A Patient Education Handbook on Pacemakers
Your heart is a muscle about the size of your fist and has a complex electrical system. It generates its own electricity, which causes it to contract and relax in the proper timing sequence, pumping blood to the body.

For the heart to work correctly, the chambers must beat in a coordinated manner at a resting heart rate between 60 and 100 beats per minute.

Electrical signals can become blocked or irregular, causing the heart to beat too quickly (tachycardia) or too slowly (bradycardia).

Pacemakers are miniaturized computers that are usually implanted just underneath the skin in the chest area.
A pacemaker monitors the heart’s rate (how fast it beats) and rhythm (the pattern in which it beats) and provides electrical stimulation when the heart does not beat or beats too slowly.

To provide support, the pacemaker sends a tiny electrical pulse down a wire or wires into your heart, stimulating the heart to beat.

The pacemaker also stores information about your heart, which can be retrieved by your doctor. This helps your doctor to program the settings of the pacemaker to provide you with the best therapy for your needs.

Pacemakers cannot be damaged by properly operated household appliances, such as microwave ovens.

Pacemakers can help people to enjoy longer, more productive, happier and healthier lives.
FREQUENTLY ASKED QUESTIONS

LIVING WITH YOUR PACEMAKER

Since the first fully implanted pacemaker in 1958, millions of people around the world have benefited from pacemaker therapy. A pacemaker monitors the heart’s rate (how fast it beats) and rhythm (the pattern in which it beats), and it provides electrical stimulation when the heart does not beat or beats too slowly. Pacemakers can help to reduce symptoms of dizziness and fatigue brought on by a slow heart rhythm, helping patients to enjoy a better quality of life.
WHY DO I NEED A PACEMAKER?

The heart has a complex electrical system. It actually generates its own electricity, which causes it to contract and relax in the proper timing sequence, so that it can pump blood to the body. Electrical signals can become blocked or irregular, causing the heart to beat too quickly (tachycardia) or too slowly (bradycardia). For the heart to work correctly, the chambers must beat in a coordinated manner at a resting heart rate between 60 and 100 beats per minute. There are two common causes of bradycardia:

1. **Sick Sinus Syndrome**, which is a disease of the sinoatrial (SA) node, the heart’s natural pacemaker.

2. **Atrioventricular block**, which occurs when the upper chambers (atria) and lower chambers (ventricles) are not coordinated, also commonly called heart block. These diseases can cause the heart to beat too slowly, either occasionally or all the time. In both cases, the heart might not pump enough blood to meet the body’s needs. As the heart rate declines, there might not be sufficient blood flow to the brain, most often causing fatigue and lightheadedness and sometimes fainting.
HOW DOES A PACEMAKER WORK?

A pacemaker is typically used for cardiac rhythm disorders involving a too-slow heart rate (bradycardia) or because electrical impulses get delayed on their way through the heart.

The pacemaker “listens” to the heart. When the heart’s own electrical system sends a signal and the heart beats, the pacemaker waits and does nothing. When the heart’s system misses a signal, the pacemaker sends a signal to replace it.

These impulses are very tiny, and most people do not feel them at all.

While the device is helping your heart to maintain its rhythm, it is also storing a lot of information about your heart. This information can be retrieved by your doctor, and it helps him or her to program your device in a way that provides you with the best therapy for your condition.
HOW IS A PACEMAKER IMPLANTED?

Usually, surgery for an implanted cardiac device is not done under general anesthesia. Instead, conscious sedation is used. You will be given medication to help you relax, but you will still be aware of your surroundings and able to hear and even talk with the medical team as the procedure is being conducted. Numbing medication will be given where the incision is made. While the local anesthetic will block sharp pain, you may still feel some pressure while the device is being implanted.
WHAT HAPPENS DURING SURGERY TO IMPLANT A PACemaker?

The doctor will first make a small cut in the upper chest and locate a vein. A small puncture is made in the vein, and the leads, long flexible wires, will be guided down the vein to the heart. The surgical team monitors the placement of the lead using a large overhead monitor called a fluoroscope. This is a kind of moving x-ray picture. The leads must be placed in exactly the right spot for best results, so this is often the most time-consuming part of the operation. Once that is done, the doctor will test the leads to make sure that they are in the best position to deliver energy to the heart.

After the leads are in place, your doctor might ask you to go through some simple maneuvers, such as taking a deep breath or coughing vigorously, to help assess the stability of the lead. Then, he or she will make a “pocket” by separating the skin and underlying tissue from the muscle beneath the tissue. After the pulse generator is connected to the leads, it is placed in that pocket.

Once the device is in place, the doctor will sew up the incision. Many people just notice a small scar and a small bump after the incision heals. However, in people who are very small or thin, the device might stick out more. If you are worried about how this might look, talk to your doctor. In some cases, the device can be located somewhere that will be less noticeable.
The length of the surgery depends on what kind of device you are getting, as well as your specific anatomy and the time it takes to locate a good position for the lead. Implanting a pacemaker can take a couple of hours.

**WHAT HAPPENS AFTER THE SURGERY?**

Right after the surgery, you will be taken to a recovery room. You may experience some tenderness at the implant site for a while. You may stay in the hospital several hours or several days. You should discuss the specifics of your case with your physician.

In the period after surgery, follow all of your physician’s instructions carefully. Above all, be sure to report any redness, soreness or tenderness around the implant site. If you are already back home when you notice redness or soreness around your scar, call your doctor immediately—do not wait for your next appointment.

**HOW LONG WILL IT TAKE ME TO RECOVER?**

It is difficult to be specific about your recovery because every patient is different. Follow your doctor’s instructions carefully. Your activities will be restricted for a period following surgery. Your doctor is your best source of advice on the subject of resuming your normal activities.
WHAT RISKS ARE ASSOCIATED WITH HAVING A PACEMAKER?

Implanting a pacemaker is considered minor surgery, but a small number of patients will develop complications because of the implant procedure. They may include infection, a reaction to a drug used during surgery or to the device itself and blood loss or damage to a blood vessel, the heart wall or other organs. These complications can usually be corrected or cured, but may require a repeat operation or a longer than normal hospital stay. After the surgery, you may feel some discomfort or tiredness. As you recover, you will feel better. However, some patients continue to feel some discomfort where the pacemaker is implanted. Speak to your doctor if this occurs.

Your doctor will discuss all the precautions with you prior to surgery. Also, read any literature that comes with your device, and pay close attention to sentences that are labeled with the word “warning” or “important.” These sentences contain important safety information.

It is important to monitor the device regularly with follow-up visits as often as your doctor recommends.
HOW OFTEN DO I NEED TO SEE MY DOCTOR ONCE I HAVE A DEVICE?

You will be asked to see your doctor regularly for routine checkups.

Immediately after your surgery, you will probably be asked to visit the doctor several times. These are all very important visits, and they allow your physician to be sure your device is working properly. Sometimes minor adjustments are required, which can be done painlessly in the doctor's office using a tabletop computer called a programmer. Your doctor will also want to check the incision to see how it is healing.

After that, your physician will want to see you for regular follow-up visits. He or she will advise you how often you should be evaluated because it varies by patient and condition.
WHAT HAPPENS DURING A FOLLOW-UP APPOINTMENT?

The follow-up is completely painless and usually takes less than half an hour. During this time, the doctor or nurse will put a wand over the spot where the device is implanted. The wand is about the size and shape of a television remote control device.

For some devices the information is sent wirelessly. The device tells the programmer about the battery status, performs other system checks and can report on your heart’s rhythms since your last follow-up.

The doctor can also alter certain settings on your device to adjust your therapy, if needed. For these reasons, it is very important that you keep your follow-up schedule with your doctor.

HOW WILL MY DOCTOR CHANGE THE BATTERIES IN MY DEVICE?

Implantable devices are powered by special batteries that are made to last a long time. These batteries do not suddenly wear out, like flashlight batteries, but they give plenty of warning that they are reaching end of service.

Your doctor will monitor the battery as part of your regular device check-up. Most device batteries last five to ten years although it depends on the device and how often it sends electrical impulses to the heart.

When the device indicates a low battery, your physician will arrange for a replacement. Implantable devices are sealed shut, so the batteries are not replaceable. Instead, your
doctor will implant a new device. Typically, this surgery does not last as long as your original device implant because your new device will simply be plugged into the leads that have already been placed in your heart.

**WILL A PACEMAKER CHANGE MY LIFE?**

The truth is that your life could be longer, more productive, happier and healthier. After surgery, you will need to take it easy for a while. Be sure to carefully follow all of your doctor’s instructions.

**WHAT PRECAUTIONS SHOULD I TAKE WITH ELECTRICAL EQUIPMENT?**

Most home appliances and office equipment in good working order are safe to use (microwave ovens, blenders, toasters, electric knives, televisions, electric blankets, stoves, garage door openers). The pacemaker will work properly with most medical equipment during x-rays, diagnostic ultrasound, CT scans, mammography and fluoroscopy. You should do your best to avoid electromagnetic interferences (EMI) that could be caused by electrical appliances in poor conditions or not grounded correctly, industrial generators, arc-welders, specific medical equipment. Magnets, large heaters and radio transmitters also can cause EMI. If you become lightheaded or feel palpitations (rapid, irregular heartbeats), you should simply turn off the electrical equipment or walk
away from it, and the implanted device should resume normal operation. Contact your doctor if you have questions or concerns.

If using problematic equipment is something that you cannot avoid, your doctor can tell you what to do. He or she may also contact the device manufacturer for guidance.

**WHAT IF I AM GOING INTO A HOSPITAL OR CLINIC?**

Tell the hospital personnel that you have a pacemaker before you undergo any medical procedure, such as electrosurgery, electrocautery, external defibrillation, lithotripsy or radiation therapy, or a dental procedure or test. Do not enter areas that have a “no pacer” symbol posted.

Do not undergo any diathermy procedure, even if your pacemaker has been turned off. It could cause damage to the tissue around the implanted electrodes or permanent damage to the pacemaker.

**CAN I USE A CELL PHONE?**

Cellular phones, which send electromagnetic signals, may interfere with proper device operation. However, simple precautions such as not carrying the phone in a breast pocket over the pacemaker and holding it to the ear that is farthest from the pacemaker minimize the risk.

St. Jude Medical has put special filters in their pacemakers
to prevent the possibility of cell phone interference.

**WILL AN iPod™ MOBILE DIGITAL DEVICE OR OTHER PORTABLE MULTIMEDIA PLAYER INTERFERE WITH MY PACEMAKER?**

There is no indication that compact multimedia players, such as iPod™ products or MP3 players, interfere with the normal function of a St. Jude Medical™ pacemaker.

**WHEN CAN I RESUME PHYSICAL ACTIVITIES?**

Your doctor will let you know when it is safe for you to resume activities. It is important that you avoid bumping or hitting the area around your implant. Your energy level may increase after you receive your device, and many people find they are able to do more physically than they were before because their symptoms have improved.

**IS IT SAFE TO ENGAGE IN SEXUAL ACTIVITY?**

Other than a brief stay in the hospital and a short recovery period, receiving an implantable device typically does not have any adverse effect on a patient’s sex life. It is important, though, to follow your doctor’s advice as to when to resume any physical activity.

**WILL I BE ABLE TO DRIVE?**

Talk to your doctor about driving. Having a pacemaker implanted should not affect your ability to drive, but it is best
to discuss driving with your physician before you resume driving.

**WHEN CAN I TRAVEL AGAIN?**

Your physician is your best resource for the answer to this question. Many pacemaker patients, however, find that with some extra planning and care, they can enjoy touring to many locations. It is always wise to plan your route carefully and give a copy of your itinerary to a loved one, just in case you encounter difficulties while traveling.

**WILL AIRPORT SECURITY INTERFERE WITH MY DEVICE?**

Though many patients worry about airport security systems, there is really no need for concern. It is true that airport security has been tightened, but this does not place an added burden on you in terms of your implanted device.

The best thing to do when you reach airport security is to walk
through the metal detector at a normal pace. If the alarm sounds (it may or may not), it only means that the system detected the metal in your device. Simply show your patient identification card and ask for a hand pat-down search.

Security personnel may perform a search with a handheld wand. If so, it is important to tell them that the search should be done quickly and that they should avoid holding the wand over your implanted device for more than a second.

**WHAT ELSE SHOULD I KNOW ABOUT TRAVELING WITH AN IMPLANTABLE DEVICE?**

Remember that, while traveling, it is important to carry with you important medical information, such as medication names and dosages, your physician’s name and phone number and how to care for you in an emergency.

You should also ask your physician for a copy of the final printout from the programmer associated with the testing results and settings at the most recent evaluation. If you are going to a Spanish, French or German speaking country, your physician might also be able to give you a printout in the language of the country you will visit. (Printouts in Italian, Japanese and Chinese may also be available for some devices.)
Carry with you enough medications, and have a supply in your carry-on luggage and your suitcase when traveling by train or plane.

Lastly, alert any travel personnel to special dietary needs you might have, and exercise good eating habits while on the road.

**WILL I STILL NEED TO TAKE MEDICATION AFTER I HAVE A PACEMAKER?**

This is a question for your doctor. Usually, having an implantable device does not replace medication. Instead, medication and implantable devices work together. But your doctor may change your dosage.

**WILL I HAVE ANY DIET RESTRICTIONS?**

For overall heart health, doctors recommend following a diet that is low in sodium, fat and sugar and high in fiber and carbohydrates. Check with your doctor for your specific diet recommendations.

**I AM FEELING BETTER PHYSICALLY, BUT SOMETIMES I FEEL WORRIED OR SAD. IS THERE ANYTHING I CAN DO?**

Health is not just physical. Many patients experience stressful feelings after a device has been implanted. There are many coping strategies, including focusing on vibrant activities, staying close to loved ones and getting enough rest.
Living with a cardiac issue can be disconcerting. But, an implantable device is designed to offer you some comfort. It is there to back you up. If you are experiencing feelings of anxiety or depression, discuss this with your physician.

Many hospitals have patient support groups that meet regularly to learn about device therapy, heart disease and so on. It is not unusual for patients—particularly right after surgery—to be nervous or apprehensive about the device. These groups can offer insight and support as you become used to your new lifestyle. They will also help you meet other patients. Ask your doctor about local patient support groups.
IMPORTANT INFORMATION

- Implantable device manufacturer:
- Device make and model number:
- Implanting physician:
- Implanting physician phone number:
- Implantation date:
- Hospital where implant was performed:
- Attending physician:
- Attending physician phone number:
- Medications name and dosage:
- Travel checklist:
- Patient ID card:
- Printout of device settings:
- Medications:
ADDITIONAL NOTES AND QUESTIONS:

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Note: This pamphlet is not intended to take the place of the manufacturer’s patient manual provided with each device.

Rx Only

Indications: Implantation is indicated in one or more of the following permanent conditions: syncope, presyncope, fatigue, disorientation due to arrhythmia/bradycardia or any combination of those symptoms. Rate-Modulated Pacing is indicated for patients with chronotropic incompetence, and for those who would benefit from increased stimulation rates concurrent with physical activity. Dual-Chamber Pacing is indicated for those patients exhibiting: sick sinus syndrome, chronic, symptomatic second- and third-degree AV block, recurrent Adams-Stokes syndrome, symptomatic bilateral bundle branch block when tachyarrhythmia and other causes have been ruled out. Atrial Pacing is indicated for patients with sinus node dysfunction and normal AV and intraventricular conduction systems. Ventricular Pacing is indicated for patients with significant bradycardia and normal sinus rhythm with only rare episodes of A-V block or sinus arrest, chronic atrial fibrillation, severe physical disability. AF Suppression™ algorithm is indicated for suppression of paroxysmal or persistent atrial fibrillation episodes in patients with one or more of the above pacing indications.

Contraindications: Dual-chamber pulse generators are contraindicated in patients with an implanted cardioverter-defibrillator. Rate-Adaptive Pacing may be inappropriate for patients who experience angina or other symptoms of myocardial dysfunction at higher sensor-driven rates. An appropriate Maximum Sensor Rate should be selected based on assessment of the highest stimulation rate tolerated by the patient. AF Suppression stimulation is not recommended in patients who cannot tolerate high atrial-rate stimulation. Dual-Chamber Pacing, though not contraindicated for patients with chronic atrial flutter, chronic atrial fibrillation or silent atria, may provide no benefit beyond that of single-chamber pacing in such patients. Single-Chamber Ventricular Demand Pacing is relatively contraindicated in patients who have demonstrated pacemaker syndrome, have retrograde VA conduction or suffer a drop in arterial blood pressure with the onset of ventricular pacing. Single-Chamber Atrial Pacing is relatively contraindicated in patients who have demonstrated compromise of AV conduction.

Potential Adverse Events: The following are potential complications associated with the use of any pacing system: arrhythmia, heart block, thrombosis, threshold elevation, valve damage, pneumothorax, myopotential sensing, vessel damage, air embolism, body rejection phenomena, cardiac tamponade or perforation, formation of fibrotic tissue/local tissue reaction, inability to interrogate or program a device because of programmer malfunction, infection, interruption of desired device function due to electrical interference, loss of desired pacing and/or sensing due to lead displacement, body reaction at electrode interface or lead malfunction (fracture or damage to insulation), loss of normal device function due to battery failure or component malfunction, device migration, pocket erosion or hematoma, pectoral muscle stimulation, phrenic nerve or diaphragmatic stimulation. The following, in addition to the above, are potential complications associated with the use of rate-modulated pacing systems: inappropriate, rapid pacing rates due to sensor failure or to the detection of signals other than patient activity, loss of activity-response due to sensor failure, palpitations with high-rate pacing.

Refer to the User’s Manual for detailed indications, contraindications, warnings, precautions and potential adverse events.

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