A GUIDE TO UNDERSTANDING THE HeartWare® Ventricular Assist System
The heart is a powerful muscle that is responsible for pushing oxygen-rich blood and other nutrients out into the entire body. It may be easier to think of the heart as a pump, or two pumps: one on the right side of the heart and one on the left.

- The right side of the heart collects oxygen-poor blood from the body and pumps it to the lungs
- The left side of the heart receives oxygen-rich blood from the lungs and pumps it out to the rest of the body

Each side of the heart is further divided into two chambers:

- An atrium, which is the collection chamber
- A ventricle, which is the pumping chamber

Special valves divide the chambers and keep the blood moving forward. Take a look at the illustration to see the heart, its sides, its chambers, and how the blood flows through it.

You have been living with heart disease...

and now, your doctor feels that you may need some additional help pumping blood throughout your body. That’s why your physician has asked you to consider using a mechanical device that will assist the pumping function of your heart. This device may be used as either a bridge-to-transplant—that is, a temporary implant that can help support your heart while waiting for a transplant—or it may be used as a permanent implant.

This brochure has been designed to help you understand how a healthy heart functions, how disease impairs this function, and how the HeartWare® Ventricular Assist System (HeartWare® System) works.
The heartWare® System includes all of the equipment needed to help your heart pump blood throughout your body—and take the strain off your heart. Use of the system is designed to minimize your symptoms and help you enjoy many regular daily activities.

At the core of the heartWare System is a pumping device called a left ventricular assist device (LVAD). The LVAD sits inside your chest and is connected directly to your heart. It pumps blood from the left side of your heart into your aorta (large blood vessel that carries blood from your heart to the rest of your body). The blood exits the pump in a continuous stream much like water out of a garden hose. Note that this continuous flow of blood is different than the pulsing beat of a normal heart, and as a result you may not be able to feel your pulse. There is no need for concern, this is completely normal.

The LVAD is run by a small external computer, called a controller. The LVAD and the controller are connected by a small cable (driveline) that passes through the skin on your upper abdomen. The controller runs the pump and also provides text messages and audible alarms to help you manage the operation of the system. The controller is powered by two batteries, or one battery and electricity from a wall or car outlet. The complete heartWare System is portable. A carrying case may be worn around your waist or carried over your shoulder, allowing you to take the system with you, wherever you go. The system weighs about 2.5 pounds (1.1 kg).

Unfortunately, the effect of certain diseases or conditions—such as coronary artery disease, heart attacks, high blood pressure, or even diabetes—may weaken the pumping action of the heart. Early on, the heart may be able to compensate for the poor pumping function by working harder. However, over time, the heart weakens and becomes unable to meet the demands of the body. This is called heart failure. Heart failure does not mean that your heart has stopped. Rather, it means that your heart can no longer keep up with the work needed to pump adequate blood to all parts of your body. As a result, your body will receive less oxygen, causing you to feel tired and weak while going about your daily routine.

Despite the use of medications, other medical devices such as pacemakers and internal cardiac defibrillators (ICDs) and lifestyle changes—such as diet and exercise—some people may still have symptoms and need the help of a device that can take on some of the pumping function of the heart.

One option for your heart disease may be the HeartWare® Ventricular Assist System.
HEARTWARE® SYSTEM COMPONENTS

The battery charger charges and tests the batteries (up to 4 at a time).

The controller operates the pump and ensures it is working correctly. It provides feedback on the operation of the pump through words, lights, and sounds.

The battery is used to power the pump. Two batteries, or one battery and an AC adapter or DC adapter, are ALWAYS required.

The battery charger charges and tests the batteries (up to 4 at a time).

The AC adapter uses power from a wall electrical outlet to power the controller.

The DC adapter uses power from an electrical outlet in an automobile to power the controller.

Figure 2: Illustration of a HeartWare® Ventricular Assist System

HVAD® pump

Driveline Exit Site

Patient Pack Containing Controller and Batteries

HVAD PUMP

The pump (LVAD) is designed to be surgically implanted above the diaphragm, next to the heart.
WHAT TO EXPECT BEFORE, DURING AND AFTER THE IMPLANT

BEFORE

Your doctor will talk with you about the potential benefits and risks of surgery and implantation of the LVAD (the pumping device). Be sure to talk to your doctor about any concerns or questions you may have.

DURING

Implanting the HVAD® pump is a surgical operation known as open heart surgery. This procedure generally takes between four and six hours.

AFTER

Once the HVAD pump has been implanted, you will be taken to the Intensive Care Unit (ICU) where nurses and doctors will provide you with the level of care you need. Initially, you will be on a breathing machine, and you will be connected to several intravenous (IV) lines and drainage tubes. As you regain your strength, you will be taken off the breathing machine and the IV lines and the tubes will be removed. You may also be moved from the ICU to a general hospital floor.

While you are in the hospital, you will begin a rehabilitation program designed to help you return to a more active lifestyle. As part of this program, you and your caregiver will be given training on the HeartWare® System. For example, you will be trained on how to use your HeartWare System at home and how to handle the basic system messages and alarms that may appear on your controller.

YOUR MEDICATIONS

Your doctors and nurses will instruct you on your medications, diet, exercise, and physical limitations. While on the HeartWare® System, you will be on medication to thin your blood (anticoagulants) along with whichever other cardiac-related drugs you were already taking before your surgery. The anticoagulants are intended to reduce the risk of a clot forming in your blood or in the pump.

WHEN YOU LEAVE THE HOSPITAL, YOU WILL BE GIVEN THE FOLLOWING INFORMATION AND EQUIPMENT

- ✔ Patient Manual
- ✔ 2 Controllers (one is for back up)
- ✔ DC Adapter
- ✔ AC Adapter
- ✔ 4-6 Batteries
- ✔ Battery Charger
- ✔ Patient Pack (Carrying Case)

Remember, the information in this brochure is not intended to replace talking with your doctor or other members of your healthcare team. If you have any questions or concerns, please speak with your doctor.
GLOSSARY OF TERMS

If you have any questions or need more information about the terms defined below, please ask your physician.

AC Adapter: A power adapter that plugs into a wall electrical outlet.

Angioplasty: The process of widening a blocked or narrowed blood vessel to restore blood flow to the heart.

Anticoagulants: Medications used to slow your blood from forming clots.

Battery: One of the power sources used to run the LVAD. Two batteries, or one battery and an AC adapter or DC adapter are required at all times.

Battery Charger: The unit used to charge batteries. Up to four batteries may be charged at a time.

Controller: A small computer that operates the LVAD and communicates information about how the LVAD is working.

DC Adapter: A power adapter that uses power from an automobile electrical outlet to run the controller and LVAD.

Driveline: The “cable” attached to the implanted LVAD that passes through the skin to connect to the controller.

Exit Site: The location where the driveline passes through the skin.

HeartWare® System: The shortened name for the HeartWare® Ventricular Assist System, which comprises the HVAD® pump, controller, and power sources.

HVAD Pump: The name of the HeartWare LVAD.

ICD: An abbreviation for Implantable Cardiac Defibrillator. This is an implanted device that sends small electrical shocks to the heart to stop fast, and potentially deadly, heart rhythms.

LVAD: An abbreviation for Left Ventricular Assist Device. This is the mechanical pump that is implanted in the left ventricle of the heart.

LVAS: An abbreviation for Left Ventricular Assist System. This comprises the mechanical pump (LVAD), the controller, and each of the power sources (batteries, AC adapter, and DC adapter).

Pacemaker: A small implanted device that sends electrical signals to the heart via electrodes to cause the heart to contract. This device is intended to maintain a regular heart beat.

Pump: A common alternate name for an LVAD.