TEACHING BRIEF®

Mayo Appears Resistant to Cell Phone Interference

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ROCHESTER, Minn., March 9 -- The Mayo Clinic appears to be refractory to interference from cellular phones, investigators here reported. So the clinic is considering ending a cell phone ban.

Using either of two common signal transmission technologies the phones caused no interference in 300 separate tests conducted in 75 rooms in 11 patient-care areas, including telemetry-laden ICUs, reported David L. Hayes, M.D., and colleagues in the March issue of *Mayo Clinic Proceedings*.

Action Points

- Explain to patients who ask that many health care institutions allow cell phone use only in restricted areas, and that such bans should be honored until the institutions adopt formal policies specifically allowing the use of cell phones and other wireless devices.

The study confirms findings of other groups that have shown that modern cell phones don't pose a risk to patient health, because they don't interfere, when used as intended, with critical or non-critical medical equipment.

"For institutions that have restricted cellular telephone use, these data support revision or abolition of the existing policy," the investigators wrote. "If no clinically important adverse effects occur as a result of using cellular telephones in the hospital, then it seems that the advantages that this technology brings to institution and patients would be well received."

They cautioned, however, that allowing the use of cell phones in hospital could have other negative effects.

"These advantages may be tempered by etiquette and lack of common courtesy by some individuals when using cellular telephones (cellular telephone users talking loudly and obnoxiously, bothering other patients and visitors)," they wrote.

The widespread ban of cell phone use in hospitals, clinics, and physician offices was prompted by the fact that older generations of cell phones were believed to have the potential to disrupt radio signals in the frequency ranges used by medical equipment such as remote heart monitors.

At the 2006 annual meeting of the American College of Emergency Physicians, researchers from the University of Mississippi Medical Center in Jackson reported that when they tested cell phone use in the emergency department, they found that the signals didn't disrupt electrocardiograms or set off alarms.

"As ubiquitous as cell phones are, if they were significant interference there would be daily noticeable disruptions," wrote A. Joseph Anderson, M.D., and colleagues, in a poster presentation.

The Mississippi authors noted that although cell phones are off limits in patient-care areas, other wireless devices, such as Blackberries, personal digital assistants, and wireless internet cards are often used with impunity.

They noted that many of the original studies used to justify a cell phone ban were conducted in the early 1990s, when cell phones used

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analog signals only, could not adjust their power output, and when medical equipment was not shielded from radio interference.

In addition, many of the early studies had cell phones touching the devices with which they were found to interfere, which is not how they were used then or now.

Many, if not most, cell phones in use today are digital, and the widespread reach of cell towers means that newer devices need much less power than older phones, and are therefore less likely to cause undue interference. Newer medical equipment is also shielded from stray radio frequencies.

The Mayo investigators acknowledged that they had previously found evidence for cell phone interference, albeit under conditions not akin to real-world uses.

"In these previous studies, interference was seen on one occasion when the cellular telephone was placed behind the ventilator within two inches of the serial or data port and during another test when the cellular telephone was within two inches of the top of a ventilator and the telephone was ringing or operating in an analog mode," they wrote.

To see whether the same type of interference would occur in a more realistic scenario, the investigators used phones from two different cellular telephone providers. One of the phones used the code division multiple access protocol (CDMA, used by AllTel, Sprint PCS, and Verizon Wireless) and the global system for mobile communication protocol (GSM, used by ATT/Cingular, T-Mobile, and European carriers).

They used the phones in the medical cardiology ICU, medical cardiology unit, echocardiography laboratory, neuroepilepsy monitoring unit, transplant critical care unit, cardiovascular surgery step-down unit, cardiovascular surgery ICU, neurosurgery ICU, medical intensive care unit, vascular surgery postoperative care unit, and pulmonary ventilator rehabilitation unit.

The 192 medical devices tested included vital signs monitors, ventilators, infusion pumps, blanket heaters, external pacemakers, intracranial pressure monitors, and urine output monitors, among others.

The investigators used the phones as they would normally be used and looked for signs of trouble, but found none.

"In total, 300 tests were performed (75 for each of the two telephones with a call connected and 75 for each of the two telephones without a call connected, the ringing test)," they wrote. "Interference occurred in 0 of the 300 tests completed. Therefore, the incidence of clinically important interference was 0% (95% confidence interval, 0%-4.8%). No interaction with any of the medical devices present in the patient rooms was found."

They also recruited 10 patients to use two Blackberry wireless handheld devices for a total of 40 tests, with similarly unimpressive results (no interactions with any of 24 medical devices tested).

"On the basis of the results of this study, we are working with institutional leaders to consider possible revision of our existing cellular telephone policy," the investigators wrote. "This revision would not include a policy change in the surgical suites or the pediatric intensive care units, where we will continue to prohibit cellular telephone use since testing has not been performed in these environments. As cellular telephone technology continues to evolve, periodic testing will be required to determine how those changes affect medical devices."

The authors did not specify their funding source or disclose potential conflicts of interest. They also did not report whether they used any of the cell phones or wireless handheld devices tested personally.

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Primary source: Mayo Clinic Proceedings
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Tri JL et al. "Use of Cellular Telephones in the Hospital Environment." *Mayo Clin Proc*. 2007;82(3):282-285.

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