This sheet explains what a pacemaker is, why it is needed and how we implant it.

**Key points**
- A pacemaker is a small electronic device that makes the heart beat more regularly.
- Pacemakers help to make a slow heart beat faster.
- They work by giving the heart a small, painless electrical impulse to bring the heart beat back to a regular rhythm.

**What is a pacemaker?**
- A pacemaker is a small electronic device (called a generator) placed under the skin of either the chest or abdomen (belly) (see Figures 1 and 2).
- We place wires (called leads) through the veins into the heart. Or, we sew the wires onto the outside of the heart.
- These wires provide painless electrical pulses to help the heart beat more regularly.

**Why would my child need a pacemaker?**
- Pacemakers help to make a slow heart beat faster.
- They can also help when the heart muscle beats irregularly (called a dysynchronous heart) and is not pumping well (called ventricular dysfunction or heart failure).

**What are the kinds of pacemakers?**
- **Single chamber pacemakers:** This has 1 wire going to either the top part of the heart (atrium) or the bottom part of the heart (ventricle).
- **Dual chamber pacemakers:** This uses 2 wires. One wire goes to the atrium, and another goes to the ventricle. The pacemaker helps the top and bottom part of the heart beat more regularly.
- **Cardiac resynchronization pacemakers:** This uses 3 wires. A wire goes to the atrium, and 2 wires go to the ventricles. This helps the ventricles contract in a more coordinated way and get more blood out of the heart.

**How is a pacemaker implanted?**
How we put the pacemaker in is based on your child's size and anatomy. We can place it either through the veins (transvenous) or on the heart's surface (epicardial).
- **Transvenous pacemaker:** We insert 1 or more leads through a big vein below the collarbone. We then guide them to the heart and attach them to the heart muscle. The leads connect to a generator under the skin (Figure 1).
- **Epicardial pacemaker:** A cardiac surgeon attaches 1 or more leads to the heart's surface through an incision in the chest. We connect the wires to a generator, usually placed under the rectus muscle (the "six-pack" on the belly) (Figure 2).

**How long will my child stay in the hospital after the procedure?**
- **For transvenous pacemakers:** Your child will stay overnight in the hospital. We’ll do a chest X-ray the next morning and check the pacemaker to be sure it’s programmed the right way.
- **For epicardial pacemakers:** Your child will stay in the Cardiac Intensive Care Unit (CICU) for 1–2 days and then moved to a different unit. They will probably spend 5–7 days in the hospital recovering from the surgery.
- This recovery time lets us make sure the incision is healing well and that any pain is under control.
• The team will also make sure your pacemaker is working and programmed the right way.

How long will the pacemaker last?
• Pacemaker batteries last 5 to 8 years. How long it lasts depends on how it is programmed and used.
• The leads are made to last 10-15 years. Young people and those with congenital heart disease (CHD) may have their leads wear down faster.

Should I avoid electronics?
• You should keep all electronics and magnets 6 inches away from the generator to prevent interference with the pacemaker.
• Some power tools and large electromagnetic tools have different rules. Check your pacemaker booklet for information about these kinds of tools, or ask your care team.

What happens next?
• You'll learn how to send transmissions from your child's pacemaker so we can check on it remotely (from our office) every 3 months. We'll also need to see your child in person every year.

Contact us
• **Monday–Friday:** Please call the Pacemaker Office at 617-355-4676 between 7 a.m.- 4 p.m.
• **After hours or if your call is urgent:** Please call the hospital operator at 617-355-6369 and page the electrophysiology (EP) doctor on call (pager #3737).