HIV and cardiovascular disease

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, emerging research suggests that HIV infection increases the risk for cardiovascular disease, including heart attacks and stroke, even in relatively young people. So, regular monitoring by your doctor of your overall and cardiovascular health should be part of your plan for living longer and living well. Getting on treatment for HIV is one of the best things you can do to stay healthy. This fact sheet has many additional steps you can take to reduce your risk for heart attacks, stroke and other complications.

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, deaths from life-threatening infections are uncommon. As a result, HIV-positive people are living longer. As they get older, people with HIV become vulnerable to all the complications brought on by age—ing—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 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 damage the immune system and other organ-systems, it also accelerates the ageing 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 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 place people with HIV at increased risk for CVD, 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
• 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
• not enough physical activity
• using street or party drugs, such as cocaine, 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 several 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.

- Health Canada’s On the Road to Quitting is a useful website with lots of tips to help you in your journey to break free from tobacco.

- How to Say “I Quit”—and Mean It from CATIE’s Positive Side magazine (Summer 2013) gives practical advice on how to quit smoking.

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 cholesterol in some people. Other approaches, such as eating a daily handful of 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 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.

- “Conquer the Kitchen” from CATIE’s Positive Side magazine (Spring 2008) is an easy-to-read article about healthy eating for people with HIV.

- CATIE’s Practical Guide to Nutrition for people living with HIV provides extensive information on healthy eating.

- “La Dolce Vita” from CATIE’s Positive Side magazine (Spring/Summer 2005) provides information on nutrition and diabetes for people with HIV.

- “Calming the Flames” from CATIE’s Positive Side magazine (Winter 2016) gives ideas and recipes for quelling chronic inflammation.

Bust a move

The “miracle drug” called exercise can help reduce inflammation, lower bad cholesterol levels, reduce weight 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.

- “Work It!” from CATIE’s Positive Side magazine (Spring/Summer 2009) provides information on exercise for people living with HIV.

Take it off

No, we’re not talking about your clothes. Being overweight or having a large belly increases the risk for CVD and diabetes. 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.

- The “Nutrition, Weight and HIV” section in CATIE’s Practical Guide to Nutrition for people living with HIV provides information on managing your 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, worry a lot or feel sad, unexpectedly tired often or depressed. Keeping free from depression and anxiety helps your overall health and quality of life.

- The “Your emotional health” chapter in CATIE’s Managing your health provides information on stress and depression.

Quit or cut down on substance use

Cocaine, amphetamine (speed), crystal meth and related chemicals such as ecstasy (E or X or xtc) can raise your blood pressure and body temperature, make your heart beat faster, narrow the blood vessels that carry blood to the heart and significantly increase your risk of a heart attack. Injecting substances such as heroin or cocaine into your body can also cause serious life-threatening infections, and the resulting inflammation may affect your heart. If you use substances, speak to your doctor and nurse about getting help.

- CATIE’s Pre-fix: A guide for people with Hep C or HIV who inject drugs provides information on substance use and HIV.

Practise safer sex

Emerging research suggests that sexually transmitted infections (STIs) heighten your risk for inflammation and even heart disease. Sex can and should be fun but there’s no reason to expose yourself to germs. Practising safer sex, even if you are an HIV-positive person who has sex with other HIV-positive people, helps reduce your risk of catching and passing on STIs such as herpes, LGV, syphilis, hepatitis B and C viruses, and other germs. Speak to your doctor about testing for and treating STIs to eliminate inflammation.

- Chapter 7 in CATIE’s Managing your health (“Your sexual health”) provides information on HIV, safer sex and sexually transmitted infections.

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 yourself of germs. 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.

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.

- “Infections and Bugs and Germs…Oh My!” from CATIE’s Positive Side magazine (Fall/Winter
2004) provides information on reducing your risk of infections, such as the flu.

Can nutritional supplements help prevent CVD?

We previously outlined some 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, there is no such magic supplement.

Some people, under the supervision and advice of their doctor and/or nutritionist or naturopath, use certain supplements in addition to the other steps we’ve outlined (lifestyle changes, medicines prescribed by their physician).

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 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**, found in cold-water fish such as anchovies, herring, mackerel, wild salmon, sardines and tuna. Clinical trials have found that supplements of fish oil can reduce levels of triglycerides in your blood, but you have to take large doses (more than 4 grams/day) of fish oil. Fish oil may also help prevent abnormal heart rhythms and reduce inflammation, but this needs further testing. Be aware that fish oil can prolong the time your blood takes to clot, so you may bleed more easily.

- **Niacin**—Some doctors prescribe gradually increasing doses of this B-vitamin until a daily dose of 2 or 3 grams is reached. At this dose, niacin can sometimes help normalize cholesterol levels by increasing levels of “good” cholesterol. However, reviews of clinical trials 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. High doses of niacin can also cause a temporary harmless rush of blood to the skin (flushing), which can be itchy.

- **Chromium**—A short, small-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**—A small molecule, carnitine helps move fats to be used as energy inside cells. 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 can affect the functioning of thyroid hormones.

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

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
Blood sugar levels

Prolonged high levels of sugar in your blood can lead to problems, wearing out your body’s capacity to deal with sugar. 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 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.

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 CAT scan

A CAT, or 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 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 and radio 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—a 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 is still in its infancy.

Many combinations of 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)
- efavirenz (Sustiva and in Atripla)
- d4T (stavudine, Zerit)

However, because combinations that include ritonavir or efavirenz are a very useful and effective part of combination therapy, many HIV-positive people continue to use these medicines while taking additional steps to reduce cholesterol levels. (See the section “How can I reduce my risk for CVD?”)

Some studies have suggested that using certain anti-HIV drugs, such as abacavir (Ziagen and in Kivexa) and ritonavir, may increase the risk of having a heart attack, although these results have not been replicated in other studies. In part, this is because the number of people who have a heart attack is very low. What’s more, most studies that have reported heart attacks are observational studies. These types of studies are good at finding an association, but they cannot prove cause and effect. That is, they cannot prove that taking certain anti-HIV drugs will cause a heart attack. However, a review by the U.S. Food and Drug Administration (FDA) of randomized clinical trials has not found any link between abacavir use and an increased risk of heart attack.

Because research on how different anti-HIV drugs may affect CVD risk is ongoing, information in this area changes frequently. Together you and your doctor can work with the best available evidence, including HIV treatment guidelines, and regular monitoring of your health to reduce your risk for CVD and find a treatment that is right for you.

Regardless of the anti-HIV drugs you are taking, your doctor will regularly monitor your cardiovascular health and work with you to make sure your risk for CVD does not increase.

Surgery

Despite these recommendations, CVD may become progressively worse in some people, perhaps because of inherited factors, difficulty making
lasting changes to diet and 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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Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV-and hepatitis C-related illness and the treatments in question.

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