

Vitamin and mineral supplementation in cystic fibrosis

A patient's guide

Fat-soluble vitamins

People with cystic fibrosis (CF), particularly those with pancreatic insufficiency, often have low levels of fat-soluble vitamins A, D, E and K, due to reduced absorption in the gut. Food sources are often not enough to prevent low blood levels and symptoms of deficiency, therefore most people with CF will need to take vitamin supplements.

Blood levels of vitamin A, D and E should be checked at least once a year at annual review and more frequently if required. You will be advised if you need to change your supplement dosage. It can be harmful to take too many vitamins so please speak to the CF dietitian or pharmacist before taking additional vitamins or health supplements.

Fat-soluble vitamins are absorbed into the body with fat therefore it is recommended that vitamin supplements are taken with a fat containing food or drink and enzymes (if pancreatic insufficient).

The following sections detail each of the fat-soluble vitamins, their health benefits and food sources.

Vitamin A

Appears on supplements as:

- Retinol
- Carotenoids
- Beta-carotene



Role in health

- Supports good eyesight and healthy skin
- Helps the immune system work properly
- Important role in keeping the lining of the nose, lungs and intestines healthy
- Supports bone and tooth formation
- Has a role as an antioxidant that defends the body's cells from damage caused by harmful products known as free radicals, which are continually produced in the body in health and disease
- A lack of vitamin A can lead to night blindness (when your eyes cannot adjust when moving from light to dark)
- Too much can cause bone or liver problems and can be dangerous in pregnancy

Sources

- Milk, cheese, yoghurt, fortified spreads, egg yolk, oily fish (eg salmon, sardines, mackerel) and cod liver oil
- Yellow and orange coloured fruits and vegetables (eg carrots, peppers, sweet potato, squash, apricot and peaches)
- Dark green, leafy vegetables (eg kale, spinach, green cabbage and broccoli)
- Liver and liver products such as liver pate and faggots are rich sources of vitamin A. You may be at risk of having too much if eaten more than once a week
- Try to store foods away from daylight as this can reduce the amount of vitamin A

Vitamin D

Appears on supplements as:

- Colecalciferol
- Cholecalciferol
- Ergocalciferol



Role in health

- Helps the body absorb calcium from the diet, which is important for strong bones and teeth
- Linked to improved lung function and muscle function
- Has a role in maintaining a healthy immune system and protecting against infection
- A lack of vitamin D can cause bone pain and muscle weakness. Over time bones will become thin and brittle, increasing the chance of breaking
- Too much vitamin D can cause calcium to build up in the body

Sources

The major source of vitamin D is exposure to sunlight during the months of April to September in the UK.

The body creates vitamin D from direct sunlight on the skin when outdoors and not wearing sunscreen. Take care not to burn your skin as this increases your risk of skin cancer. People with dark skin may not get enough vitamin D from sunlight. In the winter months (October – March), all adults in the UK are advised to take a vitamin D supplement.

Small amounts come from foods such as fortified cereals, fortified dairy products and non-dairy alternatives (check the label to be sure), oily fish (eg salmon, mackerel, sardines), red meat, egg yolk, liver and mushrooms grown in UV light.

Vitamin E

Appears on supplements as:

- Alpha-tocopherol

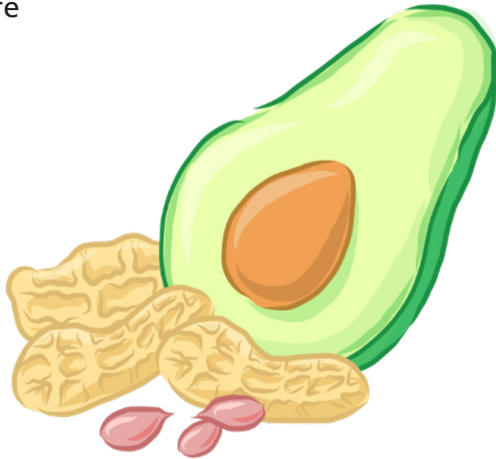
Role in health

- Important for nerve and muscle function
- Protects cell membranes helping to maintain healthy skin, eyes and red blood cells. It also keeps the linings of the lungs and intestines healthy
- Has a role as an antioxidant that defends the body's cells from damage caused by harmful products known as free radicals
- A lack of vitamin E can lead to problems with muscle and nerve function. Severe deficiency can lead to problems with mental processes, blindness and heart problems

Sources

- Plant oils (eg rapeseed, sunflower, olive)
- Avocado
- Nuts
- Seeds
- Wheat germ found in cereals and cereal products

Try to store foods away from daylight as this can reduce the amount of vitamin E.



Vitamin K

Also known as:

- Phytomenadione / Phylloquinone (K1) – plant source, used in supplements
- Menaquinones (K2, MK-4, MK-7) – found in animal products and fermented foods, produced by bacterial conversion of K1
- Menadiol – manmade source ie supplements

Role in health

- Important for blood clotting and wound healing
- Essential role in keeping bones strong and healthy
- A lack of vitamin K could mean that your blood takes longer to clot, which can lead to excessive bleeding and can be dangerous

Sources

- Green leafy vegetables (eg kale, spinach, green cabbage, broccoli, lettuce), liver, soya beans and plant/vegetable oils
- Smaller amounts in meat and dairy foods
- Good bacteria in the intestines also make some vitamin K but antibiotics can destroy these bacteria



Calcium

Calcium is a mineral that cannot be made in the body and therefore must be supplied via the diet or supplements. If your body does not receive enough calcium from these sources, it will take it from your bones to keep blood levels optimised. Over time this can result in weak bones which are prone to breaks.

Recommended daily amounts (CF Trust guidelines):

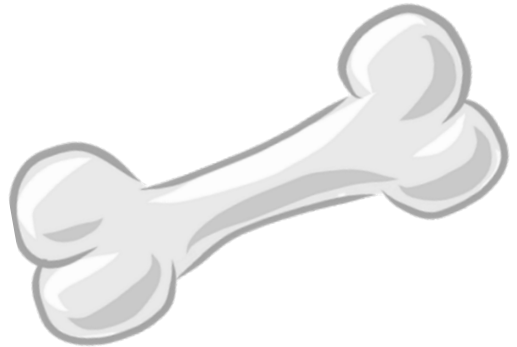
10 – 18 years	19 – 50 years	Over 50 years
1,300 mg	1,000 mg	1,200 mg

The section below details the health benefits of calcium and food sources. It is best to spread out your calcium sources across the day because your body can not absorb large quantities at one time. This is why you may be advised to your calcium supplements morning and evening rather than all at the same time.

Role in health

- Helps to build strong bones and teeth
- Is needed for muscles to move (including your heart muscles)
- Is needed for nerves to carry messages between the brain and the rest of the body
- Helps your blood clot normally

Too much calcium can weaken your bones, create kidney stones and interfere with how your heart and brain work.



Sources

- Milk, cheese, yoghurt, fromage frais, rice pudding, custard – these are the richest sources of calcium
- Calcium-fortified milk and yoghurt alternatives eg soya, nut oat, rice, coconut (check the label)
- Tofu / soya bean curd (only if set with calcium chloride (E509) or calcium sulphate (E516), not nigari)
- Fish with edible bones eg tinned salmon, sardines, whitebait
- Malted milk drink, hot chocolate, fortified milkshake mix
- Dark green leafy vegetables (eg kale, broccoli, spring greens)
- Oranges and calcium fortified orange juice
- Calcium-fortified breakfast cereals and instant hot oats
- White and brown bread (calcium-fortified)
- Products made with fortified flour eg some tortillas and crackers, pitta bread
- Scampi
- Soya beans

Important notes

- Spinach, dried fruits, nuts, seeds and beans contain calcium but also contain oxalic or phytic acid (a naturally occurring compound in plants) which binds to calcium and limits the amount your body can absorb. You should not rely on them as your main source of calcium
- Tea also contains oxalic acid and can interfere with calcium absorption
- Absorption of calcium from supplements will be reduced if taken with the above foods and drinks
- Low-fat dairy products have the same amount of calcium as the full-fat versions
- Excessive alcohol, caffeine and salt intakes cause the body to lose calcium



My results

Date	Vitamin A	Vitamin D	Vitamin E
Target range:	0.99 - 3.35 umol/L	76 - 250 nmol/L	9.5 - 41.5 umol/L

Notes

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Contact us

We would be happy to hear from you and answer any further questions you may have:

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Further information

nhs.uk/conditions/vitamins-and-minerals/

cff.org/managing-cf/vitamins

nhs.uk/live-well/eat-well/foodguidelines-and-food-labels/the-eatwell-guide/

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