

healthsmart!

Electromagnetic interference of battery operated medical devices

What are battery-operated medical devices?

Numerous types of medical devices are being used to help people manage their medical conditions. People with heart rhythm disturbances often require implanted medical devices such as pacemakers or implantable cardioverter defibrillators (ICDs). Hearing-impaired individuals may have cochlear implants. Pumps may be implanted to infuse medications for the treatment of pain or other medical problems, while stimulators, implanted into the brain, may be used to treat multiple sclerosis or certain types of epilepsy and tremors. Transcutaneous electrical nerve stimulators (TENS) are commonly used to help manage pain. Nonimplanted medical devices commonly prescribed include hearing aids, respirators, apnea monitors and powered wheelchairs.

What is EMI?

All electrical devices emit electromagnetic “energy.” Electromagnetic return interference, or EMI occurs when the electrical energy emitted by one electrical device interrupts or disrupts the functioning of another electrical device. There are numerous devices that give off strong contact and have the potential for causing EMI when in close contact with medical devices. Examples of these electrical devices include welding equipment, running car motors or alternators, battery-powered cordless power tools, chainsaws, high power generators, lawn mowers, bingo wands, stereo speakers, high-voltage lines, transformers, and radio or television broadcast transmitters. Electromagnetic interference can turn a medical device off, interfere with its safety alarms, cause the device to malfunction, or affect the memory of a device that normally stores information. In health care, magnetic resonance imaging (MRI) machines may cause EMI and are currently off limits to the more than 2 million Americans with implantable devices.

How do I reduce my risk for EMI?

Implantable device technology is improving so that EMI is less and less a risk. The following medical recommendations and suggestions for avoiding EMI in daily activities will help to reduce this low risk even more:

- Learn as much as you can about your medical device. Discuss questions with your health care provider.
- When obtaining care, always discuss your implantable device with your doctor whether in the emergency department, in a physician’s office or in the hospital.
- Magnetic resonance imaging (MRI) is not a procedure that patients with implantable devices can undergo.
- Be aware that certain procedures require special considerations for people with implanted medical devices. Tell your treating clinician before going for any of the following:
 - electrolysis (permanent removal of hair).
 - diathermy or therapeutic ultrasound (heat treatment using electricity).
 - diagnostic ultrasound, lithotripsy (crushing of stones using electricity, usually in the gall bladder or urinary tract).
 - radiation therapy (often used for cancer treatment).
- Carry your device registration card with you at all times and know the make and model number of your device.
- Wear a MedicAlert™ bracelet to inform others that you have an implanted medical device.

Avoid the following sources of EMI during daily activities:

- If you use cell phones or walkie-talkies, do not store them in a pocket close to the device. Hold phones on opposite side of implanted device, maintaining a distance of six inches or more between the cell phone and the implanted device.
- If you use power toothbrushes, shavers, or other battery or electrically operated personal care items, avoid placing these items directly over implanted devices. Sonic toothbrushes with battery chargers are to be kept at least six inches away from the device.
- Avoid using magnetic mattresses or chairs.
- If you use an induction oven – keep at least six inches between the oven and your implanted device.
- Avoid leaning over a running automobile engine, and keep six inches between the engine and the device.
- Keep electrical or battery-powered tools (screwdrivers, drills, chainsaws, gardening equipment) 12 inches away from the device.
- Keep bingo wands six inches away from the device.
- Keep your device at least 12 inches from large stereo speakers and slot machines in casinos.
- Be aware that hidden theft reduction devices are in many stores, libraries and malls. While you can walk through these systems without harmful effects, it is not a good idea to linger near the systems or lean on them.

EMI in airport security systems

When walking through an airport security system, the metal in the implanted device may set off the alarm. Although it will not harm the device, it will prompt a search using the hand-held wand. Alert security personnel before walking through the system. If it does alarm, request a hand search as opposed to the use of the hand-held wand. These wands contain a strong magnetic field and may seriously affect your device. Carry your implant card in your wallet to present to security personnel.

Work-related exposures to EMI

If you work in an industrial setting where strong magnetic waves could interfere with an implanted medical device, have your work setting assessed to determine whether unsafe electromagnetic fields exist.

What if I have an EMI-related problem?

- Move away from the source of EMI.
- Report your concern to your health care professional.
- **Call 911** if your problem involves a medical emergency.

How do I report medical device problems and EMI incidents?

Call the FDA's MedWatch Program at **1-800-FDA-1088** or visit its Web site at www.accessdata.fda.gov/scripts/medwatch. You can also report a problem by mail to MedWatch, FDA, HF-2, 5600 Fisher's Lane, Rockville, MD 20857. Be sure to inform the FDA if you think the problem may be linked to an identifiable source of EMI. Reporting this information is a very important means of showing developers how to improve these devices.

What types of medical device questions should I ask my health care professional?

- Why are you recommending this device for me?
- What experience have you had with caring for patients with this type of medical device?
- Are there any risks associated with this device? Will I have any activity limitations?
- Is there someone who has this device that I may speak to about his/her experiences with this device? Are there support groups available in this area?
- How often do I need to have the device checked? How can I be sure it is working effectively?
- What brand and model is my device?

Common battery-operated implantable medical devices used at UK HealthCare:

- Pacemakers
- Implantable cardioverter defibrillators
- Transcutaneous electrical nerve stimulators
- Spinal stimulators
- Peripheral nerve stimulators
- Cranial nerve stimulator

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Call UK Health Connection at **859-257-1000** or toll free **1-800-333-8874** to make an appointment or request a referral. Visit us online at ukhealthcare.uky.edu.

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