

Understanding Secondary Bone Cancer

Information for people affected by cancer

This fact sheet has been prepared to help you understand more about secondary bone cancer – cancer that has spread to the bone from another part of the body. We have included general information about how secondary bone cancer is diagnosed and treated.

What is secondary bone cancer?

Bone cancer can start as either a primary or secondary cancer. The two types are different, and this fact sheet is only about secondary bone cancer.

Primary bone cancer – This means that the cancer starts in the bone.

➤ See our *Understanding Primary Bone Cancer* fact sheet.

Secondary bone cancer – This means the cancer started in another part of the body but has now spread (metastasised) to the bone. It may also be called metastatic bone cancer, bone metastases or bone mets.

Cancer cells can spread from the original cancer (the primary cancer), through the bloodstream or lymph vessels, to any of the bones in the body. Bones commonly affected by secondary bone cancer include the spine, ribs, pelvis, and upper bones of the arms (humerus) and legs (femur).

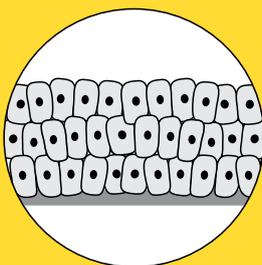
Secondary cancer in the bone keeps the name of the original cancer. Because the cancer has spread, it is considered advanced or stage 4 cancer. You may find it useful to read the Cancer Council booklet about the primary cancer type.

Which cancers spread to the bone?

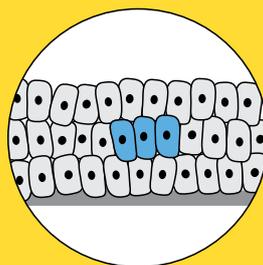
Any type of cancer can spread to the bone. The cancers most likely to spread to the bone include:

- prostate cancer
- breast cancer
- lung cancer
- kidney cancer
- thyroid cancer
- myeloma (a type of blood cancer)
- melanoma.

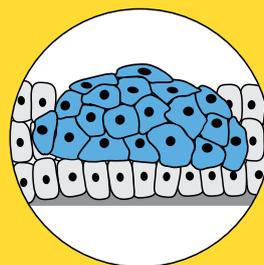
How cancer starts



Normal cells

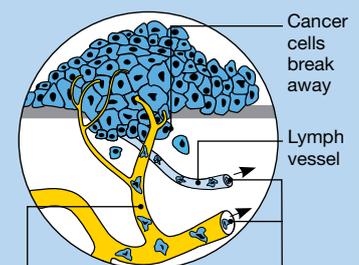


Abnormal cells



Abnormal cells multiply

How cancer spreads



Blood vessel

Cancer cells travel to lymph nodes and other parts of the body (metastasis)

Understanding Secondary Bone Cancer

The bones

A typical healthy adult has over 200 bones in their body. Bones have a number of important functions:

- support the body
- protect internal organs
- are attached to muscles to allow movement
- contain bone marrow, which produces and stores new blood cells
- store proteins, minerals and nutrients, such as calcium.

Bones are made up of different parts, including a hard, outer layer (known as cortical or compact bone) and a spongy inner core (known as trabecular or cancellous bone). The bone marrow is found in this spongy core.

Cartilage is the tough material at the end of each bone that allows one bone to move against another. The meeting point of two bones is called a joint.

Bones have two types of cells – osteoblasts and osteoclasts. Osteoblasts create new bone and osteoclasts break down old bone. Normal bone is constantly going through a process called remodelling, in which old bone is broken down and replaced with new bone.

What types of secondary bone cancer are there?

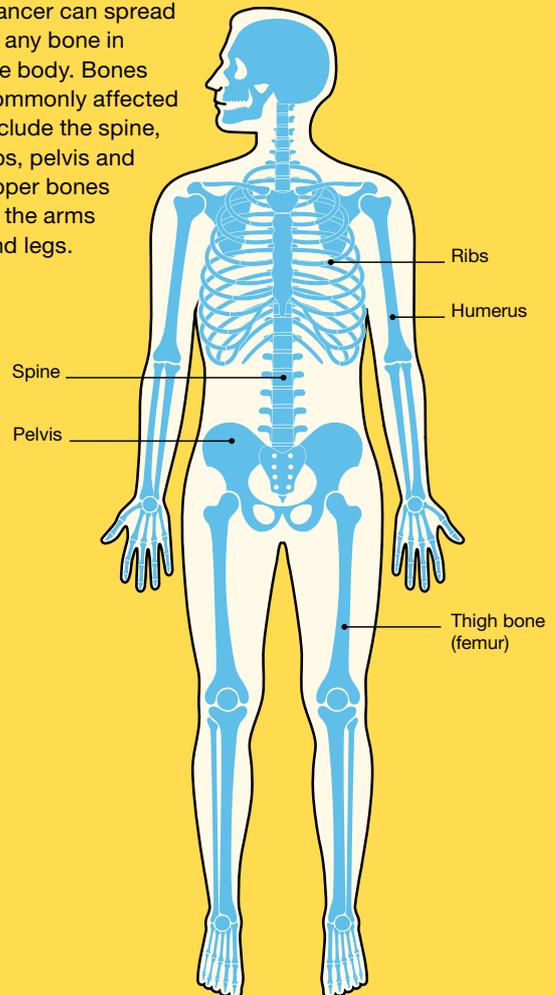
Secondary bone cancer is described as two main types: osteolytic and osteoblastic.

- **Osteolytic** – In this type, bone is broken down without new bone being made. In some cases, holes form in the bone. These are known as lytic lesions. They can weaken the bone and increase the risk of breakage or other problems.
- **Osteoblastic** – In this type, new bone is formed in some areas, but it grows abnormally. These areas are called osteoblastic lesions. The lesions are very hard (dense) but they make the bone weak and deformed.

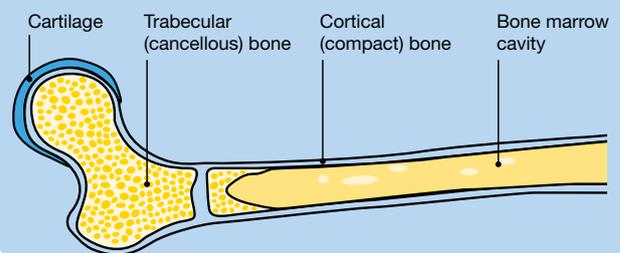
Most people with secondary bone cancer develop either osteolytic or osteoblastic changes, but some have both.

Bones of the body

Cancer can spread to any bone in the body. Bones commonly affected include the spine, ribs, pelvis and upper bones of the arms and legs.



Bone structure



How common is it?

Secondary bone cancer is much more common than primary bone cancer in Australia. It is more common in adults than children. The bone is one of the most common sites cancer may spread to, along with the lymph nodes, liver, lungs and brain.

Understanding Secondary Bone Cancer

What are the causes?

Secondary bone cancer is always caused by cancer cells spreading to the bone from a primary cancer. It is not fully understood why some people develop secondary bone cancer and others don't.

Diagnosis

Secondary bone cancer is sometimes found at the same time as the primary cancer. It can also be found months or years after the primary cancer has been treated.

Sometimes, secondary bone cancer is diagnosed before the primary cancer is found and sometimes the primary cancer cannot be found. When tests can't find where the cancer started, this is known as cancer of unknown primary (CUP). CUP can occur in other parts of the body as well as in the bone.

If your doctor is concerned the cancer has spread to the bones, you may have some of the following tests:

- **blood tests** – including a full blood count and a check of your calcium levels
- **bone x-ray** – a scan of the chest and bones to show bone damage, fractures or creation of new bone
- **bone scan** – a small amount of radioactive dye is injected into a vein; it collects in the bone and any abnormal changes are found by a special camera and computer
- **CT or MRI scans** – a special computer is used to scan and create cross-sectional pictures to highlight any bone abnormality; these scans take between 30 and 90 minutes
- **PET-CT scan** – this is a PET scan combined with a CT scan, which provides more detailed information than CT on its own; you are injected with a small amount of radioactive glucose solution to highlight any cancerous areas on the scan
- **bone biopsy** – removal of some cells and tissue from the affected bone for examination under a microscope. The biopsy may be done in one of two ways. In a core needle biopsy, a local anaesthetic numbs the area, then a thin needle is inserted to remove a sample of bone. The doctor may use a CT scan to help guide the needle into the bone. In a surgical biopsy, a surgeon removes a small section of bone. This is done under a general anaesthetic.

Signs and symptoms

These are some signs and symptoms of secondary bone cancer. If you notice any of these symptoms, see your doctor.

bone pain	This is often the first and most common symptom. The pain may be a dull, persistent ache. It can get worse with movement and is often worse at night.
fractures	Cancer cells can weaken the bones and cause them to break more easily, often with little or no force (known as a pathological fracture).
high calcium levels in the blood (hypercalcaemia)	As the bone breaks down, calcium is released into the bloodstream. When calcium builds up in the blood, it may cause severe tiredness (fatigue), a feeling of sickness (nausea), vomiting, thirst, constipation or confusion.
pressure on the nerves in the spine (spinal cord compression)	Abnormal bone growth or fractures can press on the nerves in the spine. This may cause back pain, muscle and limb weakness, tingling or numbness of the limbs, difficulty walking, or loss of bowel or bladder control.
low levels of blood cells	Secondary bone cancer can affect the bone marrow, particularly if there is a large amount of spread to the bones. The bone marrow makes blood cells, so the cancer can lead to low levels of blood cells. Symptoms depend on the type of blood cell affected. You may feel tired and breathless, have an increased risk of infections, or bruise and bleed more easily.

Understanding Secondary Bone Cancer

Prognosis

Prognosis means the expected outcome of a disease. You may want to discuss your prognosis and treatment options with your doctor.

Factors that affect prognosis include whether the cancer has spread to other parts of your body, how quickly it is growing and how it responds to treatment. It is not possible for anyone to predict the exact course of the disease, but your doctor can provide you with general information on the expected outcomes of people in a similar situation to you.

Secondary bone cancer can't be cured, but treatment can reduce symptoms and improve quality of life. In some cases, treatment can keep secondary bone cancer under control for many years.

Treatment

The aim of treatment for secondary bone cancer is to control or shrink the cancer and relieve symptoms. Treatment may make you feel better. This is called palliative treatment. Your treatment options will depend on:

- the type of primary cancer, if it is known
- the treatment you have already had
- how many bones are affected by cancer
- whether the cancer has spread to other parts of the body
- your symptoms and general health.

You may have treatment that affects the whole body (systemic) or focuses on a particular bone (local). Systemic treatments include hormone therapy, chemotherapy, targeted therapy, immunotherapy and bone strengthening drugs. Local therapies include radiation therapy and surgery. Treatments can be given on their own or in combination.

Cancer treatments may cause a range of side effects. They can vary depending on the treatments you are given, and they may vary from person to person. Talk to your doctor about managing any side effects you have.

- ▶ See our *Understanding Radiation Therapy*, *Understanding Chemotherapy* and *Understanding Surgery* booklets, and our *Understanding Immunotherapy* and *Understanding Targeted Therapy* fact sheets.

Palliative treatment

Because secondary bone cancer is advanced cancer, your doctor is likely to discuss palliative treatment for symptoms caused by the cancer. Palliative treatment aims to manage symptoms without trying to cure the disease.

Palliative treatment is one aspect of palliative care, in which a team of health professionals aims to meet your physical, emotional, cultural, spiritual and social needs. The team also provides support to families and carers.

- ▶ See our *Understanding Palliative Care* and *Living with Advanced Cancer* booklets, and listen to *The Thing About Advanced Cancer* podcast.

Hormone therapy

Hormone therapy, also called endocrine therapy, may be used to treat breast or prostate cancer that has spread to the bone. This treatment uses synthetic hormones to block the effect of the body's natural hormones. The aim is to reduce the hormones that the cancer cells receive. This can help slow down the growth and spread of the cancer. Hormone therapy may be given as tablets or injections.

Side effects – Common side effects include hot flushes, mood changes, weight changes and sweating.

Chemotherapy

Chemotherapy uses drugs to kill or slow the growth of cancer cells, while causing the least possible damage to healthy cells.

Generally, chemotherapy is given through a vein (intravenously) over several hours or sometimes as a tablet (orally). Most people have several treatment cycles with rest periods in between. The number of sessions varies depending on the drugs prescribed by your oncologist and the type of primary cancer.

Side effects – These will depend on the drugs you receive. Some people have few side effects; others have more. Common side effects include fatigue, nausea, diarrhoea, appetite loss, hair loss and increased risk of infections.

Understanding Secondary Bone Cancer

Targeted therapy

Targeted therapy uses drugs that attack specific features of cancer cells to stop the cancer growing and spreading.

This treatment can only treat cancers that are growing in response to certain genes or proteins in the cells. The type of drugs you have will vary depending on the primary cancer.

Targeted therapy drugs can be given in different ways, including:

- as tablets that you swallow (orally)
- by injection under the skin (subcutaneously)
- by injection into a vein (intravenously).

Side effects – These will vary depending on the drugs used and how your body responds. Targeted therapy drugs often cause skin problems, such as dry, flaky skin and skin rashes. Other common side effects include fever, tiredness, joint aches, nausea, diarrhoea and headaches.

Immunotherapy

Immunotherapy is a type of drug treatment that uses the body's own immune system to fight cancer. The most widely used form of immunotherapy is checkpoint inhibitor drugs. Some cancers create "checkpoints" to block the immune system. Checkpoint inhibitor drugs allow the immune system to bypass these checkpoints.

Several checkpoint inhibitor drugs are approved to treat some types of cancer that have spread to the bone, such as lung and kidney cancers. Clinical trials are testing checkpoint immunotherapy for other cancer types.

Side effects – These will vary depending on the type of immunotherapy you receive and how your body responds. Common side effects include fatigue, rashes and diarrhoea.

“I've been having palliative treatment for five years. I'm not trying to get rid of the disease, just keeping it under control. My quality of life is excellent.”  Kate

Radiation therapy

Also known as radiotherapy, radiation therapy is the use of targeted radiation to kill or damage cancer cells. The radiation is usually in the form of x-ray beams. Radiation therapy is often used to reduce pain in the bone. It is usually given from outside the body and is aimed at the particular bone causing pain.

The most common type of radiation therapy used for secondary bone cancer is external beam radiation therapy (EBRT). You will lie on a treatment table and a machine will deliver radiation to the affected area of the body. You may have one radiation therapy treatment, or several over a few days or weeks.

A type of EBRT called stereotactic body radiation therapy (SBRT) may also be used for secondary bone cancer. This is also known as stereotactic ablative radiation therapy (SABR). You will lie on a treatment table and a machine will precisely deliver a few high doses of radiation to the bones. SBRT is offered in some specialised centres.

If the cancer has spread to more than one bone, you may be injected with a small amount of radioactive liquid. This is known as radionuclide therapy and it aims to destroy the cancer cells. The material spreads throughout the body but particularly targets cancer cells. Your treatment team will let you know of any safety measures you need to follow.

Side effects – These relate to the type of cancer and the part of the body treated. They include fatigue, skin problems, hair loss, low blood cell counts, appetite loss and nausea.

Surgery

Cancer can weaken a bone and cause fractures. Surgery to insert metal rods, plates, screws, wires, nails or pins can help strengthen a bone and reduce the risk of fracture. Surgery may also be used if the cancer is pressing on the spinal cord and causing damage.

Side effects – After surgery, some people develop an infection at the wound site. Your surgeon will discuss ways to prevent this happening.

Understanding Secondary Bone Cancer

Other bone-strengthening procedures

If the cancer is causing severe back pain and damaging the bones in the spine, you may have an injection of bone cement into the bones. This stabilises and strengthens them, and helps relieve pain. This is called vertebroplasty. It is not often done in Australia.

Bone-strengthening drugs

Your doctor may prescribe medicines to help strengthen your bones, reduce bone pain and control high calcium levels in the blood (a condition known as hypercalcaemia).

There are two options for bone-strengthening drug treatment:

- **bisphosphonates** – a group of drugs that can be given as an injection into a vein (intravenously) or as a tablet (orally)
- **denosumab** – given as an injection under the skin (subcutaneously).

Side effects – These will vary depending on how the drugs are taken. Bisphosphonates taken intravenously can cause muscle and joint pain, fatigue, nausea or flu-like symptoms such as shivering and fever. Bisphosphonates taken orally may make your throat sore, or cause indigestion or nausea. Occasionally, bisphosphonates can cause kidney damage. Your kidney function will be monitored with regular blood tests.

Side effects of denosumab are uncommon but can include bone, joint and muscle pain; nausea; fatigue; diarrhoea; and constipation.

All bone-strengthening drugs can lower calcium levels, so your doctor may advise you to take calcium and vitamin D supplements.

A rare but severe side effect of bone-strengthening drugs is the breakdown of bone tissue in the jaw. This may happen after the removal of a tooth. It is called osteonecrosis of the jaw or ONJ. To reduce the risk of osteonecrosis of the jaw, it is recommended that you see a dentist before you start taking bone-strengthening drugs, and then every six months while taking these drugs. If you need to have dental work during treatment, let your dentist know that you are taking bone-strengthening

Taking part in clinical trials

New treatments are constantly becoming available. Clinical trials test new treatments to see if they're better than current methods. Getting access to new treatments is an important consideration in your care. Talk with your doctor about the latest developments and whether you're a suitable candidate.

- See our *Understanding Clinical Trials and Research* booklet.

drugs and ask your oncologist if you can have a break in treatment.

A very rare side effect that may happen when taking these drugs is a fracture of the thigh bone (femur).

See your doctor if you experience mouth ulcers, mouth pain, jaw problems or groin pain while taking bone-strengthening drugs.

Other ways to manage symptoms

For many people with secondary bone cancer, managing symptoms may make you feel better.

Pain – Your doctor may prescribe pain-relieving medicines to reduce the pain. Medicines to control mild pain include paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs). Opioid-based medicines, like oxycodone or morphine, are used to reduce moderate to severe pain.

Steroids, like dexamethasone, are strong anti-inflammatory medicines and may be used in some cases for bone pain. For example, they may be used instead of NSAIDs in people with kidney (renal) failure and bone pain.

If your treatment shrinks the bone tumours or reduces the pressure on nerves and surrounding tissues, your doctor may be able to reduce the dose of the pain-relieving medicines.

- See our *Overcoming Cancer Pain* booklet.

Fatigue – Many people experience extreme or constant tiredness known as fatigue. This may be because the cancer is affecting your bone marrow.

Understanding Secondary Bone Cancer

Complementary therapies

These therapies are used alongside conventional medical treatments. Therapies such as massage, relaxation and acupuncture can increase your sense of control, decrease stress and anxiety, and improve your mood. Let your doctor know about any therapies you are using or thinking about trying, as some may not be safe or evidence-based.

► See our *Understanding Complementary Therapies* booklet

You'll have blood tests to monitor your blood cell count. If your red blood cell level is low (anaemia), you might have a blood transfusion.

Living with secondary bone cancer

People diagnosed with secondary bone cancer can feel well and have long periods of time without symptoms. However, after finding out that you have advanced cancer, you may feel a range of emotions. At times, you may feel overcome by fear, anxiety, sadness, depression or anger.

The uncertainty of living with secondary bone cancer can leave you feeling emotionally up and down. Your doctor, nurses, a social worker or counsellor can help you and your family find ways to cope with how you're feeling.

► See our *Living with Advanced Cancer* booklet and listen to *The Thing About Advanced Cancer* podcast.

Question checklist

This checklist may be helpful when thinking about questions to ask your doctor.

- Which bones has the cancer spread to?
- What treatment do you recommend and why?
- What is the aim of the treatment?
- If I don't have treatment, what can I expect?
- What is the expected outcome of this cancer?
- How will I know if the treatment is working?
- Can I do my normal activities while having this treatment?
- Will I have a lot of bone pain? What will be done about this?
- What can I do to prevent broken bones?
- What will you do if a bone breaks?
- Are there any clinical trials or research studies I can join?
- How can I access palliative care?

Where to get help and information

Call Cancer Council **13 11 20** for more information and free copies of booklets or visit your local Cancer Council website:

- ACT..... actcancer.org
- NSW cancercouncil.com.au
- NT nt.cancer.org.au
- QLD cancerqld.org.au
- SA..... cancersa.org.au
- TAS cancertas.org.au
- VIC..... cancervic.org.au
- WA..... cancerwa.asn.au
- Australia..... cancer.org.au

Acknowledgements

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Note to reader

Always consult your doctor about matters that affect your health. This fact sheet is intended as a general introduction and is not a substitute for professional medical, legal or financial advice. Information about cancer is constantly being updated and revised by the medical and research communities. While all care is taken to ensure accuracy at the time of publication, Cancer Council Australia and its members exclude all liability for any injury, loss or damage incurred by use of or reliance on the information provided in this fact sheet.



For information and support on cancer-related issues, call Cancer Council **13 11 20**. This is a confidential service.