



The Bare Bones on Skeletal Health

A patient-friendly information booklet designed to help you better understand and manage your bone health.

Centre universitaire
de santé McGill



McGill University
Health Centre

Office d'éducation des patients
Patient Education Office

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We would like to recognize the McGill University Health Centre Patient Education Office for their support throughout the development of this booklet, including the writing, design, layout, as well as for the creation of all the images.

Funding was provided by the Patient Education Committee of the McGill University Health Centre.



IMPORTANT: PLEASE READ

Information provided by this booklet is for educational purposes. It is not intended to replace the advice or instruction of a professional healthcare practitioner, or to substitute for medical care. Contact a qualified healthcare practitioner if you have any questions concerning your care.

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This material is also available at:
MUHC Patient Education Portal
muhcpatienteducation.ca

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Patient Education Office

A Message from your Health Care Team

You have been given this booklet for one of the following reasons:

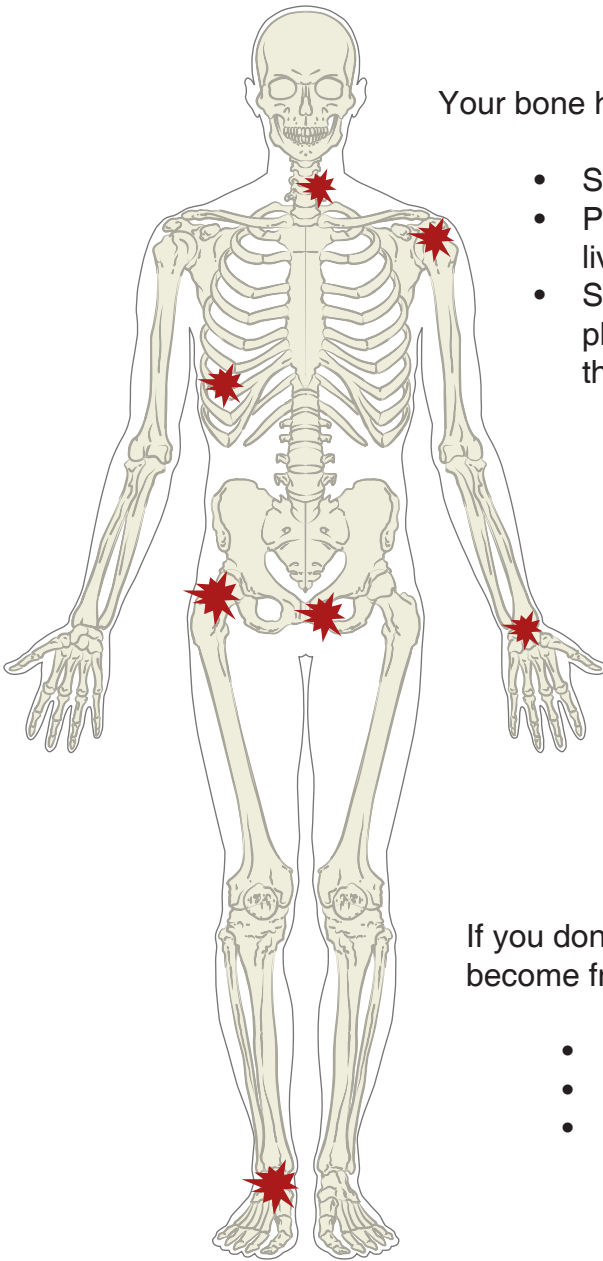
- You have recently broken a bone
- Your doctor believes you may be at risk of breaking a bone
- You have a health problem that can weaken your bones
- You are taking a medication or have had a treatment that can weaken your bones

The good news is that there are steps you can take to keep your bones strong and healthy! Using our expertise and what patients and their families have told us, we have designed this booklet so that it is useful, practical and easy to read. It will explain how you can:

- Improve the strength and health of your bones
- Lower your chances of breaking a bone
- Avoid falls
- Take action if you fall

We hope that this information and our guidance will support you and help you better manage your bone health.

Why is your bone health important?



Your bone health is important because your bones:

- Support your muscles so you can move
- Protect your organs (e.g., heart, lungs, liver, brain) from damage
- Store minerals (e.g., calcium, phosphorous) so your body can use them as needed

If you don't keep your bones healthy, they can become fragile and break (i.e. fracture):

- Fractures are painful
- Fractures can take a long time to heal
- Fractures can harm your health, happiness, general well-being and autonomy

Did you know?

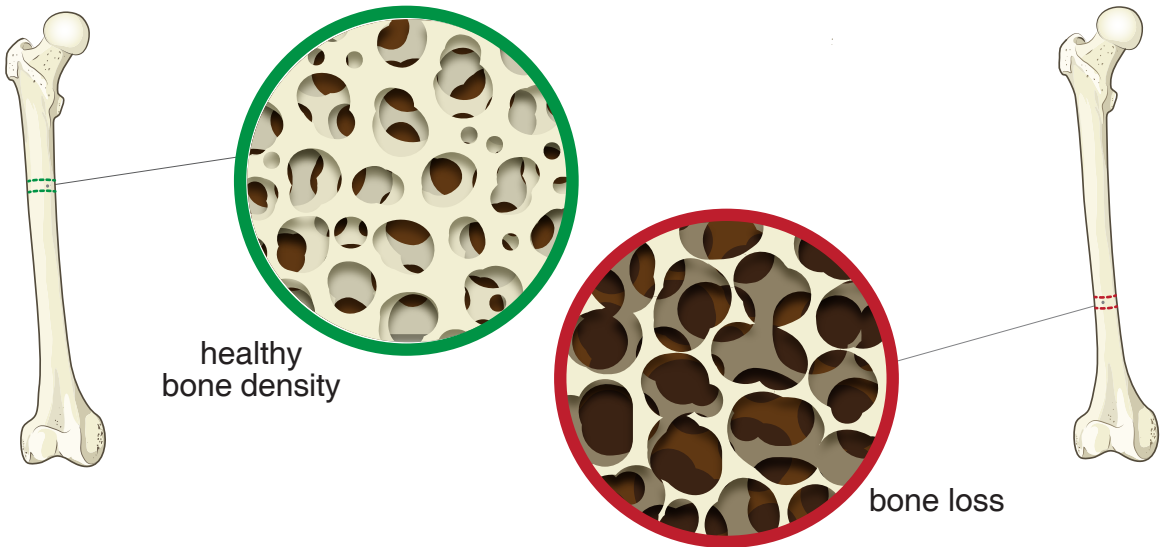
Bone is a living tissue made of protein (e.g., collagen) and minerals (e.g., calcium, phosphorus). Your bones are constantly changing. Throughout your life:

- Old bone is broken down
- New bone is added

The balance between these two steps changes as you age.

When you are young, more bone is added than is broken down, causing your bones to grow and become stronger (more dense). This is called **bone formation**.

After the age of 30, more bone is broken down than added, causing your bones to slowly become weaker (less dense). This is called **bone loss**.



What is osteoporosis?

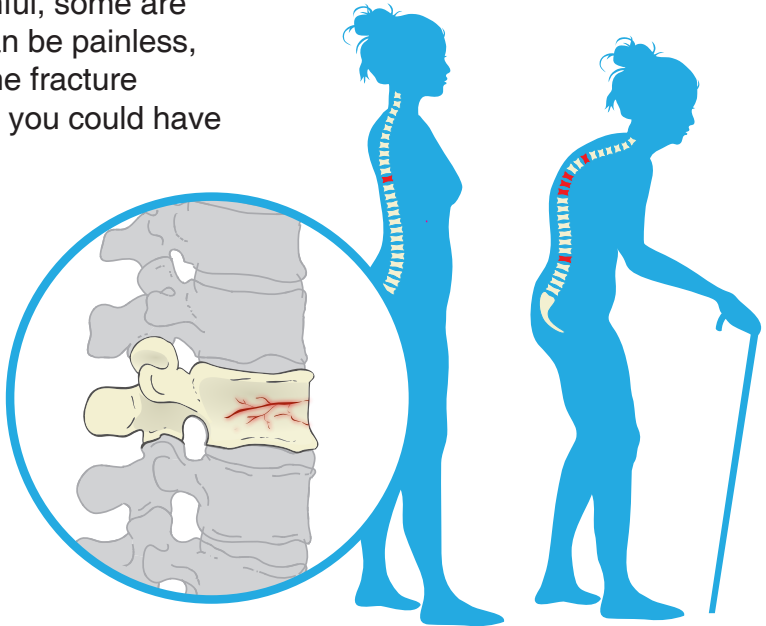
Osteoporosis is a bone disease which develops gradually over time when bone loss goes untreated. On the surface, the bones of people with osteoporosis look the same as those of healthy people but the structure inside the bone is much less dense making the bones more likely to break.

People with osteoporosis are more likely to suffer from **fragility fractures**. This is what broken bones are called when the fractures happen during normal activities that would not break a healthy bone, such as:

- Coughing or sneezing
- Reaching or lifting
- Bending or twisting
- A fall while walking or moving slowly
- A fall from standing height or less

While most fractures are painful, some are not. Fractures of the spine can be painless, meaning you can have a spine fracture without knowing it. Signs that you could have a spine fracture are:

- Loss of height
- A stooped posture
- A curved upper back



Although **fragility fractures** can happen anywhere in the body, they usually occur in the spine, hip, shoulder or wrist. A fragility fracture is often the first sign of **osteoporosis** because **bone loss** itself does not cause any symptoms.

What can increase your risk of developing osteoporosis?

Slow gradual bone loss is a normal part of aging. It does not lead to osteoporosis in all people.

Some of your personal traits can increase your risk of developing osteoporosis. On the other hand, it is possible for your actions to speed up bone loss, also increasing your risk of developing osteoporosis.

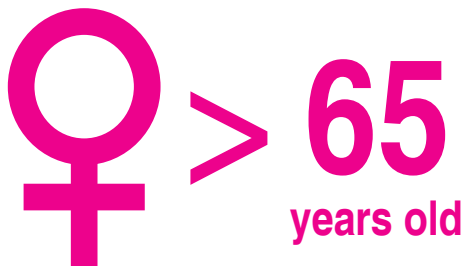
If you answer “Yes” to any of the questions below, you may be at a higher risk for developing osteoporosis. It is important that you speak with your doctor about your bone health.



Osteoporosis affects **1 in 4 WOMEN** and more than **1 in 8 MEN** over the age of 50.

Traits that increase your risk of developing osteoporosis:

- Are you a woman?
- Are you over 65 years old? Do you have a small frame?
- Are you of Caucasian (white) or of Asian descent?
- Has either your mother or father had a hip fracture?



Actions that can speed up bone loss:

- Do you smoke?
- Do you drink two or more alcoholic beverages per day on a regular basis?
- Is your diet low in calcium and vitamin D?
- Do you have an inactive lifestyle (not enough exercise)?
- Do you have a health problem that speeds up bone loss?
- Do you take a medication that speeds up bone loss?

What health problems cause bone loss?

Below are examples of health problems that can cause bone loss, increasing your risk for developing osteoporosis. Please note that this list is not complete. Always speak to your doctor to discuss any of your health problems that can cause bone loss.

Inflammation

- Rheumatoid arthritis
- Lupus
- Multiple sclerosis

Digestion

- Celiac disease
- Inflammatory bowel disease
- Bariatric surgery

Hormones

- Diabetes
- Thyroid disorders
- Cushing's syndrome
- Hyperparathyroidism
- Low estrogen levels in women
- Menstrual periods stopped for several months or longer (other than for pregnancy or menopause)
- Early menopause (before age 45)
- Low testosterone levels in men
- Erectile dysfunction
- Lack of sexual desire

Blood

- Leukemia and lymphoma
- Multiple myeloma

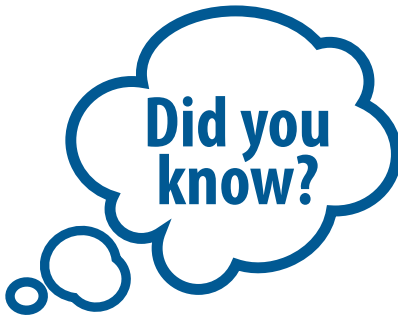
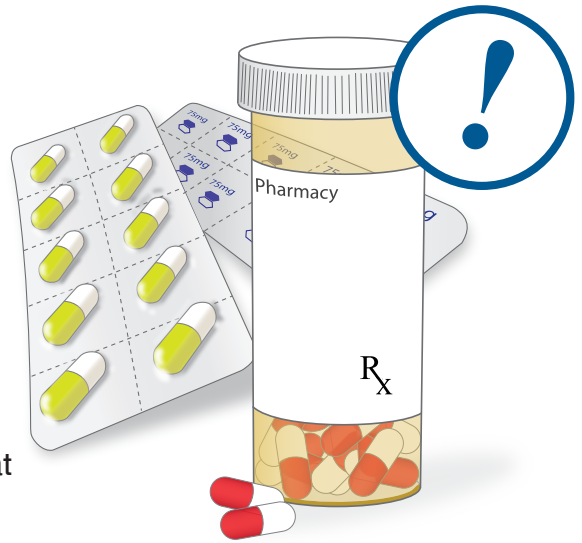
Other health problems or diseases

- AIDS/HIV
- Chronic obstructive pulmonary disease (COPD)
- Kidney disease
- Liver disease
- Organ transplant
- Significant weight loss

What medications cause bone loss?

It is important to talk to your doctor about how your medications can affect your bones. Some medications cause bone loss. They cause more bone loss if they are taken at high doses for a long period of time. If a medication you are taking causes bone loss, your doctor may suggest that you:

- Continue to take the medication but at a lower dose
- Stop taking the medication
- Switch to a different medication



Never stop any stop taking or change the dose of any medication without speaking with your doctor first.

Below is a list of common medications that can cause bone loss:

- Medications for immune system problems or for inflammation (e.g., Prednisone, Cortisone, Dexamethasone)
- Breast and ovarian cancer medications (e.g., Arimidex®, Femara®, Aromasin®)
- Prostate cancer medications (e.g., Zoladex®, Lupron®, Decapeptyl®)
- Heartburn and gastroesophageal reflux disease (GERD) medications (e.g., Pantoloc®, Prevacid®, Losec®, Pariet®, Nexium®)
- Some seizure medications (e.g., Tegretol®, Dilantin®)
- Some medications to treat edema (a type of swelling) (e.g., Lasix®)
- Some medications to prevent blood clots (e.g., Heparin)

How can you improve your bone health?

Osteoporosis is a preventable disease. For some people, lifestyle changes alone can improve bone health. Here are steps that you can take to slow or stop the progress of the disease:



1. Stop smoking

Recent studies have shown that smoking cigarettes speeds up bone loss.

2. Don't drink too much alcohol

Alcohol can get in the way of your body's ability to absorb calcium. Drinking more than two alcoholic beverages a day increases your risk for developing osteoporosis.

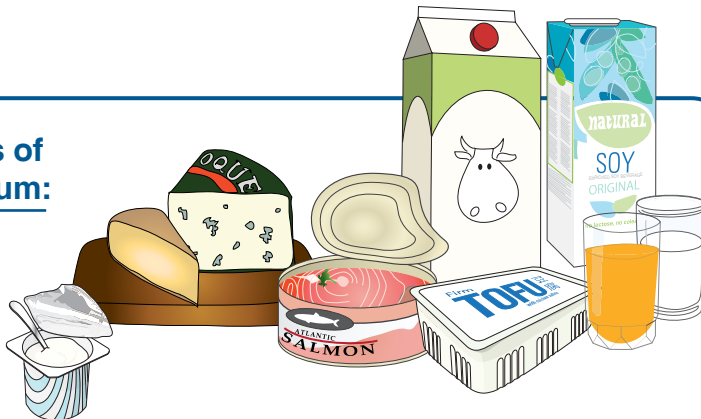


3. Eat foods rich in calcium and vitamin D

Calcium is a mineral found in many foods. Some foods contain more calcium than others.

Here are examples of foods rich in calcium:

- Milk
- Yogurt
- Cheese
- Salmon with bones
- Soy beverages and orange juice fortified with calcium
- Firm tofu made with calcium sulfate



Eating foods that are rich in **calcium** can help slow bone loss and lower your risk of breaking a bone.

Your body has more trouble absorbing calcium as you get older. Healthy adults over the age of 50 need 1200 mg of calcium every day to keep their bones strong. Speak to a nutritionist or your doctor to learn what this would look like for you. If you are not able to get enough calcium from your diet alone, your doctor may suggest that you take calcium supplements.

Vitamin D is made by your skin when it is exposed to the sun's rays without sunscreen on. This is your body's main source of vitamin D. However, too much sun exposure is not recommended because it can increase your risk of developing skin cancer. Also, your skin has more trouble making vitamin D as you get older.

Here are examples of foods rich in vitamin D:

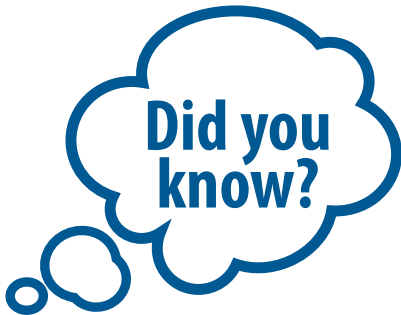


- Milk
- Egg yolks
- Fish liver oils
- Fortified non-dairy beverages (soy, almond, rice)
- Oily or fatty fish, such as salmon

It is also hard to get vitamin D from your diet because vitamin D is not naturally found in as many foods as calcium. Some of the foods that you eat may be **fortified** with vitamin D, meaning they have vitamin D added to them.

Vitamin D is important because it helps your body better absorb calcium. It also helps keep your muscles healthy, which improves your balance, making you less likely to fall.

Osteoporosis Canada recommends that all adults over the age of 50 take **800 to 2000 IU (International Units)** of vitamin D supplements every day. This is because it is very hard to get enough vitamin D to keep your bones and muscles healthy from the sun or your diet alone.

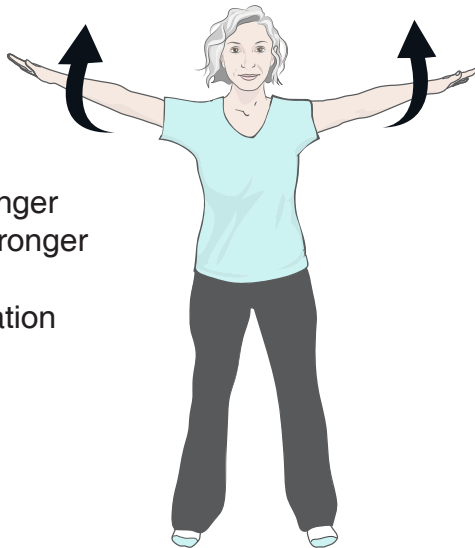


Some foods make it harder for your body to absorb calcium. To make sure your bones are getting enough calcium, don't eat or drink too many foods or beverages that contain alcohol, caffeine or sodium (salt).

4. Exercise regularly

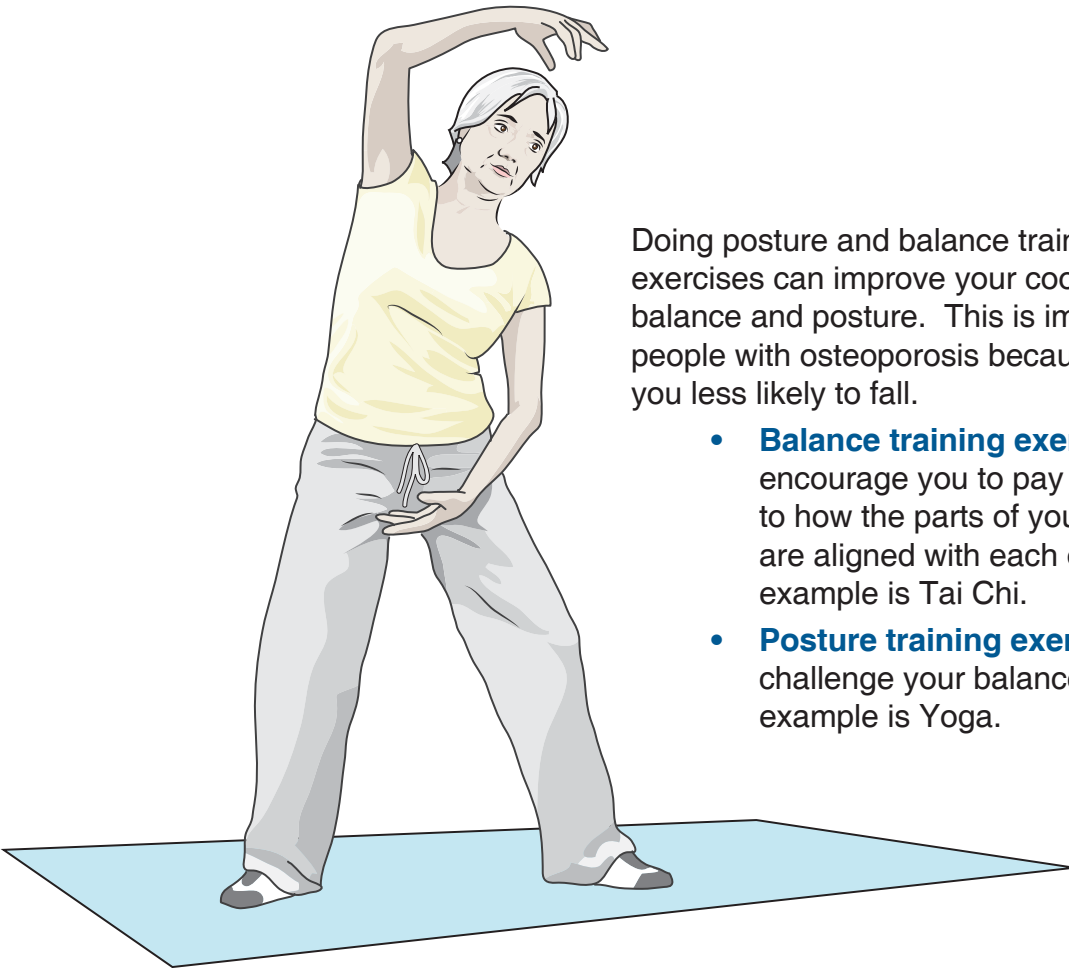
It is important to stay physically active as you get older. Exercise can:

- Make your bones stronger
- Make your muscles stronger and more flexible
- Improve your coordination and balance
- Improve your posture



Doing weight-bearing and muscle-strengthening exercises can make your bones stronger by slowing bone loss:

- **Weight-bearing exercises** encourage you to use your muscles to work against gravity to stay standing up. A few examples are dancing, jogging, using elliptical training machines, aerobics and brisk walking.
- **Muscle-strengthening exercises** encourage you to use your muscles to push or pull against an object. A few examples are lifting weights, using elastic exercise bands and using weight machines.



Doing posture and balance training exercises can improve your coordination, balance and posture. This is important for people with osteoporosis because it makes you less likely to fall.

- **Balance training exercises** encourage you to pay attention to how the parts of your body are aligned with each other. One example is Tai Chi.
- **Posture training exercises** challenge your balance. One example is Yoga.

WARNING



Please note

Always consult your doctor or physiotherapist before you start any new exercises. Your exercise plan needs to be carefully tailored to your needs so that you do not hurt yourself. Ask which exercises you can perform safely and which you should avoid. Also, ask how often you should do each exercise and how hard you should push yourself.

5. Speak to your doctor about your bone health

It is important to talk to your doctor about any concerns you may have about your bone health. Here are some questions you may want to ask at your next appointment:



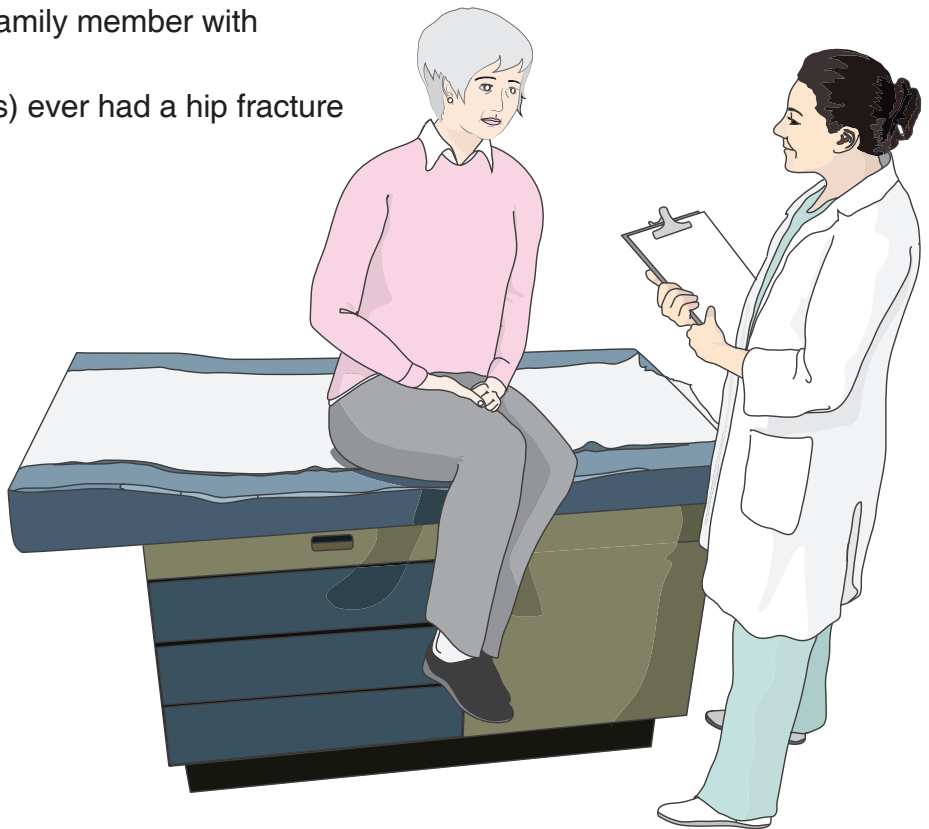
- Do I have risk factors for osteoporosis?
- Am I getting enough calcium and vitamin D?
- Should I take calcium and vitamin D supplements?
- What types of exercises should I be doing?
- Do I have a health problem that can cause bone loss?
- Do any of the medications I take cause bone loss?
- Should I be assessed to figure out the likelihood that I will break a bone?

How likely are you to break a bone?

A fracture is often the first sign of osteoporosis but it does not have to be. Speaking to your doctor about your bone health can help him/her detect bone loss before your bones become fragile and break. To assess the likelihood that you will break a bone, also called your fracture risk, your doctor will:

Ask you questions about your **medical history** similar to those found on page 6. You should always tell your doctor if:

- You have broken a bone as an adult
- You have a family member with osteoporosis
- Your parent(s) ever had a hip fracture



Do a **physical exam** to check for signs of spine fractures by:

- Measuring your height and comparing it to your last visit to see if you got shorter
- Examining your spine to see if your posture has changed
- Sending you for an x-ray if they suspect you have a spine fracture

Recommend that you have a **bone mineral density (BMD) test**:

This is a scan that uses low-level x-rays to calculate your **bone density** by measuring how much calcium and other minerals make up a section of your bone.

- The bones which are scanned are usually your spine and your hips.
- If it is not possible to scan your spine or your hips, your wrist can be scanned instead.
- These bones are chosen because they are often the site of fragility fractures.



Did you know?

The BMD machine is called a DXA (dual-energy x-ray absorptiometry). The result of your BMD test is a number called a T-Score. Your T-score compares your bone density with the bone density of an average young adult.

- A high T-Score (-1 or higher) means that your bones are in good health.
- A low T-Score (-2.5 or lower) means that your bones are fragile and you have osteoporosis.

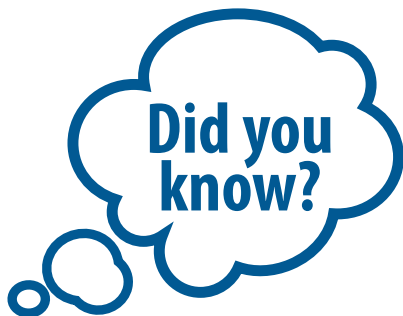
BMD tests are normally done once every two years so that your doctor can see if your bone density is improving, getting worse, or staying the same.

What are the treatment options for osteoporosis?

Your doctor will use a tool to combine the results from your medical history, physical exam and BMD test to assess your fracture risk. If your fracture risk is high (over 20%) your doctor will likely prescribe a medication to treat your osteoporosis. The goal of osteoporosis treatment is to prevent fractures. In addition to appropriate calcium and vitamin D intake, and exercise, the three most common osteoporosis treatments are:

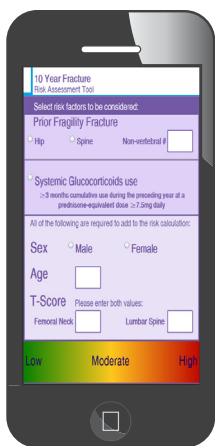


- **Bisphosphonates**, which are the most common class of drugs prescribed to treat osteoporosis. They reduce your fracture risk by slowing down bone loss. Alendronate (Fosamax®), Risedronate (Actonel®) and Zoledronic acid (Aclasta®) are bisphosphonates.
- **Denosumab** (Prolia®), which is a newer drug that also reduces your fracture risk by slowing down bone loss. It is often used in people who can't take a bisphosphonate, such as some people with reduced kidney function.
- **Teriparatide** (Forteo®), which reduces your fracture risk by speeding up bone formation.

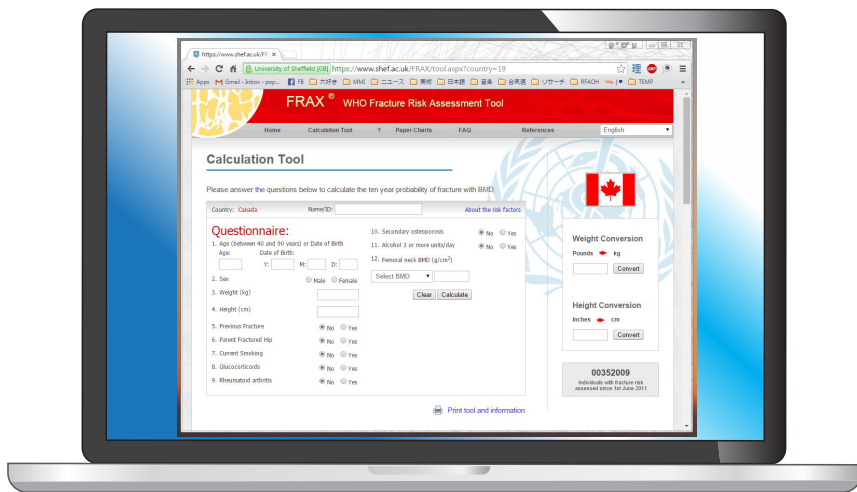


It is important to ask your doctor to do a **Fracture Risk Assessment** to calculate your fracture risk. Doctors can use one of two tools to calculate your **fracture risk**:

- 1) **CAROC** (Canadian Association of Radiologists and Osteoporosis Canada Risk Assessment)
- 2) **FRAX** (Fracture Risk Assessment Tool)



Canadian Association of Radiologists and Osteoporosis Canada (CAROC) Risk Assessment mobile app



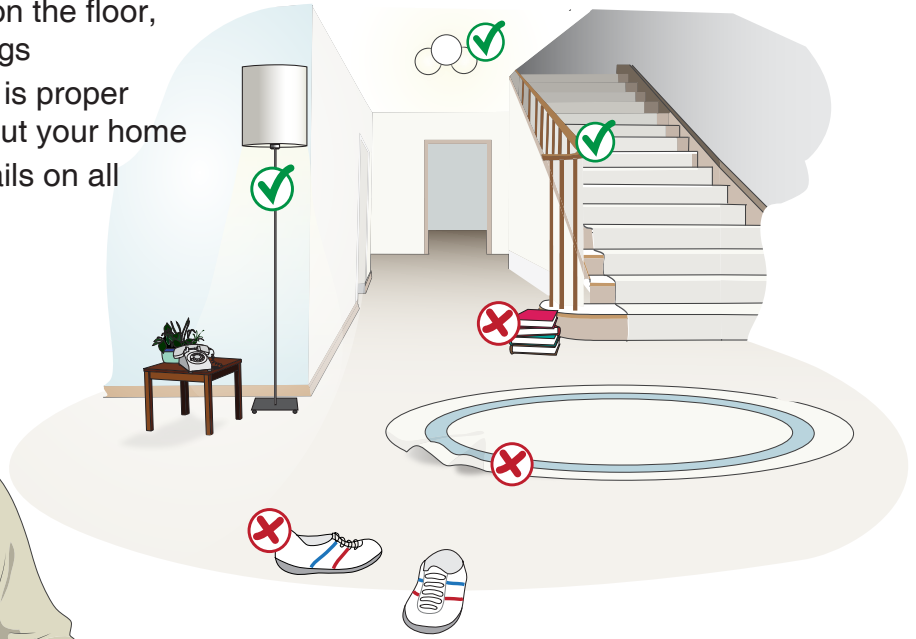
WHO (World Health Organization) online Fracture Risk Assessment Tool (FRAX)

What can you do to prevent a fall?

If you have osteoporosis, you are much more likely to break a bone if you fall, so the best way to avoid fractures is to prevent falls. You can prevent falls by:

Make your home safe:

- Remove clutter on the floor, such as loose rugs
- Make sure there is proper lighting throughout your home
- Use solid handrails on all stairways



Wear sensible shoes:

- Sturdy shoes with non-skid soles are much safer to wear than high heels, slippers, or bare stockings

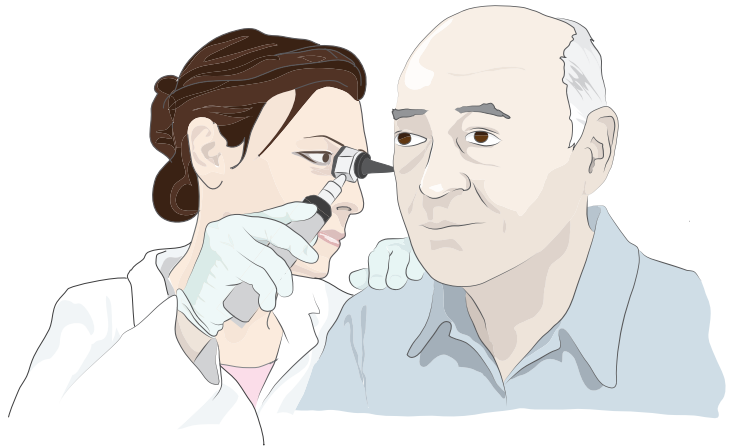
Use mobility aids and assistive devices:

- Consider using a cane or a walker
- Use rubber mats and grab bars in your bath or shower



Exercising regularly:

- Stay active to improve your balance and muscle strength
- You can do your doctor-approved exercises at home or in a group setting

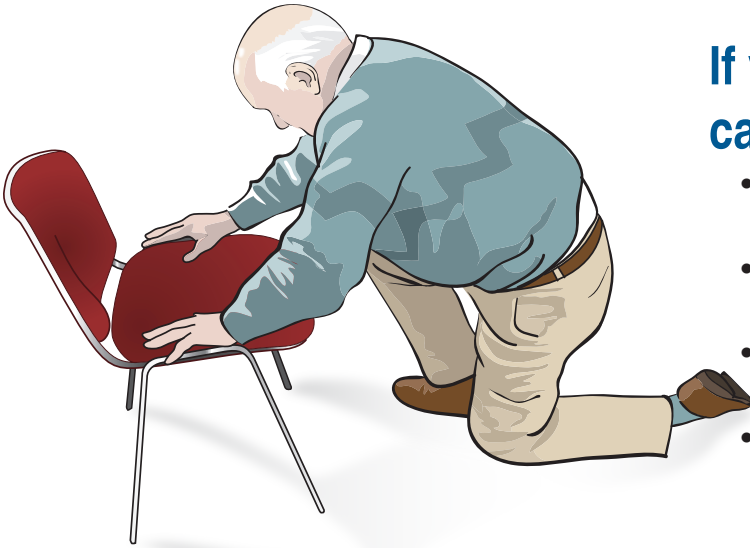


Speaking to your doctor:

- Ask your doctor or pharmacist if any of the medications you take can cause dizziness or sleepiness
- Have your vision and hearing checked regularly

What should you do if you fall?

If you do fall, don't rush to get up. Take time to catch your breath and make sure you are not hurt before trying to get up. Most importantly, stay calm.



If you feel that you can get up:

- Slowly roll onto your side and then onto all fours.
- Crawl to the nearest sturdy object or chair.
- Use your arms to brace yourself against the object.
- Pull yourself up into the kneeling position, and then stand up, one leg at a time.

If you feel that you cannot get up:

- Try to make noise to attract attention to yourself.
- Try to use a telephone or emergency call device to call for help.
- Try to stay comfortable, warm and dry while waiting for help.
- Try to move your joints to help circulation and prevent stiffness.

What should you do after a fall?

Always tell your doctor if you had a fall. Your doctor can:

- Help you understand why you fell so that you can prevent falling again
- Test your vision, balance and blood pressure to make sure there are no problems
- Refer you to an occupational therapist who can help make your home more safe
- Prescribe pain medication if you are experiencing pain

Do not let the fear of falling stop you from doing regular everyday activities!

Why is it important to manage your pain?



Injuries such as broken bones can be painful. Managing your pain is extremely important because it will help you:

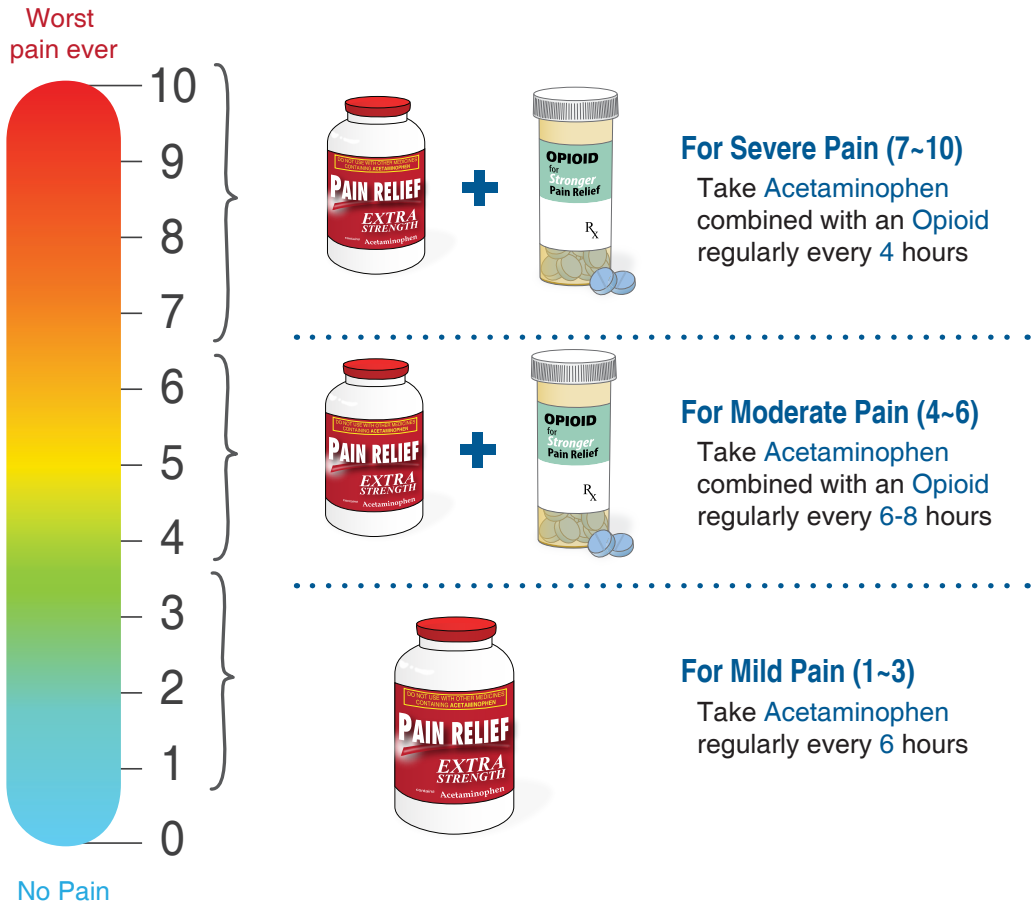
- Move and breathe more easily
- Eat and sleep better
- Become more independent
- Improve your general sense of well-being
- Avoid depression, anxiety and unnecessary suffering

The better your pain is managed, the faster you will recover, and the sooner you can return to your regular everyday activities!

How can you best manage your pain?

If you were prescribed medication for pain, follow these instructions to help decide which medication you should take and how often you should take it, to control your pain.

First ask yourself, “On a scale from 0 (no pain) to 10 (worst pain ever) how much pain am I in right now?” This is called your **pain level**. Next, look at the number that matches your pain level and follow the recommendations below:



What type of medication was I prescribed?

Doctors prescribe different medications for different levels of pain:



1. Acetaminophen:

For mild pain

- Examples: Tylenol®, Atasol®



2. Opioids*:

A stronger medication for moderate to severe pain

- Examples: Supeudol® (oxycodone), Empracet®, codeine and morphine



**Please
note**

*Use opioids only as prescribed. They are intended only for moderate to severe pain and only when prescribed by a doctor.

To help lessen your pain, you can also:

- Use cool cloths or ice to soothe your muscle pain
- Position yourself carefully with pillows and soft cushions
- Breathe slowly and quietly to relax your mind and body
- Engage in pleasant distractions such as meditating, reading, or listening to music

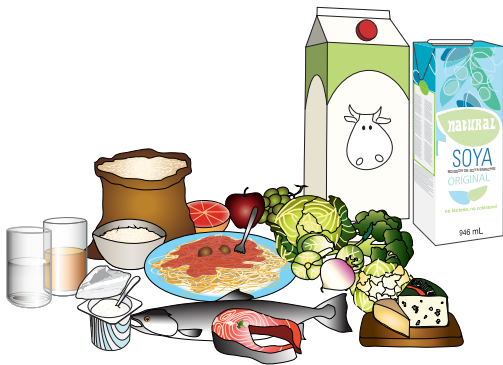


**Did you
know?**

It is important not to wait until your pain is severe to take your medications. It is much easier to treat mild to moderate pain.

To learn more, visit www.painfreeinitiative.org

How can you speed up your recovery?



Following a balanced diet and drinking water regularly



Doing exercises approved by your doctor



Making sure to get enough sleep



Controlling your pain by taking pain medication as prescribed by your doctor



Speaking to your doctor if you are unable to control your pain

Special situations

The following health problems (or their related treatments) can increase your risk of developing osteoporosis. If any of these situations apply to you, it is important to speak to your doctor about:

- Having a **fracture risk assessment** to figure out your **fracture risk**
- How to manage your health problem so you can **prevent bone loss**



I have recently broken a bone

A broken bone is often the first sign of osteoporosis. Fragility fractures, especially of the spine or hip, increase the likelihood that you will have another fracture.

I am being treated for cancer

Any of the following can lead to bone loss:

- Some types of chemotherapy and radiation therapy
- Aromatase inhibitors (to lower estrogen levels in women to treat breast cancer)
- Androgen deprivation therapy (to lower testosterone in men to treat prostate cancer)
- Lack of physical activity from cancer treatment making you very tired

I am waiting to receive an organ transplant

Any of the following can lead to bone loss:

- Organ failure (e.g. liver, lung or kidney)
- Some medications you may be taking (e.g. Heparin or loop diuretics)
- Steroids and immunosuppressive medications taken after a transplant to prevent rejection



I have rheumatoid arthritis

Any of the following can lead to bone loss:

- Changes in your body because of the rheumatoid arthritis
- Glucocorticoid medications when taken over a long period of time
- Lack of physical activity from pain and difficulty moving your joints

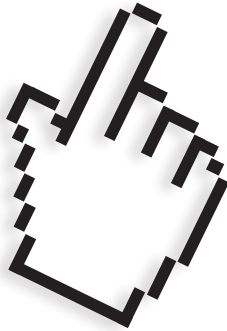
I have inflammatory bowel disease

Any of the following can lead to bone loss:

- Inflammation (worse with Crohn's disease than with ulcerative colitis)
- Glucocorticoid medications when taken over a long period of time
- The small intestine not absorbing enough vitamin D (only applies if you have Crohn's disease and is worse if you have had a small-bowel resection)



Where can you find additional reliable resources?



Osteoporosis Canada

is the only national organization dedicated to serving people who have or are at risk for osteoporosis and osteoporotic fractures.

- www.osteoporosis.ca
Toll-free information line 1-800-463-6842

COPN (Canadian Osteoporosis Patient Network)

publishes a regular newsletter, with helpful tips and information on living with osteoporosis, free of charge to subscribers. To contact COPN, email:

- copn@osteoporosis.ca.

After a broken bone:

information about pain after a broken bone

- www.osteoporosis.ca/atf
- 1-800-463-6842

National Institute of Health:

- www.nihseniorhealth.gov/osteoporosis/whatisosteoporosis/01.html

National Osteoporosis Foundation:

- www.nof.org

Journal of the American Medical Association (JAMA)

Osteoporosis Patient page

- www.jama.jamanetwork.com/article.aspx?articleid=1810381&resultClick=3

International Osteoporosis Foundation:

- <http://www.iofbonehealth.org/>

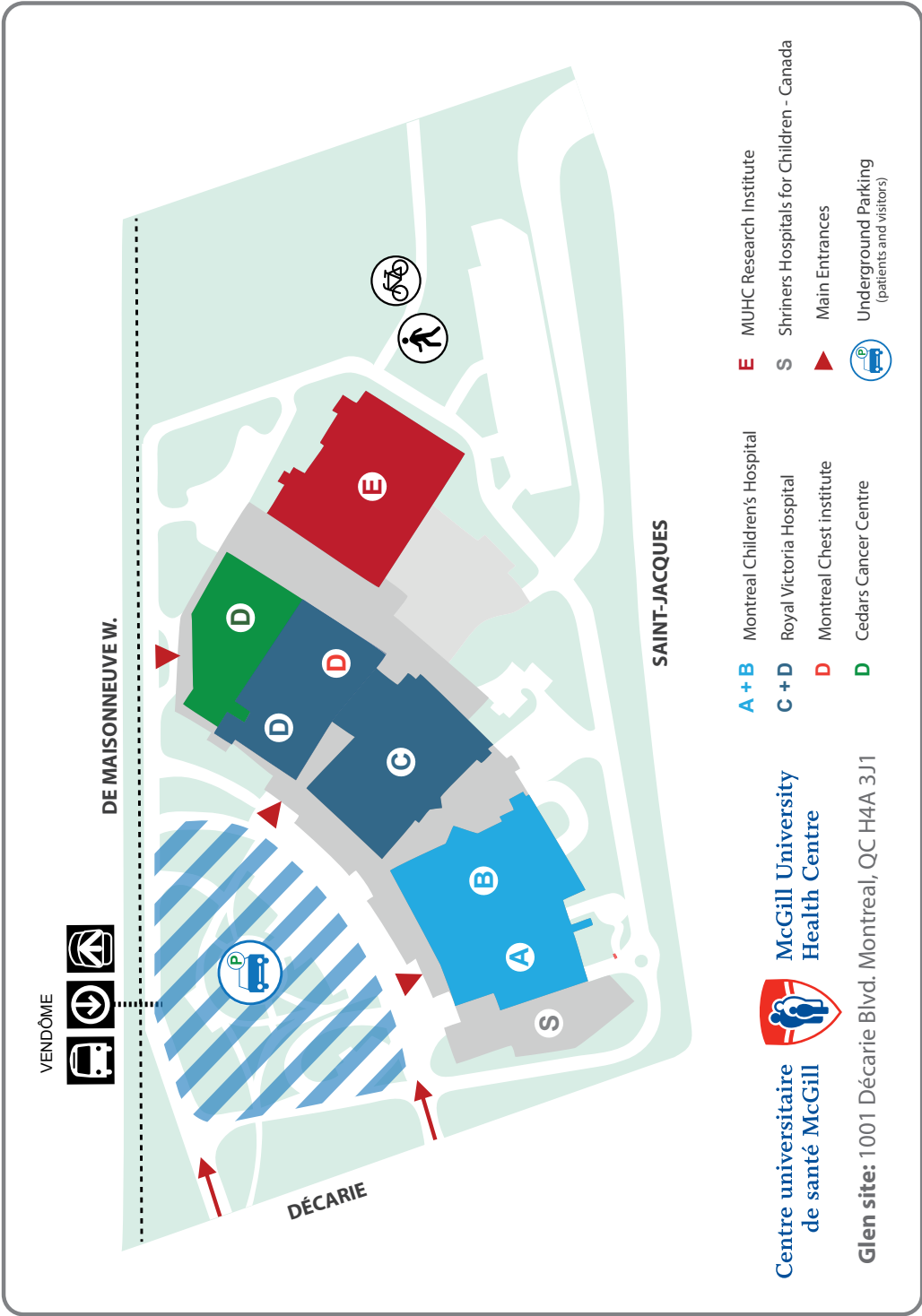
Public Health Agency of Canada Osteoporosis page

- www.phac-aspc.gc.ca/cd-mc/osteoporosis-osteoporose-eng.php

Notes

Use this page to write down questions or concerns, regarding your bone health, to discuss with your doctor or health care team.

A series of horizontal dotted lines provided for writing notes.



Help Us Help Others

Help support the MUHC Patient Education Office! Donations make a huge difference. They help us create health information materials and programs to deliver the best care for life. All patient materials are freely available on the internet to MUHC patients, and to patients and families everywhere.

Make a donation through the Montreal General Hospital Foundation to:



**MUHC Patient Education
Dr. David Fleiszer**



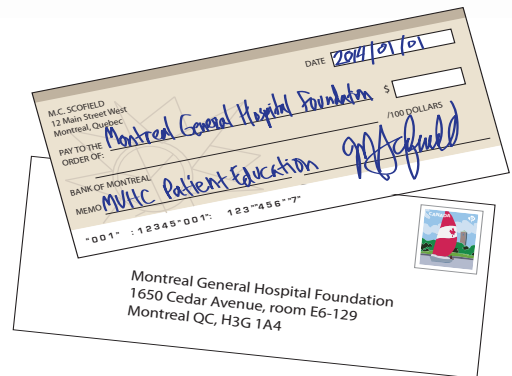
Online: mghfoundation.com

By Phone: 514-934-8230

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