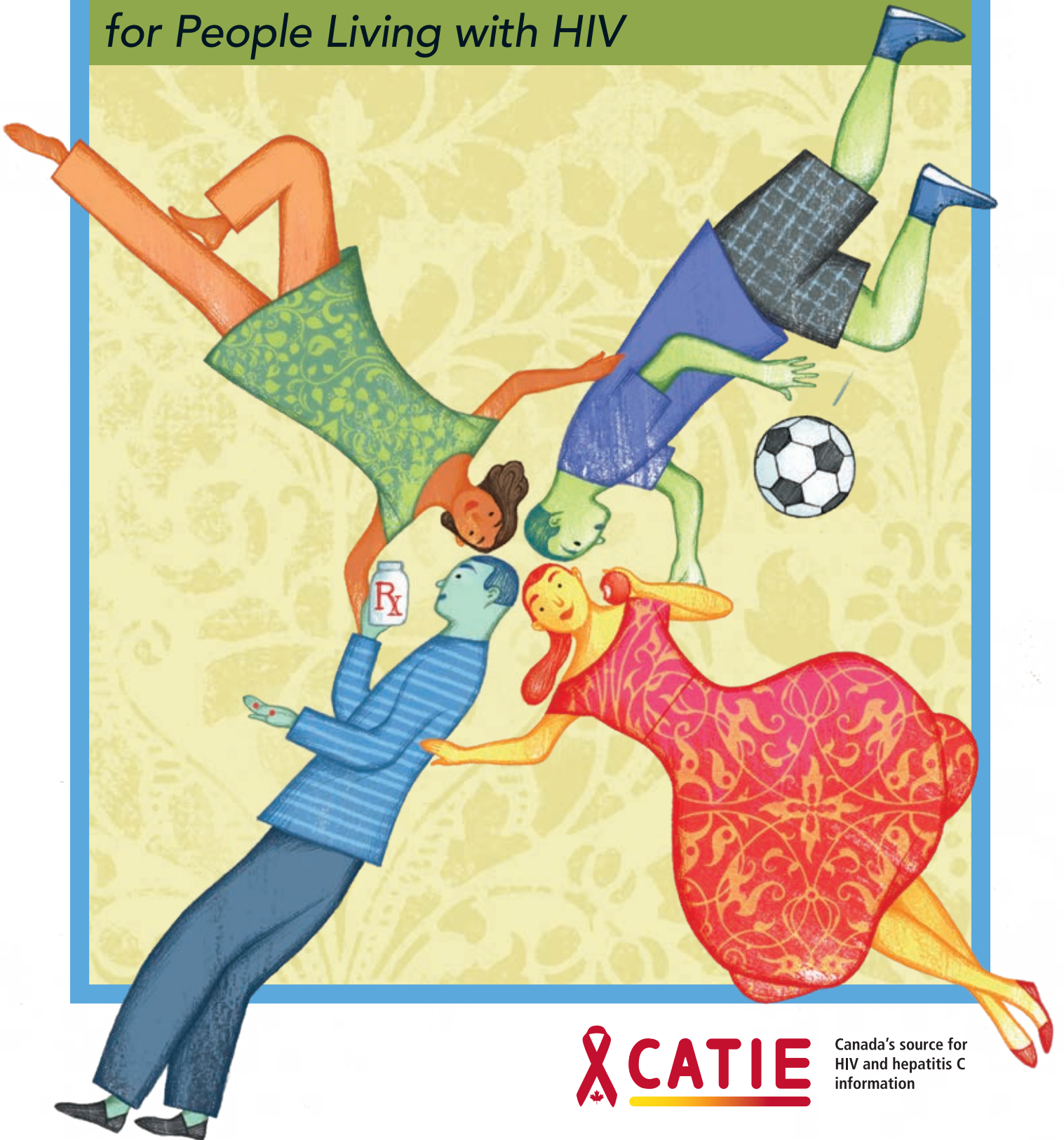


# A Practical Guide to A Healthy Body

*for People Living with HIV*



Canada's source for  
HIV and hepatitis C  
information

# A Practical Guide to A Healthy Body for People Living with HIV

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## About CATIE

CATIE is Canada's source for up-to-date, unbiased information about HIV and hepatitis C. We connect people living with HIV and/or hepatitis C, at-risk communities, healthcare providers and community organizations with the knowledge, resources and expertise to reduce transmission and improve quality of life.

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# Introduction

Welcome to CATIE's *Practical Guide to a Healthy Body for People Living with HIV*. Thanks to dramatic and ongoing improvements in HIV treatment, most people living with HIV are now living much longer than ever imagined possible. This means that we can now think about our health from a long-term perspective. We can consider the impact of HIV as we age and take care of ourselves with this in mind.



Certainly, it is still important to educate ourselves about the acute health conditions associated with HIV and the short-term side effects of HIV treatment. But it is also important to examine the long-term effects of living with the virus and to care for our bodies, which over the years bear the burden of HIV infection and the long-term side effects of HIV medication.

As you'll see in the sections that follow, HIV and the medications used to control it can have many long-term effects—on our bones, our major organs, our hormones, our blood sugar and our cholesterol levels. Even when controlled by antiretroviral therapy (ART), HIV causes chronic inflammation that can have cumulative effects on all the major organs and systems of the body. In the brain, this inflammation

can lead to cognitive impairment of varying degrees (problems with a person's memory, thinking and judgment). In the bones, it can lead to accelerated loss of bone density. People with HIV are also at greater risk of developing heart disease, diabetes and kidney problems. But just as there are many possible long-term effects of HIV and its treatment, there are also many ways, especially if we know our HIV status early on, that we can take our health in hand to prevent or resolve them. This guide will hopefully help you to do just that.

We hope that this guide will help you become—and remain—the healthiest you can be for the longest time possible. It will help you understand more about the ways in which HIV and ART can affect your body

and what you can do to prevent and manage long-term health conditions alongside your HIV. You will need your doctor and other healthcare providers to help you access some of the treatments suggested in this guide, but in these pages you will also find advice on over-the-counter remedies and lots of things you can do to help yourself.

As the title says, this publication is meant to be a practical guide. Feel free to use it in any way that suits you. You may want to read only the sections that relate to specific issues you are experiencing or you may choose to read it from start to finish to promote your overall health and well-being.

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## Staying up-to-date

What we know about HIV, its treatment and the long-term impact of living with HIV on our bodies is constantly evolving. In this guide, we've tried to focus on information not apt to change quickly.

For the most up-to-date information, visit **www.catie.ca**, where you will find a wealth of information as well as links to many other reputable online sources of HIV information. If you don't find an answer to your question there, you can contact CATIE with any questions and we'll do our best to answer them. Email us at **info@catie.ca**. Most importantly, don't forget that none of this information can replace the advice of your doctor.

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## About the author

Lark Lands has provided expert, holistic and practical advice for healthier living with HIV for more than 30 years. You can find more of her writing at **www.larklands.net**.

# Healthy Living

Making healthy living practices your “new normal” will help you live long and well with HIV. In addition to taking HIV meds, this means eating a nutritious diet, exercising regularly, enjoying a healthy sex life, nurturing your emotional well-being—and, if you do street drugs, taking steps to minimize the potential harms. These practices are good for the health of HIV-negative people, too, but for people living with HIV, they are even more important.



## Antiretroviral therapy

For most people with HIV, taking and staying on a combination of antiretroviral drugs (also called antiretroviral therapy, or ART) is central to maintaining their long-term health. ART reduces the amount of HIV in your body and allows your immune system to partially recover. By taking and staying on ART, your chances of living long and well improve significantly. We also now know that people on ART who maintain an undetectable viral load do not pass HIV to their sexual partners.

Though HIV medications can cause side effects, the newer medications commonly prescribed today are well tolerated by most people. You may have to try a couple of combinations to find the one that works best for you. With the help of your healthcare team, you will learn how to cope with any side effects you might experience. (For more in-depth discussions about HIV treatment and how you can manage side effects, check out CATIE’s *Your Guide to HIV Treatment* and *A Practical Guide to HIV Drug Side Effects*. You can also email CATIE at [info@catie.ca](mailto:info@catie.ca).)



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## Nutrition

Eating a healthy, well-balanced diet—consisting of lean proteins, healthy fats, whole grains and colourful fruits and vegetables—provides your body with the nutrients it needs to function well. A plentiful supply of all the nutrients your body needs can slow the aging process, boost your energy and enhance your sense of well-being. Good nutrition can help prevent many diseases and health problems and it can help your body to heal.

Although nothing can replace a healthy, well-balanced diet, it's a good idea for people living with HIV to supplement their diet with a multivitamin-mineral that contains a broad spectrum of antioxidants and anti-inflammatory nutrients. When the immune system is activated to fight HIV, getting enough antioxidants may help counter the oxidative stress and inflammation that can contribute to many problems. Studies have shown that people with HIV are more prone to nutritional deficiencies, so taking nutritional supplements regularly can help ensure that your body gets the nutrients it needs. (For an in-depth look at nutrition for people with HIV, see CATIE's *Practical Guide to Nutrition for People Living with HIV*.)

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## Exercise

Most people find that exercise improves their overall health and boosts their sense of well-being. A strong body is better equipped to fight HIV as well as other conditions that can affect people with HIV, such as heart disease, diabetes and osteoporosis. Resistance exercise, such as weight training, is particularly beneficial because it is the most efficient way to build healthy muscles. Aerobic exercise that gets your heart pumping—such as running, brisk walking, biking, skating, swimming and dancing—can improve your heart health, speed up your metabolism and help you maintain a healthy body weight. It helps keep

your brain fit, too! Last but not least, a good fitness program can relieve stress and reduce depression, both of which affect many people living with HIV.

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## Nurturing your emotional well-being

There's no doubt about it: Living with HIV can be stressful. Receiving the initial diagnosis, telling people you have HIV, and dealing with stigma and health concerns can all be tough. And that's on top of the other parts of our lives that can stress us out, like relationships, work and financial concerns. Everyone deals with some amount of stress, but when that level passes a certain point, it can make you feel isolated, anxious or depressed.

In the same way that stress can have a negative impact on your physical health, nurturing your emotional well-being can have a positive impact on your physical health.

Finding people you can talk to is a good place to start. Who are the people in your life whom you can trust to support you? Many people with HIV find that joining a peer support group, where they can talk to others who are dealing with similar challenges, is invaluable. Or you might want to talk to a counsellor or therapist. A supportive or therapeutic relationship can offer you an opportunity to talk openly about problems you may be dealing with and to address some of them. We all need someone we can talk to, laugh with, lean on and work through our challenges with.

What else helps you cope with stress? Maybe it's getting a massage, meditating, deep breathing, doing something creative, going to yoga class, making time to engage in activities you enjoy and having a good laugh. Check with your local HIV or community health organization to see if it offers wellness workshops and services. Many do. Many also organize social events for people living with HIV.

A healthy lifestyle can help you cope with stress and help you feel mentally and emotionally well. Eating a nutrient-rich diet is important not only for your physical health but also for your emotional health. Regular exercise can boost your mood and counter anxiety, stress and depression. Getting a good night's sleep not only helps your body regenerate and heal but can also improve your mood and ensure that you have enough energy.

Learning how to nurture your emotional wellness is an ongoing process. You might need to experiment to find what works best for you. (For more on emotional wellness, see the CATIE booklet *HIV and Emotional Wellness*.)

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## Sexual health

Sexual health is more than just the absence of sexually transmitted infections (STIs). It is about having satisfying and respectful sexual relationships and safe and pleasurable sexual experiences.

Your HIV diagnosis may have changed the way you feel about yourself and how you relate to others romantically and sexually. But whether you are HIV-negative or HIV-positive, you have a right to an enjoyable sex life! People with HIV can date and have meaningful relationships and fun, fulfilling sex lives.

It is true that some health conditions can put a damper on your sex life. For example, low testosterone, which is relatively common among people living with HIV, can lower the sex drive of both men and women and cause erectile dysfunction or impotence for some men (see “Hormone Changes,” page 35). Diabetes can lead to impotence in men (to find out how you can manage blood sugar problems and maintain a healthy sex life, see “Diabetes and Blood Sugar Problems,” page 30.) Cardiovascular disease also can sometimes cause sexual difficulties, including erectile dysfunction, as well as shortness of breath and decreased energy, which can

adversely affect a person's sex life (to find out how you can promote your cardiovascular health, see “Cardiovascular Health,” page 23).

Because your sexual health is linked to the sexual health of your partners, safer sex is an important aspect of sexual health. This involves learning how to reduce the risk of transmitting HIV and other STIs to your partner(s) and how to reduce the risk of being infected with an STI from them.

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## Harm reduction

Some people with HIV use substances recreationally, which means that they use drugs or alcohol in social situations or on occasion for fun. Some experience problems as a result of their substance use, such as hangovers, blackouts and overdose. And some people become addicted. The term *harm reduction* refers to an approach to using drugs that reduces potential harms so that you can live as healthily as possible. Although substance use can put you at risk for health problems, you can take steps to reduce those risks.

(See also *What Works: What you need to know if you have HIV and inject drugs*.)



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## Putting it all together

Does all of this seem like a lot of work? Yes, committing yourself to these healthy living practices does take effort. But if you are not already on this path to health, you will be surprised to find out that so much of it feels good. Healthy nutrition involves eating delicious food. Nourishing your body every day through what you eat and the supplements you take can result in a feeling of well-being. In addition to its other benefits, exercise can make you feel good because it boosts the brain's production of endorphins, also known as "feel-good" chemicals. Knowing that you are taking steps to protect your health can make you feel great about yourself and give you confidence in your ability to live long and well with HIV. So is it worth the effort? We think so.

# Managing Multiple Conditions

Many people with HIV also have other chronic health conditions. Some people are co-infected with hepatitis B or C. Some are living with heart disease, others with diabetes, osteoporosis, liver disease, depression or other conditions. The older we get, the more common this picture becomes. In fact, various studies have shown that in North America three out of every four people age 65 or older are living with multiple health conditions.



Managing HIV on its own can be challenging enough. When one or more of these conditions get added to the mix—either a condition you were living with before your HIV diagnosis or one you developed afterwards—managing your health can become more

complex. So it is helpful to be aware of some of the issues that can arise and to know how you can stay a step ahead of them. We hope that this chapter will help you to do just that.

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## Some issues

### A siloed approach to healthcare

Most clinical practice guidelines—documents designed to guide the decisions of healthcare providers regarding the best approach to managing a specific condition—do not make recommendations for people who have multiple conditions. One large study found that fewer than half of the guidelines assessed considered the interplay of multiple chronic conditions. Of the guidelines that did, most considered the needs of people who have two chronic conditions but not three or more.

So if you're one of the many people living with HIV who have high blood pressure and are at risk for osteoporosis, for example, your doctor(s) may be left without guidelines to supplement their knowledge and experience. Plus, the typically too-short doctor's appointment can leave little time for you and your doctor to weigh the risks and benefits of a complex treatment plan or for you to discuss your preferences and priorities.

This explains why many doctors follow the clinical practice guidelines for each condition a person has. But when recommendations conflict, this can leave people with HIV, and their caregivers, scratching their heads and may ultimately result in diminished quality of care.

### Health complications and drug interactions

People with multiple health problems are more likely to develop complications (health problems that result from an illness, treatment or procedure) than people who have just one condition. And people who take medications for multiple conditions are at higher risk for drug interactions (this is when one drug alters the effects of another drug, food or supplement). The risk for such complications and drug interactions is

highest when more than one doctor is prescribing medications for an individual. Recreational drugs and “over-the-counter” products can also interact with HIV meds and other prescription medications.

This is why it's so crucial for everyone who is a part of your healthcare team—your doctors, nurses, pharmacist, mental health professional and others you might see—to be in the loop. To prevent drug interactions, it is also a good idea to get all of your prescription drugs from one pharmacy.

### Fragmented care

If you are living with more than one condition, as so many people do, you might find yourself juggling different doctors and other healthcare providers, as well as numerous appointments, diagnostic tests, medications and recommendations. But the truth is that you are not different body parts or conditions: You are one person and you deserve coordinated patient-centred care.

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## Things that can help

Despite all the potential challenges of living with multiple health conditions, rest assured that there are things you can do to get the best care possible. Here are some suggestions:

### Try to find a doctor you can build a good relationship with

It's important to have a doctor who is knowledgeable about HIV and works in partnership with you to deliver the best possible healthcare. He or she will be an indispensable partner on your HIV journey. Look for someone you trust and can talk openly and honestly with, someone who treats you with the respect you deserve.

When it comes to managing multiple conditions, here are some questions you can ask your doctor:

- Which doctors will be involved in my care?
- How experienced are these doctors in working with other healthcare providers and handling the *combination* of health conditions that I have?
- How will my care be coordinated? Will my various doctors and their staff communicate with one another so everyone knows what everyone else is recommending?
- In addition to the problems I might develop from one condition, will the *combination* of problems result in further complications? If so, how can these be handled?

Before starting a new drug, always ask your doctor or pharmacist: Is it possible that it will interact with the other drugs I am already taking? What side effects should I watch for?

### Be your own care coordinator

Ideally, someone would oversee or coordinate all the care you receive, but most of us don't have such a person. You might know from experience that you can't assume that your primary care physician is keeping track of everything. So, you might find yourself in a position where you have to keep track of who is recommending what and informing your doctors of test results, what other healthcare providers are recommending and what drugs you are taking. A nurse or social worker might be able to help you do this. When it comes to medications, your pharmacist can help you.

### Keep track of how you're feeling

It can be helpful to keep a symptom diary where you record how you're feeling physically and emotionally so you can show your doctor a record of everything you've been experiencing. It's a lot easier to keep a daily record of symptoms as you experience them rather than having to remember them later.

The Personal Health Record (on pages 60–63) can be used for this purpose. Photocopy these pages and use them to record your medical history, all the drugs you are taking, any symptoms you are experiencing, the names and contact information of all your healthcare providers, as well as things you wish to discuss with your doctor(s) at your next appointment. Or, if you prefer, you can start your own health journal.

Be sure your doctor sees the list of your symptoms and medications. This is the best way to ensure that your doctor has the information right in front of him or her and not buried somewhere in your chart.

### Take care of your mental health

Living with more than one health condition and managing multiple appointments and meds can be stressful, particularly in the beginning. Feeling unwell, especially if you are in pain or have had to curb some of your day-to-day activities, can be demoralizing. Your physical health can affect your mental well-being and vice versa, so your emotional well-being needs some tender loving care, too (see “Nurturing your emotional well-being,” page 5).

### Take steps to prevent drug interactions

When it comes to the medications you're taking, your pharmacist can be an excellent resource. Many pharmacies check for interactions among all the medications you obtain from them. Of course, if you go to more than one pharmacy to have your prescriptions filled, be sure to let each pharmacy know about all the drugs you are currently taking.

You can also check for drug interactions on your own. Go to [www.hivmedicationguide.com](http://www.hivmedicationguide.com) or [www.hiv-druginteractions.org](http://www.hiv-druginteractions.org).

The more medications you take, the greater the chance that the interactions have not been assessed. Interactions between different HIV meds are usually

known, but the same may not be true when you mix your HIV meds with a drug for high blood pressure, a diabetes drug and the arthritis drugs you need.

A large Canadian study found that people with more than one medical condition (and older people) are often excluded from clinical trials. The researchers found that 81 percent of the drug trial results published in the most prestigious medical journals excluded patients with coexisting medical problems. This means that information on the safety or efficacy of a new drug in people living with multiple health conditions might be missing. This makes it even more important for you to track any symptoms you develop so that possible drug side effects will be noticed.

### Learn as much as you can

Last but not least, educating yourself about a health condition you develop can help you feel more in control. You will be able to make more informed choices about your care and treatment. People living with HIV have long led the way in this department—attending HIV treatment conferences, making the effort to participate in community forums on the latest developments in the world of HIV, learning about the latest treatments and, yes, reading guides like this.

More than any other patient population in the history of medicine, starting from the earliest days of the disease, people with HIV have worked in countless ways to educate themselves and others on the best ways to manage HIV. If you are managing multiple medical conditions, this model is an excellent one to follow. Educate yourself about any health condition you develop (look for information from reputable sources) and bring the information you have gathered to your doctor appointments.

Try not to feel discouraged. Will it be difficult on some days? Probably. Will there be ups and downs with one condition or another? Of course. But with your steadfast commitment to managing not only HIV but other conditions you may develop along the way, you have a very good chance of living long and well and being here to celebrate the advances in treatment that we know lie ahead.

# Bone Health

Healthy bones provide our bodies with a structure that protects our internal organs. The skull protects the brain, the spine protects the spinal cord, the ribcage protects the heart, liver and lungs, and so on. Our bones also store minerals. In addition, healthy bones allow us to move and engage in physical activity.



People living with HIV are at higher risk for osteoporosis and osteopenia—conditions characterized by low bone density—as well as a much rarer condition called avascular necrosis. Thankfully, though, there are many things you can do to promote your bone health—to prevent problems down the road or to help strengthen already weakened bones.

To understand how we can protect our bones, it helps to have a picture of how they work. Bone is a living tissue that is constantly rebuilding itself—old bone cells are continually being replaced with new bone cells. To do this, our bones need two key components: collagen and minerals. Collagen provides a flexible framework, which is important because bones need to have some “give”; without it, they can become too

brittle and can break more easily. Minerals harden the collagen framework to give bones the strength they need to provide your body’s structure. To have healthy bones, we need to strike a balance between strength and flexibility.

Two types of cells work to keep our bones healthy: osteoclasts and osteoblasts. Osteoclasts remove old or damaged bone, leaving behind cavities where osteoblasts then build healthy new bone with collagen and minerals. As children and teenagers, we generally form more bone than we lose. Later, as adults, the bone loss can start to outpace bone growth. In particular, among HIV-negative adults, bone loss can accelerate in women when they hit menopause and in both women and men in their 70s. Although it is



normal for our bones to become less dense as we age, we want to keep that bone loss to a minimum so that our bones stay strong throughout our lives.

Studies indicate that thinning bones are relatively common among HIV-positive people, affecting even some young adults. Although bone fractures are generally extremely uncommon (most people living with HIV never break a bone), people with HIV are at higher risk of fracture than HIV-negative people. A Danish study found that the fracture risk for people living with HIV was almost three times higher.

Many people think of osteoporosis as a disease of older women; however, both men and women with HIV will benefit from working with their doctors to put together a program for their long-term bone health.

In general, it appears that men with HIV develop bone problems at an earlier-than-usual age, and postmenopausal women with HIV have a higher risk of developing osteopenia and osteoporosis than HIV-negative women.

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## Risk factors for osteoporosis

The causes of bone disease in people living with HIV are not fully understood, but it appears that a combination of factors can increase a person's risk. These include:

- HIV infection
- various medications, including some antiretroviral drugs
- hepatitis co-infection
- smoking
- low levels of sex hormones, such as testosterone and estrogen
- a family history of osteoporosis
- being 50 years or older
- early menopause (before age 45)
- excessive alcohol consumption

## What are osteopenia and osteoporosis?

**Osteopenia** is characterized by a slight thinning of the bones that can occur naturally with aging. It may or may not ever progress to osteoporosis.

**Osteoporosis** is characterized by the gradual loss of bone tissue, resulting in thinning and weaker bones that may become brittle. With osteoporosis, there is both decreased bone mass and structural deterioration of the remaining bone tissue. The combination means that when a bone is stressed, it is more likely to fracture.

- a previous fragility fracture (a broken bone that results from minor trauma, for example, a fall from standing height or less)
- abnormally low body weight
- a lifestyle that does not include regular weight-bearing exercise
- malnutrition or any deficiency of the nutrients required for healthy bones (such as calcium, vitamin D, vitamin K and protein)
- health conditions that affect a person's capacity to absorb nutrients, such as chronic diarrhea, celiac disease, irritable bowel syndrome (IBS) or inflammatory bowel disease (IBD)
- hyperthyroidism (overactive thyroid)
- lipodystrophy (changes in body shape and metabolism that can result from taking antiretroviral medications)

**Medications** that can increase a person's risk of osteoporosis include corticosteroids, proton pump inhibitors, Depo-Provera (birth control shot), excessive thyroid hormones (these hormones are appropriately prescribed to restore normal thyroid hormone levels in people with hypothyroidism but taking too much thyroid hormone can cause bone problems), heparin, antacids that contain aluminum,

anticonvulsants, pentamidine, ketoconazole and cholestyramine.

In terms of **antiretroviral medications**, some protease inhibitors and some nukes (especially tenofovir disoproxil fumarate or TDF) may increase the risk for osteoporosis. Of course, stopping your drugs is not the answer. You need meds to keep HIV under control. Moreover, a large study recently found that people with HIV on treatment had a fracture risk that was about 36 percent lower than that of people with HIV not on antiretroviral therapy.

Although you may lose two to six percent of your bone density within two years of starting HIV treatment, the long-term use of antiretrovirals does not appear to cause continuing bone loss. If you have other serious risk factors for osteoporosis, the one drug that might be problematic is TDF (Viread; also in Truvada, Atripla, Stribild and Complera). Some studies report higher rates of both osteoporosis and osteopenia among those using this drug, as well as increased rates of wrist, back and hip fractures. Although not all studies have shown this risk, if you have other risk factors or have already been diagnosed with osteoporosis, you might want to talk to your doctor about this.

If you are taking TDF and tests show a significant loss of bone density, your physician may assess the possibility of low levels of phosphate in your blood, which can sometimes result from TDF use. Phosphate is crucial for providing mineral strength to bone; if your phosphate levels are low, you may need to take phosphate supplements.

A new version of tenofovir called TAF (tenofovir alafenamide) is now available. It is found in Odefsey, Biktarvy and Descovy. Clinical trials of TAF-based regimens indicate that this formulation of tenofovir has less potential for reducing bone density than a TDF-based regimen.

An important risk factor for osteoporosis in men is **low testosterone**. Because testosterone is often low in people with HIV and because it is essential

for bone health as well as many other aspects of your health and well-being, it is important to have your levels checked periodically. If they are less than optimal, your doctor may recommend testosterone replacement therapy. (For more on testosterone and HIV, see “Hormone Changes,” page 35.)

**HIV infection** itself may also contribute to the development of osteoporosis. It is thought that the ongoing inflammation caused by HIV as well as the constant activation of CD4 cells may contribute to accelerated bone loss. It is therefore important to counter chronic inflammation (see Appendix A, page 56).

If you are diagnosed with osteopenia, this does not mean that you will definitely go on to develop osteoporosis. In fact, only a fraction of people with osteopenia will eventually progress to osteoporosis. However, a diagnosis of osteopenia should provide strong motivation to strengthen your bones and take steps to prevent bone loss. With proper care and/or treatment, bone loss can be reversed.

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## Bone density tests

Tests used to assess a person’s risk for osteoporosis and monitor bone density are called bone mineral density (BMD) tests. They measure the amount of calcium and other minerals in your bones.

A **DEXA scan** is the best way to accurately measure the loss of bone density. This scan measures the BMD of the spine, hip or total body. It is a type of X-ray but it emits approximately a tenth of the radiation of a chest X-ray. For this non-invasive test, you lie on a table while a mechanical arm moves over your body. A total body scan lasts approximately 20 minutes. A baseline scan (ideally done before starting antiretroviral therapy) can eventually be compared with later readings. Current guidelines recommend that men and women with HIV over the age of 50 obtain DEXA scans. This is particularly important for individuals who have any other risk factors for

osteoporosis (see “Risk factors for osteoporosis” on page 13).

The results of a bone density test are shown as a **T-score**, which indicates how far from “normal” your BMD is. “Normal” is defined as the average BMD of a healthy young person, based on sex. Normal healthy bone will result in a T-score greater than  $-1$ . Osteopenia is indicated by a T-score between  $-1$  and  $-2.5$ . Osteoporosis is indicated by a T-score of less than  $-2.5$ .

If your T-score is...	your BMD is considered...
$\geq -1$	normal
between $-1$ and $-2.5$	osteopenia
$\leq -2.5$	osteoporosis

After a bone density test, you will also be given a Z-score. This score compares your BMD with the average BMD of people of your same age and sex. For diagnosing osteoporosis, the T-score is considered to be more important.

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## Preventing bone loss

Until all of the causes of osteoporosis in people living with HIV are well understood, advice on specific preventive measures will be incomplete. In the meantime, what we know about preventing or reversing osteoporosis in general can certainly help.

### Do weight-bearing exercise

One of the most important things you can do to build and maintain healthy bones is to regularly combine strength training and aerobic exercise that puts weight on your bones. Activities such as walking or jogging (either outside or on a treadmill) are excellent weight-bearing exercises. Before you start an exercise

program, speak to your doctor to find out what exercises are safe for you.

### Quit smoking

Smoking is strongly tied to an increased risk for osteoporosis, so if you can quit smoking you’ll be doing your bones a big favour.

### Eat a nutrient-rich diet and make sure you get enough minerals and vitamins

Bones are made up of a matrix of minerals—including calcium, phosphorus, manganese, potassium, zinc, copper, boron and chromium. A diet with plenty of protein and a wide variety of vegetables, legumes, fruit, whole grains, nuts and seeds can supply an important base of the nutrients you need to form and maintain healthy bones.

You’ll want to make sure that you get enough **calcium**. Foods rich in calcium include dairy products, dark green leafy vegetables, fish (sardines and salmon with bones in, mackerel and herring), broccoli, almonds and legumes such as chickpeas and pinto beans.

Age	Daily calcium requirement
19 to 50	1,000 mg
50+	1,200 mg
pregnant or lactating women 18+	1,000 mg

Though it is best to get your calcium and other key nutrients from food, this is not always possible. If you do not get enough calcium from your diet and are considering supplements, talk to your doctor or pharmacist first, as calcium supplements can interact with some prescription medications.

Want some help calculating your calcium intake? Osteoporosis Canada has a handy calcium calculator that can help you do the math at [www.osteoporosis.ca](http://www.osteoporosis.ca).

Because your body needs **vitamin D** to absorb calcium and phosphorus, and many people with HIV have a vitamin D deficiency, talk to your doctor about how to make sure you're getting enough of it. Your doctor can order a blood test to check your vitamin D levels to help determine the proper supplement dose for you. (For more information about vitamin D testing, see Appendix B, page 58.)

The other nutrient that is key for bone health is **vitamin K**, required for synthesizing osteocalcin, a bone protein needed for bone formation. Although vitamin K<sub>1</sub> is plentiful in leafy green vegetables, vitamin K<sub>2</sub>, the nutrient that is most important for bone health, is found in only small amounts in a few foods, such as egg yolks, cottage cheese, fermented cheeses and the fermented soy product natto. For people concerned about osteoporosis, regular vitamin K<sub>2</sub> supplementation can help ensure you get the right amount of this vitamin for your bones. Experts recommend supplements containing vitamin K<sub>2</sub> (in the form of menaquinone-7, or MK-7) in a daily dose of 100 to 200 micrograms (mcg). Check the small print on labels of any supplements you are considering because many only contain vitamin K<sub>1</sub>, which is not the form you need to prevent osteoporosis. If you take a blood thinner, such as warfarin (Coumadin), speak to your doctor and pharmacist before increasing your vitamin K intake, as it could potentially interfere with the effects of the medication.

Last but not least, you'll want to make sure you're getting enough **vitamin B<sub>12</sub>**. Several studies have shown that a vitamin B<sub>12</sub> deficiency is associated with a higher risk for osteoporosis. Because many people with HIV have a vitamin B<sub>12</sub> deficiency, supplementation may be important for your bone health as well as for its many other benefits.

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## Treating osteoporosis

Medications are often prescribed to treat osteoporosis but research on the effects of these drugs on people with HIV is extremely limited. Many of these medications have serious side effects, so you and your doctor will want to weigh the possible benefits against the risks.

Most of the drugs work by stopping osteoclasts from doing their job of breaking down old or damaged bone tissue. **Bisphosphonates**—such as alendronate (Fosamax), risedronate (Actonel) and etidronate (Didronel or Didrocal)—work in this way. The result is an increase in bone mass and bone density, but some researchers fear that long-term use of these drugs may cause problems. The concern is that when the old bone tissue is not removed, the remaining bone tissue may become weaker and more brittle. Studies have shown an accumulation of microscopic bone damage with bisphosphonate use and there have been some reports in recent years of osteonecrosis (death of bone tissue) of the jaw in small numbers of bisphosphonate users as well as a specific type of leg fracture following long-term use.

Some doctors now recommend using bisphosphonates in a more limited way. They may prescribe one of these drugs for up to five years to increase a person's bone density to within the normal range. After the drug is stopped, they order bone scans to track the bone density and resume bisphosphonate use if the bone density falls below normal. Other side effects of bisphosphonate can include nausea, abdominal pain and acid reflux, diarrhea, inflammation of the esophagus and esophageal ulcers. Some people may experience serious bone, joint and/or muscle pain. If you experience pain or difficulty swallowing while taking one of these medications, stop taking the medication and talk to your doctor as soon as possible.

**Hormone therapies**—including testosterone, raloxifene (Evista) and teriparatide (Forteo)—are also used to prevent and treat osteoporosis.

- As mentioned, countering testosterone deficiency is important for men at risk of osteoporosis (see “Hormone Changes,” page 35).
- Raloxifene (Evista), which belongs to a class of drugs known as SERMs (selective estrogen receptor modulators), was designed to have estrogen-like effects but without the risk of cancer. It is prescribed for the prevention and treatment of osteoporosis in postmenopausal women; however, its effects on postmenopausal women with HIV have not yet been studied. Because this drug can potentially cause blood clots, it should not be taken by anyone with a history of blood clots.
- Teriparatide (Forteo) is a synthetic form of a human hormone that occurs naturally, called parathyroid hormone, which stimulates new bone growth. It is approved for the treatment of osteoporosis in postmenopausal women and in men who are at high risk for a fracture. It is given as a daily injection under the skin on the thigh or stomach. Relatively short-term studies have shown that it reduces fracture risk in men and women. Because the long-term effects are not yet known, it is generally recommended that people take it for no more than two years.

Estrogen was once widely recommended for the treatment of osteoporosis in postmenopausal women. However, because of the risks of long-term use, including increased risk of cancer, heart attack and stroke, it is no longer recommended.

Calcitonin, a naturally occurring thyroid hormone that helps regulate calcium levels in the body, used to be prescribed to treat osteoporosis in postmenopausal women. However, because calcitonin use is associated with an increased risk of cancer, Health Canada has taken the drug off the market for this purpose.

Denosumab (Prolia) inhibits the formation of fully functional osteoclasts, the cells that remove old or damaged bone. Similar to bisphosphonates, it decreases the removal of old or damaged bone tissue. Denosumab is administered by injection twice a year. The most common side effects include respiratory infections, urinary tract infections and skin infections, as well as cataracts, constipation, rash, itchy dry skin, joint pain and eczema. A small study also reported a small increased risk of cancer and severe infections; although this finding was not statistically significant, there is concern that there might be a greater risk of these in people living with HIV who have low CD4 counts. In rare cases, osteonecrosis of the jaw has been reported in patients taking denosumab. This medication is not recommended for people with low calcium or vitamin D levels. If you are considering taking this drug, ask your doctor to test your calcium and vitamin D levels first. There are no studies showing the results of long-term use of this drug.

Whether or not you take any of these treatments, you'll want to make sure you get enough **calcium** and **vitamin D** on a daily basis to help your bones stay healthy.

It's also a good idea to take steps to **reduce your risk of falling**. Here are some ways that you can fall-proof your environment:

- Clear away things you could trip over, such as electrical cords and objects on the floor.
- Secure area rugs to avoid slipping.
- Make sure your bathtub and shower aren't slippery.
- Beware of medications that could make you drowsy or dizzy (such as sleeping pills, some antidepressants and pain medications).
- In the winter months, be sure to clear snow and ice from your porch and/or walkway, and sprinkle salt or sand.
- Have your eyes checked regularly, as poor vision can make it hard to see things you could trip over.
- Wear shoes that have a good tread.

An occupational therapist can help you fall-proof your home.

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## Avascular necrosis

In addition to osteoporosis and osteopenia, people living with HIV are also at higher risk for a condition—although it occurs only rarely—called avascular necrosis. Avascular necrosis (also known as AVN, or osteonecrosis) is a disease in which a lack of blood flow causes the death of bone tissue, most commonly at the top end of the thigh bone (the femur), the section that creates part of your hip. Studies suggest that high cholesterol and triglyceride levels, which may be related to the use of protease inhibitors, may contribute to such bone problems.

The following are additional risk factors for AVN because each can contribute to decreased blood supply to the bone:

- long-term use of corticosteroid drugs
- excessive alcohol use
- smoking
- bone injury (such as a fracture)
- bone infection
- scuba diving
- certain medical conditions, such as diabetes, lupus, sickle cell anemia and Addison's disease (Addison's disease affects the adrenal gland and results in reduced production of the steroid hormone cortisol. It is usually treated with low doses of hydrocortisone, which are not thought to cause AVN but might contribute in a way similar to long-term corticosteroid use.)

AVN most commonly affects the hip but it can also develop in the shoulder, knee or hand. Common early symptoms include:

- pain in the hip joint or groin area, which can radiate down the leg to the knee and may in some cases be very painful
- stiffness in the hip area, often particularly noticeable upon waking
- occasional aching, especially after long periods of walking or standing
- a decreased range of motion

With any such symptoms, a comprehensive physical exam is a must, followed if appropriate by an MRI scan of the bone.

### Tips for managing avascular necrosis

Treatment is aimed at correcting the cause of AVN, if possible. This may include anti-inflammatory drugs or medications to treat blood clots. Pain medication and limiting movement of the joint may be helpful. If AVN is detected early, small holes can sometimes be drilled in the bone to increase blood flow and allow new blood vessels to grow, a process called core decompression surgery. However, there are no known cures for AVN. If it has progressed too far in the hip bone, a hip replacement or bone graft may be needed. For people with HIV who are concerned about AVN, it may be helpful to avoid activities that could increase the pressure on the hip joint, such as certain weight-lifting exercises, squats, running on concrete and carrying heavy weight on the shoulders.



# Brain Health

Growing older in good health includes maintaining a healthy brain. Since effective antiretroviral therapy became widely available, HIV-related dementia—the serious deterioration in mental function that was once common among people living with HIV—is now rarely diagnosed. However, milder forms of cognitive impairment remain common among people with HIV. Through ongoing research, we are learning more and more about ways to minimize the effects of HIV on the brain.



HIV-associated neurocognitive disorders (HAND) is an umbrella term that covers a range of problems:

- **asymptomatic neurocognitive impairment** – Many people with HAND perform below expected levels on formal neuropsychological testing but experience no noticeable symptoms and their day-to-day lives do not seem to be affected.
- **mild neurocognitive impairment** – Some people with HAND experience mild or moderate problems in their thinking, memory, mood and/or physical coordination and function. Symptoms can include not being able to remember things

that you were told or that you read or saw recently, struggling to remember incidents from the past or facts you once knew, difficulty problem-solving and learning new things, confusion, depression or anxiety, problems with your attention span, reduced reflexes, and a feeling of “brain fog” or fuzzy-headedness.

- **HIV-associated dementia** – This is the rarest and most severe form of HAND. People with HIV-associated dementia experience a decline in brain function that interferes significantly with their daily activities and quality of life.

Exactly how many people with HIV in Canada have HAND is not clear—estimates range from 15 to 50 percent. The vast majority of people with this condition have either asymptomatic or mild neurocognitive impairment.

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## Risk factors for HAND

HAND is not fully understood but it is thought to result from a combination of brain cell injury due to chronic inflammation and a weakened immune system that leaves these nerve cells unprotected. In addition to HIV-related effects on the brain, many other factors can cause or contribute to neurocognitive impairment, including:

- aging
- depression
- a concussion
- alcohol consumption
- cardiovascular disease, hepatitis C, diabetes or thyroid disease
- vitamin B<sub>1</sub> and B<sub>12</sub> deficiencies
- the use of recreational drugs, such as cocaine, crystal meth, heroin, ecstasy, LSD and inhalants
- neurological conditions, such as epilepsy and multiple sclerosis
- learning disabilities

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## Diagnosing HAND

The diagnosis of HAND can pose a number of challenges. Many of the tests for HAND are time-consuming and your doctor may not have the resources required to perform them. But thanks to an increased focus on this disease by researchers and healthcare professionals, a number of more easily administered screening tests have been developed. These include the five-question HIV Dementia Scale, which can be used to detect both severe and milder forms of impairment; the Montreal Cognitive Assessment (MoCA), designed to help detect mild cognitive impairment; and the International HIV

Dementia Scale, which has been validated for use with populations of different cultural backgrounds but not to screen for milder forms of HAND.

If you're living with HIV and are concerned about mental changes you're experiencing, the first step is to see your doctor to rule out other conditions that can produce symptoms sometimes mistaken for HAND. These include depression, anxiety, hepatitis B or C, substance use, cardiovascular disease, prediabetes and diabetes, vitamin B<sub>12</sub> deficiency and hypothyroidism as well as side effects from prescription drugs, including some antiretrovirals, such as efavirenz (sold as Sustiva, also in the combination drug Atripla), and narcotics. Ruling out these other possible causes can help to establish the likelihood of HAND and the need for diagnostic testing. If one or more of these other factors is causing mental changes, addressing them could reduce or even eliminate the problem.

If you're concerned about problems with your memory or thinking, you might want to keep a record of these problems and how often you notice them so that you can discuss them with your doctor. If your family, friends or other people around you point out symptoms that they have observed, you might want to make a note of these, too. The more information you can provide your doctor with, the better you will be able to address the issue together.

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## Lowering the risk and reversing symptoms

Fortunately, there are things you can do to help prevent symptoms of HAND or, if you already have symptoms, to minimize them or prevent them from worsening.

### Take your HIV meds

Antiretroviral therapy (ART) hugely diminishes the risk of the more severe forms of HAND. Since potent ART became widely available, the rates of HIV-associated dementia have plummeted in Canada

Penetration of HIV drugs through the blood-brain barrier				
	Best	Moderately good	Moderately poor	Poor
<b>Nukes (NRTIs)</b>	AZT	abacavir emtricitabine	ddI 3TC d4T	tenofovir zalcitabine
<b>Non-nukes (NNRTIs)</b>	nevirapine	delavirdine efavirenz	etravirine	
<b>Protease inhibitors (PIs)</b>	boosted indinavir	boosted lopinavir boosted darunavir boosted fosamprenavir indinavir	boosted atazanavir atazanavir fosamprenavir	nelfinavir ritonavir saquinavir boosted saquinavir boosted tipranavir
<b>Integrase inhibitors</b>	dolutegravir bictegravir	raltegravir	elvitegravir	
<b>Entry/fusion inhibitor</b>		maraviroc		T-20

and other high-income countries. People who have an undetectable viral load are much less likely to develop HIV-associated dementia; if they already have symptoms, those symptoms are much less likely to worsen. It appears that taking at least one antiretroviral drug that penetrates the blood-brain barrier as part of your antiretroviral therapy may help to protect the brain. (In the chart above, HIV drugs are ranked according to their ability to penetrate the blood-brain barrier.)

### Reduce inflammation

Because inflammation in the brain may be a major underlying cause of HAND, countering it is important. (For more on HIV-related inflammation, see Appendix A, page 56.)

Chronic hepatitis B or C can also cause inflammation in the brain. Effective therapies for hepatitis B are now available, so long-term suppression of the virus is possible. There are highly effective treatments for hepatitis C that cure more than 95 percent of people. So hepatitis C can also be effectively treated and likely eliminated as a cause of inflammation. If you

have hepatitis B or C, be sure to talk to your doctor about treatment.

Cardiovascular disease and chronic kidney disease can also result in increased inflammation in the brain, so these conditions need to be managed as effectively as possible.

### Boost your B<sub>12</sub>

Vitamin B<sub>12</sub> is important for keeping your brain in good working order. Severe long-term B<sub>12</sub> deficiency can result in memory loss, confusion, paranoia, sadness, depression, shaking, unstable gait, a tendency to fall and even an inability to communicate properly. (Many of these symptoms are also seen in people with HIV-associated dementia.)

At the early stage of B<sub>12</sub> deficiency, the problem is almost always fully reversible. Vitamin B<sub>12</sub> supplementation can often improve the mental function of people living with HIV. But research has shown that some of the damage caused by a lack of vitamin B<sub>12</sub> may become irreversible if B<sub>12</sub> therapy is not initiated in time. So, if you're noticing unusual

memory loss or other aspects of diminishing mental function, talk to your doctor or a dietitian about ways to ensure that you're getting enough vitamin B<sub>12</sub> and, if necessary, to begin B<sub>12</sub> supplementation. (For more on vitamin B<sub>12</sub>, see Appendix B, page 58.)

## Maintain healthy levels of thyroid hormones

An underactive thyroid (hypothyroidism) can cause a feeling of “brain fog” that is very similar to what many people with HIV who experience neurocognitive symptoms report. So it is important to get tested to determine if hypothyroidism might be contributing to your neurocognitive symptoms. Your doctor should regularly check your levels of TSH (thyroid-stimulating hormone, an indirect indicator of thyroid function) and thyroid hormones (especially free T3 and free T4), if indicated. If your test results reveal that your levels are low, thyroid replacement therapy can help restore your mental energy and function and lift that feeling of brain fog.

## Take care of your emotional well-being

People who are depressed or anxious can experience mental fatigue and impaired mental function, so addressing depression and anxiety can sometimes improve neurocognitive symptoms. In addition, chronic depression and anxiety are associated with increased inflammation in the brain, which is thought to be one of the underlying causes of HAND. So addressing depression and other mental health issues may also help reduce inflammation.

A supportive healthcare provider should be able to work with you to identify the problem, determine what's behind it and figure out ways you can deal with it. Depression in people with HIV—especially in men—can be caused by low levels of testosterone.

Vitamin D deficiency, which is common among people with HIV, can contribute to depression, especially in the winter. The seasonal affective disorder (SAD) that affects many people during the winter may be

the result of a vitamin D deficiency. Talk to your doctor about having your vitamin D level tested and, if necessary, use supplements to boost it. With proper supplementation, depression and other problems associated with vitamin D deficiency can usually be reversed. (For more on vitamin D, see Appendix B, page 58.)

## Adopt a healthy lifestyle

A healthy lifestyle can help protect the brain in many ways:

- **Eating a nutritious diet** can provide you with the nutrients needed to optimize your brain health. These include B vitamins, omega-3 fatty acids, zinc and other minerals.
- **Exercising regularly** helps keep your brain fit by boosting oxygen flow to the brain and helping maintain healthy neurons.
- **Maintaining a healthy weight and not smoking** can help minimize the risk of developing vascular disease.
- **Limiting your consumption of alcohol and recreational drugs** can help minimize or prevent neurocognitive problems.
- **Stimulating your brain**—for example, by learning a new language or musical instrument, doing crossword puzzles or memory games—can help protect it.
- **Staying socially connected** can help, too! Take time to do things with your friends, volunteer for a non-profit organization or a political campaign, find a group you can work out or hike with, check to see if a local HIV or community health organization has a support group.... Interacting with others can help you maintain your mental health.

(For a full discussion of making healthy lifestyle choices, see “Healthy Living,” page 4.)

# Cardiovascular Health

Cardiovascular disease refers to many conditions that affect the heart and blood vessels. These include heart attack (damage to the heart muscles) and stroke (damage to the brain due to limited blood flow), angina (chest pain due to coronary artery disease), cardiomyopathy (an enlarged heart) and valve disorders, to name just a few.



Studies have found that people living with HIV appear to be at greater risk for these conditions than their HIV-negative counterparts. This is why your doctor should monitor your heart health regularly and why any efforts you can make to promote your heart health should be part of your plan for living long and well with HIV.

## Risk factors for cardiovascular disease

The many factors that can put people living with HIV at risk for cardiovascular disease include some specific to HIV as well as more traditional risk factors, such as smoking and high blood pressure.

## Chronic inflammation

The chronic inflammation caused by HIV is a major contributor to blood vessel damage and the development of cardiovascular disease in people living with HIV. Antiretroviral therapy can help reduce inflammation but does not completely eliminate it or the risk of cardiovascular disease. In a 2012 study, Harvard researchers reported that the level of inflammation in the aortas (the aorta is the main artery leaving the heart) of people with HIV who did not have cardiovascular disease was similar to that of HIV-negative people with established cardiovascular disease. The inflammation did not appear to be associated with the type of antiretroviral therapy taken and it was present both in people with an undetectable viral load and in people with HIV who had no traditional risk factors for cardiovascular disease. The researchers were careful to point out that their findings do not imply that addressing traditional risk factors for cardiovascular disease is not important, but rather that inflammation should *also* be addressed.

## Abnormal lipid levels

Many people with HIV develop abnormal lipid levels in their blood, which can increase their risk of cardiovascular disease. Untreated HIV infection, in particular, can raise triglyceride and “bad” cholesterol levels and can lower “good” cholesterol levels.

## HIV medications

Starting HIV treatment is one of the best things you can do for your heart health. But some HIV meds—in particular, some protease inhibitors and some older nukes such as d4T (stavudine, Zerit)—have been linked to an increased risk of developing cardiovascular problems. If possible, it is best to choose medications that keep that risk to a minimum. You and your doctor can work together to choose a treatment combination that can effectively suppress your HIV while causing the fewest possible side effects.

## What are lipids?

Our bodies contain different kinds of fats, known as lipids. These include:

- **HDL cholesterol** (high-density lipoprotein, also known as “good” cholesterol), which removes “bad” cholesterol from the blood
- **LDL cholesterol** (low-density lipoprotein, also known as “bad” cholesterol), which can build up in the arteries and lead to heart disease and other health problems
- **triglycerides**, which can also increase your risk for heart disease if your levels are too high, especially if you are overweight or have high blood pressure

Studies have shown that when people who had elevated triglycerides and/or bad cholesterol while taking protease inhibitors (PIs) switched to taking drugs from another class—to either the non-nuke nevirapine (Viramune) or the nuke abacavir (Ziagen)—their lipid levels improved. However, some “PI-sparing” regimens may work better than others. For example, switching to the non-nuke efavirenz (Sustiva) has not been shown to consistently improve lipid levels. Luckily, if your triglyceride or bad cholesterol levels go up shortly after starting an HIV medication (suggesting that the drug might be contributing to the problem), it should be possible to find a substitute among the wide variety of antiretrovirals available today.

Although some HIV medications can have a negative impact on lipid levels (increasing cholesterol and triglyceride levels), in general, antiretrovirals can greatly *decrease* HIV-related inflammation and the risk for cardiovascular disease and other serious illnesses.

Drugs known to increase the risk of diabetes can also contribute to heart disease. (For more on diabetes and



cardiovascular disease, see “Diabetes and Blood Sugar Problems,” page 30.)

## Other risk factors

Other factors that raise the risk of cardiovascular disease for both HIV-positive and HIV-negative people include:

- smoking
- high blood pressure
- diabetes
- stress
- a sedentary lifestyle (lack of exercise)
- being older than 45 years if male or older than 55 if female
- use of street drugs, such as cocaine, heroin and crystal meth
- being overweight
- a family history of cardiovascular disease
- gum disease

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## Diagnosis

To diagnose a cardiovascular problem, your doctor will ask you about your medical history as well as any problems you have been experiencing recently.

Your doctor will also regularly check your blood pressure or advise you to check it with a home monitor or at the pharmacy. He or she may also recommend one or more of the following tests:

- blood tests to assess whether you have problematic lipid levels
- an electrocardiogram (ECG)
- an echocardiogram
- Holter monitoring
- a chest X-ray
- a CT scan
- an MRI scan
- a stress test
- cardiac catheterization
- an ultrasound of the arteries in your neck

Signs and symptoms that can indicate cardiovascular disease include:

- high blood pressure
- erectile dysfunction in men
- pain in the lower legs and feet when you are active, which goes away quickly with rest (this can indicate peripheral artery disease in the blood vessels of the legs)
- angina (pain in the chest area that can occur with or without physical activity)
- shortness of breath
- sudden numbness, weakness or coldness in the legs or arms (this could indicate that the blood vessels in those parts of your body are narrowed)
- sudden loss of vision or visual disturbances
- dizziness, lightheadedness, weakness and moments of altered consciousness (this can indicate insufficient blood supply to the brain, or stroke)

Some people may have a heart attack or stroke even if they are not experiencing any of these symptoms. Even if you have no obvious symptoms, it’s never too soon to improve your heart health.

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## Preventing cardiovascular disease

There’s not much we can do about our age or the health history of our family members, but we can do a lot to keep our risk of cardiovascular disease low and maintain a healthy heart.

- **Quit smoking.** Smoking is the #1 cause of cardiovascular disease among people with HIV. Smoking causes chronic inflammation of the blood vessels and heart and worsens the inflammation caused by HIV. (For more on inflammation, see Appendix A, page 56.) Smoking damages the blood vessels, negatively affects cholesterol levels, and increases blood pressure and the risk for developing diabetes. If you smoke, quitting will dramatically reduce your risk for heart disease. Many tools out there can help you quit,

## Heart attack warning signs:

- Uncomfortable pressure, fullness, squeezing or pain in the centre of the chest that lasts more than a few minutes (this pressure can be mild or severe)
- Pain or numbness that spreads to the shoulders, neck, jaw or arms
- Light-headedness, fainting, sweating, nausea or shortness of breath

Women of all ages and older men, especially those with diabetes, may experience no pain or only mild pain during a heart attack.

## Stroke warning signs:

- Sudden weakness or numbness of the face, arm or leg on one side of the body
- Sudden vision problems (dimness or loss of vision), particularly in one eye
- Trouble talking or understanding speech
- Sudden, severe headaches with no apparent cause
- Sudden dizziness or loss of balance, especially if combined with any of the above

**If you experience any of these symptoms, call 9-1-1 immediately.**

including Health Canada's *On the Road to Quitting* ([www.hc-sc.gc.ca/hc-ps/pubs/tobac-tabac/road-voie-eng.php](http://www.hc-sc.gc.ca/hc-ps/pubs/tobac-tabac/road-voie-eng.php)) and the Canadian Cancer Society's *Break It Off* ([www.breakitoff.ca](http://www.breakitoff.ca)).

- **Keep your blood pressure under control.** High blood pressure is a major risk factor for both heart attacks and strokes. A nutritious diet and regular exercise will help you maintain a healthy blood pressure. If lifestyle changes aren't enough, your

doctor can suggest medication to help keep your blood pressure in the healthy range.

- **Whenever possible, keep your stress level to a minimum.** Of course, that's easier said than done. Living with HIV and other chronic conditions can add stress to our lives on top of all the other events, pressures and responsibilities we have to deal with. Regular use of various mind/body techniques, acupuncture, massage, meditation, yoga or other relaxation techniques can help you release and manage your stress.
- **If you're feeling depressed, find support.** Studies have linked ongoing depression (a reality for many people living with HIV) to an increased risk for heart disease. If you're feeling sad or down, especially for long periods, seek the emotional support of nonjudgmental friends and family members, access the counselling services and peer support offered by many HIV and community health organizations, and/or seek the help of a knowledgeable healthcare provider.
- **Exercise regularly.** Regular exercise strengthens the heart, reduces blood pressure, improves cholesterol levels, relieves stress, helps with weight management and can decrease insulin resistance and help improve blood sugar levels. If you've already had cardiovascular problems, check in with your doctor about what is appropriate for you before starting an exercise program.
- **Eat a heart-healthy diet.** A balanced and nutritious diet is good for your overall health and sense of well-being—and for your heart health. It is particularly important to reduce your total fat intake and eliminate from your diet all partially hydrogenated fats, also known as *trans* fats. Trans fats are chemically modified fats found in most margarines, vegetable shortening, many baked goods and snack foods. Stick with the fats Mother Nature made, especially monounsaturated fats like olive oil. Also, make sure you include plenty of vegetables, fruit, legumes and whole grains in your diet.

Some HIV and community organizations have a dietitian onsite. If you are looking for someone who can advise you on your diet or support you as you change your eating habits, ask your local HIV or community health organization if you can make an appointment with a registered dietitian or nutritionist.

- **Manage your lipid levels.** The standard medical advice for people with high triglyceride and bad cholesterol levels is to consume less fat. But changing what you eat is unlikely to be of substantial benefit if your HIV meds are the main cause of the problem. On the other hand, if your diet is heavy on trans fats (spring rolls, French fries and doughnuts, for example), then diet could certainly be contributing to your unhealthy lipid levels. In such cases, it could help to consume less fat and sugar and cut out trans fats altogether, while eating more fruit, vegetables and whole grains (sources of soluble fibre that can block cholesterol absorption). Consuming additional soluble fibre in the form of psyllium seed (Metamucil) may also be useful. While your triglyceride and bad cholesterol levels are elevated, consider taking nutritional supplements to help protect against cardiovascular damage (see “Cholesterol-lowering agents,” at right).
- **Maintain a healthy weight.** Excess belly fat, in particular, is tied to an increased risk of heart disease.
- **Avoid street drugs that can harm your heart.** Cocaine, amphetamines (speed), crystal meth and ecstasy can all raise your blood pressure and body temperature, make your heart beat faster and narrow the blood vessels that feed the heart in a way that greatly increases your risk of heart attack. Heroin can cause arrhythmias and pulmonary edema (fluid in the lungs that can make it difficult to breathe). Also, injecting drugs can sometimes result in serious heart infections. If using such drugs is an issue for you, seek assistance in quitting or cutting down from an addictions counsellor or

ask your doctor to refer you to someone who can help you make the changes you want.

- **Steer clear of infections.** Nobody goes out looking for the flu, gum disease or any other infection, but it’s worth taking precautions to protect against them when you can because infections trigger inflammation in the body and can increase your risk for heart attack. That includes sexually transmitted infections (STIs). If you think you could be at risk for an STI, be sure to talk to your doctor about getting tested so that, if necessary, you can get treatment. Get the flu shot every year and talk to your doctor about getting a pneumococcal vaccine.

Taking these steps can greatly reduce your cardiovascular risk and improve your heart health. Not only that, but chances are you’ll look and feel better too.

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## Cholesterol-lowering agents

If you have “high cholesterol”—or, more accurately, high levels of triglycerides and/or “bad” cholesterol—and lifestyle changes aren’t doing the trick, your doctor may recommend that you take medication to manage your lipid levels and decrease your risk of cardiovascular disease.

**Statins** are the class of drugs most commonly recommended to improve lipid levels. Statins lower bad cholesterol and triglyceride levels and can raise “good” cholesterol levels. Some statins interact with certain protease inhibitors. The statins commonly prescribed by doctors for people living with HIV include pravastatin (Pravachol), atorvastatin (Lipitor) and rosuvastatin (Crestor). Statins such as lovastatin (Mevacor) and simvastatin (Zocor) should not be taken with protease inhibitors.

The heavily promoted cholesterol-lowering herbal compound **Cholestin** works similarly to statins and

may also interact with some HIV meds. Statins can also interact with herbal supplements. Always let your doctor and pharmacist know about all of the medications and herbal supplements you're taking.

All statins reduce the body's ability to produce the antioxidant coenzyme Q<sub>10</sub>. This antioxidant is important for the health of the heart, nerves and muscles and particularly for the functioning parts of a cell that produces energy (called mitochondria). For this reason, some natural health practitioners and pharmacists advise people who use statins to take 200 to 400 mg of coenzyme Q<sub>10</sub> per day.

Statins are safe for many people but they can cause side effects. Some side effects are relatively minor whereas others are potentially serious—for example, muscle problems, liver injury, and raised blood sugar levels that could lead to type 2 diabetes and a decreased ability of your body to create the active form of vitamin D. Statins can also cause birth defects and should not be used during pregnancy or by people who are considering becoming pregnant. Experts advise that you stop using statin drugs at the first sign of muscle pain, muscle tenderness, muscle weakness or tiredness and that a doctor evaluate the cause promptly. Your doctor may do a blood test for creatine phosphokinase (a measure of muscle breakdown) to see if you should continue taking a statin.

**Fibrates** are another class of drugs that can help with lipid abnormalities. They are considered the best choice for people who have only elevated triglycerides. Sometimes statins and fibrates are used together, but this increases the risk of muscle toxicity, a side effect of statins. Some fibrates, such as gemfibrozil, deplete both vitamin E and coenzyme Q<sub>10</sub>. Supplementing with vitamin E (400 to 800 IU daily) and coenzyme Q<sub>10</sub> (100 to 400 mg daily) should be considered with these drugs.

Because of drug interactions with these medications, some doctors prefer the B vitamin **niacin** (1,000 mg daily), which can lower triglycerides significantly and bad cholesterol to a lesser degree. Niacin also works better than the statin drugs to raise good cholesterol.

However, it does have several potential problems. First, many people experience flushing, redness and warmth and some people experience painful stinging and itching for a half-hour or more after taking it. A sustained-release form of niacin is much less likely to cause these problems, especially if a baby Aspirin is taken 30 minutes before the niacin. Taking niacin in the middle of a meal can also help. If you find that taking the full dose all at once causes problems, the tablet can be cut in half and be taken with breakfast and dinner. If the dose is tolerable but not high enough to normalize lipid levels, it can be increased until results are seen, but this increases the risk of liver toxicity.

While you take niacin, your doctor should do liver enzyme tests to make sure you can tolerate it. Your blood glucose (sugar) levels should also be monitored because niacin can affect blood sugar levels. Because of its potential to cause insulin-resistance problems, some experts advise against niacin for people taking antiretrovirals, especially if they are already showing signs of blood sugar problems. In the last few years, niacin use has declined, as there are no studies that show it has a major impact on heart disease and death due to heart disease.

Some people find the supplement **pantethine** (a form of the B-vitamin pantothenic acid) useful in raising their levels of good cholesterol.

The amino acid **L-carnitine** has been shown to be effective in normalizing triglyceride levels that are elevated due to HIV infection. Because it releases more free carnitine into the bloodstream, the form called acetyl-L-carnitine is more effective than plain L-carnitine. Some doctors have found that taking acetyl-L-carnitine (1,500 mg daily) along with one of the lipid-lowering drugs can normalize triglyceride levels when drugs alone do not do the job.

**Omega-3 fatty acids**, found in fish oil and krill oil, can decrease inflammation, may help prevent heart rhythm problems and can lower triglyceride levels. Eating fatty fish, such as wild salmon (canned salmon is often wild), anchovies, mackerel, sardines, herring

and halibut, is a tasty way to get those fatty acids. Studies of the general population have shown reduced incidence of heart disease in those who consume several servings of such fish weekly. Regular use of fish oil supplements (one or two capsules, twice daily) can also help.

It's worth remembering that even if your lipid levels can't be completely normalized, you can lower your overall risk for heart disease by combining regular exercise, a healthy diet, meditation or other stress reduction therapies and nutrient supplementation.

The following nutrients may also help prevent arterial damage and protect the heart:

- **Magnesium** (500 to 600 mg daily), which has been found to be deficient in some people with HIV, can help prevent arterial damage and protect the heart. Too much magnesium can cause diarrhea; aim for the dose that gives you soft, well-formed stools.
- **Antioxidants** (including vitamin E, vitamin C, bioflavonoids, selenium, coenzyme Q<sub>10</sub>, N-acetylcysteine [NAC] and alpha-lipoic acid) and **B vitamins** help prevent the chemical changes in the blood vessels and blood fats that are required for fat to be deposited into the lining of the blood vessels, thus helping to prevent damage to the arteries. So even if you can't fully normalize your cholesterol readings, you can help keep cholesterol from being deposited in the blood vessels by having a good supply of all of these nutrients in the body.

# Diabetes and Blood Sugar Problems

Normally, when we eat, our body converts food into glucose (sugar) and that glucose is then carried to cells throughout the body, providing our muscles, tissues and brain with the energy they need. If a person has too much blood glucose or blood sugar (a condition called hyperglycemia), it can eventually cause serious health problems. This is why it is so important to do as much as possible to avoid developing a blood sugar problem in the first place or, if you already have one, to take steps to manage it. Fortunately, diabetes can be controlled through eating well, exercise and medicine.





There are three types of diabetes:

- **Gestational diabetes** – diabetes that can develop during pregnancy.
- **Type 1 diabetes** – an autoimmune disease that typically develops during childhood. It occurs when the body is unable to produce insulin.
- **Type 2 diabetes** – a form of diabetes that usually affects middle-aged and older adults (although it can affect a person at any age). This is by far the most prevalent form of diabetes and the one we focus on in this chapter.

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## Risk factors for diabetes

A growing number of people living with HIV also have type 2 diabetes. This is due to some HIV-specific risk factors as well as some traditional risk factors, which affect both HIV-positive and HIV-negative people.

**Certain HIV medications**, especially some of the older ones, have been associated with a higher risk of diabetes:

- some protease inhibitors, such as indinavir (Crixivan) and nelfinavir (Viracept)
- some nucleoside analogues (nukes), such as AZT (zidovudine, Retrovir, also in Combivir and Trizivir), d4T (stavudine, Zerit) and ddI (didanosine, Videx EC)

**HIV infection** itself can increase a person's risk for diabetes, especially if they have had HIV for many years, if they have a low CD4 count and a high viral load, or if they are co-infected with hepatitis C. Researchers have found that diabetes is more common among people who are co-infected with HIV and hep C than among people infected with only hep C.

**Traditional risk factors** include:

- being overweight (especially if you have excess weight around the belly)
- a family history of diabetes
- being over the age of 40
- lack of physical activity
- hepatitis C infection

## What are insulin resistance and diabetes?

Insulin is a hormone that your body needs to maintain the right level of glucose in your blood. When you don't have enough insulin, or your body cannot use insulin properly, the amount of glucose in the blood becomes too high. This is called **insulin resistance**.

When insulin resistance first develops, your body tries to compensate by producing more and more insulin. But eventually, these efforts are unsuccessful and sugar levels build up in the blood instead of being used by your cells for energy. This ongoing high blood sugar is the hallmark of **type 2 diabetes**.

When a person has diabetes and their cells don't get enough glucose, the cells cannot function properly. High blood glucose levels can also result in damage to the blood vessels in different parts of the body. Over time, this can lead to serious, and some potentially deadly, health problems—such as cardiovascular problems, kidney failure, blindness, nerve damage and digestive issues. These problems need advanced medical care.

- abnormal lipid levels, specifically low levels of “good” cholesterol (HDL) or high levels of triglycerides
- a history of high blood pressure
- the use of medications that can increase blood sugar levels (for example, human growth hormone, niacin, glucocorticoids and megestrol acetate [Megace])
- being diagnosed with prediabetes
- polycystic ovary syndrome
- sleep apnea

Studies have shown that diabetes rates are also higher among people who have a low income and among people who are black, Hispanic, Aboriginal or Asian.

Because hepatitis C is a risk factor for type 2 diabetes, all people who are co-infected with HIV and hepatitis C should be screened for diabetes.

## Diagnosing diabetes

These are the classic warning signs of diabetes to watch for:

- excessive thirst that continues despite drinking lots of water
- abnormal hunger
- increased urination (both increased frequency and increased volume of urine)
- fatigue or lack of energy
- blurred vision
- unexplained weight loss (even when a person eats substantial amounts of food)
- wounds and bruises that are slow to heal
- trouble getting or maintaining an erection
- numbness or tingling in the hands and/or feet

Also, high blood sugar can make a person feel nauseous and throw up.

If you experience any of these symptoms, call your doctor. As part of your care, he or she may recommend one of the following tests.

### Fasting blood sugar test

This blood test is done after you fast (don't eat) for at least eight hours. Your doctor will tell you how long you need to fast for and how to prepare for the test.

If your blood sugar level is...	it is considered...
< 5.6 mmol/L	normal
5.6–6.0 mmol/L	potentially abnormal
6.1–6.9 mmol/L	prediabetes
≥ 7.0 mmol/L	diabetes

A fasting blood sugar level that is higher than normal but not high enough to be classified as full-blown diabetes is called prediabetes. People with prediabetes are at higher risk for heart disease and are five to six times more likely to develop diabetes, so it is a warning that you can take steps to control your blood sugar and prevent prediabetes from progressing. Many people with prediabetes will not go on to develop diabetes.

### Hemoglobin (A1C) test

When blood sugar levels rise, some of the sugar combines with your hemoglobin (the substance in your red blood cells that carries oxygen). By measuring the amount of glucose attached to the hemoglobin, this test is used to estimate your average blood sugar level over the last two to three months.

If your A1C level is...	it is considered...
< 5.5%	normal
5.5%–5.9%	potentially abnormal
6.0%–6.4%	prediabetes, a sign that you are at increased risk for diabetes
≥ 6.5% on two separate tests	diabetes

A number of things can alter the results of this test. For example, anemia (low iron), pregnancy, kidney disease, liver disease and high cholesterol levels can all affect the accuracy of an A1C test and lead to an abnormal result.

## Oral glucose tolerance test

This test is used to see how well your body is able to lower blood sugar. After fasting for eight hours, you will be given a drink that contains some glucose (usually 75 grams). A sample of your blood will be taken before you do this, and then again at regular intervals after you drink the solution. In all, the test can last for up to three hours.

Note that many medications can influence the results of an oral glucose tolerance test, including some antipsychotic medications (used to treat schizophrenia, bipolar disorder, depression and Alzheimer's disease), beta-blockers, corticosteroids, estrogens, oral contraceptives (birth control pills) and thiazide diuretics. Be sure that the doctor testing you for diabetes knows about any medications you are taking that might affect the test results.

If the results of these tests are abnormal, your blood sugar levels may need to be monitored more frequently. Your healthcare provider may recommend that you do regular blood sugar testing. Meters that require a small amount of blood from a finger prick can be used at home. Testing can be done upon awakening, before and after meals, and at bedtime, to help establish how much your blood sugar varies throughout the day and in response to the food you eat. Your healthcare provider will discuss your monitoring and treatment plan with you.

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## Tips for managing your blood sugar levels

Although diabetes rates have been on the rise in Canada, the good news is that there are things you can do to prevent and manage diabetes.

If you take HIV drugs that have been associated with blood sugar problems, **switching your HIV drugs** may decrease the risk of diabetes. Research findings to date have been somewhat conflicting so we do not know what the ideal medications are. But there

is some evidence that switching from a protease inhibitor that is associated with an increased risk for diabetes to either a non-nuke or another drug class that is *not* associated with blood sugar problems may lower the blood sugar levels of some people.

If you have elevated insulin or blood sugar levels, these are some steps you can take to lower your risk of developing diabetes:

- **Exercise regularly.** If you're just starting to exercise, try to do:
  - 10 minutes of aerobic exercise 4× per week; and
  - resistance exercise or weight training 2× per week.

If you already do some exercise, aim to do:

- 2½ hours of moderate-to-vigorous aerobic exercise per week (that's equal to a half-hour 5× per week); and
- resistance exercise or weight training 3× per week.

The more you increase your muscle mass, the more you will improve the sensitivity of your body's cells to insulin (insulin sensitivity) and the better your chances of controlling your diabetes.

- **Maintain a healthy weight.** Obesity is a serious risk factor for type 2 diabetes. On the other hand, losing fat while gaining muscle can help improve blood sugar levels as well as other conditions such as high blood pressure and high cholesterol.
- **Limit your intake of sugar and refined carbohydrates** by reducing the amount of white starchy foods, white sugar and flour, and alcohol you consume. Many people benefit from limiting carbohydrates until their blood sugar levels have been controlled and, if needed, excess weight has been lost. When you do eat carbohydrates, try to stick to those that are low on the glycemic index, which ranks how much a serving of food raises blood sugar levels. (To find out how specific foods rank on this scale, visit the Canadian Diabetes

Association website at [www.diabetes.ca](http://www.diabetes.ca) and search for “glycemic index.”)

To lower your sugar intake, check food labels. Sugar, which is added to many processed foods, can also show up as glucose, fructose, corn syrup and maple syrup. Reading food labels can help you make healthy food choices. You might also want to make an appointment with a nutritionist or registered dietitian.

- **Eat more foods that are high in fibre** (especially vegetables, legumes and fruit) **and low in polyunsaturated fats.** This can help improve your blood sugar levels. The Canadian Diabetes Association recommends that adults have 25 to 50 grams of fibre every day. If you aren't getting enough fibre from your diet, you can take a fibre supplement, like one of the psyllium seed husk products that are widely available. Build up your intake slowly; starting with too much or increasing your intake too quickly can cause gas and bloating. To reduce your intake of polyunsaturated fats, found in most vegetable oils and in many prepared foods, it's best to stick with monounsaturated fats such as olive oil.
- **Quit smoking.** Because smoking cigarettes speeds up the long-term health complications that diabetes can cause, smoking cessation is a crucial part of managing diabetes.
- **If you have low testosterone, talk to your doctor about testosterone replacement therapy.** In men, low levels of testosterone have been linked to insulin resistance.
- **Take a vitamin/mineral supplement** that contains B complex vitamins (including B<sub>6</sub>), antioxidants (especially alpha-lipoic acid) and minerals (especially magnesium and chromium).

- **If you are diagnosed with hepatitis C, consider treatment.** Treating chronic hepatitis C infection can improve a person's blood sugar levels. (Highly effective treatments now cure more than 95 percent of people with hepatitis C.)
- **Have your blood pressure and cholesterol levels monitored.** If your levels are high, you may need treatment for these conditions.
- **Have your blood sugar levels monitored regularly.** If lifestyle changes or switching drugs are not enough to get your blood sugar under control, your doctor may recommend that you take an antidiabetic medication, such as metformin. Before starting a new medication, find out what the possible side effects and risks are. You'll want to make sure that it doesn't interact with your HIV meds. If you do take an antidiabetic medication, your healthcare provider should carefully monitor your blood sugar levels.

By monitoring and controlling your blood sugar level, you can potentially prevent diabetes. If you've already been diagnosed with diabetes, these steps can help you prevent serious complications so that you can live a full and healthy life.

# Hormone Changes

Hormones are chemical messengers that travel through the body to help the cells perform their many tasks. They influence our immune system, our energy, our mood, how well we sleep, our sex drive, our appetite and digestion, the strength of our muscles, the health of our bones and many other aspects of our health and lives.



Some people living with HIV may have low levels of certain hormones—most commonly, testosterone, thyroid hormones and DHEA (a hormone that leads to the production of androgens and estrogens, male and female sex hormones). People with HIV who have low CD4 counts, life-threatening infections and who have experienced severe weight loss are more likely to have seriously low hormone levels. For people who are in the earlier stages of HIV infection, changes in hormone levels may be less pronounced but can still cause troubling symptoms. Whatever stage of

HIV infection you're at, it's a good idea to have your hormone levels tested and, if necessary, to take steps to help restore the balance.

As with many blood tests, labs define “normal” hormone levels on the basis of the average levels among a large number of people in the general population. Your “normal” may be within or outside of that range. The right hormone levels for you are the ones that eliminate symptoms and return you to a vibrant state of health.

Restoring hormones to optimal levels can not only relieve symptoms but also help prevent serious conditions, such as heart problems, osteoporosis, depression, loss of sex drive, fatigue and problems with muscle strength and balance.

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## What causes hormone changes?

Hormone levels can change for a variety of reasons, including:

- HIV infection
- opportunistic infections, such as cytomegalovirus (CMV), *Mycobacterium avium* complex (MAC), Kaposi's sarcoma (KS) and histoplasmosis
- some medications
- some street drugs
- stress

In addition, our hormone levels change as a natural part of aging, whether we are HIV-positive or HIV-negative.

## Opportunistic infections

Far fewer people with HIV get opportunistic infections these days now that effective antiretroviral therapy (ART) is available, and fewer people experience the hormone changes that can occur as a result of those infections. For example, CMV, MAC, KS, histoplasmosis and tuberculosis (TB) can all cause the adrenal glands to produce inadequate amounts of certain hormones. (The adrenal glands are two glands situated on top of the kidneys that produce sex hormones and cortisol.) Thankfully, effective HIV treatment and, in some cases, prophylactic antimicrobials can prevent these problems.

## Medications and other drugs

Several medications and drugs can affect your hormone levels, including the following:

- **Ketoconazole** and some other drugs used to treat fungal infections may suppress the production of adrenal corticosteroid hormones and sex hormones.
- **Rifampin** (Rifadin, also in Rifater), used to treat tuberculosis, may cause levels of the hormone cortisol to become too low and can also contribute to hypothyroidism. (For a list of drugs that can affect your thyroid hormones, see page 41.)
- **Marijuana** can increase estrogen levels and lower testosterone levels, though in studies these lower levels were still within the normal range.
- **Opiates** can decrease the production of luteinizing hormone (which triggers ovulation in cisgender women<sup>1</sup> and stimulates testosterone production in cisgender<sup>2</sup> men) and follicle-stimulating hormone (which regulates reproductive processes in both women and men). Opiates can also increase the production of the hormone prolactin, which stimulates breast development and milk production in cisgender women.

## Stress

You may know from experience that stress can interfere with your appetite, sleep, mood and sex drive. Stress also has an impact on your hormones. Our bodies are hard-wired to perceive stress as an imminent threat to our survival. Although your stress may be due to an impossibly heavy workload, the rush-hour traffic you have to fight your way through,

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<sup>1</sup> Women who identify as the gender they were assigned at birth, as opposed to transgender women.

<sup>2</sup> Men who identify as the gender they were assigned at birth, as opposed to transgender men.



your fears about making ends meet or the fight you just had with your ex, the stress triggers a “fight or flight” reaction, as though a sabre-toothed tiger is about to attack.

First, the hypothalamus, a small area at the base of the brain, sets off an alarm system. This prompts your adrenal glands to release a surge of hormones, including adrenaline and cortisol. The adrenaline raises your heart rate and blood pressure, boosting blood flow to your muscles and enabling you to fight or flee. Cortisol, also known as “the stress hormone,” increases the level of glucose in your bloodstream to provide the fuel you need to keep those muscles pumping while you fight or flee. Cortisol also suppresses bodily functions that are not essential for your response to the threat—it alters your immune response and suppresses the digestive system, the reproductive system and growth processes.

If you were being chased by a sabre-toothed tiger, this response could help save your life. But when stress continues over an extended period of time and becomes chronic, this stress response can become a serious health hazard. Chronic stress can lead to digestive problems, heart disease, insomnia, depression, weight gain, skin problems or hair loss.

To keep those stress hormones in check, try to address the issues in your life that are the main sources of stress. Many people find that some combination of exercise, meditation, deep breathing, yoga, relaxation techniques, counselling and peer support can be extremely helpful for alleviating their stress.

### Aging, perimenopause and menopause

HIV, opportunistic infections, some medications and other drugs, and stress can all potentially throw your hormones out of whack. At the same time, there are hormone changes that occur as a natural and normal part of the aging process.

For cisgender men, testosterone levels peak during adolescence and early adulthood and then decline slowly from about age 30 onward. The transition stages for cisgender women occur at puberty and then during perimenopause and menopause. Menopause usually occurs between the ages of 45 and 55, although it can occur earlier. And perimenopause—the years that lead up to menopause—can start anywhere from one to 10 years before menstruation stops completely.

During perimenopause, your body slows down its production of estrogen and progesterone. Your menstrual cycle may become shorter (for example, 24 days instead of 28 days), you may skip periods or your bleeding may be heavier than normal. Some individuals notice that their vaginal tissue thins, their premenstrual syndrome (PMS) worsens, their sex drive changes and they experience hot flashes, night sweats, insomnia and irritability. Although menopause often gets a bad rap, many transition through menopause without any unpleasant symptoms; some even welcome “the change.” The experience varies dramatically from person to person.

Early studies reported a number of differences between the menstrual cycles of HIV-positive and HIV-negative cisgender women; however, more recent and better-designed studies suggest that HIV generally has less impact on menstruation than originally thought. There generally seem to be no significant differences in the rates of excessive menstrual pain, perimenopausal discomforts or the development of early menopause in HIV-positive women compared with HIV-negative women. However, some research has shown that women with low CD4 counts are more likely to have skipped or infrequent periods. In particular, one large study found that women with CD4 counts below 200 were about 50 percent more likely to have irregular cycles with 90 days or more between periods.

## Tips for dealing with menopause and perimenopause

Menopause is a natural part of growing older. You don't need any kind of treatment for it unless you find that you're experiencing bothersome symptoms.

### Diet

Studies have found that consuming a combination of simple and complex **carbohydrates** increases the levels of serotonin, the brain's "feel-good" chemical, and can help relieve the emotional challenges you might experience during perimenopause or menopause. Any foods that raise your blood levels of **tryptophan** may help because tryptophan stimulates the production of serotonin. High-carbohydrate foods like whole-grain toast or hot cereal, as well as protein foods that are high in tryptophan, such as dairy products and turkey, will raise serotonin levels. (You may want to monitor your weight, as excess carbs can lead to weight gain.)

### Supplements

For painful or swollen breasts, some naturopaths find that **vitamin E** can be helpful. A daily dose of 800 to 1,200 IU taken the week before your period starts and during your period may bring some relief. Vitamin E has also been found to be helpful for reducing hot flashes and night sweats

during perimenopause or menopause. The amount required is very individual so speak to a healthcare provider about how much you should use. Supplementing with the full range of compounds from the vitamin E family, called mixed tocopherols and tocotrienols, is preferred. If possible, take a tocopherols supplement at a different meal than a tocotrienols supplement.

**5-hydroxy-tryptophan (5-HTP)** may be helpful for relieving the sleep problems that can accompany perimenopause and menopause. Your healthcare provider may recommend that you take it with vitamin B<sub>6</sub> (many 5-HTP products contain vitamin B<sub>6</sub>). 5-HTP should *never* be taken by people who are also taking medicines to treat depression or anxiety. Speak to your healthcare provider or pharmacist about these options.

### Over-the-counter and prescription drugs

Naproxen (Aleve, Anaprox), mefenamic acid (Ponstan) and ibuprofen (Advil, Motrin) are anti-inflammatory drugs that relieve cramps and may reduce PMS symptoms. Some of these are available over the counter from your pharmacist. Prescription drugs are sometimes recommended for the more disruptive emotional challenges of menopause.

## Testosterone

Although testosterone is considered to be primarily a male hormone, women also produce some. In both men and women, low testosterone can lead to:

- lower sex drive (or libido)
- infertility
- an inability to build muscle mass (even when a person works out), which can lead to wasting
- decreased strength and compromised ability to do everyday activities
- difficulty maintaining balance
- loss of appetite
- fatigue
- decreased heart function

- loss of bone mass
- depression

If you are experiencing these symptoms and you have low testosterone, your doctor may recommend testosterone replacement therapy to address these problems.

## Testosterone testing

A blood test is the only way to determine if your testosterone level is low. There are two tests: *total testosterone* and *free testosterone*. If possible, get both tests. (Not all provinces and territories cover the costs of these tests.) To decide whether you need testosterone replacement therapy, you and your doctor should review your test results and any symptoms you are experiencing that could relate to low testosterone levels. If replacement therapy is an option, ask your doctor about all of the risks and benefits.

## Testosterone replacement therapy

Taking testosterone replacement therapy can boost your mood, energy, strength and sex drive while also helping to maintain heart and bone health. Research has shown that reversing testosterone deficiency may, in some cases, also help to reverse insulin resistance. In a study of HIV-positive men with wasting and low testosterone levels, those who took testosterone supplements experienced improved insulin sensitivity as their lean body mass increased.

That said, testosterone replacement therapy is not a silver bullet that will magically reverse the aging process. And it may come with risks. Studies have reported conflicting findings related to the risk of cardiovascular disease associated with testosterone replacement therapy. A few studies have found increased risk, while others report either no increased risk or reduced risk among some groups of men. Moreover, its safety in men who are older and who have diabetes or obesity has not been well studied. As

everyone's risk for cardiovascular disease is different, speak to your doctor about whether testosterone therapy is right for you.

For many men whose testosterone levels are low, long-term replacement will be necessary. Short-term replacement may initially return testosterone levels to normal and reverse related symptoms, but if the therapy is discontinued, testosterone levels will promptly drop and the symptoms may return.

Anyone on testosterone replacement therapy should have follow-up testing of both their total testosterone and free testosterone levels done to ensure that they are taking the right dose. Too much testosterone can raise blood fat levels, cause prostate enlargement, increase the risk of blood clots, raise red blood cell counts, cause acne, make a person more aggressive and contribute to male pattern baldness. Women may also experience masculine body hair growth and a deepening voice.

## Types of therapy

Testosterone replacement therapy is available in different forms: as a skin cream, gel, patch, oral medication or injectable. You and your doctor will determine what form is suitable for you based on availability, side effects, your situation and other factors. Long-term use of oral testosterone can adversely affect the liver, and long-term use of testosterone injections can shut down a person's remaining testosterone production and ultimately cause more problems than it solves. Injections also carry a much higher risk of side effects (including anxiety, headaches, aggressiveness, irritability, mood swings, insomnia, testicular shrinkage and impotence). The only time injectable testosterone might be advisable is as an initial therapy for men who are experiencing life-threatening wasting. In this case, an injection is sometimes used to boost testosterone levels and help reverse the loss of lean tissue.

## Dosing

A standard formulation for testosterone replacement therapy is gels, such as AndroGel and Testim, which contain one percent testosterone. Some doctors prefer creams or gels that have been prepared in a pharmacy to meet the unique needs of an individual, because the dose can be tailored to precisely meet your needs. These compounded creams or gels tend to be much less expensive. They usually contain one percent to 20 percent of testosterone and are applied once or twice daily. Follow-up testing is done after the first month of use to fine-tune the dosage if necessary.

## Special considerations for women

For women who need testosterone replacement, a compounded cream or gel can provide the small amount that may be required to achieve optimal testosterone levels. There are also alternative options that some naturopathic doctors recommend for boosting testosterone in women. Some naturopaths may suggest the use of chasteberry; however, researchers are not certain how ingredients in this herb work. Also, chasteberry may interact with other medications. Zinc, a mineral that some people with HIV are short of, is sometimes suggested for women as well as men. Some naturopaths recommend that zinc supplementation should always be balanced with copper supplementation; these minerals should be taken separately because they compete for absorption. This combination may stimulate the body to produce more of its own testosterone. It would not be enough to address serious testosterone deficiencies, but it may help people with mild deficiencies. Talk to your healthcare provider and pharmacist about the potential benefits of zinc.

## Special considerations for men

Some experts recommend that all men on testosterone replacement therapy be tested regularly for two other hormones, DHT (dihydrotestosterone) and estradiol, because testosterone can be converted into these and have potentially negative effects. To

help avoid raising DHT levels, testosterone cream or gel should be applied to parts of the body that are hairless (the inner arm, back of the knees, around the ankles) because enzymes around the hair follicles can convert testosterone to DHT. The herb saw palmetto can also be used to help prevent DHT elevations. (Talk to your doctor about whether saw palmetto could interact with any medications you are taking.) To help prevent estradiol elevation, a compounding pharmacy can add diindolylmethane (DIM) to the testosterone cream.

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## DHEA

DHEA is a hormone that is produced by the adrenal glands and, to a lesser extent, by the testes and ovaries. It is the precursor to other hormones such as testosterone and estrogen, and it helps stimulate the production of growth hormone. Studies have shown that people living with HIV often have low levels of DHEA. Levels of this hormone also decline steadily with aging. Studies in older HIV-negative people have shown that supplementation can sometimes increase energy, reverse memory problems, boost appetite and improve mood and the overall feeling of well-being. HIV specialists who prescribe DHEA for their patients say that restoring optimal DHEA levels may help restore immune function, improve energy and protect the body against the negative effects of stress. However, replacement therapy should not be taken unless testing reveals that your DHEA levels are lower than optimal.

As with all hormones, more is not better when it comes to DHEA supplementation. DHEA is a powerful steroid and taking too much can raise a person's estrogen or testosterone to abnormally high levels. DHEA should only be used under medical supervision and when tests show the need for it.

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## Thyroid hormones

Some people with HIV develop thyroid problems. The thyroid is a small butterfly-shaped gland that sits above your collarbone and below your Adam's apple. It produces the hormones thyroxine (T4) and triiodothyronine (T3), which affect a person's metabolism. These control how our bodies store and use energy and they help regulate our mood and weight. The most common thyroid abnormality is hypothyroidism, a condition whereby the thyroid becomes underactive and does not produce enough thyroid hormone.

### Risk factors for hypothyroidism

People with low CD4 counts and active opportunistic infections have a higher chance of developing hypothyroidism. In addition to HIV infection, other risk factors include:

- a family history of thyroid disease
- gender (women are more likely than men to develop thyroid problems)
- age (women over 60 have a one in five chance of having thyroid disease)
- autoimmune disease (such as lupus, multiple sclerosis or rheumatoid arthritis)

The use of certain medications can adversely affect the thyroid. Drugs that can contribute to hypothyroidism include certain heart drugs, such as amiodarone (Cordarone) and the antidepressant drug lithium (Carbolith). Also, the use of other medications can impact your levels of thyroid medication and may require that you adjust your dose—for example, the HIV drug ritonavir (Norvir, also in Kaletra), the tuberculosis drug rifampin (Rifadin, Rofact) and the anti-seizure medications carbamazepine (Tegretol), phenytoin (Dilantin) and phenobarbital.

The nutritional supplement alpha-lipoic acid, a widely used antioxidant, appears to cause thyroid problems in some people. When taken at higher doses, symptoms related to thyroid deficiency may occur.

This problem was only recently discovered and it is not yet known how many people may be susceptible to it. If you are thinking of taking alpha-lipoic acid, talk to your doctor about this issue and about having baseline thyroid testing done before you start using the supplement.

### Symptoms of hypothyroidism

Signs and symptoms of an underactive thyroid include:

- fatigue
- memory problems or “brain fog” that makes thinking and concentration difficult
- depression
- low body temperature, which can result in cold feet and hands and a feeling of being cold even in a room where everyone else is comfortable
- skin that is dry, rough or scaly
- fingernails that split, peel or break
- hair loss or hair that becomes coarse or brittle
- difficulty sweating (even during hot weather or exercise)
- constipation that does not respond to mild laxatives or magnesium
- muscle weakness or pain, including fibromyalgia symptoms
- weight gain
- high cholesterol

### Thyroid hormone testing

If you have any of these symptoms or any of the risk factors, talk to your doctor about getting screened for thyroid disease. A diagnosis of thyroid disease is generally based on symptoms, a physical exam and blood tests. Blood tests that reveal a low level of thyroxine and a high level of TSH indicate an underactive thyroid, or hypothyroidism.

A good first step for assessing possible thyroid problems is to test TSH levels in the blood. If these are found to be abnormal, your doctor will also likely test your levels for specific kinds of T4 and T3, called free T4 and T3.

If your symptoms seem to indicate thyroid problems, your doctor may test for thyroid antibodies. This can help to identify the most common cause of hypothyroidism—Hashimoto’s thyroiditis. There are two kinds of thyroid antibodies: thyroglobulin antibodies and thyroid peroxidase antibodies. If you have elevated levels of these, it means that you might have Hashimoto’s thyroiditis.

## Thyroid hormone replacement

Managing hypothyroidism is generally very straightforward. The most commonly prescribed thyroid hormone replacement, called levothyroxine (Eltroxin, Euthyrox and Synthroid), is available in different strengths. Your doctor will probably start you on a low dose and may gradually increase the dose until your hormone levels normalize and your symptoms are eliminated. Be patient, as it can take several weeks or months for this to happen. If you experience heart palpitations, sleep problems, anxiety, nervousness, sweating or agitation, mention this to your doctor right away. It could mean that your dose is too high.

If your body is not properly converting T4 (the storage form of the hormone that is found in these medications) to T3 (the active form), the symptoms will persist even with hormone replacement therapy. In this case, speak to your doctor and pharmacist about other options that may be available.



# Kidney Health

Although they are small, the kidneys do invaluable work protecting the body. They process almost 200 litres of blood every day, to filter almost two litres of waste products and extra water, which then become urine. If the kidneys are not working well, this waste builds up in the blood and can damage the body.



The kidneys also play other crucial roles: They regulate mineral levels in the body, produce a hormone that stimulates the production of red blood cells, help regulate blood pressure, and process vitamin D into its active form, which we need to build healthy bones, maintain cardiovascular health, help guard against cancer and prevent depression, among other things. Monitoring your kidney function and keeping these powerful organs in good shape is essential for the long-term health of all people living with HIV.

## Risk factors for kidney disease

Both HIV and various antiretroviral meds can take a toll on the kidneys, as can traditional risk factors.

### HIV

People living with HIV whose CD4 count is below 200 or whose viral load is not controlled are at greater risk for kidney disease. When untreated HIV infection is the cause of kidney problems, antiretroviral therapy (ART) might help. Some antiretroviral medications do, however, have the potential to cause kidney injury, also known as renal toxicity or nephrotoxicity.

Because HIV infection causes inflammation even in people with an undetectable viral load and because inflammation is associated with a greater risk of cardiovascular disease and kidney disease, people with HIV are at higher risk for kidney disease whether or not they have an undetectable viral load.

## Antiretroviral medications

The HIV medication tenofovir disoproxil fumarate or TDF (Viread, also in Truvada, Atripla, Complera and Stribild) and certain protease inhibitors, such as indinavir (Crixivan), atazanavir (Reyataz) and lopinavir/ritonavir (Kaletra), can all cause kidney injury.

- When it comes to the kidneys, **TDF** is the HIV medication that seems to be the greatest cause for concern. Although the overall risk of kidney damage is extremely low (less than one percent of people who take it experience serious kidney injury), many studies have shown that TDF use is associated with an increased risk of kidney disease. A major study conducted by researchers at the University of California, San Francisco, found that the risk of having protein in the urine (an indication of kidney disease) increased by 34 percent every year that TDF was taken and the risk of chronic kidney disease increased by 33 percent. People taking TDF also had an 11 percent higher risk of rapidly declining kidney function for every year the drug was continued. The researchers reported that discontinuing the drug did not immediately reverse the kidney disease—kidney dysfunction continued for at least a year afterward. Study participants who had used TDF in the past remained at higher risk for kidney disease than those who had never taken the drug.

In the same study, TDF use was also associated with higher levels of parathyroid hormone (PTH). When PTH levels remain high, kidney function can become impaired. Although it is not clear from this study whether elevated PTH is the main or only way in which TDF damages the kidneys, several earlier studies also suggested a

link. In this study, PTH levels were more likely to be elevated among people with low vitamin D levels, leading the researchers to suggest that vitamin D supplementation for such individuals might protect against PTH elevation. So if you are taking TDF, you might want to talk to your doctor about testing your vitamin D level and, if necessary, taking whatever amount of vitamin D supplementation is required. (For more on vitamin D testing, see Appendix B, page 58.)

A new version of tenofovir called TAF (tenofovir alafenamide) is now available. It is found in Odefsey, Biktarvy and Descovy. Clinical trials of TAF-based regimens indicate that this formulation of tenofovir is relatively safer for the kidneys than a TDF-based regimen.

- **Atazanavir** (Reyataz) can, in rare cases, cause kidney stones and a condition called interstitial nephritis. When a person has interstitial nephritis, the spaces between the kidneys' filtering units—the nephrons, of which there are more than a million in each kidney—swell.
- **Indinavir** (Crixivan), which is no longer widely used in Canada, can cause kidney crystals, kidney stones and interstitial nephritis to develop. People who take indinavir are advised to drink at least 1.5 litres of water every day in addition to their intake of other fluids to ensure adequate hydration and help prevent kidney stones.

## Other drugs

Many other prescription medications, over-the-counter meds, natural health products and street drugs can potentially have adverse effects on the kidneys. These include nonsteroidal anti-inflammatory drugs (NSAIDs), certain antibiotics and diuretics, intravenous acyclovir or valacyclovir (Valtrex), the antifungal drug amphotericin B (Fungizone), some weight loss supplements, cocaine, heroin and amphetamines, among many others. Also, drugs that don't normally cause kidney damage on their own can sometimes interact with one another

and thereby lead to kidney damage. This is why it's so important that both your doctor(s) and pharmacist know about all of the medications and drugs you are taking.

## Smoking and alcohol

Cigarette smoking is a major risk factor for kidney disease. When consumed in large amounts, alcohol can also damage the kidneys.

## High blood pressure and diabetes

High blood pressure and diabetes are the two leading causes of kidney failure. People of colour are at higher risk for kidney disease in part because both high blood pressure and diabetes are more common among people of colour. (See "Cardiovascular Health," page 23, and "Diabetes and Blood Sugar Problems," page 30, for more on these conditions.)

## Hepatitis C

Hepatitis C infection can damage not only the liver but also the kidneys. People living with HIV who are co-infected with hepatitis C are at increased risk of chronic kidney disease and renal failure.

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## Tests

Moderate declines in kidney function rarely cause any noticeable symptoms. The body can function quite well with only 50 percent of normal kidney function. This is why many people can donate a kidney to someone in need and still lead healthy lives. However, serious health problems generally occur when a person's kidney function drops to less than 25 percent. When a person's kidney function falls to 10 to 15 percent, kidney dialysis (a treatment that helps the body filter waste) is required until a transplant can be obtained.

Symptoms that can occur with seriously decreased kidney function include:

- the need to urinate more or less often
- fatigue or drowsiness
- appetite loss
- nausea and vomiting
- swelling in the hands or feet
- feeling itchy or numb
- difficulty concentrating
- darkened skin
- muscle cramps

To screen for kidney damage, your doctor may order one or more of the following simple tests:

- **Blood pressure test** – High blood pressure is not only a risk factor for kidney disease but can also be a result of kidney damage, so an increase in blood pressure can be an important indicator.
- **A test to check for protein in the urine** – Normally, protein is not found in a person's urine. With kidney damage, the kidneys may fail to separate blood proteins, such as albumin, from the waste they are filtering. Initially, only small amounts of albumin leak into the urine (a condition known as microalbuminuria). When kidney damage progresses, the amount of albumin and other proteins in the urine increases (a condition called proteinuria).
- **A blood test to measure creatinine and calculate eGFR** – Creatinine is a waste product from the muscles that the kidneys normally filter out. When the kidneys aren't working properly, creatinine builds up in the blood. This test is used to calculate your eGFR (estimated glomerular filtration rate), which indicates how well your kidneys are doing their job of filtering waste from the blood.
- **Blood urea nitrogen (BUN)** – This test measures the amount of urea nitrogen that's in your blood. After cells use protein, the blood carries away the waste product as urea and then the urea is filtered out by the kidneys into the urine. A BUN

test can reveal whether elevated levels of urea remain in the blood; if so, the kidneys may not be fully functional.

- **Other tests** – Your doctor may recommend additional tests to monitor the amount of sugar, protein and phosphorous in the urine and the blood, depending on which HIV medications you are taking.

If the above tests indicate serious kidney dysfunction, your doctor may order kidney imaging tests—an ultrasound, CT scan or MRI—or a biopsy.

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## Protecting the kidneys

If tests reveal kidney damage, it is important to immediately address anything that could be contributing to this problem. If you are currently taking a drug that could be to blame, your doctor might suggest replacing it with a different one. (Note that you should never stop taking an HIV medication without discussing it with your doctor first.) If your doctor suggests discontinuing TDF, the problem may not resolve immediately but at least you might be able to prevent your symptoms from worsening.

Here are some other ways that you can protect your kidneys and prevent kidney damage from worsening:

- **Control your blood glucose and prevent the blood sugar elevations** that can damage kidneys (see “Diabetes and Blood Sugar Problems,” page 30).
- **Eat a low-protein diet.** High levels of protein can damage the kidneys, particularly when some level of dysfunction is already present.
- **Avoid smoking.** Smoking increases the risk of kidney disease and contributes to deaths from strokes and heart attacks in people with chronic kidney disease.
- **Consume enough fluids, but not too much!** Although a healthy intake of water and other fluids is generally good for the kidneys, it is possible to drink too much, which can be hard on the kidneys if they are already significantly damaged.
- **Maintain a healthy blood pressure** and do everything possible to prevent cardiovascular damage, which can worsen kidney damage (see “Cardiovascular Health,” page 23).
- **Take an ACE (angiotensin-converting enzyme) inhibitor or an angiotensin receptor blocker,** two blood pressure medications that can protect the kidneys.

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## Kidney stones

Kidney stones are an entirely different problem, unrelated to chronic kidney damage. If you or someone you know has ever had kidney stones, you probably know that they can cause severe pain. But the upside is they rarely do significant long-term damage.

A kidney stone is a solid mass made up of tiny crystals that stick together. A kidney stone can be as small as a grain of salt or as large as a lime. One or more stones can be in the kidney or ureter (the thin tube that carries urine from the kidneys to the bladder) at the same time. In general, stones form when the urine contains too much of certain crystal-forming substances, which then become stones, a process that can take weeks or even months.

Kidney stones tend to be more common among people who live in warmer climates. Part of the reason for this is that kidney stones develop when your urine has a higher concentration of minerals or crystals, which is more likely to happen when people sweat more. People who don’t drink enough fluids are also more likely to develop kidney stones.

## Different kinds of kidney stones

**Calcium stones** are by far the most common type of kidney stone. They can occur in men and women at any age but are most common in men. Calcium combines with other substances, such as oxalate or phosphate, to form the stone.

You may want to increase your fluid intake to increase the amount of urine that flows through the kidneys. This will reduce the concentrations of calcium, oxalate and phosphate that are necessary for kidney stone formation. You may also want to limit the amount of sugar and salt you consume, as these can cause your body to excrete more calcium and oxalate in the urine. Consuming more fibre—by eating more fruit, vegetables and whole grains—may also limit your calcium output. Some studies have shown that a magnesium deficiency, relatively common among people living with HIV, can increase the risk of kidney stones. Conversely, the combination of magnesium and vitamin B<sub>6</sub> can substantially reduce the formation of calcium oxalate stones, so taking a multivitamin that contains these nutrients may help. To check whether your oxalate output is normal or too high, your doctor can run a urine test for oxalate.

**Uric acid stones** most commonly occur in people with gout, and they affect more men than women. They can also occur as a result of some types of chemotherapy. Consuming foods that boost the body's production of uric acid increases the risk for these stones. Such foods include liver and other organ meats, shellfish, some fish (especially sardines, mackerel, anchovies and herring) and beer. In addition, fructose (contained in high-fructose corn syrup, sugar and many foods and drinks) rapidly raises uric acid levels. If you tend to develop uric acid stones, cutting way back on these foods can decrease your risk. A blood test to measure your level of uric acid can help you know if you are at risk.

**Struvite stones** generally occur in women who have a urinary tract infection. These stones can become so large that they block the kidney, ureter or bladder.

**Cystine stones** generally run in families and form when the kidneys excrete too much of the amino acid cystine.

A few antiretrovirals have been known to cause kidney stones or a similar problem called “sludge,” including the rarely used protease inhibitor **indinavir** (Crixivan) and, much less commonly, **atazanavir** (Reyataz) and possibly **efavirenz** (Sustiva). Other medications that can cause stones to form include the anti-herpes drug **acyclovir** and its other form **valacyclovir** (Valtrex); a diuretic called **triamterene**, used to treat fluid retention in people with liver or heart disease and other conditions; the antibiotic combo **trimethoprim-sulfamethoxazole** (Septra/Bactrim), used to prevent

and treat pneumonia in people with HIV; and the antifungal drug **amphotericin B** (Fungizone).

## Symptoms of kidney stones

The most common symptoms of kidney stones include:

- severe pain that starts suddenly and may disappear suddenly. The pain is usually felt in the lower back and sides or belly and may also be felt in the groin area. In some cases, the pain may start off dull and then turn into a sharp pain.

- difficult or painful urination or an inability to urinate
- dark urine or urine that contains blood
- nausea and vomiting
- chills and/or fever

If you develop these symptoms, notify your doctor or go to your local hospital as soon as possible. If treatment is delayed, damage to the kidney or other serious complications can occur.

Your doctor may run one or more tests to help determine whether or not you have a kidney stone and, if so, which type. These tests include:

- a physical exam of the belly area (abdomen) or back
- blood tests to check calcium, phosphorus, uric acid and electrolyte levels
- kidney function tests
- urinalysis to check for crystals and red blood cells in urine
- laboratory analysis of the stone to determine the type

In some cases, imaging studies are done—for example, a CT scan, MRI, X-ray, intravenous pyelogram, retrograde pyelogram or ultrasound—to see the location and extent of stones.

## Preventing and treating kidney stones

The biggest risk factor for kidney stones is not drinking enough fluids. Kidney stones are more likely to occur if you produce less than one litre (slightly over a quart) of urine a day. If you suffer from kidney stones, consume at least eight or more glasses of “good” fluids each day, such as water, herbal tea, vegetable juice or broth, unless you have other medical conditions that prevent you from doing so.

Drink even more water in very hot weather, when dancing or exercising, or if you have diarrhea or have been vomiting. Remember that alcohol and caffeine can be dehydrating. Beverages containing either of these can increase your need for water and other good

fluids. In some cases, medications may be prescribed to help prevent the formation of stones.

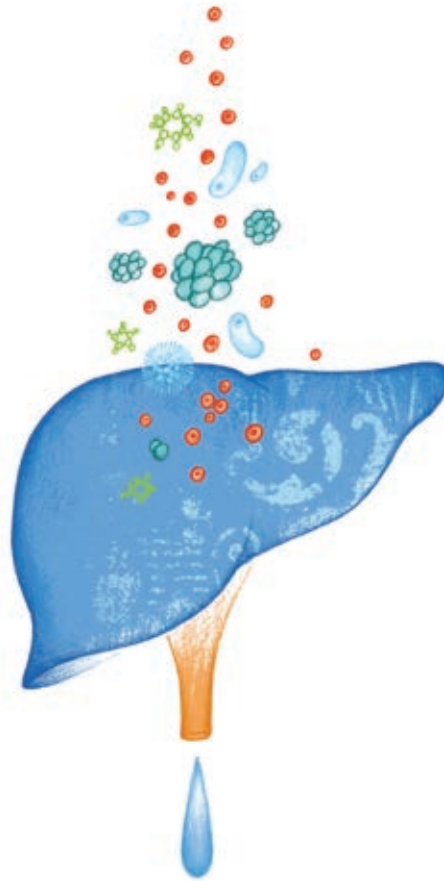
If you develop kidney stones despite your best efforts, the treatment will depend on the type of stones you have. In many cases, with enough fluid intake, the stone will eventually pass on its own. Your doctor may prescribe medications to help break down and remove the material that is causing the stone. If a stone is too large to pass on its own, or if it is growing, blocking urine flow or causing an infection or kidney damage, and/or if pain is too severe to be controlled, other techniques may be used. If the stone is small enough (less than half an inch, or roughly 13 millimetres) and located near the kidney or ureter, a therapy that uses sound or shock waves to break up the stone so it can leave the body in the urine may be used. For larger stones, procedures may be used in which a tube is inserted to remove the stone. When none of these methods are possible, surgery may be needed, though this is rare.



# Liver Health

The liver truly is a vital organ: You can't live without it. The largest solid internal organ in the human body, it works around the clock to perform more than 500 functions. It metabolizes and stores nutrients from the food we eat. It helps process the medications we take. It removes waste products from our blood, breaking down and detoxifying harmful substances. It regulates our hormones, builds proteins needed by the immune system and helps fight infections, among other things. So it's well worth it to do what we can to help this powerhouse work smoothly.

If you are living with HIV, especially if you are on antiretroviral therapy (ART), it's a good idea to have your liver health checked regularly by your doctor or nurse practitioner. That's because some medications, including some HIV meds, can strain the liver. Also, liver problems are sometimes silent, so many people who have a liver problem initially



experience few symptoms or none at all. A person can live with liver disease for years without knowing it. By understanding what can harm and what can help your liver, you'll see that there is much you can do to protect it.

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## Risk factors for liver problems

Liver injury has many possible causes, including:

- hepatitis A, B, C, D or E
- heavy use of alcohol and/or recreational drugs
- overuse of acetaminophen (Tylenol)
- repeated use of antibiotics
- some medications, including some HIV meds
- poor diet
- exposure to harmful chemicals
- higher-than-normal triglyceride levels
- having a history of life-threatening infections, such as MAC (*Mycobacterium avium* complex), tuberculosis or CMV (cytomegalovirus)
- lymphoma
- liver conditions such as Wilson disease, Gilbert's syndrome and primary biliary cirrhosis

Although the liver is generally up to the job of breaking down, or metabolizing, medications, some HIV meds can cause liver injury, especially in people who are co-infected with hepatitis viruses. In particular, nevirapine (Viramune) and abacavir (Ziagen, also in Kivexa, Trizivir and Triumeq) can produce an allergic (hypersensitivity) reaction in some people that can harm the liver. Other antiretrovirals that have been known to cause liver problems in some people include efavirenz (Sustiva), tipranavir (Aptivus) and darunavir (Prezista). While it can be toxic to the liver in larger doses, in the lower doses commonly prescribed to boost other protease inhibitors, ritonavir (Norvir) is much less likely to result in liver injury.

In addition to these risk factors, people who are overweight tend to be at higher risk for developing liver problems.

Because of the risk of severe liver injury (hepatotoxicity) from nevirapine, anyone who starts taking this HIV drug should have their liver health monitored frequently during the first 18 months of therapy, and then every three to four months for as long as test results remain normal.

To reduce the risk of nevirapine-associated liver problems, a lower dose is typically prescribed for the first two weeks that a person takes it. After that, if there are no symptoms and if test results indicate no problems, the dose is increased.

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## Fatty liver

Another type of liver disease that some people with HIV develop is called fatty liver. Nonalcoholic fatty liver disease (NAFLD)—a term used to differentiate it from the fatty liver that can develop as the result of alcohol consumption—is fairly common among people on ART. With this condition, large amounts of fat gradually build up in liver cells. Often this buildup doesn't cause harm. However, in a small proportion of people with NAFLD, progressive inflammation of the liver may occur and result in serious scarring (cirrhosis of the liver). Eventually, the cirrhosis caused by fatty liver can become so severe that the liver no longer functions properly (liver failure).

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## Diagnosing liver damage

Unfortunately, many people remain unaware that they have liver disease until they develop symptoms and feel unwell.

### Symptoms that could indicate liver damage include:

- dark (tea-coloured) urine
- jaundice (yellowing of the skin or whites of the eyes)
- light-coloured or bloody stool
- persistent nausea and/or vomiting
- flu-like symptoms (fever, aches, pains, feeling generally unwell)
- pain or tenderness on your right side below your ribs
- abdominal pain
- unusual fatigue or weakness
- loss of appetite

- itchy skin
- swollen ankles and feet

**Signs and symptoms that could indicate a drug hypersensitivity reaction** (which can harm the liver) include:

- a rash, particularly if it is severe or accompanied by fatigue
- gastrointestinal symptoms (including nausea, vomiting, diarrhea or belly pain)
- fatigue, lack of energy, weakness
- respiratory symptoms (sore throat, shortness of breath, cough, unusual findings on X-rays of the chest)
- mouth sores
- “pink eye” (conjunctivitis)
- swelling of the face, throat, tongue, lips, eyes, hands, feet, lower legs
- the liver damage symptoms previously listed

If you experience any of these symptoms at any time, particularly during the first eight weeks of HIV treatment, notify your doctor immediately.

Your doctor may recommend blood tests to determine whether an HIV medication you’re taking should be discontinued. If a medication has to be discontinued due to a hypersensitivity reaction, *it can never again be used* because a fatal reaction could occur within hours.

Various blood tests can help assess liver damage or inflammation. A **bilirubin test** is a blood test that measures how well your liver is clearing the waste product bilirubin. Other tests measure the levels of certain **liver enzymes**. The liver uses enzymes to get rid of the waste produced by your body and by the breakdown of drugs, alcohol and other toxins. When the liver is stressed, blood tests may show high levels of certain enzymes, such as:

- AST (aspartate aminotransferase)
- ALT (alanine aminotransferase)
- GGT (gamma-glutamyl transpeptidase)
- ALP (alkaline phosphatase)
- LDH (lactic dehydrogenase)

If you take HIV medications, you should have your liver enzymes monitored regularly. It is especially important that people who already have some liver damage—due to hepatitis, for example—get regular blood tests. In this way, any drug causing problems can be discontinued and other problems causing liver damage can be addressed. (Abnormally high enzyme levels can sometimes be caused by problems other than liver disease, so the test results need to be interpreted carefully.)

**Nonalcoholic fatty liver disease** usually causes no obvious symptoms, but when it does they include fatigue, pain in the upper right abdomen and unintentional weight loss. Diagnosis can involve liver enzyme tests, imaging tests and sometimes liver biopsy.

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## How to protect your liver

### Detoxify

Because a healthy liver is so important to your overall health, and it will help you handle antiretroviral therapy over the long term, detoxifying and repairing it is one of the best things you can do for your long-term health. To prevent or repair liver damage, try to eliminate as many sources of toxicity as possible.

### Cut down or eliminate your use of alcohol and street drugs

Heavy drinking can be toxic to the liver. Consuming too much alcohol can cause fatty liver and other forms of liver damage. If you already have some liver damage, the risk from alcohol is greater. In people with hepatitis C, a high alcohol intake has been tied to an increased risk of cirrhosis, more advanced liver fibrosis and a higher rate of death. Try to limit your alcohol consumption to no more than one drink per day, or avoid it altogether.

## Quit smoking

Tobacco smoke contains hundreds of extremely toxic chemicals that the liver must try to break down. For someone who already has liver problems, continuing to smoke adds another burden to a liver that is already struggling. Easier said than done but if you can quit smoking, you'll be doing your liver a big favour.

## Eat healthy

Eating a healthy diet helps keep your liver healthy. Cut out junk foods and drinks that are loaded with chemicals and sugar that the liver will have to detoxify. Limit the amount of fat you eat. Another way to give your liver a break is to limit the amount of sugar and fructose you consume. (Learn more about liver-friendly foods on the next page.)

## Get vaccinated against hepatitis A and B

Hepatitis A and B are liver diseases caused by the hepatitis A and B viruses. There are vaccines that can protect you from these viruses. Some people from high-risk groups can get the vaccines free of charge. Talk to your doctor for more information.

## Avoid activities that carry a risk of hepatitis C

If you inject drugs, avoid sharing needles, syringes, filters, alcohol swabs, water and cookers. If you smoke or snort drugs, avoid sharing crack pipes, straws and bills. Because Hep C can also be passed when people share personal items that could have blood on them, such as razors, nail clippers and toothbrushes, it's also a good idea to avoid sharing these items. During sex, avoid sharing sex toys or other objects that may have someone else's blood on them.

## If possible, avoid being exposed to chemicals, or reduce your exposure

In the workplace and elsewhere, avoid being exposed to chemical fumes and vapours, such as gasoline, solvents, pesticides and herbicides. Or reduce your exposure by wearing an appropriate face mask.

## Avoid taking antibiotics unnecessarily

Some antibiotics can be toxic to the liver. Antibiotics are overused in our society and sometimes prescribed and taken in situations where they will have no effect. You should, of course, take antibiotics if you have a real need, but they shouldn't be used for a cold or flu or other infection that is caused by a virus for which an antibiotic will do nothing.

## Use acetaminophen with caution

Acetaminophen (Tylenol) overdose is the most common cause of acute liver failure in North America, and alcohol consumption can substantially increase the risk. If you consume alcohol regularly, some experts strongly recommend that you take no more than 1,000 to 2,000 mg of acetaminophen per day and for only a few days at most. That means taking no more than two to four extra-strength pills in a 24-hour period.

Acetaminophen is an active ingredient in more than 200 medications, including many popular over-the-counter headache and cold remedies (such as Dayquil, Buckley's and NeoCitran). It's also in some common prescription drugs (such as Percocet and Tylenol 3). To protect the liver, avoid combining acetaminophen-containing products. Talk to your pharmacist for help reading labels.

If you take acetaminophen, do not exceed the maximum daily recommended dose on the label. You might also consider taking N-acetyl-cysteine

(NAC) to decrease the risk of liver injury. Talk to your doctor about ways to prevent any negative effects from acetaminophen.

### Go for a “brown bag” checkup to review your drugs and supplements

Gather all of the prescription medications, over-the-counter meds and supplements you’re taking and bring them to your doctor’s appointment to determine if anything could cause liver problems and, if so, if you should switch to another drug or supplement. At that time your doctor can also assess whether there’s a possibility of drug interactions. It is possible that drugs that would normally cause no problems when taken alone might interact with one another and cause toxicity.

You might want to also do a “brown bag” checkup with your pharmacist. He or she will look at everything you’re taking to check for possible interactions or other problems. Do not change your HIV meds unless your doctor advises you to do so.

### Eat foods that support the liver

**A well-balanced diet** that includes fruits and vegetables, whole grains and good sources of protein and fats supports your liver by providing it with the nutrients it needs to stay healthy.

Consuming a variety of colourful fruits and vegetables provides the body with **antioxidants**, which protect the liver. Tea, coffee and dark chocolate are also loaded with antioxidants. Research suggests that polyphenols in green and black tea may help protect the liver from toxins and may help prevent liver cancer when two to four cups of tea are consumed daily. Coffee also contains high levels of antioxidants. If you can, stick to organic coffee because non-organic coffee is one of the crops most heavily sprayed with pesticides, and pesticides are filtered by the liver.

Fruits, vegetables and whole grains are a valuable source of **fibre**. Fibre can help bind toxins in the intestines and then speed their elimination through the bowel, thereby reducing the liver’s detoxification workload. Taking fibre supplements like psyllium or oat bran can add to your fibre intake.

Certain fruits, vegetables, fatty fishes and other foods are also a source of powerful **natural anti-inflammatories**. These foods can help reduce the inflammation that can contribute to liver damage. (For a full discussion, see Appendix A, page 56.)

The **good fats** from olive oil, nuts and seeds, avocados and wild-caught fish are easier for the liver to process and help the liver to create healthy cell membranes around its cells. On the other hand, bad fats like trans fats place a heavy burden on the liver.

If possible, choose **organic foods** because they do not contain the pesticides that are sprayed on many fruits, vegetables and grains or the antibiotic residues found in non-organic meats, eggs and farm-raised fish. Organic foods tend to be more expensive and many people can’t afford the higher prices. But if you *can* afford to buy organic occasionally, you might want to buy those fruits and vegetables that tend to be the most heavily sprayed with pesticides. These are sometimes referred to as “the dirty dozen”: apples, celery, bell peppers, peaches, strawberries, nectarines, grapes, spinach, lettuce, cucumbers, blueberries and potatoes.

Finally, be sure to drink plenty of water to help flush out toxins after they have been processed by your liver.

### Avoid foods that could harm the liver

If you have fatty liver, reducing your intake of fructose may help. High-fructose corn syrup (also called glucose/fructose syrup) is a major source of fructose. White sugar, or what is commonly referred to as table sugar, contains 50 percent fructose and 50 percent glucose.

Of the 40 kilograms of sugar consumed by the average Canadian each year (that's about 26 teaspoons each day), only a small fraction comes straight from the sugar bowl. The vast majority comes from commercial foods such as soft drinks, ice cream, cakes, cookies, chocolate bars and breakfast cereals. Significant quantities are also found in cold cuts, relishes, canned soups and vegetables, mayonnaise-like spreads, salad dressings, ketchup and many commercial breads. So, to cut down your intake of sugar/fructose, you will have to read food labels carefully.

When you read labels, remember that all of these are sugars: corn syrup, high-fructose corn syrup, glucose/fructose syrup, sucrose, glucose, fructose, dextrose, maltose, evaporated cane juice, cane sugar, beet sugar, maltodextrin, corn sugar, barley malt, caramel and carob syrup. If you see several of these on the same label, you know that the food is loaded with sugar!

**For people with moderate or severe liver disease**, certain dietary restrictions may be necessary. A low-sodium diet is recommended for anyone who has advanced liver disease that has resulted in an abnormal accumulation of fluid. The more the salt intake can be reduced, the better the chances of avoiding this excessive fluid accumulation. In general, liver experts recommend limiting sodium intake to only 500 to 1,000 mg daily. This will require reading food labels carefully. You will want to avoid most prepared foods, which are high in sodium, and choose more fresh foods, as they contain little sodium. Your doctor will be able to determine whether you need to restrict your sodium intake.

The amount of protein you consume might need to be limited. When protein is broken down in the body, one of the byproducts is ammonia. A damaged liver cannot process ammonia as well as a healthy liver can. An overload of ammonia can result in a serious brain condition called encephalopathy, which can affect your ability to think clearly and remember. The exact level of protein intake that is desirable for you will depend on the condition of your liver. Your doctor

will be able to determine whether you need to restrict your protein intake.

### **People who are co-infected with HIV and hepatitis C**

should avoid high levels of iron. Some iron is good but too much can cause iron overload. This is especially true for people who have had a liver biopsy that showed an abnormal accumulation of iron in the tissue. A daily intake of antioxidants may make iron less problematic. But since it is not known exactly when and in whom iron will be a problem, eliminating excessive iron from your diet appears to be a good idea if you are co-infected with HIV and hepatitis C.

### **Treat liver-damaging infections and cancers**

Liver injury can also be caused by certain infections and certain kinds of cancer. Early diagnosis and treatment can limit their effect on the liver. For example, there are now excellent treatments for hepatitis B. The treatment does not cure the infection but can greatly suppress hepatitis B and prevent it from causing further damage to your liver.

There have also been huge advances in hepatitis C treatment. Highly effective treatments now cure more than 95 percent of people with hepatitis C. Everyone who has hepatitis C should talk to their doctor about their options. Hepatitis C treatment can save your liver and your life.

The liver is an organ that is capable of repairing itself. When hepatitis viruses are suppressed or eliminated, particularly if this is done before serious damage has occurred, the liver may be able to repair itself. So don't hesitate to talk to your doctor about hepatitis testing and treatment.



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## Supplements

In addition to removing, as much as possible, anything that might be stressing the liver, taking certain supplements may help. Some naturopathic doctors find the following antioxidants and nutrients useful for helping to protect the liver.

**Glutathione (GSH)** is an antioxidant made by the body that helps break down drugs and toxins and protect the liver. Taking the following nutrients may help to maintain or increase levels of glutathione:

- **N-acetyl-cysteine (NAC)** – 500 mg taken three times per day with food. (The body converts NAC into GSH.)
- **vitamin C** – try to eat fresh and colourful fruits and vegetables every day. If you cannot get fresh fruit, then consider taking a vitamin C supplement. Speak to your healthcare provider about the dose that is right for you.
- **alpha-lipoic acid** – 300 mg per day.

One well-designed clinical trial that lasted for six months found that the amino acid L-carnitine (1 g taken with a meal once daily) was able to reduce inflammation in people with fatty liver. Carnitine is available by prescription (sold under the brand name Carnitor) or over the counter from some pharmacies and health food stores.

Because inflammation is a major contributor to liver damage in nonalcoholic fatty liver disease, dietary changes and nutritional supplements that reduce inflammation may also be helpful. (For more information, see Appendix A, page 56.)

A herb called milk thistle (*Silybum marianum*) contains the compounds silybin, silychristin, silydianin and isosilybin, which, as a group, are commonly referred to as silymarin. Silymarin has powerful effects as both an antioxidant and protector of the liver. However, milk thistle and its extracts have the potential to interact with many medications, including various prescription drugs and over-the-counter meds. Early test-tube studies

led to a concern that silybin might affect blood levels of some antiretrovirals. A later study in humans led researchers to conclude that at commonly used doses the herb should not interfere. Talk to your doctor or pharmacist if you are considering taking this supplement.

Although people living with HIV have found some supplements to be helpful, certain supplements can seriously harm the liver. Many pre-packaged medicines are labelled inaccurately and may contain herbs that are toxic to the liver. Herbs grown in an environment where they have been exposed to toxic chemicals can also cause liver damage. Always consult a knowledgeable practitioner for advice. And always let your doctor and pharmacist know about any herbs or supplements you are thinking of taking.

# Appendix A: Oxidative Stress and Inflammation

Oxidative stress and inflammation begin during the early stages of HIV infection and continue over time. When left unchecked, they have the potential to cause serious damage—they harm immune cells, major organs and the nervous system and contribute to various diseases. We now know that taking antiretroviral therapy (ART) to control HIV can greatly reduce, but not eliminate, chronic inflammation. Fortunately, certain foods and supplements may also help counter oxidative stress and inflammation without adversely affecting the body's immune responses.

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## What is oxidative stress?

Oxidative stress occurs when the body is low on antioxidants. Antioxidants are substances produced by the body and found in some foods (for example, many fruits and vegetables) and supplements. They protect the body from unstable molecules, called free radicals, which are generated by various bodily processes. When we don't have enough antioxidants to counter oxidative stress, our immune cells and important organs—such as the liver, heart and kidneys—can be harmed.

Long-term infections, such as HIV, can cause the body to produce more free radicals than usual and can upset the body's balance in the process. This is why it's especially important for people living with HIV to get enough antioxidants.

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## What is inflammation?

Inflammation is part of the body's immune response to injury, irritation or infection. For example, it kicks in when we cut ourselves, come into contact with something we are allergic to or become infected with a sexually transmitted infection (STI). Cells of the immune system are activated and travel to the site of infection or injury. Signs of inflammation can include redness, swelling, heat, pain and loss of function.

Inflammation is one of the body's ways of fixing or suppressing the problem. Over the short term, it can help us fight a cold or flu or protect us from something we're allergic to. But when inflammation continues over the long term—when it becomes chronic—it stops being beneficial and can contribute to the development of various diseases.

When a person is infected with HIV, inflammation (like oxidative stress) is part of the body's effort to fight the virus. Different kinds of immune cells contribute to a coordinated effort: Some attack the virus and HIV-infected cells; some act as “generals,” coordinating the battle; and others try to amplify the immune response against the virus. However, ongoing inflammation can have the opposite effect: It can activate the virus, cause HIV to infect more cells and raise a person's viral load.

HIV can directly affect tissues in the bones, brain, circulatory system and other parts of the body and can cause damage to the nervous system, important

organs and other parts of the body. The end result is an increased risk of what we sometimes think of as the diseases of aging, such as cardiovascular disease, osteoporosis, liver disease and kidney disease.

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## What you can do to counter chronic inflammation

### Medications

Taking antiretroviral therapy (ART) greatly reduces HIV-related inflammation. That's why it's so important to initiate ART as early as possible after HIV infection and to take your medications every day, as directed, even if you don't feel sick. Regular viral load testing will measure how much HIV is in your blood (your viral load) and help ensure that your treatment is working.

Unfortunately, meds do not completely eliminate the inflammation. The immune system continues to be activated and low-level inflammation persists even when a person's viral load is undetectable.

Researchers are studying various other drug approaches to reducing the chronic inflammation caused by HIV.

### Foods, seasonings and supplements

Although research findings on the benefits of antioxidant foods and supplements have been conflicting, certain foods and seasonings rich in antioxidants appear to have anti-inflammatory qualities. These include:

- ginger
- turmeric
- cherries, berries and red grapes
- onions and garlic
- the white inner rind of citrus fruits

- foods rich in omega-3 fatty acids, such as flaxseed, walnuts and fatty fish (in particular, wild salmon, mackerel, sardines, anchovies, cod and halibut). Fish oil or krill oil supplements provide anti-inflammatory omega-3 fatty acids in a form that can be processed by the body more easily than that in foods or other supplements containing omega-3 fatty acids.

The best way to add antioxidant nutrients to your diet is to consume a wide variety of colourful fruits and vegetables as well as nuts and seeds.

Antioxidant supplements can also help counter both oxidative stress and inflammation. Talk to your doctor and pharmacist (and dietitian/nutritionist or naturopathic doctor, if you see one) about taking supplements, such as:

- a good multivitamin
- vitamin E (choose a supplement that contains all members of the vitamin E family)
- vitamin C
- bioflavonoid complex
- selenium
- N-acetyl-cysteine (NAC)
- coenzyme Q<sub>10</sub>
- supplements derived from anti-inflammatory foods, such as fish oil, ginger root, curcumin, quercetin and bromelain

### Lifestyle changes and screening

Other important things that can help counter the level of inflammation in your body include:

- quitting smoking
- exercising (talk to your doctor about what type of exercise is right for you)
- treating co-infections, such as hepatitis B and C
- regular screening for sexually transmitted infections (STIs)
- maintaining a healthy weight
- maintaining healthy blood sugar levels (see "Diabetes and Blood Sugar Problems," page 30)

# Appendix B:

## Vitamin B<sub>12</sub> and Vitamin D

People with HIV often have lower-than-normal levels of micronutrients, and doctors often recommend that everyone with HIV take a complete multivitamin-mineral supplement every day to maintain optimal levels. Two specific vitamins—vitamin B<sub>12</sub> and vitamin D—are of particular concern because of their many effects in the body.

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### Vitamin B<sub>12</sub>

A number of studies have shown that vitamin B<sub>12</sub> is deficient in a large percentage of people with HIV, and the deficiency can begin early in the disease. Vitamin B<sub>12</sub> deficiency can result in neurologic symptoms—for example, numbness, tingling and loss of dexterity—and the deterioration of mental function, which causes symptoms such as foggy thinking, memory loss, confusion, disorientation, depression, irrational anger and paranoia. Deficiency can also cause anemia. It has also been linked to lower production of the hormone melatonin, which can affect the wake-sleep cycle.

If you have developed any of the emotional or mental symptoms mentioned above, especially combined with chronic fatigue, vitamin B<sub>12</sub> deficiency could be contributing. This is especially true if you also have other symptoms that this deficiency can cause, including neuropathy, weakness and difficulty with balance or walking. On the other hand, these symptoms can also be associated with HIV itself, with hypothyroidism or with advanced cases of syphilis

called neurosyphilis. A thorough workup for all potential diagnoses is key to determining the cause.

Research at Yale University has shown that the standard blood test for vitamin B<sub>12</sub> deficiency is not always reliable. Some people who appear to have “normal” blood levels are actually deficient and could potentially benefit from supplementation. The dose of vitamin B<sub>12</sub> required varies from person to person, so working with a doctor or naturopathic doctor to determine the correct dose is recommended. Vitamin B<sub>12</sub> can be taken orally, by nasal gel or by injection. The best way to take it depends on the underlying cause of the deficiency, so it’s important to be properly assessed before starting supplements. For oral therapy, a typical recommendation is 1,000 to 2,000 mcg daily. One way to know if supplementation can help you is to do a trial run of vitamin B<sub>12</sub> supplementation for at least six to eight weeks. If you are using pills or sublingual lozenges, the most useful form of vitamin B<sub>12</sub> is methylcobalamin.

Talk to your doctor before starting any new supplement to make sure it is safe for you. Some people will see improvements after a few days of taking vitamin B<sub>12</sub> and may do well taking it in a tablet or lozenge that goes under the tongue. Others will need several months to see results and may need nasal gel or injections for the best improvements. For many people, supplementation has been an important part of an approach to resolving mental and emotional problems.

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## Vitamin D

Some studies show that vitamin D deficiency, and often quite severe deficiency, is a common problem in people with HIV. Vitamin D is intimately linked with calcium levels, and deficiency has been linked to a number of health problems, including bone problems, depression, sleep problems, peripheral neuropathy, joint and muscle pain and muscle weakness. It is worth noting that in many of these cases there is a link between vitamin D and the health condition, but it is not certain that a lack of vitamin D causes the health problem.

A blood test can determine whether or not you are deficient in vitamin D. If you are taking vitamin D, the test will show whether you are taking a proper dose while avoiding any risk of taking an amount that could be toxic (although research has shown that toxicity is highly unlikely, even in doses up to 10,000 IU daily when done under medical supervision). The cost of the test may not be covered by all provincial or territorial healthcare plans or may be covered only in certain situations. Check with your doctor for availability in your region.

The best test for vitamin D is the 25-hydroxyvitamin D blood test. There is some debate about the optimal levels of vitamin D, but most experts believe that the minimum value is between 50 and 75 nmol/l. Many people use supplements to boost their levels to more than 100 nmol/l. While sunlight and fortified foods are two possible sources of vitamin D, the surest way to get adequate levels of this vitamin is by taking a supplement. The best dose to take depends on the person. A daily dose of 1,000 to 2,000 IU is common, but your doctor may recommend a lower or higher dose for you, depending on the level of vitamin D in your blood and any health conditions you might have. People should not take more than 4,000 IU per day without letting their doctor know. Look for the D<sub>3</sub> form of the vitamin rather than the D<sub>2</sub> form. Vitamin D<sub>3</sub> is the active form of the vitamin and there is some evidence that people with HIV have difficulty converting vitamin D<sub>2</sub> to vitamin D<sub>3</sub>. Historically,

vitamin D<sub>3</sub> supplements are less commonly associated with reports of toxicity than the D<sub>2</sub> form.

It is best to do a baseline test so you know your initial level of vitamin D. Then, have regular follow-up tests to see if supplementation has gotten you to an optimal level and that you are not taking too much. Regular testing is the only way to be sure you attain—and then maintain—optimal levels. With proper supplementation, problems caused by vitamin D deficiency can usually be efficiently reversed.

# Personal Health Record

(Photocopy this page and give to a friend in case of emergency.)

Name _____	Home address _____
Email address _____	_____
Phone number _____	_____
Employer phone number _____	_____

Health card number \_\_\_\_\_

Private health insurance information \_\_\_\_\_

Date of birth \_\_\_\_\_ Weight \_\_\_\_\_ Height \_\_\_\_\_ Blood type \_\_\_\_\_

Date of HIV diagnosis _____	Allergies and drug sensitivities _____
Other medical conditions _____	_____
_____	_____
_____	_____

Family history (Has a family member ever had diabetes, heart disease, cancer, etc?)			
Condition	Family member (relationship)	Condition	Family member (relationship)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Healthcare providers		
Specialty	Name	Contact information
Family doctor	_____	_____
HIV specialist	_____	_____
Pharmacy	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

In case of emergency, contact:

Name \_\_\_\_\_ Relationship \_\_\_\_\_ Phone \_\_\_\_\_



History of HIV drugs (Keep this list current.)

HIV drug	Dosing schedule	Special instructions	Date started	Date stopped	Reason for stopping

History of other drugs, therapies and supplements (Keep this list current.)

Name of drug or therapy	Dose (if applicable)	Special instructions	Date started	Date stopped	Reason for stopping

History of significant medical events—such as hospitalization, serious illness, surgery (Keep this list current.)

Date	Description of event	Notes

Monitoring tests (Fill in this chart with the results of each viral load test, CD4 test and any other tests you want to monitor, such as cholesterol or triglyceride levels.)

<b>Date of test</b>										
<b>Viral load</b>										
<b>CD4 cell count</b>										

Symptoms and side effects

<b>Describe symptom/ side effect</b>	<b>When did it occur and how long did it last?</b>	<b>How was it treated?</b>	<b>Notes</b>

# Notes for visit to doctor

(Photocopy this page and use for each visit.)

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Changes in my health since the last visit (for example, new symptoms, illnesses)

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Difficulties or challenges with my treatment and/or care

---

Questions for my doctor

---

Things I need from my doctor (for example, prescription refill, referral)

---

Action plan



**Treatment.**  
**Prevention.**  
**Healthy living.**



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