New cell phone and smart watch models can interfere with pacemakers and defibrillators

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New research findings verify FDA recommendation for patients with implanted medical devices to keep their smart phones and watches at least six inches away to avoid interference with implanted medical devices. Credit: US Food and Drug Administration

After reports of smart phone and watch interference with implanted medical devices, investigators affiliated with the Center for Devices and Radiological Health (CDRH) at the US Food and Drug Administration

conducted a study that supports the FDA recommendation that patients keep any consumer electronic devices that may create magnetic interference, including cell phones and smart watches, at least six inches away from implanted medical devices, in particular pacemakers and cardiac defibrillators. Their findings appear in *Heart Rhythm*, the official journal of the Heart Rhythm Society, the Cardiac Electrophysiology Society, and the Pediatric & Congenital Electrophysiology Society.

"Ensuring the safety of our nation's medical devices is a cornerstone of our consumer protection mission, especially as technology continues to advance," explained lead investigator Seth J. Seidman, MS, Research Electrical Engineer and EMC Program Advisor with the CDRH. "As part of this work, the agency reviewed recently published articles describing the possibility that certain newer cell phones, smart watches, and other consumer electronics with high field strength magnets may temporarily affect the normal operation of implanted electronic medical devices, such as pacemakers and implantable defibrillators. Based on our review, we decided to conduct our own testing to confirm and help inform appropriate recommendations for patients and consumers."

Cardiac implanted electronic devices are intended to support heart rhythm disorders, such as slow or fast heart rates. Implantable pacemakers and cardioverter defibrillators (ICDs) include a "magnet mode" designed to be used when a patient is undergoing a procedure where electromagnetic interference is possible, or when suspension of the device is necessary for medical treatment. However, this feature can also be triggered accidentally from strong magnetic fields greater than 10G, which can change how the device works and could result in serious harm to the patient.

Historically, magnets strong enough to trigger this magnet mode were very large and identifiable, such as stereo speakers or electronic motors in cordless tools. With the advent of small rare-earth magnets, however,

strong magnetic fields can be found in headphones, door locks, or small phone speakers.

The investigators tested the magnetic field output of all iPhone 12 and Apple Watch 6 models at varying distances from the devices. They found that all the devices have static magnetic fields significantly greater than 10G in close proximity, high enough to place implanted cardiac devices into magnet mode. However, when a separation distance of six inches or more is maintained, the phones and watches will not trigger magnet mode.

"Because of these results, we are taking steps to provide information for patients and healthcare providers to ensure they are aware of potential risks and can take simple proactive and preventive measures like keeping consumer electronics, such as certain cell phones and smart watches, six inches away from implanted medical devices and not carrying consumer electronics in a pocket over the medical device," advised Mr. Seidman.

"We believe the risk to patients is low and the agency is not aware of any adverse events associated with this issue at this time. However, the number of consumer electronics with strong magnets is expected to increase over time. Therefore, we recommend people with implanted medical devices talk with their healthcare providers to ensure they understand this potential risk and the proper techniques for safe use. The FDA will continue to monitor the effects of consumer electronics on the safe operation of medical devices," noted Mr. Seidman.

More information: Seth J. Seidman et al, Static magnetic field measurements of smart phones and watches and applicability to triggering magnet modes in implantable pacemakers and implantable cardioverter-defibrillators, *Heart Rhythm* (2021). DOI: 10.1016/j.hrthm.2021.06.1203

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