



Better bone health for everybody

Including information about calcium and vitamin D

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About this information

Taking control of your bone health now and in the future is part of a healthier lifestyle. Making positive lifestyle choices will help to keep your bones strong.

This information is for you if you:

- have osteoporosis
- have broken a bone
- are at risk
- want to improve your bone health.

For more information about bone health, you can visit our website (theros.org.uk) or speak to our specialist nurses. Call free on **0808 800 0035**, email nurses@theros.org.uk or contact us by post – see our details on page 10.

Why your bones matter

Your bones have an important job to do. They work with your muscles to make sure you can move and be active. They perform other jobs too, such as protecting your organs, storing minerals, and producing blood cells.

Your genes play a key role in determining the size and strength of your skeleton, but the way you live your life plays an important part too. This is where a healthy lifestyle is essential. Building up the amount of bone you invest in your 'bone bank' when you are younger helps to resist the loss of bone and bone strength that happens in older age. It also ensures you are helping to keep your skeleton strong throughout your life. Strong muscles and bones give you the best chance of staying active as you age.

About your living skeleton

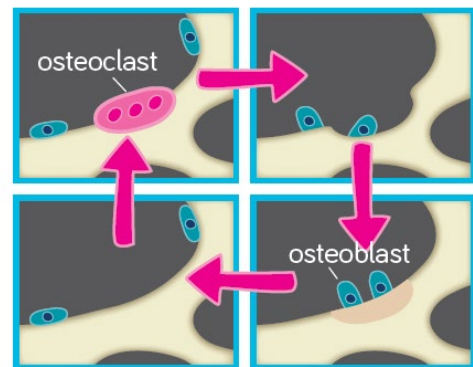
Your bones are alive and always changing throughout your life. Bone tissue is a scaffold of a protein, collagen, made strong by calcium and other minerals. Older bone tissue is broken down by specialist cells called osteoclasts. New bone is then rebuilt by bone-building cells called osteoblasts. This is often described as 'bone turnover' or 'bone remodelling'.

Until we reach older age, there is usually a balance between the amount of bone that is removed and created. This means the total amount of bone tissue you have stays the same, so your skeleton is strong and healthy.

In childhood, the osteoblasts work harder than the osteoclasts. This enables your skeleton to increase in size, density, and strength as you grow. During this period of rapid bone growth, it takes the skeleton just two years to completely renew itself. In adults, this process takes seven to ten years.

Bones stop growing when you reach around 16–18 years old. But the total amount of bone tissue you have increases slowly until your late twenties.

Bone remodelling



What can you do to keep your bones healthy?

You need to look after your bones just as you look after your heart and your mind. What you eat and drink, exercise, and other lifestyle choices all have roles in bone health.

Healthy eating

Whatever your age, you can make sure that what you eat today will help to keep your skeleton strong for the future. Getting enough calcium and vitamin D is important, but you need a healthy, balanced diet to provide your bones with all the nutrients they need.

Aim to eat meals that incorporate a wide variety of foods from the four main groups. These are:

- fruit and vegetables
- carbohydrates, such as bread, potatoes, pasta, and cereals
- dairy and alternatives
- beans, pulses, fish, eggs, meat, and other proteins

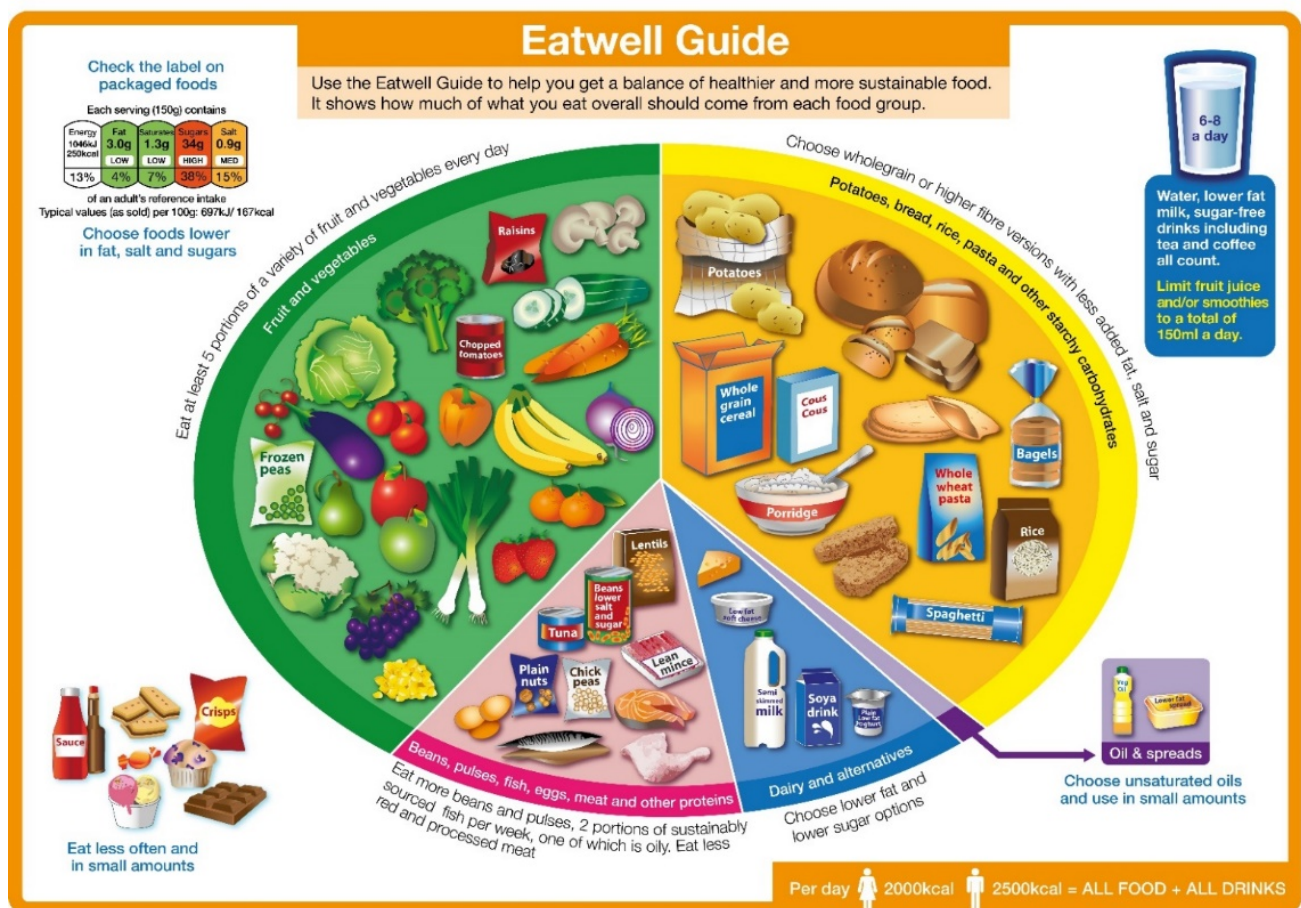
This will help you to get all the vitamins, minerals, and energy you need to live life to the full. It will reduce your risk of developing other health conditions too.

You do not need to avoid any specific foods because they are bad for bones. But there are some foods and drinks that are best to have in moderation, for example, caffeinated and cola drinks.

If you don't eat dairy foods, make sure you get all the nutrients you need from alternatives, especially calcium and protein.

The **Eatwell Guide** shows the proportions of different foods that make up a well-balanced, healthy diet. You can use this as a guide for your meals.

Make sure you eat the recommended proportions from each food group every week. This will ensure you get all the nutrients you need for good health, including what your bones need to stay strong. Having a mixture of foods within each food group will also ensure you get a range of different nutrients. **See our fact sheet 'Further food facts' for more information.**



Source: Public Health England in association with the Welsh Government, Food Standards Scotland and the Food Standards Agency in Northern Ireland

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You can also use our food choosers on pages 4 and 6 to help you get the amount of calcium and vitamin D you need to keep your bones strong. Choose from the tables to help you get the UK recommended amounts.

For example, if you need 700mg of calcium a day, you might choose two options from the 300mg section and one from the 100mg section.

Try to choose a wide variety of foods from the different sections, rather than restricting yourself to two or three foods. This way your bones are more likely to get all the nutrients they need.

Calcium

Calcium gives our bones strength. Our bodies contain about 1kg of this important mineral, 99% of which is found in our bones. Most people can get enough calcium through healthy eating, without needing supplements. **See our fact sheet 'Calcium supplements' for more information.**

Age	Reference Nutrient Intake (RNI)
0-12 months (non-breastfed infants only)	525mg
1-3 years	350mg
4-6 years	450mg
7-10 years	550mg
11-18 years	1000/800mg
19+ years	700mg
Pregnant women	700mg
Breastfeeding women	700mg + 550mg

Calcium-rich food chooser - calcium-rich foods to form part of a balanced, healthy diet

Foods providing around 300 mg of calcium per average portion	
Edam / Gouda	1 portion (40g)
Cheese omelette	1 portion (120g)
Quiche (cheese and egg)	1 portion (140g)
Macaroni cheese	1 portion (220g)
Foods providing around 200 mg of calcium per average portion	
Milk or milk drink e.g. hot chocolate (skimmed / semi-skimmed / whole)	1 tumbler or mug (200ml)
Soya milk (calcium boosted)	1 tumbler or mug (200ml)
Cheddar cheese & low-fat hard cheese	Small matchbox size (30g)
Yogurt (low-fat fruit, plain & calcium-boosted soya)	1 pot (125g)
Porridge (made with semi-skimmed milk)	1 bowl (160g - weight with milk)
Halloumi	2 thin slices (35g)
Cauliflower cheese	1 portion (200g)
Lasagne (meal for one, vegetable or meat)	1 portion (290g)
Pizza 12" (cheese & tomato, vegetarian or meat)	¼ of the whole
Tofu (steamed or fried)	1 portion (120g)
Sardines (canned)	1 portion (50g)
Rice pudding	1 portion (200g)
Foods providing around 100 mg of calcium per average portion	
Cottage cheese	2 tbsp (80g)
Camembert	1 portion (40g = 1/6 of whole)
White pitta bread	1 small (75g)
Plain naan bread	½ (43g)
Baked beans	1 small tin (200g)
Cornish pasty	1 medium size (155g)
Sausages (pork or vegetarian)	2 large sausages (80g)
Tahini (sesame paste)	1 heaped tsp (19g)
Sesame seeds	1 tbsp (12g)
Tinned pink salmon	1 small tin (105g)
Grilled herring	1 (119g)
Custard (ready made)	1 portion (120g)
Dried figs	2 (40g)
Paneer cheese	1 portion (30g)
Parmesan cheese	1 portion (15g)

Foods providing around 50 mg of calcium per average portion	
Plain yogurt	1 tbsp (40g)
Fortified fromage frais	1 'mini' pot (47g)
Muesli Swiss style	1 portion (50g)
Bread (white)	1 medium slice (35g)
Bread (wholemeal)	1 thick slice (44g)
Green or French beans	1 portion (90g)
Green cabbage	1 portion (95g)
White cabbage (raw)	1 portion (90g)
Broccoli (steamed)	1 large portion (110g)
Watercress	1 small bag (40g)
Almonds	10 whole nuts (22g)
Brazil nuts	9 whole nuts (30g)
Red kidney beans	2 tbsp (70g)
Vegetable casserole	1 portion (260g)
Veggie burger	1 (56g)
Vegetable samosa	1 (75g)
Pasta (dried, boiled)	1 portion (230g cooked weight)
Rice (basmati, boiled)	10 heaped tbsp
Dairy or non-dairy ice cream	1 scoop (50g)
Dried apricots	8 (64g)
Orange / easy-peel citrus (e.g. tangerines, satsumas)	1 large orange / 3 medium easy-peelers (210g)

Vitamin D

Vitamin D is essential for good bone health because it helps your body to absorb calcium. It also keeps your muscles strong, which helps to prevent you falling when you get older. Our bodies make vitamin D when exposed to the sun's rays, which react with our skin. You can also get small amounts from food and drink that contain vitamin D (either naturally or added in, often called 'fortified'), or from dietary supplements.

Sunlight

The sun's rays are strong enough to produce vitamin D in your skin between the start of April to the end of September. Getting outside between 11am and 1pm during these months will usually give you enough vitamin D.

Try to expose your bare skin (such as your forearms) to sunlight for around 10 minutes, once or twice a day. Do this without sunscreen, but always take care not to burn. On cloudy days, your skin can take longer to make vitamin D, but fair-skinned people still need to take care not to burn. Babies and children also have very sensitive skin and need careful protection. Your skin cannot produce vitamin D from sunlight through a window. This is because glass blocks ultraviolet B (UVB) rays, which are what your skin uses to create vitamin D.

Food and vitamin D supplements

Most of us can get enough vitamin D from sunlight in the summer.

But to make sure you're getting what you need, anyone over the age of one should try to get an extra 10 micrograms (sometimes described as 10µg or 400IU) every day. You can get this from foods (see the food chooser below for ideas) or supplements. Infants under one should have an extra 8.5–10 micrograms.

In the winter months, we rely only on foods and supplements because we don't get vitamin D from the sunlight. Our bodies store vitamin D from the summer sun, but this may not be enough to carry us through the winter.

The government recommends some people should take vitamin D supplements all year round. These include:

- Infants from birth to one year, unless they have at least 500ml of vitamin D-fortified formula milk each day.
- Children aged one to four years.
- People who aren't exposed to much sunlight. For example, if you cover up your skin for cultural reasons, if you are frail, housebound, or confined indoors for long periods, or if you use sunblock for medical reasons.

You should also consider taking a 10-microgram supplement if you have dark skin due to your ethnicity, are pregnant or breastfeeding. This will ensure you get enough vitamin D, especially during the winter months. **See our fact sheet 'Vitamin D supplements and tests' for more information.**

Other supplements

Many other vitamins (such as B, C and K) and minerals (such as magnesium) play a part in keeping us healthy. They may also help to keep bones strong. These nutrients are all available through a well-balanced diet. So, if you eat a wide range of foods from all the main food groups, you should not need supplements for these.

Vitamin D-rich food chooser – vitamin D-rich foods to form part of a balanced, healthy diet

Foods providing around 20 micrograms of vitamin D per average portion	
Grilled herring *	1 portion (119g)
Foods providing around 12-13 micrograms of vitamin D per average portion	
Pink salmon, canned in brine & drained *	1 small can (100g)
Grilled salmon *	1 portion (170g)
Grilled kipper fillet *	1 portion (130g)
Grilled rainbow trout fillet *	1 portion (155g)
Smoked mackerel *	1 portion (150g)
Foods providing around 3-4 micrograms of vitamin D per average portion	
Some malted hot drinks (check labelling)	1 mug (25g)
Crab, cooked *	1 small can (85g)
Tinned sardines in tomato sauce *	1 small can (100g)
Scrambled eggs / plain omelette	2 eggs (120g)
Foods providing around 1-2 micrograms of vitamin D per average portion	
Build-up powdered sachet (shake)	1 sachet (38g)
Soya milk (fortified)	1 glass (200ml)
Boiled chicken's egg	1 egg without shell (50g)
Cornflakes (fortified) / bran flakes (fortified)	1 portion (30g)
Foods providing around 0.5 micrograms of vitamin D per average portion	
Pork chop, grilled	1 chop, excluding bone (75g)
Corned beef	1 thick slice (50g)
Grilled bacon rashers	2 middle rashers (80g)
Low-fat spread, polyunsaturated (fortified)	1 teaspoon (5g)
Baking fat / margarine	1 teaspoon (5g)
Pork sausages, grilled or fried	1 sausage (40g)
Lambs liver, fried	1 portion (40g)

- Limit processed meat.
- *Limit oily fish to no more than four portions a week (two if you are pregnant, trying to conceive or breastfeeding)
- *Limit liver portions to no more than one a week if you are over 50 and avoid if you are pregnant
- Check the food labels or packaging for more information – the range of foods fortified with vitamin D is increasing. Some yogurt and bread products are enriched although there is no consistent evidence that specially enriched yeast is absorbed by the body.
- Some foods such as mushrooms can be high in vitamin D, but this will vary.

Exercise for strong bones

Being active and doing exercise helps to keep our bones strong and healthy throughout our lives. That's because our bones are alive and changing, and they get stronger when we use them.

In childhood, exercise is important to make our bones grow bigger and stronger. As we get older, exercise and keeping active remain important for bone strength. It can also reduce our risk of falling over by improving our balance, and help us to stay independent.

For children and young people, any sports or leisure activity with a variety of movements, speeds and directions can help to make their muscles and bones strong. Examples include team sports, dancing, and games that involve running and jumping. The most important thing is to find something that you enjoy and keep doing it!

Everybody should ensure that their exercise includes:

- Weight-bearing exercise with added impact or force. This is physical activity where you are supporting the weight of your own body, so the weight of your body pulls on your skeleton. Include some impact if you can, which could include jogging, aerobics, tennis, dancing, or brisk walking. It's important to do what you can manage. Even standing regularly for a few minutes is better than long periods sitting or lying down.
- Muscle-strengthening exercise. This is any kind of movement where you are working against resistance. This could be a weight in your hand, a resistance band, or your body weight, such as during a press-up. Increase the intensity gradually with stronger resistance bands or heavier weights if you can.

See our series of factsheets and videos about exercise online at theros.org.uk/exercise or contact us to request printed copies – see our details on page 10.

Other lifestyle choices that can affect bone health

The three other main ways you can help your bone health are:

- stopping smoking
- avoiding too much alcohol
- maintaining a healthy weight

Smoking and drinking

Smoking and drinking excessive amounts of alcohol have harmful effects on bones. This is because they reduce your body's ability to absorb calcium and change how your bone-building cells work.

Stopping smoking is a very positive thing you can do for your bone health. NHS 'stop smoking' services offer lots of free support to help you quit.

For alcohol, the current UK recommendation is that both men and women should have no more than 14 units a week (spread evenly at least three days). One and a half units is a small glass (125ml) of wine or half a pint (300ml) of higher-strength beer or cider.

Maintaining a healthy weight

Being too light or too heavy isn't good for your bones. If you are underweight, you have less weight pulling down on your skeleton to keep your bones strong. Being underweight can also affect the hormones and nutrition that your bones need. Evidence suggests that people who are overweight have more ankle and limb fractures.

Your bones and osteoporosis

If your bones become weak, you may be at risk of osteoporosis and broken bones.

The word 'osteoporosis' means 'porous bone'. Bones have a thick outer shell with a strong structure inside that looks like a honeycomb. With osteoporosis, the holes in the structure get bigger and the bone becomes less dense. Eventually, the inner structure begins to break down. This leads to bones getting weaker and makes them more likely to break.

Osteoporosis is usually linked to the natural bone loss that occurs as we get older. Sometimes it is caused by other factors. As we age, we lose more bone than we gain. This means the natural process of bone renewal gets out of balance. As a result, the amount of bone tissue we have reduces. This is often

described as 'bone thinning'. It doesn't mean that your bones look any different from the outside and you won't feel any different. It means the outer shell becomes thinner and the inner structure becomes more porous. This can lead to bones losing strength and breaking more easily.

This bone loss starts sometime before we reach the age of 45, but usually we do not lose enough bone to make a difference to our bone strength until we are older. For women, bone loss starts to increase after the menopause because oestrogen levels decrease. Men lose bone more gradually than women.

Fractures (broken bones)

You will not notice that the inner structures of your bones have become weaker, however, weaker bones can break (fracture) more easily. This can affect your life by reducing your mobility and causing pain. Any bone can break when enough force is applied to it, but weaker bones break more easily - for example, after a simple fall. If you have osteoporosis or weaker bones, this doesn't mean you will definitely have fractures or you are at imminent risk of breaking a bone. It just means that your overall chance of breaking a bone is higher.

When bones break because of osteoporosis, they are sometimes called osteoporotic fractures or fragility fractures.

If bones become very weak, spinal fractures (also called 'vertebral fractures') can occur during normal activities. These are different from other fractures because the bones don't snap, but they can squash or compress down on themselves. This can result in you getting shorter and developing a curved spine (often called 'kyphosis'). Some people experience long-term pain, especially if they have had several fractures. Spinal fractures due to osteoporosis don't cause damage to the spinal cord or paralysis, unlike those caused by a severe injury. In fact, sometimes they are painless. **See our fact sheet 'Getting help with pain and other symptoms caused by spinal fractures' for more information.**

A broken hip is a common consequence of a fall, especially in older people and those with osteoporosis. It can lead to long-term health issues, such as not being able to work/hobbies and being less able to care for yourself.

What causes bones to get weaker?

There are many things that can increase the risk of your bones getting weaker and potentially lead to osteoporosis and broken bones. These are often called 'risk factors'. Your risk of osteoporosis and broken bones increases as you get older, and women are more likely to get osteoporosis than men. Broken bones are more common the older you get, with a broken hip most likely in your late 70s or older. The genes you have inherited from your parents also play a part, but there are no specific tests that can assess how your genes might affect your bone health.

Sometimes other medical conditions can cause osteoporosis. These include early menopause before the age of 45, rheumatoid arthritis and anorexia nervosa. Medications can also cause osteoporosis and broken bones. For example, steroids or 'glucocorticoids' such as prednisolone, and some drugs used to treat breast or prostate cancer. **See our booklet 'Getting your bones checked to keep them healthy' for more information about risk factors.**

Can a healthy lifestyle make a difference to osteoporosis?

A healthy lifestyle is vital to reduce your risk of osteoporosis and broken bones. But it is not guaranteed to prevent osteoporosis. If your bones have already lost a lot of strength or you have a higher fracture risk, you may need a drug treatment (medication) to lower your chance of breaking a bone. Healthy living

can't replace the effects of a drug treatment, but positive lifestyle changes will make some difference and help to improve your bone strength. And it's never too late to start. **See out booklet 'About osteoporosis and weaker bones' for more information on osteoporosis drug treatments.**

Calcium, vitamin D and osteoporosis

You don't need extra calcium and vitamin D if you have osteoporosis, but it is important that you get the minimum recommended amounts. If you are taking an osteoporosis drug treatment, aim for 700–1000mg of calcium daily to make sure you get enough. Try to get this amount from healthy foods. Your doctor may suggest that you also take a supplement to be certain you get what you need.

People with osteoporosis are often recommended to take a vitamin D supplement of 10–20 micrograms each day. You should especially consider this if you are older and taking drug treatments to strengthen your bones. This is to make sure you are getting what you need.

Exercise and osteoporosis

Exercise for strong bones

Exercise is good for bone strength - even if you have osteoporosis - and it very rarely causes injuries or broken bones.

If you have osteoporosis and are well enough, aim to include some moderate-impact exercise such as jogging or low-level jumping. Whatever your age, gradually build up your level of exercise. This helps your bones to adapt and grow stronger without being at increased risk of breaking.

If you are older or less able, or if you have spinal fractures, choose lower-impact forms of exercise like walking. You can still benefit from muscle-strengthening exercise using weights or resistance bands and you can gradually increase the weight or resistance over time. Get advice about proper techniques from a fitness trainer or physiotherapist if you need it.

Exercise to keep steady

Falling over is a major cause of broken bones (especially broken hips) in people with osteoporosis. So it's vital to do exercises that help to maintain or improve your balance. Exercises like swimming, gardening, golf, and Tai Chi may help you to maintain your muscle strength, balance, and coordination, and reduce your risk of falling.

If you struggle with your balance, begin with some balance-improving exercises before increasing your activity levels in other ways. Once you're more confident with your balance, start with simple forms of activity such as brisk walking.

Your bones, your future

It's never too late to start caring for your bones by making positive lifestyle changes, including eating a healthier diet and starting bone-strengthening exercise. We are here to help you understand your bone health and keep living an active, fulfilling life.

More ways to get support

If you have any further questions or would like to speak to one of our specialist nurses, here's how to get in touch:

- Contact the specialist nurses on our Helpline. Call Freephone **0808 800 0035** (Monday –Friday, 9am -12:30pm and 1:30pm -5pm), email nurses@theros.org.uk or send a letter to us at **Royal Osteoporosis Society, St. James House, Bath BA2 3BH**. Our specialist nurses are here to give you the information and support you need through a confidential service. You don't need to have a medical problem – you are welcome to ask any question you may have.
- Find expert information that will help you understand more about bone health on our website (theros.org.uk) or order more free printed information by calling **01761 471771**.
- Find your local support group and view the online programme at theros.org.uk/support-groups or email volunteerengagement@theros.org.uk or call **01761 473113**. We have a network of support groups across the UK, which are run by volunteers. Our groups provide support by organising regular meetings - both face-to-face and online. Regardless of where you live, you can join an online meeting from anywhere in the UK.
- Become a member of the ROS. You'll have access to guidance and support from bone health experts - and all the latest information on osteoporosis, to ensure you have everything you need to build strong healthy bones for life. Join today at theros.org.uk/membership or call **01761 473287**.
- Watch our #BoneMatters series of online events. We have a very popular series of online information events, where you can hear leading health experts discussing everything from drug treatments to nutrition and exercising safely. For details of upcoming sessions, and to watch past events, visit theros.org.uk/bone-matters

About the Royal Osteoporosis Society

We're the UK's largest national charity dedicated to improving bone health and beating osteoporosis. And we're here for people like you, to equip you with practical information and support to take action on your own bone health.

Working with healthcare professionals and policymakers, we also influence and shape policy and practice at every level. We drive the research and development of new treatments, to beat osteoporosis together.

As an independent charity, we don't receive any government funding, so we can only continue to provide our services through the generosity of our supporters. If you'd like to donate, visit theros.org.uk/donate or call **01761 473287**.

To find out more about volunteering, visit theros.org.uk/volunteers or call **01761 473113**.

Together, we can build a future without osteoporosis.