

MACMILLAN
CANCER SUPPORT

BONE HEALTH



About this booklet

This booklet is about bone health. It is for people who are having, or have had, cancer treatments that may affect their bones.

It explains factors that affect bone health. It also tells you about things you can do to help maintain healthy bones, and drug treatments that can improve bone strength.

We hope it helps you deal with some of the questions or feelings you may have. We cannot give advice about the best treatment for you. You should talk to your doctor, who knows your medical history.

This booklet does not have information about cancer in the bone. We have separate information about cancer that starts in the bones (primary bone cancer) and cancer that has spread to the bones (secondary bone cancer).

How to use this booklet

This booklet is split into sections to help you find what you need. You do not have to read it from start to finish. You can use the contents list on page 3 to help you.

It is fine to skip parts of the booklet. You can always come back to them when you feel ready. On pages 60 to 64, there are details of other organisations that can help. There is also space to write down questions and notes for your doctor or nurse (see page 65).

If you find this booklet helpful, you could pass it on to your family and friends. They may also want information to help them support you.

Quotes

In this booklet, we have included quotes from people who are having, or have had, cancer treatments that may affect their bones. These are from people who have chosen to share their story with us. To share your experience, visit macmillan.org.uk/shareyourstory

For more information

If you have more questions or would like to talk to someone, call the Macmillan Support Line free on **0808 808 00 00**, 7 days a week, 8am to 8pm, or visit macmillan.org.uk

If you would prefer to speak to us in another language, interpreters are available. Please tell us, in English, the language you want to use.

If you are deaf or hard of hearing, call us using NGT (Text Relay) on **18001 0808 808 00 00**, or use the NGT Lite app.

We have some information in different languages and formats, including audio, eBooks, easy read, Braille, large print and translations. To order these, visit macmillan.org.uk/otherformats or call **0808 808 00 00**.

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WHAT AFFECTS BONE HEALTH?

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What do bones do?

Bones are made from a protein called collagen. They are strengthened by calcium and other minerals. This makes bones strong and rigid but not heavy. Your bones:

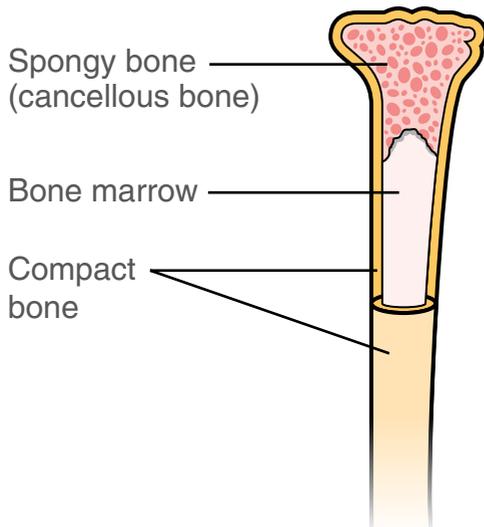
- provide support and protection for your internal organs – for example, the ribs protect the heart and lungs
- work with your muscles so that your body can move
- store calcium and other minerals
- contain bone marrow, which is where blood cells are made.

Types of bone

There are two types of bone:

- Compact bone is the hard, rigid shell on the outside of the bones.
- Cancellous bone is inside the compact bone. It is arranged like a honeycomb or mesh with lots of spaces. It is sometimes called spongy bone because the spaces look a bit like a sponge.

The structure of a long bone



Bone growth and repair

Bones are living tissue. They have a blood and nerve supply to keep them healthy. Bones are constantly being renewed. This helps maintain their strength and shape.

Inside the bones, there are two types of bone cell:

- Osteoclasts which break down and remove old bone.
- Osteoblasts which build new bone.

Our bones stop growing longer by the time we are about 18 years old. But bones continue to increase in thickness (density) until our late-20s.

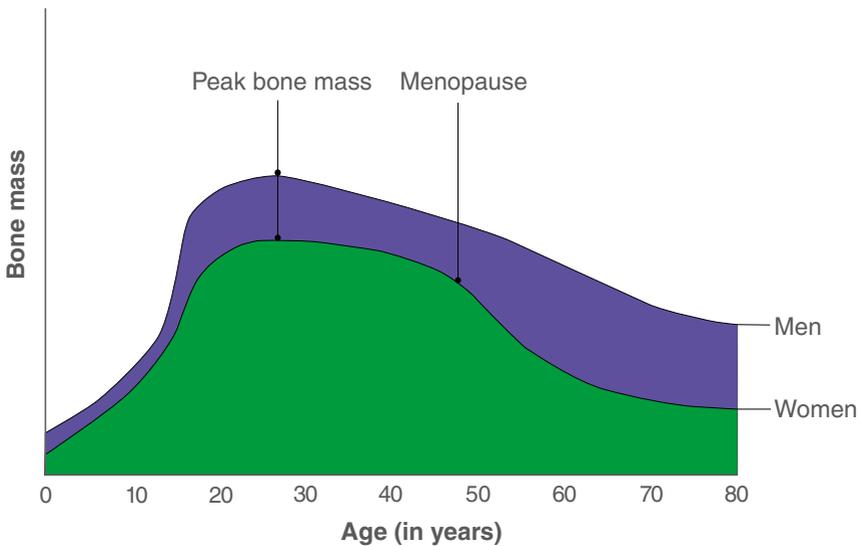
Bone density stays about the same into our mid-30s. After this, bone density slowly decreases. This is because osteoclasts remove more bone than osteoblasts make.

Bone thinning

As we get older, our bone density slowly decreases. This is called bone loss or bone thinning.

The hard, outer shell of the bones (compact bone) gets thinner and the holes in cancellous (spongy) bone get larger. In time, bones become more fragile. This is why bone fractures are more common after the age of 65.

Bone mass at different ages

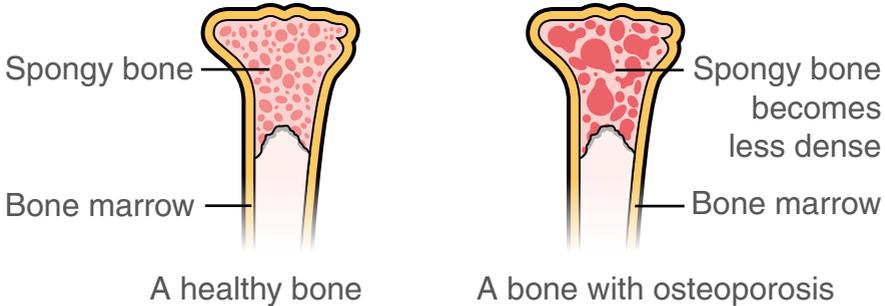


Osteoporosis

Some people develop osteoporosis as they get older.

Osteoporosis means bone density is much lower than normal. This means the bones are weaker and more likely to break (fracture). The most common places to have fractures are the wrists, hips and spine.

Osteoporosis does not cause symptoms until a weakened bone breaks (fractures). But your doctor can do tests to assess your risk of osteoporosis and to check the strength of your bones (see page 38). The results of these tests help doctors decide if you need treatment to lower your risk of osteoporosis and fractures (see pages 42 to 51). Your doctor can give you advice on things that you can do to help lower your risk (see pages 26 to 35).



Factors that affect bone health

Many factors can affect bone health and your risk of osteoporosis. There are some factors you cannot do anything about, such as your age or family history. But there are also factors you can control. This includes your diet and how much physical activity you do.

Age

Your bones are strongest when you are in your 20s. Bone loss begins in your 30s. The risk of a fracture because of bone loss increases from the age of 50. Fractures are most common over the age of 65 in women and over the age of 75 in men.

Low hormone levels

Low levels of the hormones oestrogen or testosterone can affect bone density. Oestrogen levels naturally drop after the age of 50. Testosterone levels can also drop after the age of 50, but not as much as oestrogen. Some cancer treatments can lower oestrogen or testosterone levels and increase risk of bone loss (see page 19 to 23). If these hormone levels are low, your doctors can talk to you about treatments to protect your bones.

Gender

Anyone can develop osteoporosis, but it is more common in women. Before the menopause, the hormone oestrogen keeps women's bones healthy. But after the menopause, oestrogen levels decrease and women lose bone density more quickly.

Physical activity

Being physically active when you are a young adult helps make your bones stronger and denser. Doing regular exercise throughout your life helps to keep your bones strong. Weight bearing exercises such as walking or climbing stairs are also good for bone strength.

Diet

Eating a balanced diet helps keep bones healthy. It is important to get the recommended amounts of protein, calcium and vitamin D, to help build bones and keep them strong (see pages 26 to 35).

You can ask your doctor, nurse or a dietician what foods you should try to include in your diet. We have more information about what makes up a healthy balanced diet in our booklet **Heathy eating and cancer** (see page 56).

Family history of osteoporosis

If one, or both, of your parents have had osteoporosis, you are more at risk of developing it. If you are worried about this, talk to your doctor.

Fragility fractures

If you break a bone after falling from a standing height or less, this is called a fragility fracture. After the age of 50, it can be a sign that you have weaker bones and are more at risk of having a fracture in the future.

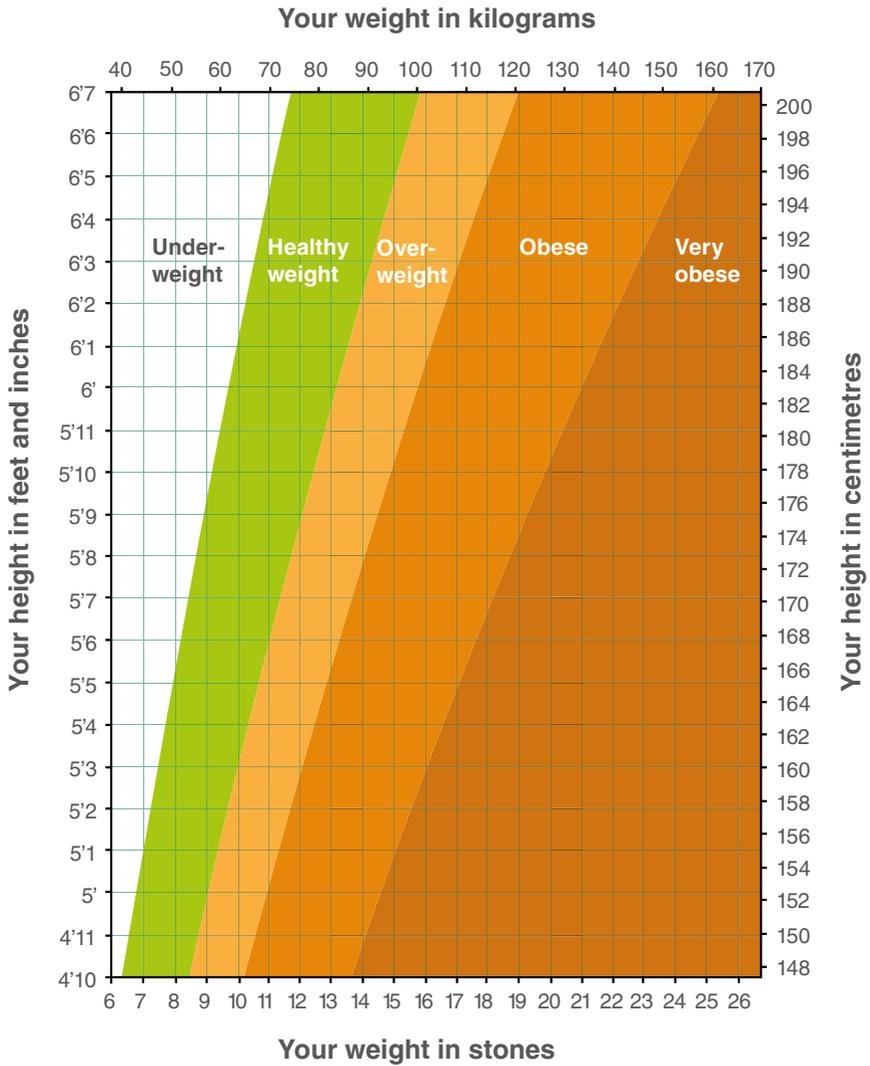


Weight

People who have a low body weight are more at risk of fractures than people who are a healthy weight.

Body mass index (BMI) is a measure of healthy weight. Your BMI is based on your height and weight. Guidelines recommend that for bone health and general health, your BMI should be between 19 and 25kg/m². Your GP or practice nurse can work out your BMI for you. Or you can use the chart on the opposite page to find your BMI. Find the line that matches your weight and follow it until it crosses the line that matches your height. Speak to your GP or nurse if you are above or below the healthy range.

BMI chart



Source: Department of Health

A small amount of exercise every day is so important to me. Small cycle rides, walks, picnics – outdoor space and nature. Most weeks I go swimming with a small group of friends. This is fun and a regular connection with friends to look forward to.

Carol

Smoking

Research has shown that smoking reduces bone density, weakens bones and increases the risk of osteoporosis. The NHS website has more information about giving up smoking. Visit [nhs.uk/live-well/quit-smoking](https://www.nhs.uk/live-well/quit-smoking)

Alcohol

Drinking alcohol in moderation is not harmful to bone health. But if you often drink more than the government guidelines advise, your bone density may be reduced. This can increase your risk of osteoporosis.

It is best to keep to the guidelines of not drinking more than 14 units of alcohol a week. If you regularly drink as much as 14 units per week, it is best to spread your drinking evenly over 3 or more days. You should also try to have several alcohol-free days a week.

Drinking alcohol also causes a higher risk of falls, which are a common cause of fractures.

Medical conditions

Some medical conditions have been linked to lower bone density. These include:

- diabetes (type 1 and type 2)
- asthma
- inflammatory rheumatic diseases, such as rheumatoid arthritis and lupus (SLE)
- inflammatory bowel diseases, such as Crohn's disease and ulcerative colitis
- long-term liver or kidney disease
- thyroid diseases, for example an overactive thyroid gland
- eating disorders, such as anorexia.

If you have difficulty walking or a condition that makes you less mobile, this may lead to a lower bone density.

Medicines

Some drugs may increase your risk of fractures and of developing osteoporosis. These include the following:

- Steroids – these are given to treat illnesses such as rheumatoid arthritis and asthma. They may also be used with some cancer treatments.
- Some anti-epileptic drugs – these are used to prevent fits (seizures) if you have epilepsy.
- Some types of cancer treatments (see pages 19 to 23).

Cancer treatments and bone health

Some cancer treatments can reduce the levels of the hormones oestrogen or testosterone in the body. This can cause bone loss. The treatments that can cause this include some:

- hormonal therapies
- chemotherapy
- surgery
- radiotherapy treatments
- steroid therapy
- targeted therapies.

If a treatment or a drug is likely to affect your bone health, your doctor will talk to you about this. They may give you treatments to protect you from bone thinning (osteoporosis) – see pages 42 to 51.

Hormonal therapy for breast cancer

The hormone oestrogen can encourage some breast cancers to grow. Some drugs used to treat breast cancer work by reducing oestrogen levels. They include:

- anastrozole (Arimidex®)
- exemestane Aromasin®)
- letrozole (Femara®)
- goserelin (Zoladex®).

Taking these drugs for several months or more can cause bone loss and increase the risk of fractures.

Not all hormonal therapies for breast cancer cause bone loss. The drug tamoxifen slows down bone loss in women who take it after the menopause. We have more information about these hormonal therapies on our website. Visit macmillan.org.uk

Hormonal therapy for prostate cancer

The hormone testosterone stimulates most prostate cancers to grow. Some drugs used to treat prostate cancer work by reducing testosterone levels. A side effect of these drugs is bone loss. These drugs include:

- goserelin (Zoladex®)
- leuprorelin (Prostap®)
- triptorelin (Decapeptyl® or Gonapeptyl®).

Chemotherapy drugs

Some chemotherapy drugs affect the ovaries or testicles. This can reduce the levels of oestrogen or testosterone in the body.

The effect maybe temporary or permanent. Having lower than normal levels of these hormones before the age of 50 can lead to bone loss. Your cancer doctor or nurse can tell you if your chemotherapy treatment is likely to affect your hormone levels.

Surgery

Hormone levels are reduced after:

- an operation to remove both testicles
- an operation to remove both ovaries before the menopause.

The reduced hormone levels can lead to bone loss.

Radiotherapy

Radiotherapy to the ovaries

Radiotherapy to the ovaries before menopause reduces oestrogen levels. This increases the risk of bone thinning (osteoporosis). We have more information in our booklet **Understanding radiotherapy** (see page 56).

Pelvic insufficiency fractures (PIFs)

Radiotherapy can sometimes cause changes to the bone in the area being treated. It is most likely to happen when radiotherapy is given to the pelvic area. This treatment may be used to treat cancer of the womb, cervix, prostate, bladder, anus or rectum.

The changes to the bone can mean the pelvis cannot cope with the normal stresses put on it. This may increase the risk of small cracks or fractures. Doctors call these pelvic insufficiency fractures (PIFs). PIFs are most likely to happen in the first 2 years after pelvic radiotherapy.

PIFs do not always cause noticeable symptoms. They may show up on a scan that is done for another reason. Symptoms can range from a mild ache to severe pain. There may be pain in the lower back or pelvis when moving. This can make walking difficult. Pain is not usually a problem when resting or sleeping.

You are more likely to have a PIF after pelvic radiotherapy if you are over the age of 50 or are post-menopausal, and if you have a higher risk of osteoporosis. Looking after your bones can help to reduce your risk (see pages 26 to 35).

If you have pain in a bone, always tell your doctor. They can arrange tests to find out what is causing it and give you treatment if needed.

Steroid therapy

Some people have steroids, such as prednisolone and dexamethasone, as part of their cancer treatment. Having high doses of steroids or taking steroids for 3 months or more can cause bone loss and increase the risk of fractures.

Targeted therapies

Targeted therapy drugs target something in or around a cancer cell that is helping it grow and survive. Some targeted therapy drugs may affect bone health. Your cancer doctor or specialist nurse can tell you if your treatment may affect your bone health. We have more information about targeted therapies on our website. Visit [macmillan.org.uk](https://www.macmillan.org.uk)

The steroid treatment was a double dose and caused me to lose over 1 stone in two weeks. I completed the month's treatment and went for the routine blood test and zoledronate infusion to maintain bone strength.

John

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Improving your bone health

There are changes you can make to your lifestyle to improve or maintain your bone health and reduce your risk of osteoporosis. These changes are also good for your general health.

Eat well

Eat a healthy and balanced diet. Try to include foods that contain calcium and vitamin D. This will help keep your bones strong and healthy.

A balanced diet includes:

- fruit and vegetables
- protein, such as meat, fish, soya beans and lentils
- starchy foods (carbohydrates), such as rice, bread, pasta, potatoes and whole grains
- milk and dairy products, such as yoghurt and cheese or non-dairy alternatives
- only a small amount of foods that are high in fat, salt and sugar.

We have more information about healthy eating and cancer in our booklet **Healthy eating and cancer** (see page 56).

Calcium

Public health bodies in the UK recommend most adults should have 700mg of calcium a day. If you have osteoporosis, your doctor may advise that you have 1,000mg a day.

Foods that have lots of calcium in them include:

- dairy products (these contain the highest amounts of calcium)
- tinned oily fish where you eat the bones, such as sardines
- leafy green vegetables, such as broccoli and curly kale
- nuts
- soya beans, tofu, kidney beans and baked beans
- dried fruit, such as figs, apricots and raisins.

If you have a dairy-free diet, make sure you eat non-dairy foods that contain calcium. You may also choose to have products with added calcium. These include some types of fortified non-dairy milks and orange juice. Always shake the carton well before use. This makes sure the calcium is mixed through the drink.

Some foods and drinks can upset the calcium balance in the body.

Avoid large amounts of:

- caffeine
- red meat
- salt
- fizzy drinks that contain phosphates, such as cola.

The Royal Osteoporosis Society has more information about the amount of calcium in specific foods. Visit **[theros.org.uk](https://www.theros.org.uk)**

Get enough vitamin D

Vitamin D helps your body absorb calcium. It is important to get enough vitamin D to maintain healthy bones and muscles.

Sunlight is the best natural source of vitamin D. In the UK, exposing your skin to sunlight every day between 11am and 3pm, from May until September increases vitamin D levels. Guidelines recommend that adults get 10 minutes of sun on bare skin (without sun cream) once or twice a day, depending on their skin type. But take care not to burn, especially during strong sunshine. On cloudy days, it will take longer than 10 minutes to get enough vitamin D.

Your cancer doctor, nurse or GP can advise you on whether this is safe for you to do. Some people may need to take special care when out in the sun.

We only get a small amount of vitamin D from the food we eat. But it is important to include foods in your diet that have a lot of vitamin D in them, such as:

- oily fish
- red meat
- liver
- egg yolks.

Some breakfast cereals, yoghurts or margarines have vitamin D added to them. You can check the labels to find out.

During the autumn and winter when sunlight levels are low, it is difficult to get enough vitamin D. Guidelines suggest that people take a daily supplement of 10mcg (800 IU) of vitamin D.

The government advises that people who are more likely to have low levels of vitamin D consider taking a vitamin D supplement all year round. This includes people who:

- cover their skin when outside
- have dark skin, from African, African-Caribbean and South Asian backgrounds
- do not spend regular time outdoors every day, such as people who are housebound or in a care home.

You can buy vitamin D supplements from supermarkets, health food stores and pharmacies. If you are not sure what to buy, ask your GP or pharmacist for advice.

If you are having cancer treatment that increases the risk of osteoporosis, your GP or hospital doctor may prescribe vitamin D and calcium supplements for you.



Keep to alcohol guidelines

If you drink alcohol, keep to the recommended guidelines. Current drinking guidelines recommend that men and women drink no more than 2 units of alcohol a day or 14 units a week. It is also recommended that you have a couple of alcohol-free days each week.

One drink is not the same as 1 unit of alcohol. As a guide:

- a single measure (25ml) of spirits contains 1 unit
- half a pint (250ml) of standard strength (3% to 4%) beer, lager or cider contains 1 unit
- half a pint of stronger (5%) beer, lager or cider contains 1.5 units
- a standard glass (175ml) of wine (13%) contains 2 units
- a large glass (250ml) of wine (13%) contains 3 units.

Do not smoke

If you smoke, giving up will be good for your bones and your general health. The NHS website offers free information about giving up smoking. Visit [nhs.uk/live-well/quit-smoking](https://www.nhs.uk/live-well/quit-smoking)

Be physically active

Physical activity and strength training makes bones stronger. It can also improve your co-ordination and balance, which makes you less likely to fall. Falls are a common cause of fractures, especially as you get older.

If you have not exercised much before, you need to start slowly. Talk to your doctor or nurse before starting any exercise programme. This is especially important if you have, or are at risk of, osteoporosis. Your GP can tell you if there are any exercises you should not do. They may be able to tell you if there are any suitable exercise schemes in your area.

I joined an Argentine tango class. It hurt, but I was determined. Within 10 weeks, the pain in my leg began to ease. I found I had greater range of movement in my arm and my physical confidence was returning.

David

Exercise

There are lots of different ways to exercise. It is best to find something you enjoy. This will make it easier for you to keep doing it. You need to exercise regularly to get the most benefit.

It is best to do the following types of exercise:

- Activities that raise the heart rate for 30 minutes, five times a week. The 30 minutes could be made up of three, 10-minute periods of activity. This type of aerobic activity strengthens the heart and lungs.
- Physical activity that improves muscle strength on at least two days each week.
- Exercises to improve balance and co-ordination on at least two days each week.

When exercising, do not push yourself too hard. If you are not used to exercising, start slowly and increase the amount you do gradually. At the end of an activity, you should feel warm and slightly out of breath, but not exhausted. With practice, you will soon find you are able to do more.

Weight-bearing exercise

Exercise that is weight-bearing is particularly good for your bone health. Weight-bearing exercises include walking, jogging, skipping, climbing stairs, dancing and hiking. Swimming and cycling are good for your heart and health but are not weight bearing. Weight-bearing exercises can be high-impact or low-impact.

High-impact exercises include:

- jogging
- hiking
- skipping
- racket sports like tennis
- some types of dancing.

Low-impact exercises include:

- walking (outside or on a treadmill machine)
- using an elliptical training machine or cross-training machine
- low-impact aerobics
- stair-step machines.

Check with your doctor if you are not sure whether it is safe for you to do high-impact exercises. If you have a high risk of fractures, or have had a fracture in the past, you may be advised to only do low-impact exercises.

Strength-building exercises

These exercises make your muscles work against some form of resistance. They strengthen muscles, bones and joints. They may also improve your balance. You can do them with:

- hand weights
- resistance exercise machines
- exercise (resistance) bands.

Exercises to improve balance and flexibility

Having flexible joints helps you stay supple and prevents injuries and strains. Simple stretching exercises are a good way to start. It is best to do these stretches as part of your daily routine. They will only take you a few minutes.

Exercises that are good for flexibility and balance include:

- yoga
- tai chi
- pilates
- body balance
- qi gong.

These can also help you relax and reduce stress. Balance exercises help increase strength as well as balance.

If you have osteoporosis, or have had a fracture in the past, avoid sudden movements or exercises where you bend forward and twist your waist. These movements can increase your risk of fractures in the spine.

Next steps

We have more information in our booklet **Physical activity and cancer** (see page 56). You can also get more information about physical activity and bone health from the Royal Osteoporosis Society (see page 60). The infographic opposite shows the type and amount of physical activity recommended for adults.

Physical activity guide for adults

	Be active	Build strength	Improve balance
	Keep your heart and mind healthy	Strengthen muscles, bones and joints	Reduce your risk of falling
How often?	150 minutes of moderate activity a week or 75 minutes of vigorous activity a week	2 days a week	2 days a week
	Walk  Run  Gardening  Sport  Swim  Stairs 	Gym  Aerobics  Carry bags 	Dance  Tai chi  Bowling 
	Sit less TV  Sofa  Computer 		
	Break up long periods of sitting down to help keep your muscles, bones and joints strong.		



TESTS AND TREATMENTS

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Tests to check bone health

If you think you are at risk of weak bones, talk to your GP or hospital doctor. They can do tests to check your bone health.

Fracture risk assessment tools

There are two online tools that doctors in the UK can use to see whether you are at risk of a fragility fracture (see page 12).

These are called FRAX® and QFracture®. Your doctor may use one of these tools if they are concerned about your bone health, or if you have risk factors for bone loss.

When your doctor uses the online tool, they will ask about your:

- height
- weight
- medical history
- possible risk factors for osteoporosis or fragility fractures.

The online tool then works out your risk of developing a fracture. The results will show whether you have a low, intermediate or high risk of a fracture.

Dual energy x-ray absorptiometry scan (DXA or DEXA scan)

This scan may also be called a bone mineral density scan (BMD scan). It checks the density of your bones. If your bone density is low, you have a higher risk of a bone fracture.

Who has a DXA scan?

Your GP or hospital doctor may arrange for you to have a DXA scan if:

- a fracture risk assessment tool shows your risk of fracture is intermediate (between low risk and high risk)
- you are under the age of 40 and have a significant risk of fracture – for example, you have had more than one fragility fracture, or have recently taken high doses of steroids (see page 23)
- you have had an early menopause and not had hormone replacement therapy (HRT)
- you have prostate cancer and you are going to start treatment with hormonal therapies that reduce testosterone levels
- you are taking steroids.

You may also have a DXA scan if you have early invasive breast cancer and you:

- are going to start treatment with an aromatase inhibitor
- have had an early menopause because of your treatment
- are going to have treatment to stop your ovaries working.

How a DXA scan is done

During a DXA scan, you lie on your back on a couch while a scanner moves above your body. The amount of radiation from a DXA scan is much less than from a normal x-ray.

The scan only takes a few minutes and is painless. It is important that there are no metal fastenings such as zips in the area being scanned. You may be asked to wear a hospital gown for the scan.

DXA scan results

The results of the scan will show whether you have:

- normal bone density
- low bone density (osteopenia)
- osteoporosis (see page 10).

Your DXA scan results are given as a number called a T-score. Your T-score is worked out by comparing your bone density with the bone density of an average healthy adult of your gender. Your T-score is the number of units that your bone density is above or below the average.

What your T-score means

T-score	What it means
-1 and above	Your bone density is normal.
Between -1 and -2.5	Your bone density is below normal – doctors call this osteopenia.
-2.5 and below	Your bone density is low, and your bones are at higher risk of fracture. This score suggests you have osteoporosis.

Your doctor may also talk about a Z-score. This score compares your bone density measurement with someone of the same age. If your Z score is below -2, your bone density is lower than it should be for someone of your age.

After bone health tests

If tests to check your bone health show you have low bone density or a high risk of fracture, your GP may advise you to:

- eat a healthy, balanced diet
- get enough sunshine (if this is possible) – see pages 28 to 29
- keep physically active
- take calcium and vitamin D supplements – see page 42
- increase the amount of calcium in your diet
- take a drug treatment, such as a bisphosphonate – see pages 44 to 45.

Our booklets **Healthy eating and cancer** and **Physical activity and cancer**, and our **Move more** pack have more information that you might find useful (see page 56).

Treatments to protect your bones

There are different drug treatments that can help prevent or treat bone loss and reduce the risk of fractures.

Calcium and vitamin D supplements

Your doctor may advise you to take calcium and vitamin D supplements. This may be because you:

- are not getting enough calcium or vitamin D
- are having a treatment that can increase your risk of osteoporosis.

They may do blood tests to check your calcium levels. Or they may organise a fracture risk assessment or DXA scan (see pages 38 to 41) before deciding whether you need to take supplements.

If you need supplements, your doctor may prescribe them for you. Or you can buy vitamin D supplements without a prescription.

If you are thinking about buying calcium supplements, always talk to your specialist doctor or GP. They can talk to you about whether you need to take them and what dose you should take. You may be able to get enough calcium from your diet (see pages 26 to 27).

Your doctor may measure your blood calcium levels regularly if you are having bisphosphonate treatment. If you are having bisphosphonate treatment, you may also be prescribed calcium and vitamin D supplements to take as part of the treatment.



Bisphosphonates

These drugs are widely used. They can help to:

- prevent bone loss caused by hormone therapy and other cancer treatments
- reduce the risk of fractures in people with osteoporosis
- prevent cancer spreading to the bone
- treat cancer that has spread to the bone (secondary bone cancer or bone metastases).

Bisphosphonates reduce the activity of cells that break down bone (osteoclasts). This slows down bone loss.

Bisphosphonates do not replace lost bone, but they can stop further bone loss. This helps to make the bone stronger.

There are several bisphosphonates used to treat osteoporosis.

These include:

- alendronic acid (Fosamax®)
- ibandronic acid (Bonviva®)
- risedronate sodium (Actonel®)
- zoledronic acid (Aclasta®).

Bisphosphonates used to prevent bone loss and treat osteoporosis are usually taken as tablets or capsules. You may take them daily, weekly or sometimes monthly.

You take the tablets first thing in the morning on an empty stomach. Take them with a glass of water. You need to sit or stand upright for 30 to 60 minutes after taking the tablet. This helps the drug move quickly into the stomach and reduces the risk of it staying in the throat or gullet, where it can cause irritation. It also helps stop the drug coming back up from the stomach into the gullet. This can happen when you are lying down or bending.

Some people with osteoporosis may be given bisphosphonates by a drip (infusion) into a vein (intravenously). It can usually be given in the outpatient department at the hospital.

Side effects of bisphosphonates

Possible side effects include:

- indigestion
- a sore throat or inflamed gullet (the tube that goes from the mouth to the stomach)
- pains in your muscles and joints
- flu-like symptoms, which usually settle after the first dose.

Talk to your cancer doctor or GP if you have any of these side effects.

If swallowing is painful or difficult, or if you have indigestion that is new or getting worse, tell your doctor before taking any more of this drug.

Rare side effects

Thigh bone fractures (atypical fractures)

A small number of people taking bisphosphonates have developed fractures in their thigh bone without any obvious cause. Sometimes both thigh bones are affected.

If you have any pain in your thigh, hip or groin, tell your doctor and explain that you are taking bisphosphonates. They can arrange tests to check the thigh bones for any signs of weakness or fracture.

Osteonecrosis of the jaw (ONJ)

A rare side effect of bisphosphonate treatment is osteonecrosis of the jaw (ONJ). It happens when healthy bone tissue in the jaw becomes damaged and dies. This can cause loose teeth and problems with the way the gums heal.

The risk of ONJ is very low if you are taking bisphosphonates to treat osteoporosis. If 10,000 people were treated with bisphosphonate tablets for 10 years, 1 person would get ONJ.

ONJ is more likely to happen when bisphosphonates are given to treat cancer that has spread to the bones (secondary bone cancer). This is because higher doses of bisphosphonates are used to treat secondary bone cancer.

Your doctor will advise you to see your dentist before you start bisphosphonate treatment. If you have not been to the dentist for 6 months, or if you have dentures that do not fit well, ask for a check-up. It is important to look after your teeth and gums during treatment with bisphosphonates. You should have regular check-ups with your dentist.

It is important to avoid having dental treatment that could affect your jawbone during bisphosphonate treatment. This includes having dental implants put in or having a tooth or root removed, except in an emergency. But it is fine to have fillings, gum treatments or a scale and polish.

If you need dental treatment that could affect the jaw while you are taking bisphosphonates, tell your doctor before you have the dental treatment.

Denosumab (Prolia®)

Your doctor may give you denosumab if you have to stop taking bisphosphonates because of problems such as indigestion, a sore throat or inflamed gullet.

You have denosumab once every 6 months as an injection just under the skin (a subcutaneous injection). If you have denosumab, your doctor may advise you to take calcium and vitamin D supplements.

Denosumab can cause some side effects. These include:

- skin, urine and chest infections
- constipation
- pain in the arms or legs
- a rash.

Rarely, denosumab can also cause osteonecrosis of the jaw (ONJ) or atypical thigh bone fractures.

Raloxifene (Evista®)

Raloxifene is used to treat osteoporosis in women who have been through the menopause. It is only used for women who cannot take bisphosphonates. You take raloxifene daily as a tablet.

The drug has some of the helpful effects of oestrogen. It can reduce the breakdown of bone and the risk of fractures.

But women who are taking tamoxifen should not take raloxifene. This is because raloxifene can make tamoxifen less effective.

I have low bone density (osteopenia) and have not yet developed full-blown osteoporosis. My consultant recommends weight-bearing exercise, like walking, running gardening, dancing, and Zumba.

Sheri

Hormone replacement therapy (HRT)

There are different types of hormone replacement therapy for both men and women. They can be given as tablets, injections, gels or skin patches.

Oestrogen replacement

Oestrogen helps protect women's bones. If your oestrogen levels are low because of cancer treatment, your doctor may give you HRT to replace the oestrogen. This can help to protect bone health and reduce menopausal symptoms.

HRT may contain oestrogen and progesterone. This is called combined HRT. Or it may contain oestrogen only. It is most commonly given as tablets or skin patches (transdermal patches).

HRT can have benefits for bone health. But there are also possible side effects or risks from taking HRT. The risks and benefits of HRT depend on:

- the type of HRT (combined or oestrogen only)
- whether HRT is taken as tablets or skin patches
- your age
- your general health
- whether you have a family history of blood clots
- the type of cancer you have had
- your risk of cancer of the ovary and breast.

HRT is not suitable for everyone. Your doctor will tell you if it is suitable for you. If you are thinking about having HRT, it is important to discuss the possible benefits and risks with your doctor. This will help you decide if HRT is right for you.

Testosterone replacement

If you have a low level of testosterone because of cancer treatment, you can have testosterone replacement to get back to a normal level. This helps increase bone density.

If you have had prostate cancer, testosterone therapy may not be suitable for you. Your cancer doctor can talk to you about this.

Treatment with parathyroid hormone (PTH)

The parathyroid glands make parathyroid hormone (PTH). These glands are attached to the thyroid gland in the front of the neck. PTH helps the body absorb calcium and stimulates the body to make bone.

A type of PTH called teriparatide (Forsteo®) is made as a treatment in a laboratory. You inject it just under the skin (a subcutaneous injection). A nurse can teach you how to do this yourself. You have the injection every day for up to 24 months (2 years).

People who have broken bones because of severe osteoporosis may be given teriparatide. It cannot be given to people with cancer in the bone. It is also not suitable for people who have had radiotherapy to an area of bone.

Specialist referral

If your GP or hospital doctor thinks you need specialist advice for osteoporosis, they may refer you to a specialist hospital team. These teams may include doctors, nurses and physiotherapists who work closely with occupational therapists and pain specialists.



Share your experience

If cancer treatments have affected your bone health, you may find it helpful to talk about it with other people. Sharing your thoughts and feelings with others can help them too. Hearing about how you have coped and what you have done to manage your bone health could help someone in a similar situation.

There are also opportunities to influence future healthcare by sharing your experiences. You could do this by:

- joining a patient group or online forum
- volunteering with a cancer charity
- taking part in research
- telling NHS staff what you think about the care you received, or the care you would like to have received.

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About our information

We provide expert, up-to-date information about cancer.
And all our information is free for everyone.

Order what you need

You may want to order more booklets or leaflets like this one.
Visit be.macmillan.org.uk or call us on **0808 808 00 00**.

We have booklets about different cancer types, treatments and side effects. We also have information about work, financial issues, diet, life after cancer treatment and information for carers, family and friends.

Online information

All our information is also available online at macmillan.org.uk/information-and-support You can also find videos featuring stories from people affected by cancer, and information from health and social care professionals.

Other formats

We also provide information in different languages and formats, including:

- audiobooks
- eBooks
- Braille
- large print
- British Sign Language
- translations.
- easy read booklets

Find out more at macmillan.org.uk/otherformats

If you would like us to produce information in a different format for you, email us at cancerinformationteam@macmillan.org.uk or call us on **0808 808 00 00**.

Other ways we can help you

At Macmillan, we know how a cancer diagnosis can affect everything, and we are here to support you.

Talk to us

If you or someone you know is affected by cancer, talking about how you feel and sharing your concerns can really help.

Macmillan Support Line

Our free, confidential phone line is open 7 days a week, 8am to 8pm. Our cancer support specialists can:

- help with any medical questions you have about cancer or your treatment
- help you access benefits and give you financial guidance
- be there to listen if you need someone to talk to
- tell you about services that can help you in your area.

Call us on **0808 808 00 00** or email us via our website, **macmillan.org.uk/talktous**

Information centres

Our information and support centres are based in hospitals, libraries and mobile centres. There, you can speak with someone face to face. Visit one to get the information you need, or if you would like a private chat, most centres have a room where you can speak with someone alone and in confidence.

Find your nearest centre at **macmillan.org.uk/informationcentres** or call us on **0808 808 00 00**.

Talk to others

No one knows more about the impact cancer can have on your life than those who have been through it themselves. That is why we help to bring people together in their communities and online.

Support groups

Whether you are someone living with cancer or a carer, we can help you find support in your local area, so you can speak face to face with people who understand. Find out about support groups in your area by calling us or by visiting macmillan.org.uk/selfhelpandsupport

Online Community

Thousands of people use our Online Community to make friends, blog about their experiences and join groups to meet other people going through the same things. You can access it any time of day or night. Share your experiences, ask questions, or just read through people's posts at macmillan.org.uk/community

The Macmillan healthcare team

Our nurses, doctors and other health and social care professionals give expert care and support to individuals and their families. Call us or ask your GP, consultant, district nurse or hospital ward sister if there are any Macmillan professionals near you.

Help with money worries

Having cancer can bring extra costs such as hospital parking, travel fares and higher heating bills. If you have been affected in this way, we can help.

Financial guidance

Our financial team can give you guidance on mortgages, pensions, insurance, borrowing and savings.

Help accessing benefits

Our benefits advisers can offer advice and information on benefits, tax credits, grants and loans. They can help you work out what financial help you could be entitled to. They can also help you complete your forms and apply for benefits.

Macmillan Grants

Macmillan offers one-off payments to people with cancer. A grant can be for anything from heating bills or extra clothing to a much-needed break.

Call us on **0808 808 00 00** to speak to a financial guide or benefits adviser, or to find out more about Macmillan Grants.

We can also tell you about benefits advisers in your area. Visit **[macmillan.org.uk/financialsupport](https://www.macmillan.org.uk/financialsupport)** to find out more about how we can help you with your finances.

Help with work and cancer

Whether you are an employee, a carer, an employer or are self-employed, we can provide support and information to help you manage cancer at work. Visit **[macmillan.org.uk/work](https://www.macmillan.org.uk/work)**

Work support

Our dedicated team of work support advisers can help you understand your rights at work. Call us on **0808 808 00 00** to speak to a work support adviser (Monday to Friday, 8am to 6pm).

Other useful organisations

There are lots of other organisations that can give you information or support.

Bone health support organisations

Royal Osteoporosis Society

Helpline **0808 800 0035**

(Mon to Fri, 9am to 1pm, and then 2pm to 4pm)

www.theros.org.uk

ROS is a UK-wide organisation dedicated to finding a cure for osteoporosis and improving the lives of everyone affected by it. They have a helpline staffed by specialist nurses, and information resources.

General cancer support organisations

Breast Cancer Now

Helpline **0808 800 6000**

(Mon to Fri, 9am to 4pm and Sat, 9am to 1pm)

www.breastcancernow.org

Provides information, practical help and emotional support for anyone affected by breast cancer. Experienced breast care nurses and trained staff who have personal or work-related experience of breast cancer run the helpline.

Cancer Black Care

Tel **020 8961 4151**

www.cancerblackcare.org.uk

Offers UK-wide information and support for people from Black and ethnic minority communities who have cancer. Also supports their friends, carers and families.

Cancer Focus Northern Ireland

Helpline **0800 783 3339** (Mon to Fri, 9am to 1pm)

Email nurseline@cancerfocusni.org

www.cancerfocusni.org

Offers a variety of services to people affected by cancer in Northern Ireland.

Cancer Research UK

Helpline **0808 800 4040** (Mon to Fri, 9am to 5pm)

www.cancerresearchuk.org

A UK-wide organisation that has patient information on all types of cancer. Also has a clinical trials database.

Cancer Support Scotland

Tel **0800 652 4531** (Mon to Fri, 9am to 5pm)

Email info@cancersupportscotland.org

www.cancersupportscotland.org

Runs cancer support groups throughout Scotland. Also offers free complementary therapies and counselling to anyone affected by cancer.

Maggie's Centres

Tel **0300 123 1801**

Email enquiries@maggiescentres.org

www.maggiescentres.org

Has a network of centres in many locations throughout the UK. Provides free information about cancer and financial benefits. Also offers emotional and social support to people with cancer, their family, and friends.

Penny Brohn UK

Helpline **0303 300 0118** (Mon to Fri, 9.30am to 5pm)

Email helpline@pennybrohn.org.uk

www.pennybrohn.org.uk

Offers physical, emotional and spiritual support across the UK, using complementary therapies and self-help techniques.

Equipment and advice on living with a disability

British Red Cross

Tel **0344 871 11 11**

Textphone **020 7562 2050**

Email **information@redcross.org.uk**

www.redcross.org.uk

Offers a range of health and social care services across the UK, such as care in the home, a medical equipment loan service and a transport service.

Disabled Living Foundation (DLF)

Helpline **0300 999 0004** (Mon to Fri, 10am to 4pm)

Email **helpline@dlf.org.uk**

www.dlf.org.uk

Provides free, impartial advice about all types of disability equipment and mobility products.

Disability Rights UK

Tel **0207 250 8181**

(Mon to Fri, 10am to 12.30pm, then 1.30pm to 4pm)

Email **enquiries@disabilityrightsuk.org**

www.disabilityrightsuk.org

Provides information on social security benefits and disability rights in the UK. Has a number of helplines for specific support, including information on going back to work, direct payments, human rights issues, and advice for disabled students.

Motability Scheme

Tel **0300 456 4566**

(Mon to Fri, 8am to 7pm, and Sat, 9am to 1pm)

Textphone **0300 037 0100**

www.motability.co.uk

The scheme enables disabled people to exchange mobility allowances they have as part of benefits (including the enhanced rate mobility component of Personal Independence Payment) to lease a new car, scooter or powered wheelchair.

Scope

Helpline **0808 800 3333** (Mon to Fri, 9am to 5pm)

Textphone Use Type Talk by dialling **18001** from a textphone followed by **0808 800 3333**.

Email **helpline@scope.org.uk**

www.scope.org.uk

Offers advice and information on living with disability. Also supports an independent, UK-wide network of local Disability Information and Advice Line services (DIALs) run by and for disabled people.

Support for older people

Age UK

Helpline **0800 055 6112** (Daily, 8am to 7pm)

www.ageuk.org.uk

Provides information and advice for older people across the UK via the website and advice line. Also publishes impartial and informative fact sheets and advice guides.

LGBT-specific support

LGBT Foundation

Tel **0345 330 3030** (Mon to Fri, 10am to 6pm)

Email **helpline@lgbt.foundation**

www.lgbt.foundation

Provides a range of services to the LGBT community, including a helpline, email advice and counselling. The website has information on various topics including sexual health, relationships, mental health, community groups and events.

Disclaimer

We make every effort to ensure that the information we provide is accurate and up to date but it should not be relied upon as a substitute for specialist professional advice tailored to your situation. So far as is permitted by law, Macmillan does not accept liability in relation to the use of any information contained in this publication, or third-party information or websites included or referred to in it. Some photos are of models.

Thanks

This booklet has been written, revised and edited by Macmillan Cancer Support's Cancer Information Development team. It has been approved by Chief Medical Editor, Prof Tim Iveson, Macmillan Consultant Medical Oncologist. With thanks to: Dr Sophie Barrett, Consultant Medical Oncologist & SACT Lead; and Professor Robert Thomas, Consultant Oncologist.

Thanks also to the people affected by cancer who reviewed this edition, and those who shared their stories.

We welcome feedback on our information. If you have any, please contact **cancerinformationteam@macmillan.org.uk**

Sources

Below is a sample of the sources used in our bone health information. If you would like more information about the sources we use, please contact us at **cancerinformationteam@macmillan.org.uk**

National Institute for Health and Care Excellence (NICE). Bisphosphonates for treating osteoporosis. TA464. 2019 <https://www.nice.org.uk/guidance/ta464> (accessed Sept 2019).

National Institute for Health and Care Excellence (NICE). Osteoporosis: assessing the risk of fragility fracture. CG146. 2017. <https://www.nice.org.uk/guidance/cg146> (accessed Sept 2019).

National Institute for Health and Care Excellence (NICE). Osteoporosis: Quality standard QS149. 2017. <https://www.nice.org.uk/guidance/qs149> (accessed Sept 2019).

Royal Osteoporosis Society (ROS). Care: Frameworks and guidance. 2019. <https://theros.org.uk/healthcare-professionals/courses-and-cpd/osteoporosis-resources-for-primary-care/frameworks-and-guidance> (accessed Sept 2019).

Can you do something to help?

We hope this booklet has been useful to you. It is just one of our many publications that are available free to anyone affected by cancer. They are produced by our cancer information specialists who, along with our nurses, benefits advisers, campaigners and volunteers, are part of the Macmillan team. When people are facing the toughest fight of their lives, we are here to support them every step of the way.

We want to make sure no one has to go through cancer alone, so we need more people to help us. When the time is right for you, here are some ways in which you can become a part of our team.

5 ways you can help someone with cancer

Share your cancer experience

Support people living with cancer by telling your story, online, in the media or face to face.

Campaign for change

We need your help to make sure everyone gets the right support. Take an action, big or small, for better cancer care.

Help someone in your community

A lift to an appointment. Help with the shopping. Or just a cup of tea and a chat. Could you lend a hand?

Raise money

Whatever you like doing you can raise money to help. Take part in one of our events or create your own.

Give money

Big or small, every penny helps. To make a one-off donation see over.

Call us to find out more 0300 1000 200
macmillan.org.uk/getinvolved

Please fill in your personal details

Mr/Mrs/Miss/Other

Name

Surname

Address

Postcode

Phone

Email

Please accept my gift of £
(Please delete as appropriate)

I enclose a cheque / postal order /
Charity Voucher made payable to
Macmillan Cancer Support
OR debit my:
Visa / MasterCard / CAF Charity
Card / Switch / Maestro

Card number

Valid from

Expiry date

Issue no

Security number

Signature

Date / /

Do not let the taxman keep your money

Do you pay tax? If so, your gift will be worth 25% more to us – at no extra cost to you. All you have to do is tick the box below, and the tax office will give 25p for every pound you give.

I am a UK tax payer and I would like Macmillan Cancer Support to treat all donations I make or have made to Macmillan Cancer Support in the last 4 years as Gift Aid donations, until I notify you otherwise.

I understand that if I pay less Income Tax and/or Capital Gains Tax than the amount of Gift Aid claimed on all my donations in that tax year it is my responsibility to pay any difference. I understand Macmillan Cancer Support will reclaim 25p of tax on every £1 that I give.

Macmillan Cancer Support and our trading companies would like to hold your details in order to contact you about our fundraising, campaigning and services for people affected by cancer. If you would prefer us not to use your details in this way please tick this box.

In order to carry out our work we may need to pass your details to agents or partners who act on our behalf.

If you would rather donate online
go to macmillan.org.uk/donate



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Please cut out this form and return it in an envelope (no stamp required) to: Supporter Donations, Macmillan Cancer Support, FREEPOST LON15851, 89 Albert Embankment, London SE1 7UQ

This booklet is about bone health. It is for people who are having, or have had, cancer treatments that may affect their bones.

The booklet explains factors that affect bone health. It also tells you about things you can do to help maintain healthy bones, and drug treatments that can improve bone strength.

We're here to help everyone with cancer live life as fully as they can, providing physical, financial and emotional support. So whatever cancer throws your way, we're right there with you. For information, support or just someone to talk to, call **0808 808 00 00** (7 days a week, 8am to 8pm) or visit **macmillan.org.uk**

Would you prefer to speak to us in another language? Interpreters are available. Please tell us in English the language you would like to use. Are you deaf or hard of hearing? Call us using NGT (Text Relay) on **18001 0808 808 00 00**, or use the NGT Lite app.

Need information in different languages or formats? We produce information in audio, eBooks, easy read, Braille, large print and translations. To order these, visit **macmillan.org.uk/otherformats** or call our support line.

**MACMILLAN
CANCER SUPPORT**

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Patient Information Forum