

Vitamin D supplements and tests

What is osteoporosis?

Osteoporosis occurs when the struts that form the mesh-like structure inside bones become thin. This causes the bone to become fragile and break easily, even after a minor bump or fall. You might hear these breaks described as 'fragility fractures'. The terms 'fracture' and 'broken bone' mean the same thing.

Fractures can occur in many parts of the body, but they are most common in the wrists, hips and spine. It's these broken bones that can cause pain, rather than osteoporosis itself. Spinal fractures can also cause height loss and a curved spine.

You need vitamin D to help regulate the way your body uses calcium and to ensure your bones, muscles and teeth remain strong. The condition associated with vitamin D deficiency is called osteomalacia (or rickets in children). This is not the same as osteoporosis.

For healthy adults in the UK, much of the vitamin D you get is obtained by the action of sunlight on your skin alongside foods that contain vitamin D.

As we cannot make vitamin D in our skin from October to March, some people might not have enough to last over the winter and may need a supplement to boost their diet.

UK health experts advise that everyone should consider taking a daily supplement containing 10 micrograms of vitamin D during the autumn and winter months.

For more information about getting enough vitamin D for strong bones, including safe sunlight exposure and food sources, see our booklet, 'Better bone health for everybody', or visit our website at theros.org.uk/info

Will taking vitamin D supplements prevent osteoporosis and make my bones stronger?

Getting enough vitamin D from sunlight and food sources is important for strong muscles and bones. Taking a supplement can help to increase your intake to recommended levels.

However extra vitamin D over and above these amounts is unlikely to improve bone strength.

Osteoporosis is not specifically due to vitamin D deficiency and having a very high intake of vitamin D isn't a guarantee against osteoporosis and fractures.

Will taking vitamin D supplements help prevent other medical conditions?

If you have osteomalacia, vitamin D supplements (often with calcium) are essential. But it's not clear whether vitamin D supplements help with other conditions.

UK health experts have studied the available evidence for benefits in relation to other conditions, such as reproductive health (mothers and babies), cancer, heart disease, multiple sclerosis, and COVID-19.

They found there isn't enough evidence to draw firm conclusions about these conditions. The advice from the committee focuses on bone and muscle health, particularly the prevention of osteomalacia and rickets (soft bones), muscle weakness, and falls.

Should I take a vitamin D supplement and what dose do I need?

Vitamin D supplements are recommended if you are unlikely to be getting enough from sunlight and food (either natural or fortified).

Public Health England recommends a supplement:

From birth to one year (unless having 500 ml or more of formula milk, as this contains vitamin D)	8.5 to 10 micrograms a day
Children aged 1 to 4 years	10 micrograms a day
Children aged over 4 years and adults	10 micrograms a day, in autumn and winter
Children aged over 4 years and adults who: <ul style="list-style-type: none">• don't get much sunlight *• cover up their skin for cultural reasons• are frail, housebound or indoors for long periods• use sunblock for medical reasons	10 micrograms a day, all year round

* around 10 minutes twice a day without sunscreen taking care not to burn. Sunlight only makes vitamin D in your skin from April to September.

Talk to your doctor if you have a condition or treatment such as the following when a vitamin D supplement may also be important:

- severe liver or kidney disease or a condition that affects the way you absorb food
- long-term anti-epileptic drugs, as these alter the way vitamin D is broken down and used by the body and can affect the absorption of calcium.

Pregnant and breastfeeding women and people with darker skin because of their ethnic origin are not in the 'need a supplement' group (see above). But, like everyone, they need to make sure they get enough vitamin D in food and, if not, consider taking supplements all year round.

The recommendation is that everyone should make sure they get 10 micrograms a day from food sources and consider whether they need a supplement, especially during the autumn and winter months (from the end of September until the end of March).

10 micrograms (μg) is equal to 400 International Units (IU)

Are higher doses sometimes needed?

10 micrograms (400 IU) is the recommended dose of vitamin D if you are an adult, although doctors may prescribe 800 IU (20 micrograms), especially if you have a bone condition such as osteoporosis.

Even if you are 'deficient,' that is you have had a test that shows very low levels of vitamin D in your blood, this 800 IU dose is often sufficient.

If a blood test shows very low vitamin D levels, and you are getting bone pain as a result, then a higher dose may be prescribed to improve your vitamin D levels quickly. You may be given a total of about 300,000 IU vitamin D, either as weekly or daily doses over 6 to 10 weeks, before you go down to the lower dose taken long term (usually 800 IU).

You may also be prescribed a higher dose for a short time if you have low blood levels and you are about to start an osteoporosis drug treatment such as denosumab or zoledronic acid. These drugs can lower the calcium levels in your bloodstream, which can make you unwell if levels fall too low. Getting enough vitamin D and calcium before and while you take a drug treatment can help to prevent this.

The information provided here is based on the Royal Osteoporosis Society Guideline produced by a group of UK clinical and scientific experts. But your local hospital might have a slightly different way of managing vitamin D deficiency.

The Department of Health recommends that babies from birth to one year of age who are being breastfed or getting less than 500ml (about a pint) of infant formula (which is fortified with vitamin D) a day, should be given a daily supplement containing 8.5 to 10 micrograms of vitamin D.

Can I take too much vitamin D and what are the symptoms?

High intakes of vitamin D for prolonged periods can be toxic, so it is important not to take more than 100 micrograms of vitamin D daily. (The upper limit is 50 micrograms a day for children from 1-10 years and 25 micrograms for babies under a year).

Toxicity is unusual, but can cause high levels of calcium in the blood with nausea, vomiting, thirst and weakness. Medical treatment would be needed to correct this.

Remember, however, these are 'toxicity' levels and much higher than the doses generally recommended. The current advice is to take 10 micrograms (400 IU) daily unless prescribed for a specific reason by your doctor. The positive benefits have been found at these lower levels and, as with any supplement, taking high doses without medical supervision could have unintended consequences.

If you are taking a number of different supplements, check how much vitamin D you are taking in total to ensure it is a sensible amount.

Generally, foods and fortified foods (fortified at current levels) provide small amounts of vitamin D which are very unlikely to cause any problems.

Are there any special instructions for taking vitamin D supplements?

No, vitamin D supplements can be taken with or without food and at any time of the day. However if you are taking an osteoporosis drug treatment such as alendronic acid or risedronate (bisphosphonates) then you must separate them out from any supplements (read the instructions on your packet). Bisphosphonates can't be absorbed by the body, so they won't work unless you take them on a completely empty stomach (drinking water is fine).

Which is the best vitamin D supplement?

Most supplements contain vitamin D3 (cholecalciferol) which may be slightly more effective than vitamin D2 (ergocalciferol). But D2 is vegan (D3 is derived from lamb's wool) so may be the only acceptable supplement for some people.

If you are taking vitamin D because you have a bone condition, such as osteoporosis, it might be best to take a supplement prescribed by your doctor, as these products will have been carefully tested to make sure they work well.

Vitamin D is available as a tablet, drops, spray or injection. Tablets are cheapest and usually the best option. There are some uncertainties about whether the injectable form works as quickly or as well as tablets so you will usually only be given an injection if you have a condition that affects the way you absorb anything taken by mouth.

Vitamin D tablets or drops for babies and young children can be bought from most pharmacies and larger supermarkets. If you are claiming income support or other state benefits you are entitled to 'Healthy Start' vouchers for free supplements until your child is 4 years old.

For information about vitamin D added to foods, see our booklet, 'Better bone health for everybody', or visit our website at theros.org.uk/info

Do vitamin D supplements cause side effects?

No, vitamin D supplements rarely cause side effects although calcium in supplements can do – many people take the two together.

See our fact sheet, 'Calcium supplements and tests', for more information.

Can I get a supplement suitable for a vegetarian or vegan?

Some vitamin D3 products are suitable for vegetarians (check with the manufacturer), but D3 (cholecalciferol) is difficult to get in a vegan form.

There are some lichen-derived products that are suitable for vegans, but how well they work is less certain.

Do I need to take both calcium and vitamin D? Can I get a vitamin D supplement without calcium?

Supplements are prescribed together if you need both. This may be because you are older and frailer and there is concern you might not be getting sufficient of either especially if you are living in a nursing or residential home.

You can buy, or be prescribed, either calcium or vitamin D separately if you don't need both. If you are getting sufficient calcium in your diet but need extra vitamin D then you may be advised to take vitamin D supplements alone.

Why aren't vitamin D blood tests done routinely to check I'm getting enough?

Because it's often unnecessary and therefore not cost effective. Research has shown that some people, particularly those who don't get enough sunshine, probably aren't getting enough vitamin D. It makes sense for these people to take a supplement to ensure they get the amount they need. A blood test isn't needed to confirm this and a suitable supplement won't cause any harm.

Another issue is that a one-off blood test won't necessarily give a complete picture of your vitamin D levels throughout the year. Experts recommend a winter supplement for anyone uncertain whether they are getting enough vitamin D from their food.

You will sometimes be given a blood test if you are being investigated or treated for various bone diseases including osteoporosis and osteomalacia (soft bones). Even then, you might not need a test before supplements are prescribed if your situation suggests you are very likely to need a supplement.

Your doctor, or other health professional, will often do a blood test if you have bone pain that could be related to vitamin D deficiency or if you are starting on an osteoporosis drug treatment given by infusion or injection (zoledronic acid or denosumab).

If you have a very low blood level of vitamin D, then a higher dose of vitamin D supplement than normal will be prescribed initially (see above).

I've had a vitamin D blood test. What do the results mean?

The blood test measures a circulating form of vitamin D called 25 hydroxyvitamin D (serum 25OHD). Your kidneys convert this into an 'active form' that your body can use.

Unfortunately there isn't a simple, normal range with supplementation recommended if your result is abnormal. Most experts agree that a result greater than 50nmol/L would certainly be adequate, but whether everyone needs to aim for this and will benefit is unclear. It is agreed that a result below 25-30nmol/L is an indication of risk of vitamin D deficiency and supplementation would be important.

Current UK government advice aims to ensure no one is deficient. Your doctor will be able to advise you about your results depending on your situation.

How do I know the supplements are giving me enough vitamin D? Don't I need a blood test to check this?

If you take the prescribed dose of vitamin D then, as with any supplement, you can be confident you are getting enough and you usually won't need a test to check vitamin D levels in your blood have improved.

If you have a medical condition such as Crohn's disease that could affect how you absorb medicines or you have 'bone pain' which continues despite having taken supplements, then your doctor might want to use repeat blood test as the results may affect treatment decisions.

Getting more information and support

We hope this fact sheet will help you feel more informed and more confident when discussing your bone health with your medical team.

For more information about osteoporosis and bone health, including fact sheets on all available drug treatments, please visit our website at theros.org.uk/info

If you need more information or support, talk to your healthcare professional.

You can also call our specialist Helpline nurses with any questions or concerns about bone health, for free, on **0808 800 035**, or email them at nurses@theros.org.uk

For more information about calcium, vitamin D and healthy eating for strong bones, and on who needs a vitamin D supplement, visit our website at theros.org.uk/info or see our information resources.

There's a summary in our booklet, 'Better bone health for everybody'. We also have a 'vitamin D rich food chooser' in our publications and on our website.

For information about calcium, read our fact sheet, 'Calcium supplements and tests'.



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This information is based on the latest evidence and clinical practice. It should not replace advice from your own healthcare professionals.

To give us feedback on this fact sheet, email us at health.info@theros.org.uk

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To view or order more information about osteoporosis and bone health:



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