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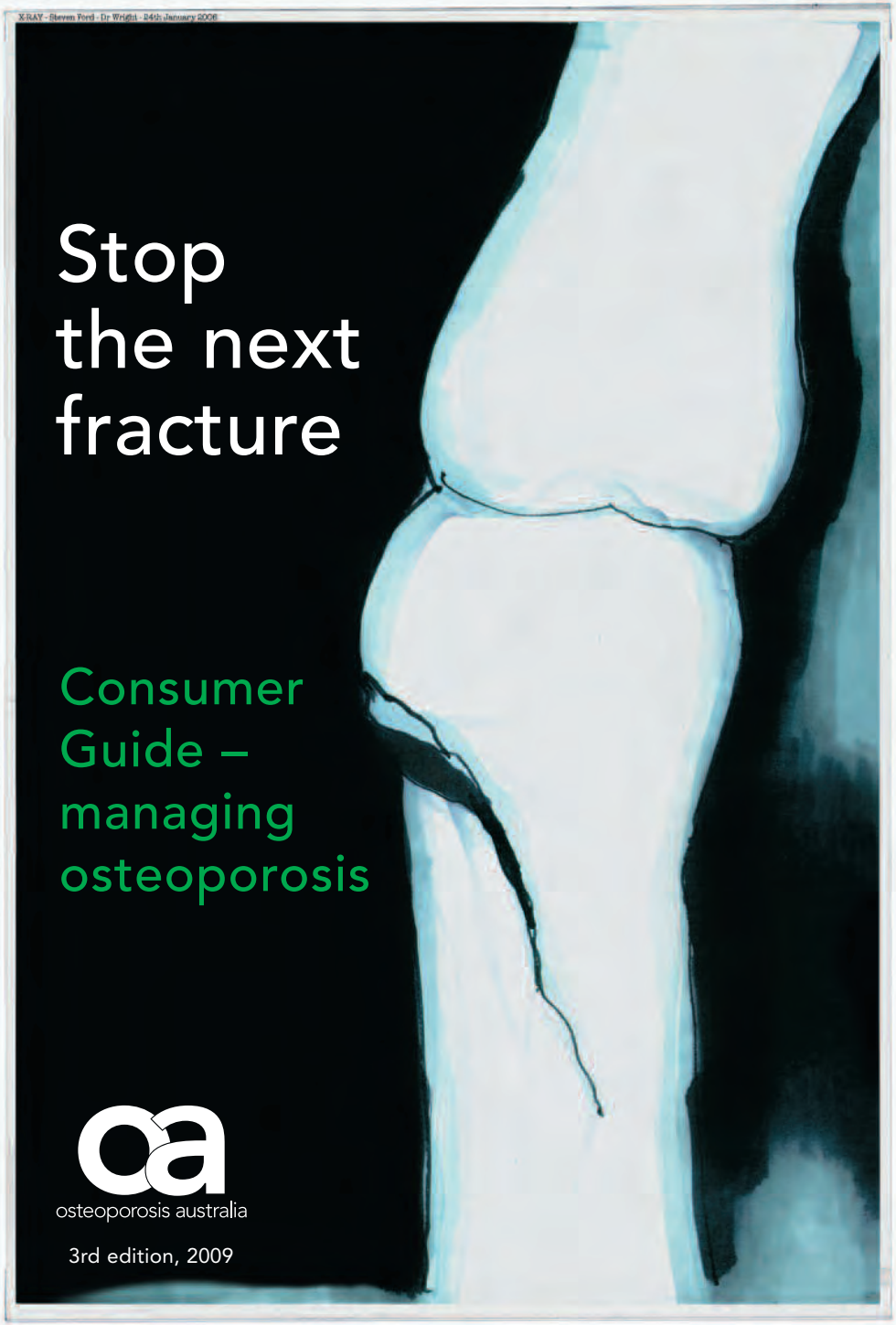

Stop the next fracture

Consumer Guide – managing osteoporosis

osteoporosis australia

3rd edition, 2009

INTRODUCTION

2.2 million Australians are affected by osteoporosis, which causes bone loss and bone fragility. However, as many as 4 out of 5 people with osteoporosis don't know that they have it, so they don't know that they are at greater risk of having a bone break (fracture). This is because osteoporosis is a 'silent' disease. You won't know that you have the disease until you break a bone, unless it is diagnosed and treated in time.

In Australia, one in two women and one in three men over sixty will suffer a fracture due to osteoporosis. After the first fracture, there is a 2-4 times greater risk of another one happening within 6-12 months. This risk rises rapidly with each fracture – this is known as the *cascade effect*.

Unfortunately, most Australians do NOT receive the investigations and treatment necessary to prevent fractures from occurring, either before or after one happens.

This booklet will help you identify your risk of osteoporosis and the steps you can take to minimise the development of fractures and prevent further damage if you have already had an osteoporotic fracture.

This guide is based on a review of the current evidence and research. A bibliography and reference list is available at **www.osteoporosis.org.au**.

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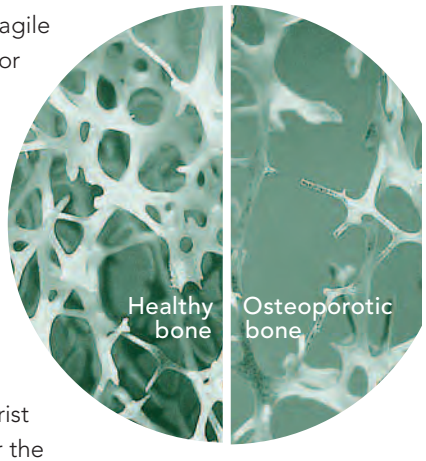
1. WHAT IS OSTEOPOROSIS?



Osteoporosis is a condition in which the bones become fragile and brittle, leading to a higher risk of fractures (breaks or cracks) than in normal bone.

Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, leading to a loss of bone thickness (bone mass or density). As a result, bones become thinner and less dense, so that even a minor bump or accident can cause serious fractures. These are known as fragility or minimal trauma fractures.

Any bone can be affected by osteoporosis but the most common sites are the spine, upper arm, ribs, forearm or wrist and importantly, in the hip of older people, especially over the age of 75, often with little or no trauma (although almost any bone can fracture from osteoporosis). Osteoporosis usually has no signs or symptoms until a fracture happens – this is why osteoporosis is often called the 'silent disease'.

Fractures due to osteoporosis (osteoporotic fractures) can lead to changes in posture (eg developing a stoop or Dowager's hump in your back), muscle weakness, loss of height and bone deformity of the spine. Fractures can lead to chronic pain, disability, loss of independence and even premature death.

Every 5-6 minutes, someone is admitted to an Australian hospital with an osteoporotic fracture. This is expected to rise to every 3-4 minutes by the year 2021, as the population ages and the number of osteoporotic fractures increase.

THE FRACTURE CASCADE

About 50% of people with one fracture due to osteoporosis will have another, and the risk of new fractures rises exponentially with each new fracture – the 'cascade effect'.

The 'cascade effect' means for example that women who have suffered a fracture in their spine are over 4 times more likely to have another fracture within the next year, compared to women who have never had an osteoporotic fracture.

People who have had two or more osteoporotic fractures are up to 9 times more likely to have another fracture, rising to an 11 times greater risk for people who have had three or more fractures, compared to someone who has not had one.

1 in 2 women & 1 in 3 men over 60 years in Australia will have an osteoporotic fracture.

Two thirds of fractures of the spine are not identified or treated, even though they nearly all cause pain and some disability. Often people believe that the symptoms of spine fracture – back pain, height loss or rounding of the spine are just due to 'old age'. However, for many people, osteoporotic fractures can be prevented, or at least your risk of having further fractures greatly reduced.

To stop the fracture cascade, it is essential that osteoporotic fractures are identified and treated as quickly as possible.

2. WHO GETS OSTEOPOROSIS?

Women are at a greater risk of developing osteoporosis than men. Women generally have less bone stock than men to begin with and there is a rapid decline in the production of oestrogen by the ovaries after menopause.

Oestrogen is a hormone which is important for maintaining healthy bones. When oestrogen levels decrease, the bones lose calcium and other minerals at a much faster rate than they did before. Bone loss is approximately 1%-5% per year after menopause.

Men also lose bone as they age, but they do not experience rapid bone loss with menopause, as women do and their bone mass generally remains adequate until much later in life. As women tend to live longer than men, so the effects of osteoporosis have more opportunity to show up later in life. Reduced calcium intake and low levels of vitamin D can increase age-related bone loss.

Although osteoporotic fractures are less common in men than in women, when they occur, these fractures are associated with higher disability and death than in women.

WHAT'S MY RISK OF OSTEOPOROSIS?

We can predict our risk of getting osteoporosis before the disease occurs. Certain people are more likely to develop osteoporosis than others and there are several risk factors for the disease. Some of these risk factors are things you can change and others can't be changed.

FIGURE 1 PROGRESSION OF VERTEBRAL FRACTURES IN OSTEOPOROSIS

Risk factors you may be able to change:

- An inactive lifestyle / low physical activity levels (over many years)
- Cigarette smoking
- Excessive alcohol intake
- Having a low body weight
- A diet low in calcium
- Vitamin D deficiency
- Frequent falls.

Risk factors you can't change:

- Being female
- Being Caucasian or Asian
- Having a small body build
- Having delayed puberty or early menopause
- A previous osteoporotic fracture
- Having a direct relative who has had an osteoporotic fracture
- Being over 50 years of age
- Having rheumatoid arthritis, chronic liver disease or kidney failure
- Having malabsorption syndromes (including chronic liver disease and inflammatory bowel disease)
- Having a history of over-active thyroid or parathyroid glands, or past treatment with thyroid hormones
- Being a male with low testosterone levels
- Having had long-term drug treatment (more than 3 months) with corticosteroids (eg for asthma and rheumatoid arthritis).

Life time fracture risk of people at 50 years of age

One in three women and one in eight men over 50 years of age will experience osteoporotic fractures:

Wrist fracture: *men 1 in 40 (2.5%) ; women 1 in 6 (16%)*

Vertebral fracture: *men 1 in 20 (5%) ; women 1 in 6 (16%)*

Hip fracture: *men 1 in 17 (6%) ; women 1 in 6 (17.5%)* *(Melton L.J., 1992)*

COULD I HAVE OSTEOPOROSIS?

- Do you think you have shrunk in height?
- Are you thin with a small frame?
- Do you have a family history of osteoporosis?
- Have you had sudden, severe unexplained back pain?
- Have you had a recent bone fracture (and are over 50 years)?
- Have you developed a "Dowager's Hump"?
- Could you be vitamin D deficient because you do not get much sun exposure?
- Does your diet lack calcium?
- Do you have a very sedentary lifestyle – sitting all day and not doing much physical activity?

If you answer YES to any of these questions you should discuss the possibility of having osteoporosis with your GP.

3. HOW IS OSTEOPOROSIS DIAGNOSED?

Osteoporosis is diagnosed by combining information from a person's medical history with a physical examination and some specific tests for osteoporosis. Your doctor will ask about any risk factors you may have and take a thorough medical history, including information about any past or current fractures.

Osteoporotic fractures generally occur after a small bump or fall, for example, falling from standing height, stumbling on steps or even coughing.

Your doctor will also measure your height, because losing 3 cm (more than 1 inch) in height can be a signal that you have had a 'crush' fracture in your spine (these fractures are sometimes painless, so they may go unnoticed).

Your doctor may also order an X-ray to check if any bone fractures have occurred and blood tests, to look for other medical causes of osteoporosis.

BONE DENSITY TEST

Bone strength, which shows your risk of osteoporosis, can be measured with a bone mineral density scan. This measures the density/strength of your bones in comparison to the bone density of an average young healthy adult. This result is called a T-score. A T-score of -2.5 SD or lower indicates osteoporosis.

The most reliable way to measure bone density is the dual-energy X-ray absorptiometry (DXA) scan, which is widely available around Australia. It is a quick, painless test in which a small amount of radiation is used to measure the density of the bones in the spine and hip, the most common areas for a fracture.

Bone density is classed as normal, osteopenic (low bone density) or osteoporotic.

BMD TESTING – REBATE

A Medicare rebate is available for BMD testing (DXA scan) for all women and men aged 70 years and over.

There is a Medicare rebate for DXA scans (for people aged less than 70 years) including if you:

- Have been diagnosed with osteoporosis
- Have had one or more fractures due to osteoporosis
- Are taking corticosteroids
- Have not had a menstrual period for more than 6 months, are under age 45, other than for pregnancy.

If you have osteopenia, your doctor may recommend lifestyle modifications so as to reduce the number of risk factors that you can do something about e.g. giving up smoking, taking more calcium. Your doctor will recommend follow-up testing in 1-2 years to reassess your bone density.

If a DXA scan shows that you have osteoporosis, then you are at high risk of having a fracture and your doctor will probably recommend that you start some form of treatment, with follow-up testing in one year to see how effective the treatment is.

Remember, osteoporosis has no signs or symptoms until a fracture occurs.

You may see advertisements for other types of bone density tests in chemists and shopping centres, called Heel Ultrasounds. **Heel Ultrasound is not the recommended standard test to measure your bone strength and predict your risk of fracture.**

4. WHAT CAN I DO TO PREVENT OSTEOPOROSIS?

You can take action to minimise your risk of developing osteoporosis and a first fracture, by changing those risk factors that you are able to, as recommended in this booklet. If you have already had an osteoporotic fracture, this booklet it also designed to help you prevent further fractures from happening.

Both men and women can reduce their risk of developing osteoporosis and fracture by looking after their bone health.

Bone health is maintained in the body by:

- **getting enough calcium and vitamin D**
- **regular appropriate exercise**
- **and maintaining hormone levels (oestrogen).**

CALCIUM

Calcium is essential for building and maintaining bone. It combines with other minerals to form the hard crystals that give bone its strength. Almost all the body's calcium (about 99%) is found in the bones, and the remaining 1% is dissolved in blood and other fluids. This small amount is essential for maintaining healthy functioning of the heart, muscles, blood and nerves. When you are not getting sufficient amounts of calcium in your diet, some of the calcium crystals dissolve and give their calcium back to the bloodstream. Bones therefore act like a calcium bank, storing calcium and releasing it into the blood stream when needed.

Because our bodies cannot make calcium, it must come from our diets. So if your calcium intake is too low and there are more withdrawals than deposits from your calcium bone bank, you risk losing bone strength.

Calcium absorption may also be reduced by excessive caffeine and alcohol, soft drinks containing phosphates and diets high in animal proteins. As well, calcium is continually lost from your body each day through your skin and nails, sweat, and urine.

Adults need at least 1000 mg of calcium per day; women aged over 50 and men aged over 70 require at least 1300 mg of calcium per day.

Your daily calcium needs depend on your age and sex. By age 30, peak bone mass (maximum bone density) is reached and most of this is achieved by puberty when there is the greatest rate of bone growth. The higher your peak bone mass, the more likely it is that you will maintain better bone health even during times of rapid bone loss such as menopause. This is why calcium is so important for children and teenagers.

In adults, dietary calcium is vital in order to maintain bone strength. Also, as we age calcium is absorbed less effectively from the intestine, so that intake needs to be increased. When the body can no longer replace calcium fast enough to keep the bones healthy, they become thinner and weaker, resulting in osteoporosis.

Less than half of all Australian adults get their daily recommended intake of calcium.

WHO NEEDS TO EAT WHAT?

- Children 5 to 9 years should aim for 2 to 3 serves of calcium-rich foods each day to reach a total intake of 800 - 1000 mg/day.
- Children and adolescents aged 9 to 18 years should aim for 3 serves of calcium-rich foods a day to reach a total intake of 1000 - 1300 mg/day.
- Adults need at least 1000 mg of calcium per day; women aged over 50 and men aged over 70 require at least 1300 mg of calcium per day.

Food sources of calcium

For most Australians, dairy foods are the main source of calcium.

Dairy foods are the most convenient way to obtain adequate calcium because milk, yoghurt and most cheeses are particularly high in calcium. Small amounts of calcium are found in nuts, breads, cereals, fruits and vegetables.

Three servings of dairy products each day will generally provide you with the recommended daily calcium intake around 1000 mg/day.

Practical tips for getting more calcium

- Aim to get at least half your daily intake of calcium from dairy foods. Calcium is more easily absorbed from dairy products than most other food groups.
- Try to eat two to three serves of food each day that are particularly high in calcium, eg. a glass of milk, a container of yoghurt, a slice of hard cheese.
- Eat canned fish with bones, particularly canned salmon and sardines (the edible bones are where most of the calcium is concentrated).
- Add milk or skim milk powder to soups or casseroles. Use yoghurt in soups, desserts and salads.
- Some soy products such as tofu (bean curd) and a number of brands of soy milk are high in calcium or fortified with calcium.
- Eat more broccoli, beans, almonds, tinned salmon and sardines in your regular diet.
- If you cannot eat dairy foods, eat other types of food that contain calcium or that are fortified with calcium. People with lactose intolerance are often able to eat yoghurt and cheese as the lactose levels in these foods have been broken down.
- Get advice from a dietician or nutritionist if you need help with increasing the calcium in your diet or for general advice on healthy eating.

Calcium Supplements

If you cannot get enough calcium in your diet, your doctor may suggest that you take a calcium supplement.

Supplements can be in the form of calcium phosphate, calcium carbonate and calcium citrate taken in pill, chewable or liquid form. Talk to your doctor about the type of supplement he or she recommends.

The easiest way to do this is with a single calcium tablet containing 600 mg of calcium. Many companies now provide calcium tablets which also have vitamin D. Vitamin D aids the absorption of calcium from the gut. This is useful if you are vitamin D deficient.

When and How to Take Calcium Supplements

- Generally it is not important whether calcium tablets are taken with or without food.
- Calcium carbonate requires gastric acidity for the best absorption, so it should be taken with meals. Calcium citrate is not dependent on gastric acidity so can be taken at any time.

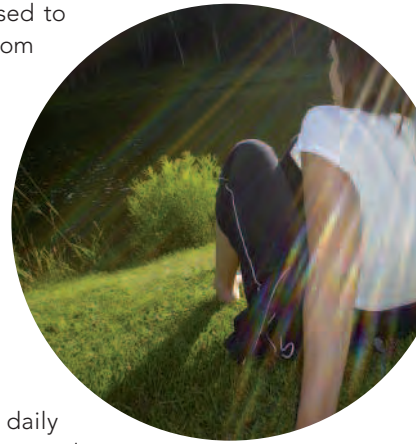
TABLE 1 THE CALCIUM CONTENT OF SELECTED FOODS

FOOD	STD SERVING SIZE	CALCIUM (MG)	KILOJOULES
Rump Steak (lean)	100g	5	883
Apples	1 medium (156g)	7	323
Lamb Chop (lean)	100g	8	1000
Bread - mixed grain	30g (slice)	15	272
Bread - wholemeal	30g (slice)	16	282
Chicken - roasted no skin	100g	16	783
Broccoli	60g	18	61
Strawberries	1 cup (145g)	19	118
Eggs - boiled	1 large (48g)	21	303
Baked Beans	100g	34	285
Oranges	1 medium (122g)	35	190
Apricots - dried	50g	35	410
Spinach	100g	50	80
Tahini	20g (1 tbsp)	65	520
Soy beans (boiled)	100g	76	540
Custard	100g	100	393
Almonds	50g	110	1235
Ice Cream	100g	133	800
Tofu (calcium set)	100g	150	479
Salmon - tinned, red	100g	220	814
Sardines - canned	100g	380	951
Cheese - mild	40g (piece)	300	676
Cheddar (reduced fat)	40g (2 slices)	323	548
Cheddar Cheese	40g (2 slices)	327	575
Yogurt - Low fat	200g (std tub)	316	738
Yogurt - Plain	200g (std tub)	390	716
Milk - Regular	250ml (std glass)	285	698
Milk - Reduced Fat (1%)	250ml (std glass)	352	525
Milk - Skim	250ml (std glass)	320	377
Milk - Calcium Fortified	250ml (std glass)	353	523

- Calcium supplements and oral bisphosphonates (eg Actonel or Fosamax) should be taken at least 2 hours apart, otherwise the absorption of one medicine can interfere with the other.
- Certain factors can interfere with calcium supplements being absorbed: foods such as phytates (cereals, brans etc) and oxalates (spinach, rhubarb etc); inadequate vitamin D; long term corticosteroid use (eg prednisone and prednisolone) and kidney disease. Proton pump inhibitors (medications used to reduce gastric acid) may reduce calcium absorption from calcium carbonate supplements.

Side Effects of Calcium Supplements

Calcium supplements are usually well tolerated and side effects are uncommon. However, calcium supplements are associated with an increased risk of kidney stones in people with a pre-existing high dietary calcium intake (≥1200mg/per day). Always check with your doctor before starting a calcium supplement.



VITAMIN D

The NRV (Nutrient Reference Value) or minimum daily requirement is 400-800IU (10-20 micrograms) of vitamin D per day but is of limited relevance since most vitamin D comes from sunlight exposure.

Vitamin D is also essential for bone health, because it:

- helps increase the absorption of calcium and phosphorous from the stomach
- helps regulate the amount of calcium in the blood
- helps strengthen the skeleton.

Vitamin D_3 is formed by the action of sunlight (UV light) on the skin. A deficiency of vitamin D can contribute to osteoporosis because without it, calcium will not be fully absorbed by your body.

GROUPS & PEOPLE MOST AT RISK OF VITAMIN D DEFICIENCY:

- the elderly;
- people who are housebound or in residential care;
- naturally dark-skinned people;
- those who cover their skin for cultural or religious reasons; and
- babies of vitamin D deficient mothers.

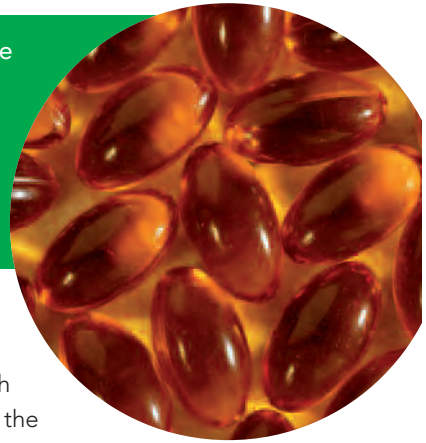
Major risk factors for vitamin D deficiency

- Limited sun exposure – including elderly age and/or being institutionalised, house-bound or non-ambulatory and individuals who are at high risk of skin cancer (due to sun avoidance)
- People with cognitive impairment
- People with gastrointestinal disease (e.g. coeliac disease), especially with malabsorption
- Those taking certain medications (e.g. some antiepileptic agents)

To get enough sunlight to produce vitamin D, a moderately fair person needs to expose their hands, face and arms (or equivalent area of skin which is about 15% of the body surface) to sunlight for about 6-8 minutes, 4-6 times a week, just before 10am or just after 3pm in summer. This would produce about a third of a minimal erythemal dose (MED) which is enough to give 1000 IU (International Units) of vitamin D. One MED is the amount of sun exposure that produces a faint redness of the skin. In winter, longer exposure times would be needed (depending on latitude) and preferably closer to noon. *(See Table 2 on opposite page).*

Older people need exposure to sunlight 5-6 times a week, while people with dark skin need longer exposure times, around 3-6 times greater.

Exposure to sunlight between 10 am and 2 pm in the summer months (11 am - 3 pm in daylight saving) is not advised or recommended, due to the cancerous effects of sunlight at that time. This outweighs any possible benefits from vitamin D production.



If you have low vitamin D levels in your blood, your doctor may suggest that you take a vitamin D supplement. Sometimes vitamin D is combined with calcium in the same preparation. Talk to your doctor about the type of supplement he or she recommends.

TABLE 2 SUN EXPOSURE TO ACHIEVE SUFFICIENT VITAMIN D FOR PEOPLE WITH MODERATELY FAIR SKIN*

	DECEMBER - JANUARY	JULY - AUGUST	
Region	At 10am or 2pm†	At 10am or 2pm	At 12 noon
NORTHERN AUSTRALIA			
Cairns	6 to 7 minutes	9 to 12 minutes	7 minutes
Townsville	5 to 7 minutes	9 to 13 minutes	7 minutes
CENTRAL AUSTRALIA			
Brisbane	6 to 7 minutes	15 to 19 minutes	11 minutes
Perth	5 to 6 minutes	20 to 28 minutes	15 minutes
SOUTHERN AUSTRALIA			
Sydney	6 to 8 minutes	26 to 28 minutes	16 minutes
Adelaide	5 to 7 minutes	25 to 38 minutes	19 minutes
Melbourne	6 to 8 minutes	32 to 52 minutes	25 minutes
Hobart	7 to 9 minutes	40 to 47 minutes	29 minutes
NEW ZEALAND			
Auckland	6 to 8 minutes	30 to 47 minutes	24 minutes
Christchurch	6 to 9 minutes	49 to 97 minutes	40 minutes

* *Sun exposure times resulting in 1/3 minimal erythemal dose. Exposure times for people with highly pigmented skin would be three to four times greater.*

† *11am or 3pm daylight saving time, respectively.*

Adapted from: Working Group of the Australian and New Zealand Bone and Mineral Society, Endocrine Society of Australia and Osteoporosis Australia. Vitamin D and adult bone health in Australia and New Zealand: a position statement. Med J Aust 2005: 182: 281-284.

EXERCISE

Regular physical activity on a long-term basis has a particularly important role in maintaining healthy bones. Exercise can maintain and increase bone strength by increasing bone mass or by slowing age-related bone loss. Muscle strength is also increased, which is important for supporting the joints and preventing falls.

Exercise has also been shown to improve co-ordination and balance, which helps to prevent falls and to improve general physical health and well-being.

Be aware that any positive gains in bone strength are lost when you stop exercising, so that it is important that your exercise is regular and ongoing.

Caution: Someone who has established osteoporosis (one or more fractures) may not be able to do as many types of activities as someone without osteoporosis. Talk to your doctor, physiotherapist or exercise physiologist about activities you can do. Also see the section in this booklet on 'Exercising with Osteoporosis'.

Exercise helps to build and maintain strong bones, prevent falls and fractures and speed rehabilitation.

PHYSICAL ACTIVITY AT DIFFERENT AGES AND STAGES

Childhood/Adolescence

Bone status: In girls, the major build up of bone occurs in the pre-teen years. Lifetime Peak Bone Density is reached during mid to late 20s.

Effect of exercise at this age: Maximises peak bone density, which helps keep bones strong for longer in adulthood.

Early to Middle Adulthood

Bone status: Bone loss starts to occur very gradually when a person reaches their thirties, although increases in bone density are still possible during middle adulthood. In women from 45 years on, bone loss begins to increase to 1-2% per year.

Effect of exercise at this age: Maintains bone strength by helping to slow bone loss, plus improve muscle strength, heart and lung fitness.

Postmenopausal Women

Bone status: Bone loss speeds up to 2-4% per year at the onset of menopause.

Effect of exercise at this age: Can maintain bone strength by helping to slow the rate of bone loss following menopause.

Men

Bone status: Generally bone density tends to remain constant until later in life. Low testosterone or hypogonadism can cause bone loss similar to postmenopausal women.

Effect of exercise at this age: Improvements in muscular strength, balance and co-ordination to help prevent falls and maintain general health. Testosterone combined with exercise may be beneficial for bone in men with hypogonadism.

Older Adults without Osteoporosis

Bone status: After 75 years of age further increases in bone loss occur in both sexes, especially from the neck of the femur (thigh bone). The risk of fracture increases as bone loss increases.

Effect of exercise at this age: Helps to maintain bone strength and increase muscle strength, balance and co-ordination, which in turn help to prevent falls.

Older Adults with Osteoporosis/Fractures

Bone status: Bones are increasingly thinner and brittle.

Effect of exercise at this age: Exercises recommended by doctors, physiotherapists or exercise physiologists can improve general health, strength, balance and posture to prevent falls.

Exercise and Bone Health

There are 4 main types of exercise that are beneficial to bone health:

1. Weight-bearing exercise
2. High impact exercise
3. Resistance training (weight lifting exercise)
4. Balance exercises

1. Weight-bearing exercise

Weight-bearing exercise means any exercise that is done while you are on your feet, so that gravity is exerting a force.

Your bones become stronger when they bear weight during exercise and when some amount of 'impact' or extra strain is placed on those bones.

If the 'strain' level is too low, then the bone will not become stronger and may still lose mass. Too much 'strain' could result in injury. The best 'strain' is from activities that may be new to your body, which means your bones are getting a variety of forces and loads on them.

Weight-bearing activities include: jogging, brisk walking, tennis, dancing and netball. Swimming and cycling are not weight-bearing exercises (but are good for muscle strength).

2. High impact exercise

Activities that are 'high-impact', such as aerobics, running, jumping, rope skipping and sports involving jumping, such as basketball and netball, have a greater effect on bone strength than 'low-impact' activities, such as walking and cycling. Everyday activities such as normal walking are not considered to be especially bone-building because they do not place sufficient strain on the bones to increase bone strength. Very fast walking however, has been shown to help maintain bone strength.

High-impact activities may not be suitable for everyone, especially if you have problems with your joints or other medical conditions. If you are unfit or inactive, lower intensity exercise is a safe starting point and you can progress to more moderate intensive exercise over time.

Everyday ways to increase your level of weight-bearing exercise:

- walking some or all of the way to work
- including some hills or specific exercises in your daily walk
- using stairs instead of lifts.

It is important to talk to your doctor, physiotherapist or exercise physiologist about the best type of weight-bearing exercise before you start.

A very fast short walk (20 min) is better for bone than a long slow walk of 1 hour.

3. Resistance exercise/training *(lifting weights with your arms or legs)*

Resistance exercises, also called strength training, can have a good effect on the health of your bones and have been shown to reduce the number of falls in older people. The strong muscle contractions required to move a heavy weight place stress or 'strain' on the bone that the muscles are attached to. When bone feels a 'strain' repeatedly (as also happens in regular exercise training) it responds by increasing bone mass so as to become stronger.

Targeting specific muscle groups around the hip, spine and arms with weight-lifting is also a good idea.

Everyday activities do not produce enough 'strain' to change bone mass, so resistance exercises need to be increased as the body adapts to each new level. This can be done by: increasing the resistance; changing the exercise so that a new strain pattern begins; or when it starts to feel easy, you need to increase the weight.

4. Balance exercises

Although balance training doesn't improve muscle strength or increase bone mass, it will improve balance and mobility and reduce fear of falling which are important for preventing osteoporotic fractures. Ways to improve balance include doing yoga and tai chi. Specific exercises include standing on one leg with eyes closed, sitting on an exercise ball, heel-to-toe walking (heel of one foot directly in front of the toes of the other foot, so they touch or almost touch) and balancing while placing a pillow or rocker board under your feet.

EXERCISE TIPS FOR STRONG BONES

- To have an effect on bone, exercise needs to be **regular, fairly vigorous, have variety** (put different loads on it), and include **short intense bursts**.
- The amount and type of exercise will vary depending on your age and bone health. Overall, most people should aim to exercise for 30 - 40 minutes, four to six times each week, and include some weight-bearing and resistance exercises in the program. You can build up to this level over time.
- 2 short exercise sessions (20 mins) separated by 8 hours, is better for bone than one long session.
- Start slowly and progress gradually. Try to get into an exercise routine. You can break it up into several smaller amounts throughout the day.
- Set short term goals for what you want to achieve. They must be realistic, achievable and measurable. For example, adding 50 jumps to your regular walk over a 3-month period.
- The process of bone building is slow, it starts to happen as soon as you start regular exercise but it takes at least 6 months to be able to measure the effects.
- Good exercises for bones: fast walking, jogging, dancing, tennis, volleyball and lifting weights. Choose exercises that you enjoy and vary your program to keep it interesting.
- If you are having pain while exercising, stop and talk to your doctor, physiotherapist or exercise physiologist.

Exercises if you have osteoporosis

Before commencing any exercise program, and especially if you have been diagnosed with osteoporosis and/or already had a fracture, you should first see your doctor, physiotherapist or exercise physiologist for an individual exercise program.

- Regular weight-bearing and resistance exercises are best for people with osteoporosis. **High-impact activities are only recommended for people with osteoporosis who don't have lower limb arthritis or recent fractures.**
- Spinal exercises (specifically extension strength training) during middle-age have been shown to reduce vertebral fracture rates over 10 years.
- Exercise can help to relieve the pain and some of the symptoms of increased kyphosis (curvature of the upper spine) and other postural changes.

Exercises if you have osteoporosis and spinal or lower limb fractures

Supervision by a physiotherapist, an exercise physiologist or other qualified health care professional can help to reduce your risk of further injury through falling, ensure that the program is suited to your needs and relieve acute pain.

You should:

- Practice balance-enhancing exercises
- Avoid high impact activities during acute recovery from fractures
- Avoid jarring and twisting movements while recovering
- Strengthen all the muscles of the legs to improve rehabilitation and prevent future falls
- Train upper body (eg triceps) while leg is healing to ease functional tasks
- Train the fractured leg once the surgical site is healed and permission is obtained from your orthopaedic surgeon
- **Avoid any physical activities that involve forward bending from the waist, especially while carrying objects because it increases the risk of compression fractures of the spine eg sit-ups with straight legs, lawn bowls and bending over to pick up something from the floor.**

EXERCISE WILL BENEFIT YOUR GENERAL HEALTH AND YOUR BONES

- Think of movement and exercise as an opportunity, not an inconvenience.
- Be active everyday in as many ways as you can, including bone building activities.
- 30 minutes of moderate intensity physical activity on most days is recommended for your general health – good for your heart and your bones.
- Exercise with a friend or in a group – you may be more likely to stick with it.

5. WHAT CAN I DO TO PREVENT FRACTURES?

If your doctor has diagnosed osteoporosis, you may be able to change some of the risk factors listed on page 6 to slow the rate of bone loss and lower the risk of fractures.

THESE CHANGES MIGHT INCLUDE:

- Stopping smoking.
- Increasing your calcium intake (through diet or supplements prescribed by your doctor).
- Increasing the amount of physical activity each week.
- Decreasing your alcohol intake.
- Increasing your exposure to limited sunlight to correct vitamin D deficiency.
- Finding ways to prevent falls from happening.

Your doctor might also change or reduce some of your medications, as they may be a cause of osteoporosis. Corticosteroid medications e.g. prednisolone, which is used to treat many other conditions such as asthma and arthritis, can cause osteoporosis and your doctor may reduce the dose. Your doctor may also advise you to start taking a medication specifically aimed at increasing bone mass and reducing fracture risk *(see below)*.

However, you need to consider all of the changes above that you can make to reduce your overall fracture risk, including medications as appropriate.

MEDICATION

In addition to lifestyle changes, your doctor may recommend medications to prevent further bone loss and minimise your fracture risk.

The medications work by making the bone cells that break down bone ineffective, while leaving the cells that form bone alone. This reduces the amount of bone lost, so that a net gain in bone density occurs over time.

Men and women aged 70 years and older with a very low BMD (T score ≤ -3.0) can receive medication for osteoporosis on the PBS (Pharmaceutical Benefits Scheme), without having had a fracture. Please speak to your doctor about which medication available is appropriate for you.

There are several types of medication available, including:

Bisphosphonates

Risedronate (trade name Actonel), alendronate (Fosamax) and disodium etidronate (Didrocal).

- These drugs reduce your risk of fracture by increasing bone density and reducing the turnover of bone. These drugs can lead to an increase in bone density by approximately 4-8% at the spine and 1-3% at the hip over the first 3-4 years of treatment.
- In clinical trials involving people with osteoporosis, bisphosphonates have been shown to reduce the incidence of spinal fractures by as much as 30-40% and in the hip by as much as 30-50%.
- Bisphosphonates are the best-studied drug treatment for men with osteoporosis. Stopping smoking and reducing excessive alcohol intake is also recommended.
- Bisphosphonates have also been shown to protect against the development of osteoporosis in people who are taking corticosteroids (e.g. cortisone, prednisone) for other medical conditions. One medication, risedronate, is now available for preventing bone loss in patients with low bone density (T-score of -1.5 or less) who are taking prednisolone at a daily dose of at least 7.5mg for at least 3 months.
- Side effects are generally few, but can include pain with swallowing, upper gastrointestinal effects and indigestion. It is important to take these medications with the recommended amount of water and stay upright for 30 minutes after taking the medication to avoid the rare complications of ulcers and erosions in your oesophagus.
- Fosamax Plus is Fosamax with vitamin D. Actonel Combi is Actonel plus calcium. Actonel Combi D is Actonel plus both calcium and vitamin D.

Generally, bisphosphonates should be taken first thing in the morning on an empty stomach with a glass of water. You should remain upright for half an hour after taking them and not eat or drink anything else in that half hour but you can walk around.

Zoledronic Acid (trade name: Aclasta)

- It is a bisphosphonate, given as a once-yearly, fifteen-minute intravenous infusion. It prevents further fractures in post-menopausal women who have had an osteoporotic fracture and prevents additional spinal and non-spinal fractures in men and women with recent hip fractures. A recent study showed it reduced the risk of spinal fractures by 70% and hip fractures by 41%. Side effects include fever, pains in the muscles, bones or joints, flu-like symptoms and headaches but these only usually last 1-2 days and occur mostly after the first infusion. These symptoms can be prevented by taking paracetamol. This medication is subsidised by the PBS for one treatment per year for a total of 3 years.

Jaw Osteonecrosis with Bisphosphonates

Jaw osteonecrosis (which means death of the bone) has most commonly been reported in cancer patients using very high doses of zoledronate or pamidronate. It is very uncommon in people taking bisphosphonates for osteoporosis, where the doses used (both oral and intravenous) are much lower. This problem can be caused by having a tooth removed if there is associated trauma whilst getting the tooth out, or an infection occurs afterwards. Patients should be aware of this potential side-effect, especially if they have poor dental hygiene and are likely to face a tooth extraction. If you have poor dental hygiene and may require an extraction, consider seeing your dentist before starting on bisphosphonates. For those already taking bisphosphonates, you should inform your dentist you are taking bisphosphonates if a tooth extraction or dental implant is planned.

Strontium Ranelate

Strontium Ranelate (trade name: Protos)

- Strontium ranelate is an agent for the prevention of fractures in post-menopausal women with osteoporosis. It has a dual action – increasing bone formation and decreasing bone resorption. Strontium ranelate reduces vertebral fractures by 50%, non-vertebral fractures by 16% and reduces hip fractures by 19%. It is a once daily dose, taken as a powder mixed with water. It is best taken at bed-time, at least 2 hours after food, calcium-containing products or antacids. Possible side-effects include nausea, diarrhoea, headache and skin irritation. An uncommon side effect is a blood clot in the vein (thrombosis) so if you experience pain or swelling in the legs or unusual or sudden shortness of breath, see your doctor immediately. A very rare side effect of strontium ranelate is drug hypersensitivity syndrome which causes a fever and/or rash and can affect other organs. See your doctor immediately if a fever and/or rash occurs whilst taking this medication.

Hormone Replacement Therapy (HRT)

- Oestrogen therapy (alone or in combination with progestogen) can prevent bone loss and reduce fracture risk in menopausal women and is especially indicated in the first 3-5 years of menopause, during which time menopausal symptoms are common and HRT is associated with very little risk of adverse effects.
- HRT is indicated for the short-term relief of menopausal symptoms (up to 5 years) and may have a role in preventing bone loss in these women. Its use is most appropriate in women under the age of 60 years.
- HRT is **not** recommended for the long-term management of osteoporosis alone in women or men, because of concerns about long-term safety. A small increase in the risk of cardiovascular disease (heart attack and stroke) and breast cancer is associated with prolonged use.

Tibolone (trade name: Livial)

- Tibolone is a synthetic hormone used in post-menopausal women for management of the menopause. It acts like the hormones oestrogen, progesterone and testosterone in different tissues. Although its use is associated with reduced spinal and non-spinal fractures, it is also associated with a small increase in the risk of stroke.

Selective Oestrogen Receptor Modulators (SERMs)

Raloxifene (trade name: Evista)

- This class of drugs works in a way that is either similar to or opposite to oestrogen, depending on which organ the drug is acting on. In bone it acts like oestrogen to reduce bone loss.
- Raloxifene reduces the incidence of spinal fractures by up to 50% but has not been demonstrated to reduce the risk of hip/non-spinal fractures.
- Raloxifene can worsen the symptoms of menopause.
- Raloxifene has been demonstrated to reduce the risk of invasive breast cancer in post-menopausal women on long-term therapy (greater than 5 years) without increasing the risk of endometrial cancer. However there is an increased risk of clots and fatal stroke.
- As raloxifene can increase your risk of clotting, your doctor will probably advise you to stop it if you are immobilised for a prolonged period.

Other Agents

Teriparatide (trade name: Forteo)

- Teriparatide is a synthetic parathyroid hormone fragment which stimulates new bone formation and increases bone density and strength.

HOW LONG SHOULD I TAKE MEDICATION FOR?

- Your bone density improves very slowly, especially around the hip, so the effects of medication may take many months to occur.
- The reduced risk of fractures seen with bisphosphonates and SERMs can be seen as early as 6 months to one year after starting treatment. You will probably have to take medication long-term. Currently, clinical trials looking at preventing fractures only extend for 5 years. If you are at high risk of fractures (eg have a prevalent fracture or osteoporosis on BMD T-score criteria) you are likely to be advised to continue treatment beyond 5 years. Your doctor may need to monitor the effect of treatment by repeating DXA scans and other tests at various stages.
- To get full benefit from your prescription medications, it is important to take them exactly as directed and for as long as your doctor prescribes. Unfortunately, many people stop treatment within 2 years, which is common with long-term medications. This means you do not get the full benefit of taking the drugs.

- Studies in postmenopausal women with prior spinal fractures have shown a reduction in the incidence of spinal (65%) and non-spinal (35%) fractures.
- It is for people with severe osteoporosis (bone mineral density T-score of -3.0 or lower), who have had at least two fractures when other drugs are considered either unsuitable or ineffective. It is a daily subcutaneous injection, with a maximum lifetime treatment time of 18 months.
- Side effects are minor but can include headache, dizziness and leg cramps. Bone cancers have been seen in some rats treated with teriparatide. It is not yet known whether humans treated with teriparatide would have an increased chance of getting bone cancer but to date no increase in such cancers has been seen in people treated with this drug.

QUESTIONS TO ASK YOUR DOCTOR

Your doctor will give you information about your condition, but you should make sure that you clearly understand the benefits and risks of any treatment he or she recommends.

It may help to take a list of questions to your appointment, and talk to your doctor about any concerns you have.

Discuss any problems you are having with treatment. Tell your doctor about any medications and treatments you are taking (including alternative ones such as vitamins) and don't stop any medication without talking to your doctor about it.

GOOD QUESTIONS TO ASK:

- What are the benefits of the treatment you recommend?
- Will I notice any changes while taking the medication?
- What are the side effects of treatment?
- What should I do if I have any side effects?
- What changes can I make to my lifestyle to help lower my risk of osteoporosis and fractures?
- Can you recommend a specific exercise program or a physiotherapist?
- What will happen if I don't have any treatment?
- How much do the treatments/tests cost?
- How long should I take the medication?
- Where can I get more information about osteoporosis?
- When should I return for another appointment?

You can also speak to your pharmacist with specific questions about your medications.

FALLS PREVENTION

A third of people aged over 65 fall every year and 10-15% of those falls lead to a fracture. In someone with osteoporosis, even a minor fall or injury can lead to a fracture, so preventing falls is very important. Falls are responsible for 90% of hip fractures and 50% of vertebral fractures in older patients. Falls are also more likely in people with poor leg muscle strength, poor balance or poor eyesight.

Muscle strength

- Do regular physical activity, as recommended by your physiotherapist.
- Tai Chi can be helpful in preventing falls.
- Ask for a referral to a 'Falls Prevention' or 'Falls and Balance' class or clinic through your doctor or health centre.

Balance

Poor balance can occur because of weak muscles, changes in blood pressure or heart rate, medications, ear problems and even poor diet. To improve balance:

- Let your doctor know if you have any dizziness or light-headedness, especially after taking any of your medications.
- Follow a healthy diet that includes calcium-rich foods such as dairy products, tinned fish (with bones) and plenty of fresh fruit and vegetables.
- Make sure you stay well hydrated by drinking plenty of water throughout the day.
- Ask your doctor or physiotherapist about specific balance exercises. You can also ask them about special 'falls and balance' classes.
- Use a walking aid if needed for balance.
- Consider putting in handrails by stairs, baths and toilets.

Individually tailored exercise programs include balance training to reduce the likelihood of having a fall.

Eyesight

Eyesight can deteriorate with age, making the eyes less sensitive to small details such as things on the floor, uneven ground and steps. It is important to:

- Make sure that your home is well lit so you can see where you are going at all times.
- Have your eyes tested yearly by an optometrist.
- If you wear glasses, make sure you use them as directed, and be careful when going up and down stairs if you wear bifocals or trifocals.
- Wear sunglasses outside to minimise glare and squinting.

Footwear

Poorly designed shoes can contribute to falls. Try to:

- Wear shoes with a broad heel and non-slip soles.
- Wear the correct size socks, pantyhose and shoes.
- Choose shoes that offer good foot support.
- Avoid high-heeled shoes.

AROUND THE HOME

Most falls occur in the home, but removing potential hazards may prevent many from occurring.

- Declutter all rooms, make clear paths for walking and move obstacles such as furniture away from the paths.
- Improve uneven floor surfaces such as shag pile carpets or damaged lino floors.
- Make sure mats, rugs and carpet edges are lying flat or remove them.
- Remove electrical cords from walking areas.
- Avoid walking on slippery or wet surfaces.
- Make sure rooms are well lit.
- Take care getting in and out of bed – go slowly and use a bedframe if needed.
- Install a handrail on at least one side of any stairs, baths, showers and toilets.
- Consider putting safety strips on edges of outdoor stairs.
- Be aware of pets when you are moving about.

6. GETTING ON YOUR FEET AFTER A FRACTURE

SPINAL FRACTURES

- For spinal osteoporotic fractures, your doctor may suggest: pain relief with non-steroidal anti-inflammatory drugs, abdominal bracing exercises, postural exercises and physiotherapy, particularly hydrotherapy.
- Hydrotherapy is also a good way to start exercising again. You can do strengthening exercises in the water, and the warmth and buoyancy make slow, gentle movements easier.
- It is important to exercise under the supervision of a physiotherapist to reduce the risk of falling and further injury. Physiotherapists can also advise you about maintaining good posture and show you techniques to relieve pain.
- The pain from spinal or vertebral crush fractures is usually short-term (6-8 weeks) and should resolve as the fracture heals. However, permanent changes to your posture can lead to chronic pain.
- If you have had multiple crush fractures, pain relief medications given in combination with TENS (transcutaneous electrical nerve stimulation) and relaxation techniques have been shown to be most effective. Talk to your physiotherapist about TENS machines and other pain-relieving treatments.
- Where pain persists, several surgical techniques have proven effective for some people. These include:
  - Vertebroplasty: 'cement' is injected through the skin into the vertebrae.
  - Kyphoplasty: an expandable balloon is put into a vertebrae and inflated. The cavity created in the bone is then filled with cement.

HIP FRACTURES

- Depending on your age and the type of surgery you have, you may go to a rehabilitation hospital after your hip surgery. This will help you to become as physically independent as possible.
- State Offices *(see contact details page 31)* run Osteoporosis Self-Management Programs for people who have osteoporosis and fractures. These courses also include sections on pain management and falls prevention strategies.
- You may continue rehabilitation at home or as an outpatient at the hospital. Home-based rehabilitation after any fracture usually includes various combinations of muscle strengthening, walking, transfer and balance training supervised by a physiotherapist.

7. FREQUENTLY ASKED QUESTIONS

1. **Are osteoarthritis and osteoporosis the same thing?**
   No. Osteoarthritis is a degenerative joint disease and involves deterioration of the joint surfaces (the cartilage covering the ends of the bones), leading to pain and stiffness in the joints. Osteoporosis involves thinning of the bone itself, making it weak, brittle and more likely to fracture.
2. **What is the difference between osteopenia and osteoporosis?**
   These words both describe bone loss. Osteopenia is when you have had some bone loss but not as much as with osteoporosis. If you have osteopenia, your risk of breaking a bone is increased, but not as much as with osteoporosis. If you have osteopenia you should be talking to your doctor about what you can do to maintain your bone strength and prevent fractures.
3. **Is there any difference between getting your calcium from food or from supplements?**
   There is no difference in the absorption of calcium from supplements or from food.
4. **Is there any difference between the bisphosphonates Actonel (risedronate) and Fosamax (alendronate)? Do they both have the same effect?**
   There is no evidence to suggest that there are any significant differences in the treatment effects of alendronate or risedronate. They are very similar in the way they act and in any potential side-effects. The most common side-effect with these medications is mild-moderate gastrointestinal discomfort.
5. **I am 50, have rheumatoid arthritis and am on high doses of corticosteroids. What should I do for my bone health?**
   Generally it is recommended that people commencing corticosteroid therapy for more than 3 months should be placed on a bisphosphonate at the same time to prevent bone loss and fractures. As well, a calcium/vitamin D supplement should also be considered.
6. **I am a 75 year old woman and becoming very hunched over in the top and middle part of my spine – do I have osteoporosis or is this just part of ageing?**
   Changes in your spinal posture as you describe are not just part of ageing. You may have had some 'crush' fractures in your spine that have caused your posture to become like a 'Dowager's hump'. You should definitely see your GP to discuss having a bone density test or spinal x-rays.
7. **I am 48 years old and seem to be going through menopause. Should I have a bone density test to see if I have osteoporosis?**
   This would depend on whether you have any other major risk factors for osteoporosis, such as a previous fragility fracture or family history. Discuss this with your GP next time you see him/her.

donations

HELP BUILD HEALTHY BONES. Please complete this section if you would like to make a donation to Osteoporosis Australia (OA) or if you would like further information. We welcome your support.

My Contact Details:

Title_____ First Name _____

Surname _____

Address _____

Suburb_____ State _____ Postcode _____

Daytime Phone (___)_____

Email _____

☐ *Tick if you prefer to receive information by email.*

Please Send Me Further Information About:

☐ Giving to OA in my will (strictly confidential)

☐ Giving regularly to OA through my bank account

My Gift Details:

YES! I want to help OA build healthy bones with a gift of:

☐ $50 ☐ $100 ☐ $250 ☐ $500 ☐ $1000 ☐ Gift of choice $_____

☐ My cheque/money order made payable to Osteoporosis Australia is enclosed

OR please deduct the above amount ☐ once ☐ monthly ☐ annually

from my ☐ Visa ☐ Mastercard ☐ Amex

Card Number |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Expiry Date |_|_|_|_|

Cardholder's Name_____

Signature _____

Please complete this form and mail it to:

✉ Osteoporosis Australia, GPO Box 121, Sydney NSW 2001

You can also make a donation by:

Phone: 1300 556 900 (9am to 5pm)

Fax: 02 9518 6306 (you can use this form)

Online: www.osteoporosis.org.au

osteoporosis australia

8. WHO WE ARE

OSTEOPOROSIS AUSTRALIA

Osteoporosis Australia is a national, not-for-profit organisation. Our goal is to reduce the incidence of osteoporosis and osteoporotic fractures in the Australian Community.

Our services include:

- a toll-free information line for consumers (1800 242 141)
- educational materials for consumers and health professionals
- Osteoblast magazine for consumers and medical professionals
- Osteoporosis Prevention and Self-Management Program for consumers
- regular community education seminars and national education programs.

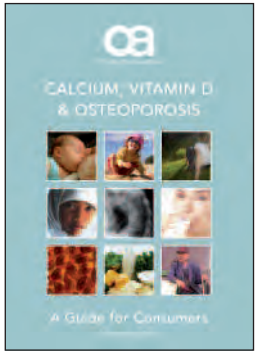
Our activities include:

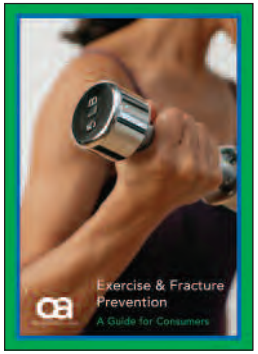
- National Healthy Bones Week – first week in August
- World Osteoporosis Day (October 20)
- Supporting medical research
- Health Professionals Program for GPs, Pharmacists, Nurses and other Health Professionals.

For further information, contact OA in your State 1800 242 141 or visit our website www.osteoporosis.org.au

Osteoporosis NSW	Tel: 02 9683 1622	Osteoporosis WA	Tel: 08 9388 2199
Osteoporosis VIC	Tel: 03 8531 8000	Osteoporosis TAS	Tel: 03 6231 2988
Osteoporosis QLD	Tel: 07 3857 4200	Osteoporosis ACT	Tel: 02 6288 4244
Osteoporosis SA	Tel: 08 8379 5345	Osteoporosis NT	Tel: 08 8948 5232

A SAMPLE OF CONSUMER GUIDES:





Translated Fact Sheets available in Arabic, Chinese, Greek, Italian and Vietnamese.