

# HIV and cardiovascular disease

## FACT SHEET

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### Summary

Cardiovascular disease affects the health of your heart and blood vessels and can lead to heart attacks or stroke. You may think that these are problems that affect only older people. However, much research suggests that HIV infection increases the risk for cardiovascular disease, including heart attacks and stroke, even in relatively young people. Initiating and staying on treatment for HIV is one of the best things you can do to stay healthy. Regular monitoring by your doctor or nurse of your overall and cardiovascular health should be part of your plan for living longer and living well. This fact sheet has many additional steps you can take to reduce your risk for heart attacks, stroke and other complications of cardiovascular disease.

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### What is cardiovascular disease?

The simplest way to understand how your heart works is to think of your heart as a muscular pump that moves blood through blood vessels to tissues. The word “cardio” refers to the heart and “vascular” refers to the body’s network of blood vessels. Cardiovascular disease (CVD) is a broad term that covers a number of conditions that affect the health of your heart and/or blood vessels. Examples of such conditions include the following:

- abnormal heart beats (arrhythmia)
- ballooning of the arteries (aneurysm)
- enlarged heart (cardiomyopathy)
- chest pain (angina)—usually due to coronary artery disease
- coronary artery disease—narrowing of the vessels that supply blood to your heart
- heart attack—irreversible damage to the heart muscles

- heart defects—problems in your heart that you’ve inherited
- peripheral artery disease—narrowing of the blood vessels in your legs or feet
- stroke—irreversible damage to the brain due to limited flow of blood
- sudden cardiac death—the heart stops beating suddenly because of disturbances in the electrical currents of the heart

Many of these conditions are related to an underlying, unhealthy process called atherosclerosis, which refers to a hardening and narrowing of the arteries.

### Why should people living with HIV be concerned about CVD?

In the first two decades of the HIV epidemic the biomedical focus was to prevent and treat life-threatening infections. However, now that effective antiretroviral therapy (ART) is widely available in high-income countries like Canada, deaths from life-threatening infections are uncommon. As a result, people with HIV are living longer. In fact, research indicates that many ART users will have near-normal life expectancy. As they get older, people with HIV become vulnerable to all the complications brought on by aging—this includes CVD.

In addition to this, ongoing HIV infection, particularly if left untreated, can increase the risk of CVD. This happens because the ongoing replication of HIV in your body causes your immune system to be in a continuous state of high-level inflammation. Over the long-term, continuous inflammation releases chemical messengers called cytokines that harm the body, damaging and degrading tissues.

Not only does HIV-related inflammation injure the immune system and other organ-systems, it also accelerates the aging of blood vessels. The use of ART greatly decreases HIV-related inflammation. Indeed, studies have found that people who stop taking ART have a greatly increased risk for heart attacks and stroke. However, even in the setting of low or undetectable viral load, low-level inflammation triggered by HIV infection may

continue to slowly affect organs and blood vessels, but at a much lower level than before. Over the long-term, this inflammation may heighten the risk for CVD in HIV-positive people.

Finally, abnormal levels of lipids (fatty substances in the blood), such as triglycerides and cholesterol, particularly high levels of so-called “bad” cholesterol (LDL-C) and low levels of so-called “good” cholesterol (HDL-C) increase the risk for CVD. Some medicines used to treat HIV infection (particularly a class of drugs called protease inhibitors) or other complications in people living with HIV can increase lipid levels in the blood.

Regular monitoring of the levels of cholesterol and triglycerides in your blood can help determine if this is the case for you.

### How can I determine my risk for CVD?

There are many factors that can contribute to an increased risk for CVD and its complications in people with HIV, including the following:

- smoking tobacco
- close family members who have been diagnosed with CVD; this includes parents, brothers or sisters who were diagnosed with premature CVD
- pre-diabetes or diabetes
- high blood pressure
- abnormal cholesterol levels
- being more than 45 years old in men and more than 55 years old in women
- excessive weight
- stress
- depression
- problems breathing during sleep (sleep apnea)
- not enough physical activity
- using drugs such as cocaine, fentanyl, heroin or crystal meth
- having gum disease appears to be an emerging risk factor for CVD

Certain symptoms may suggest the presence of atherosclerosis—the unhealthy, underlying process that occurs in CVD: erectile dysfunction in men, pain in the lower legs/feet that develops with physical activity, and very cool pale skin in the feet and hands. It is important to discuss all of these risk factors with your doctor to determine your overall risk for CVD.

### How can I reduce my risk for CVD?

The list of CVD risk factors may seem long. Some of the factors you may have no control over, such as your age or family history of CVD. However, there are many other factors you can control with help and advice from your doctor, nurse, dietitian or pharmacist. Here is a list of some of the most important things you can do to improve your overall health and reduce your risk of CVD. Most of these interventions have only been studied in HIV-negative people, but there is no reason to expect that they won't help HIV-positive people as well.

#### Butt out

Tobacco smoke contains nicotine, which tightens your blood vessels and raises blood pressure. This smoke also contains many poisons, including the gas carbon monoxide, which damages the lining of blood vessels. Smokers have a greatly increased risk for heart attacks. If you smoke, quitting is the single most important step you can take to reduce your risk of CVD. Quitting smoking also reduces your risk of lung diseases such as bronchitis and emphysema, cancer, thinning bones, hormone abnormalities and many other health problems.

Talk to your doctor, nurse and pharmacist for advice about quitting smoking. Nicotine replacements in the form of patches and gum are available. Certain medications have also been proven to increase the chance of successfully quitting smoking. Other therapies might also help you. Remember that quitting is a process and requires patience, and for some people it takes many attempts before they are successful. Talk to other close friends and family members who also smoke and see if they will commit to quitting smoking with you.

#### Eat healthy

Having a healthy diet can go a long way toward reducing your risk of CVD.

Studies have found that eating a diet rich in colourful fruit, vegetables, low-fat dairy products and whole grains can significantly reduce high blood pressure and may reduce cholesterol in some people. Oats, beans, peas and apples are rich in soluble fibre that helps to lower cholesterol and blood sugar. Other approaches, such as eating a daily handful of tree nuts with helpful fats (such as almonds, pistachios and walnuts) may be useful as part of an overall plan to help improve your cholesterol levels. For people at risk for diabetes, changes to your diet, such as reducing carbohydrates (like desserts, sugary foods and others made from white flour) may be beneficial. Reducing your intake of salt also helps to lower blood pressure. It's not easy to make major changes to your diet, so ask your doctor or nurse for a referral to a registered dietitian who can give you the advice and support you need. Some hospitals offer free counselling from registered dietitians while other clinics may charge for such a consultation.

#### Bust a move

The “miracle drug” called exercise can help reduce inflammation, lower bad cholesterol levels, reduce weight, help improve your mood and help you control diabetes. Because of these amazing benefits, regular exercise can reduce your risk for CVD. Ideally, your exercise program should make you break into a sweat, make you somewhat breathless and/or significantly increase your heart rate for at least 30 minutes at least four times per week. Going for a 30-minute walk every day is a good way to start this exercise program. Importantly, before beginning anything more active than walking, speak to your doctor or nurse about what kind of exercise is right for you.

#### Take it off

No, we're not talking about your clothes. Being overweight increases the risk for CVD and diabetes, and gradually reducing your weight to a normal

range helps lower your risk for heart attacks. If you are overweight, talk to your doctor or nurse about how to safely lose weight.

### **Come to your emotional rescue**

Too much stress may increase your risk for CVD. Try to reduce your exposure to stressful events. If this is not possible, regular use of acupuncture, massage, meditation, yoga and other relaxing activities can help you better cope with stress.

In one large study, researchers found that between 15% and 20% of people who have had a heart attack also suffer from depression. Moreover, in some cases, depression can occur long before a heart attack. Because depression and the related issue, anxiety, seem to increase the risk of CVD, let your doctor and nurse know if you are feeling anxious, sad, depressed, or unexpectedly tired often. Keeping free from depression and anxiety helps your overall health and quality of life.

### **Try to quit or reduce substance use**

Stimulants like cocaine, crystal meth and MDMA/ecstasy can increase your risk of a heart attack. This is because they raise your blood pressure and body temperature, make your heart beat faster and narrow the blood vessels that carry blood to the heart. Injecting substances such as fentanyl, heroin or cocaine into your body can also cause serious life-threatening infections, and the resulting inflammation may affect your heart. If you use drugs, speak to your local harm reduction organization for advice.

### **Practise safer sex**

Emerging research suggests that sexually transmitted infections (STIs) heighten your risk for inflammation and even heart disease. Using condoms helps reduce your risk of catching and passing on STIs such as chlamydia, gonorrhoea, and syphilis. If you are sexually active, consider testing regularly for STIs.

### **Reduce your exposure to germs**

Exposure to germs, particularly chronic exposure, may increase inflammation in your body, which is a risk factor for CVD. Regular hand washing with soap and warm water helps reduce your risk of infections by ridding your skin of germs. Consider wearing a mask in crowded conditions such as buses, subways and so on.

Regular visits to the dentist to maintain and improve the health of your teeth and gums help lower your risk of heart disease because these germs can travel from your mouth to your heart.

COVID-19 can cause serious disease and affect the health of the heart and blood vessels. If you have not already been vaccinated, speak to your doctor or nurse about getting a vaccine to reduce your risk of getting COVID-19-related complications.

Influenza (the flu) greatly increases inflammation. If you have CVD and get the flu, you are at heightened risk for a heart attack. Speak with your doctor about getting a flu shot every fall.

### **Can nutritional supplements help prevent CVD?**

We previously outlined some general dietary and lifestyle changes that can be helpful when used as part of an overall plan to prevent CVD. From time to time you may hear about natural health products (herbs, vitamins, supplements and so on) that are supposed to prevent or cure heart disease. Unfortunately, when the data about such supplements are closely examined, they are generally not effective. Such supplements are not a replacement for changes to diet, exercise and other doctor-recommended interventions.

Some people, under the supervision and advice of their doctor, dietician and/or naturopath, use certain supplements in addition to lifestyle changes or prescription medicines.

Always let your doctor, nurse and pharmacist know what medicines (both prescription and over the counter), herbs and supplements you are taking. This is because some natural health products can weaken the effects of your HIV medications as well as certain other medications, make pre-existing

medication side effects worse, or cause their own side effects.

Some supplements that are under study for a possible role in the prevention of CVD include:

- **Omega-3 fatty acids**—These are found in cold-water fish such as anchovies, herring, mackerel, salmon, sardines and tuna, as well as in tree nuts such as almonds and walnuts. Whenever possible, it is best to obtain omega-3 from food sources, as food contains a range of nutrients, rather than a single nutrient found in pills. Fish oil may help prevent abnormal heart rhythms and reduce inflammation, but this needs further testing. Clinical trials show that fish oil may reduce inflammation and triglyceride levels in some people, but these changes were not linked to a reduced risk of heart attack or stroke. Be aware that fish oil can prolong the time your blood takes to clot, so you may bleed more easily if you take this supplement.
- **Niacin**—Some doctors prescribe gradually increasing doses of this B-vitamin until a daily dose of 1 to 3 grams is reached. At these doses, niacin can sometimes help normalize cholesterol levels by increasing levels of “good” cholesterol. However, reviews of clinical trials of high doses of niacin have not found a consistent benefit. Furthermore, high doses of niacin should only be taken under medical supervision because it can increase the risk of high blood sugar levels—a prelude to diabetes. Due to all these findings, high-dose niacin is not recommended by leading cardiovascular disease guidelines.
- **Chromium**—A small, short-term controlled clinical trial in Toronto has found that some HIV-positive people can have better control of their blood sugar as a result of chromium supplementation. These results need to be confirmed in a larger study.
- **Co-enzyme Q10**—This is an antioxidant that is being studied in cardiovascular disease. It is very expensive and has not been proven to stop heart attacks or stroke.
- **Carnitine**—This is a small molecule that helps move fats to be used as energy inside cells. Small clinical trials have found that carnitine can help

reduce triglyceride levels when taken together with cholesterol-lowering medicines. However, it is not clear whether this affects the risk of CVD. Carnitine supplements can affect the functioning of thyroid hormones, so they should only be used under medical supervision.

- **Alpha-lipoic acid**—This antioxidant has been extensively tested in laboratory animals and has shown to help to control their blood sugar. However, large well-designed studies in people have not been done. Also, alpha-lipoic acid supplements can affect the functioning of thyroid hormones and should only be used under medical supervision.

## How can my risk for CVD be monitored?

Your doctor and, in some cases, nurse can request different tests to help assess your risk for CVD. Here is a list of some of the more common tests (note that this list is not exhaustive):

### Cholesterol and triglyceride levels

Getting your blood tested regularly for cholesterol and triglyceride levels is an important way for many people to keep track of a major risk for CVD. Ideally, blood should be drawn after you have fasted (not eaten) for 12 consecutive hours, so it is best done in the morning after you have not had anything to eat the night before. Also, avoid alcohol for two consecutive days before having your blood tested. Keeping your levels of so-called “bad” cholesterol (LDL-C) low helps reduce your risk for a heart attack and other related problems. And keeping your levels of so-called “good” cholesterol (HDL-C) high is also a good idea. There are a group of prescription medicines called statins; the most commonly used are rosuvastatin (Crestor) and atorvastatin (Lipitor). They are highly effective at reducing abnormal cholesterol levels and are used as part of a plan to help reduce your risk for cardiovascular disease. Depending on your age and CVD risk factors, your doctor may prescribe a statin.

## Blood sugar levels

Prolonged high levels of sugar in your blood can lead to problems, wearing out your body's capacity to control blood sugar levels. Getting your doctor to regularly test your blood sugar levels helps you to be aware of this issue. If blood sugar levels get higher and higher, over time diabetes can develop. In turn, diabetes can lead to nerve damage (including the nerves in your heart). Overall, diabetes makes CVD worse. This blood test needs to be done while you have been fasting for at least eight hours, so it is best done in the morning after you have not had anything to eat the night before. Speak to your doctor and dietitian about your blood sugar levels and ways that you can lower your risk for diabetes. There are several medicines that your doctor can prescribe as part of a plan to help you normalize blood sugar levels.

## Blood pressure

Having high blood pressure increases your risk for CVD and kidney damage. Remind your doctor to check your blood pressure at least once a year. If it is high, more frequent checks will be needed. Blood pressure is reported using two numbers: the systolic pressure over the diastolic pressure. A normal blood pressure is 120/80; an example of high blood pressure is 140/90 or more. If you have high blood pressure, speak to your doctor or nurse about ways that you can lower your blood pressure.

## ECG (electrocardiogram)

A technician puts small sensors on your chest. These sensors can detect the electrical signals that your heart produces every time it beats. The ECG records these electrical signals and produces a chart commonly called a cardiogram. Your doctor(s) can inspect the chart to find out if your heart is beating abnormally.

## Holter monitoring

Sometimes the ECG may not detect any abnormal heart rhythms when they are present infrequently, so a longer period of heart monitoring may be necessary. For this, you can wear a portable device called a Holter monitor for several days. This

monitor records your heart's electrical signals for later analysis.

## Echocardiogram

This is an ultrasound scan of your heart. A small device produces invisible ultrasound waves that are beamed at your heart. These waves bounce off the heart, producing an echo that is recorded by a computer. The computer then converts the ultrasound waves into an image that your technician, nurse or doctor can see. Echocardiograms are useful when your doctor wants to get an idea of how your heart is working and if there is abnormal heart muscle function.

## Chest x-ray

An X-ray machine produces a very small amount of radiation that is beamed toward your chest and helps form a picture of your lungs, heart, blood vessels and other structures.

Here is a list of some of the less common tests:

### Cardiac CT scan

A CT scan is a special type of X-ray scan that takes detailed X-ray images of your body. Before scanning, you lie on a narrow table with a massive doughnut-shaped machine affixed to it. This machine moves around your body as it performs a scan, which does not hurt.

### Cardiac MRI

MRI (magnetic resonance imaging) scanners produce magnetic waves that are beamed at your body, producing images of your organs. To undergo an MRI scan, you lie on a table which then slides into a tunnel inside a large machine. The scanner makes a lot of noise but is harmless.

### Cardiac catheterization

This test is used to look at the structure of blood vessels that supply blood to the heart. Before this procedure is performed you will receive a mild sedative. A very small tube is inserted into a blood vessel in your arm or leg. A thinner tube—called a



guide catheter—is inserted into the first tube. Using X-ray images, the doctor gently moves the second tube through the blood vessel until it reaches your heart. There, the blood pressure within your heart can be measured and blood flow through the heart can be checked. If necessary, a tiny piece of the heart can be removed—a procedure called a biopsy—and later analysed.

## How can I recognize serious complications of CVD, such as heart attacks and strokes?

There are several major complications that can occur as a result of CVD. The most common are heart attack and stroke.

### Warning signs—heart attack

Symptoms that are suggestive of heart attack include:

- chest pain that may be mild or severe, like a tight band on your chest
- this pain may also occur or only occur in your chest, left arm, jaw, neck or back
- chest pain that occurs after vigorous activity and does not go away
- problems breathing
- anxiety together with the other symptoms in this list
- cool, damp skin

Note that some groups of people, such as women and the elderly, may experience no pain or only mild pain during a heart attack.

If you are experiencing these symptoms suggestive of a heart attack, Canada's Heart and Stroke Foundation recommends that you take these steps:

- **CALL 911** or your local emergency number immediately, or have someone call for you. Keep a list of emergency numbers near the phone at all times.
- Stop all activity and sit or lie down in whatever position is most comfortable.

- If you take nitroglycerin, take your normal dosage.
- If you are experiencing chest pain, chew and swallow one adult 325 mg ASA tablet (acetylsalicylic acid, commonly referred to as Aspirin) or two 81 mg tablets. Pain medicines such as acetaminophen (Tylenol) or ibuprofen (Advil) do not work the same way as ASA (Aspirin) and therefore will not help in the emergency situation described above.
- Rest comfortably and wait for emergency medical services (EMS)—the ambulance—to arrive.

### Warning signs—stroke

A stroke occurs when the flow of blood to your brain stops. There are two types of strokes. The more common kind occurs when a blood clot forms and blocks the flow of blood to your brain. The other kind occurs when a blood vessel leaks and blood escapes into the brain.

Mini strokes or TIAs (transient ischemic attacks) occur when the blood supply to your brain is briefly interrupted.

Here are the five key symptoms of a stroke:

- weakness—sudden loss of strength or sudden numbness in the face, arms or legs, even if temporary
- trouble speaking—sudden difficulty speaking or understanding or sudden confusion;
- vision problems—sudden trouble with vision, even if temporary
- headache—sudden severe and unusual headache
- dizziness—sudden loss of balance, especially with any of the above signs

If you experience any of these, call 911 or your local emergency telephone number right away.

### Sudden cardiac death

The pumping action of the heart is driven by regular waves of tiny electrical currents. When

disturbances in the electrical currents of the heart occur, heartbeats can become irregular and, in some cases, can even stop. When the heart stops beating and pumping blood the brain and lungs are immediately affected. People quickly become unconscious and, if standing, suddenly collapse and stop breathing. There is no pulse because the heart has stopped beating. This is called sudden cardiac death, or SCD.

### Not a heart attack

Sudden cardiac death is different from a heart attack. During a heart attack, pain and distress occur yet the heart continues to beat. During SCD, the heart stops beating.

Sudden cardiac death usually occurs without a warning but in some cases the following symptoms may occur:

- unexpected tiredness or lack of energy
- fainting
- dizziness
- chest pain
- shortness of breath

### Changes in risk

In general, among HIV-negative people, the risk of SCD is generally very low (0.001% per year) in otherwise healthy teenagers and young adults. After the age of 30, the risk of SCD begins to rise and increases to about 0.1% per year. From this point, the risk gradually increases with age. In people with serious heart disease who are 50 or older, the risk of SCD may be much greater, reaching between 10% and 25% per year.

### Focus on the heart

Disturbances in the heart's electrical system are likely to occur in people who have or have had the following conditions:

- heart attack
- coronary artery disease

- abnormally thickened heart muscle (cardiomyopathy)
- abnormal heart valves
- inherited heart disease
- problems with the electrical system of the heart

As sudden cardiac death is linked to CVD, the same factors that place a person at risk for CVD also increase the risk for SCD.

### Consequences

In cases of SCD, the flow of oxygen-rich blood to the brain stops and a person immediately loses consciousness. Unless the heart quickly resumes its normal rhythm and beats within about 10 minutes, the oxygen-starved brain undergoes serious damage and death occurs. People who survive SCD may show signs of brain damage.

### Tests

The most common test to monitor heart rhythms is the ECG, which can detect abnormalities in the electrical wave produced by the heart.

To find the underlying cause of SCD there are many additional tests that a cardiologist may order, including analyses of blood samples, ultrasound and other scans of the heart and its vessels, and more complex tests of the heart's electrical system. Some tests and procedures used in assessing the risk for SCD and heart disease may be invasive.

### Preventing SCD

To help prevent SCD, regular checkups with a focus on screening for heart disease are necessary. Leading a life that is good for your heart is also crucial.

### What medical treatments are there for CVD?

The first and most important step in reducing your risk for a heart attack is to reduce or ideally



eliminate traditional CVD risk factors by doing the following:

- quitting smoking
- improving your diet, exercise routine and losing or gaining weight as directed by your doctor, nurse and other health care providers

## Medications

Depending on the type of CVD you may have and the results of the monitoring tests previously mentioned, your doctor might prescribe one or more medicines to help treat your CVD.

These medications work best if they are part of an overall plan that you and your health care team make with the goal of improving your health.

If a person has a high risk for abnormal heart rhythms or has abnormalities of the heart's electrical system, cardiologists may prescribe drugs. Classes of drugs used to treat abnormal heart rhythms include the following:

- beta blockers
- ACE (angiotensin-converting enzyme) inhibitors
- calcium channel blockers

## ART and cardiovascular risk

Untreated HIV infection is associated with increased risk for heart attacks and stroke. (See the section “Why should people living with HIV be concerned about cardiovascular disease?”) However, research on the relationship between specific anti-HIV drugs and risk for CVD has been underway for more than a decade.

This research has found that some combinations of older anti-HIV drugs can increase your level of lipids—cholesterol and triglycerides—in your blood. By visiting your doctor and getting your blood tested on a regular basis you can be aware of any changes to lipids. If they are higher than normal, speak to your doctor about ways of lowering cholesterol, triglycerides and reducing your overall CVD risk. Combinations that include any of the following anti-HIV drugs often increase cholesterol levels:

- ritonavir (Norvir and in Kaletra)
- cobicistat (in Genvoya, Prezcobix and Stribild)
- efavirenz (Sustiva and in Atripla and generic formulations)
- d4T (stavudine, Zerit)

Today, doctors in Canada and other high-income countries are more likely to prescribe other drugs for the treatment of HIV. Newer drugs, particularly a group called integrase inhibitors, generally do not cause increased levels of bad cholesterol. Older drugs such as d4T and efavirenz are generally not widely used today. However, because combinations that include ritonavir or the related drug cobicistat, may be necessary for some people, doctors may prescribe these medicines while advising additional steps to reduce cholesterol levels. (See the section “How can I reduce my risk for CVD?”)

## Abacavir

Data from a well-designed trial (called Reprieve) of 7,769 people with HIV have been analysed. This study recruited people at low-to-moderate risk of cardiovascular disease. Participants were randomly assigned to receive the cholesterol-lowering medicine pitavastatin or placebo. After an average of five years of monitoring, researchers found that people who received pitavastatin had a 35% reduced risk of major symptoms of cardiovascular disease (heart attack, stroke and so on).

Although people in Reprieve were not randomly assigned to receive their HIV treatment (they were already all on treatment), the randomization used in the study helps to reduce the possibility of drawing biased conclusions when analyzing the data. The researchers are able to further analyse the information captured from the Reprieve study to answer important research questions. One such question is the potential risk associated with the use of the drug abacavir.

Since 2008, some observational studies have reported that there has been an increased risk of heart attack in some people with HIV who used abacavir. However, because these studies were observational in design, they could not prove that the use of abacavir was linked to an increased risk

of heart attack. Furthermore, most of these analyses from observational studies appeared to have issues, such as missing data or not being able to take into account factors such as smoking and substance use.

Now that has changed. An analysis from the very well-designed Reprive study has found that recent or past use of abacavir was linked to a 50% increased risk for heart attack and other major symptoms of severe cardiovascular disease.

The analysis from Reprive was able to consider factors such as sex, smoking, age, substance use, kidney health and so on. Even when the Reprive researchers adjusted for these and other factors, abacavir was still linked to a significantly increased risk for heart attack and related issues.

These results from Reprive have again heightened concern about the safety of abacavir-containing medicines.

Therefore, as a precaution, before starting Triumeq, let your doctor know if you have any of these or other risk factors for cardiovascular disease:

- close family members (parents or siblings) with a history of heart attack or stroke
- high blood pressure, abnormal cholesterol or triglyceride levels in your blood, pre-diabetes or kidney injury/disease
- smoking tobacco or drugs
- injecting drugs (such as fentanyl or heroin) or using stimulants (such as cocaine, crystal meth or MDMA/ecstasy)

Regardless of the anti-HIV drugs you are taking, your doctor will regularly monitor your cardiovascular health and work with you to manage your risk for CVD.

## Surgery

Despite these recommendations, CVD may become progressively worse in some people, perhaps because of inherited factors, difficulty making lasting changes to diet and increasing physical activity, or not taking their medicines as directed. In such cases, your doctor may recommend certain procedures to help improve the flow of blood to

your heart. Here are two fairly common procedures. In both cases a blockage can occur again, so some people may need another procedure in the future:

- **Angioplasty**—A tiny tube is placed into one of your arteries. A small balloon is inserted into this and pushed into a blocked artery. The balloon is inflated and it squashes plaque, helping to widen the artery and improve the flow of blood. A wire mesh or stent may be used to help hold the artery open, and you may need to take blood thinners to decrease the chance of the arteries becoming blocked again.
- **Carotid endarterectomy**—a surgeon makes a tiny cut into the carotid artery in the neck (this artery carries fresh oxygen-rich blood to the brain). The surgeon then removes plaque from the walls of this artery. As a result of this surgery blood flow to the brain improves. This surgery can greatly reduce the risk of a stroke.
- **Bypass surgery**—This is sometimes necessary when you have a blocked artery. The surgeon removes the part of your artery that is blocked and replaces it with a blood vessel from another part of your body. Now blood can flow and bypass the blockage. Unfortunately, a bypass can close again so some people may need another bout of bypass surgery in the future.

Less common procedures include:

- **Implantable cardioverter defibrillator (ICD)**—This may be surgically emplaced near the collarbone in people with electrical disturbances in the heart, including SCD. The ICD has wires that are connected to the heart. The purpose of the ICD is to monitor the heart's rhythms. It can release tiny electrical signals that adjust the heart's rhythm.
- **Heart transplant**

## If I am diagnosed with CVD, what steps can I take to support my recovery?

It is normal to feel upset or overwhelmed when you have been diagnosed with CVD. To help you cope with this, there are a number of steps that you can

take after discussion with your doctor or nurse, as follows:

- **Cardiac rehab**—Doctors often recommend this for people recovering from a heart attack or who have had cardiac surgery. The rehab program involves exercise monitoring, nutritional and emotional support and counselling from health care professionals.
- **Support groups**—Speak to your doctor or nurse to find out more about support groups that may be available in your area.
- **Checkups**—Regular visits to your doctor are an essential part of monitoring your heart health and ensuring that the steps you have taken are working.

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