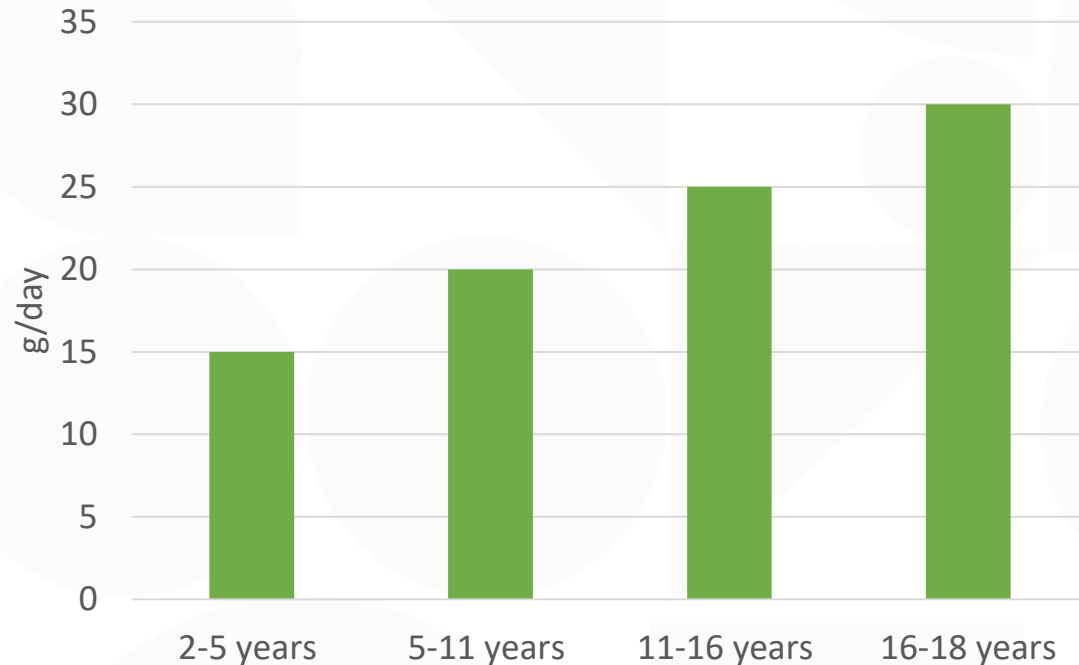
How much dietary fibre do children need?

- Children need proportionally less fibre in their diet than adults.
- Recommendations vary from country to country.

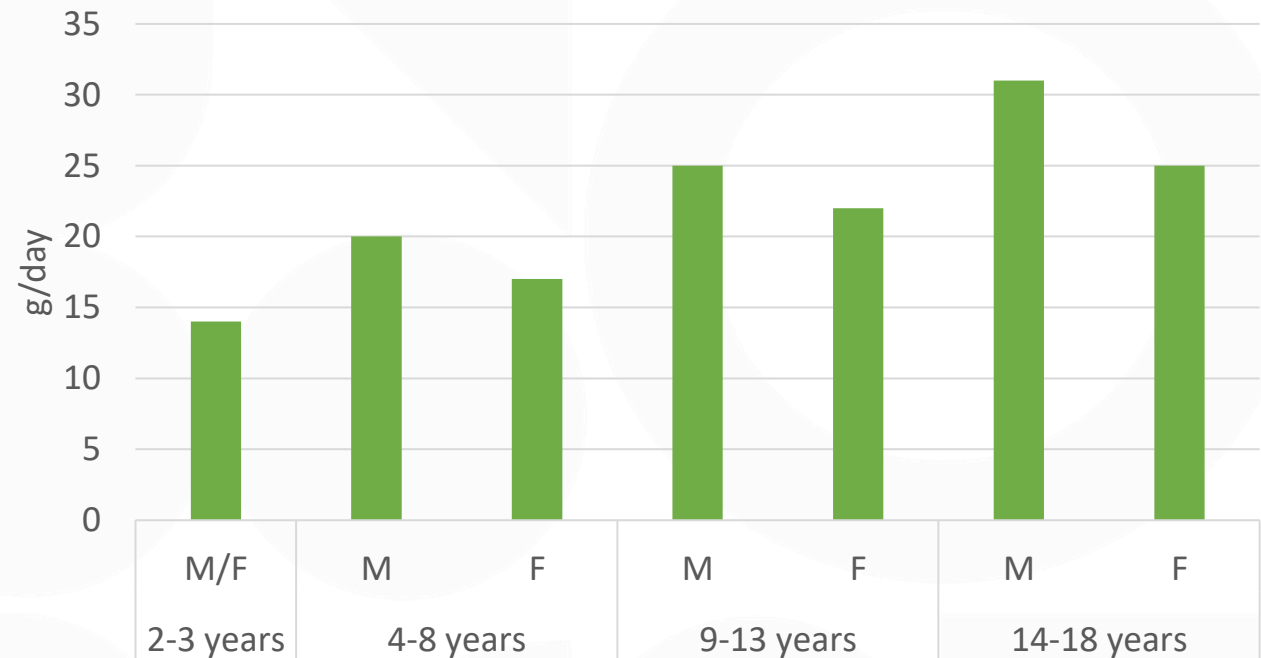


Recommendations for children in the UK and US

Fibre recommendations for children in the UK



Fibre recommendations for children in the US*



* Adequate Intake (AI) for fibre is 14 g/1000 kcal of intake per day



Fibre for the under-2s

- World Health Organisation Guidelines recommend exclusive breastfeeding for the first 6 months.
- Interestingly breast milk is rich in human milk oligosaccharides (HMOs). HMOs are minimally digested in the gastrointestinal tract and reach the colon intact, where they can help shape the gut microbiota.
- Babies should be introduced to solid foods (referred to as complementary feeding) at around 6 months old. A wide range of solid foods should be introduced in an age-appropriate form, alongside continued breastfeeding.
- Gradual diversification of foods, flavour and texture should proceed, with increasing amounts of wholegrains, legumes, fruits and vegetables.

Fibre recommendations in different countries generally start from either 1 or 2 years of age.



Encouraging an increasingly higher fibre diet from 6 months after complimentary feeding commences, may help to establish healthier eating patterns in later life.



Lack of availability of higher fibre versions of starchy carbohydrates in Out of Home sector.

Lack of consumer awareness of the health benefits of fibre and negative perception of starchy foods.

Perceived high cost of fruit and vegetables and wholegrain starchy carbohydrates.

Why may people not be achieving the fibre recommendations?

Lack of mandatory labelling in some countries of fibre values on packaging.

Greater familiarity with lower fibre foods e.g. white bread, rice and pasta.

Education and dietary advice is useful but effective behaviour change requires a multi-faceted approach from a range of stakeholders such as government, health authorities, schools, media and food industry.

See supplementary information for more on barriers to fibre intake



How can people increase their fibre intakes?

- It's important to get fibre from a variety of sources such as wholegrains, potatoes in skins, fruit and vegetables, legumes and nuts and seeds.
- To get enough fibre these foods need to be included at most eating occasions.

Practical tips to increase fibre intakes

SWITCH	→	white rice for brown/wild rice, quinoa or buckwheat
SNACK ON	→	fresh fruit, nuts and seeds instead of cake and biscuits
CHOOSE	→	high-fibre breakfast cereals and porridge oats
REPLACE	→	some of the meat in dishes with veg and beans
SWAP	→	mashed potatoes for baked potatoes with skins
SWITCH	→	to wholewheat pasta or wholewheat noodles
EAT	→	wholegrain (e.g. wholewheat, rye) or seeded breads instead of white
DON'T PEEL	→	potatoes – wash well, cook and eat them with the skin on
USE	→	wholemeal flour in baking (or use half white, half wholemeal)
ADD	→	berries, bananas, dried fruit, unsalted nuts and/ or seeds to natural yogurt
READ	→	nutrition info on food labels and choose those with the most fibre (but also check saturated fat, salt and sugars)



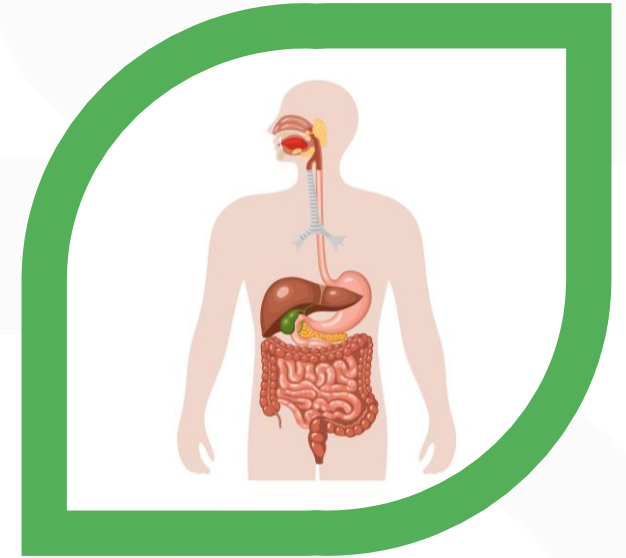
Fibre and dietary energy

- Originally it was thought that dietary fibre was entirely indigestible and did not provide any energy.
- It is now known that fibre can be fermented by the gut microbiota, producing short-chain fatty acids. These fatty acids are absorbed into the blood stream and provide a small amount of energy (2 kcal/g).

Did you know?

Dietary fibre contributes 8 kJ or 2 kcal per g to the energy content of the diet.

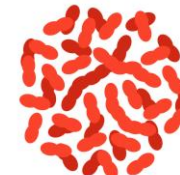
This is less than glycaemic carbohydrates (starch and sugars) that contribute 16 kJ or 4 kcal per g.



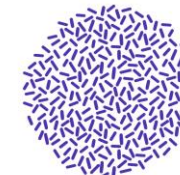
The gut microbiota : The human body's largest population of microorganisms resides in the intestine and is collectively called the gut microbiota.



LACTOBACILLUS



LACTOCOCCUS



PROPIONIBACTERIUM



STREPTOCOCCUS
THERMOPHILUS



BIFIDOBACTERIUM



Key learning points

High fibre intake is characteristic of healthier and more sustainable dietary patterns

- Higher fibre, plant-rich diets are characteristic of healthier and more sustainable dietary patterns.
- Dietary guidelines typically emphasise intake of a variety of foods that are sources of fibre in the diet including fruit and vegetables, wholegrains, legumes, nuts and seeds.

Fibre recommendations are not being met

- Dietary fibre guidelines across the globe typically recommend around 25–35 g/day for adults (and less for children). On average, most people do not eat enough fibre.
- To meet recommendations, most of us need to increase dietary fibre intakes, and fibre-rich foods should be included at most eating occasions.
- Potential reasons why people don't eat enough fibre include: lack of consumer awareness of the health benefits of fibre; a negative perception of starchy foods; perceived high cost of fruit and vegetables and wholegrain starchy carbohydrates; voluntary (rather than mandatory) labelling of fibre values in some countries on packaging; less taste preference and familiarity with wholegrain versions.



Key references

Recommendations for dietary fibre

- [Australian National Health and Medical Research Council \(NHMRC\) and the New Zealand Ministry of Health 2006](#)
- [D-A-CH \(Germany, Austria, and Switzerland\) reference values 2020](#)
- [Dietary Guidelines for Americans 2020-2025](#)
- European Commission – [Dietary Fibre](#)
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<http://www.efsa.europa.eu/en/efsajournal/pub/1462>
- IFST – [Dietary fibre](#)



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- Public Health England – [NDNS: results from years 9 to 11 \(2016 to 2017 and 2018 to 2019\)](#)
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Barriers to fibre intakes (1)

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Barriers to fibre intakes (2)

- Hooper et al. (2015) [30 g of fibre a day: An achievable recommendation?](#) Nutrition Bulletin
- Lockyer et al. (2016) [Dietary fibre and the prevention of chronic disease – should health professionals be doing more to raise awareness?](#) Nutrition Bulletin

Foods providing fibre

- Public Health England – [Composition of foods integrated dataset \(CoFID\)](#)

Food-based dietary guidelines

- Australian Government – [Australian Guide to Healthy Eating](#)
- Government of Canada – [Canada's Food Guide](#)
- Healthy Ireland – [The Irish Food Pyramid](#)
- Public Health England (PHE) – [The Eatwell Guide](#)
- The German Nutrition Society (DGE) – [The German Nutrition Circle](#)
- US Department of Agriculture – [MyPlate](#)



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Plant-based diets

- British Nutrition Foundation – [Plant-based diets](#)
- FAO and WHO. 2019. [Sustainable healthy diets – Guiding principles](#). Rome

Increasing fibre intakes

- British Dietetic Association – [Fibre: Food Fact Sheet](#)
- British Nutrition Foundation – [Dietary fibre](#)
- NHS – [How to get more fibre into your diet](#)

Fibre on nutrition labels

- Food and Drug Administration – [Questions and Answers on Dietary Fiber](#)
- Food Standards Agency – [Packaging and labelling](#)
- Food Standards Australia New Zealand – [Nutrition information panels](#)



