TITLE: Wireless Devices in Hospitals: Safety and Guidelines

DATE: 02 December 2010

RESEARCH QUESTIONS

1. What is the evidence that wireless communication devices interfere with patient monitoring equipment in hospitals?

2. What is the evidence for the safe use of wireless communication devices in hospitals?

3. What are the guidelines for the use of wireless communication devices in hospitals?

KEY MESSAGE

Limited evidence from non-randomized studies suggests that wireless communication devices such as two-way radios may cause clinically relevant electromagnetic interference with patient monitoring equipment in hospitals.

METHODS

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 11, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between January 1, 2006 and November 23, 2010. No filters were applied to limit the retrieval by study type. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
RESULTS

Rapid response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Three non-randomized studies were identified pertaining to the potential interference of wireless communication devices (other than cellular telephones) with patient monitoring equipment and the safe use of wireless communication in hospitals. No relevant health technology assessment reports, systematic reviews, meta-analyses, randomized controlled trials, or evidence-based guidelines were identified. Additional information that may be of interest is included in the appendix.

OVERALL SUMMARY OF FINDINGS

Limited evidence is available regarding the potential for electromagnetic interference (EMI) between wireless communication devices and patient monitoring equipment. Evidence from non-randomized studies suggests that EMI can lead to impaired electrocardiography (ECG) interpretation,¹ TETRA 380 devices may result in life-endangering EMI,² and that walkie talkies should not be used in hospitals.³ Further detail regarding the included studies is contained in Table 1.

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<thead>
<tr>
<th>Author, Year, Study type</th>
<th>Study objectives, devices studied</th>
<th>Results</th>
<th>Conclusions</th>
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<tbody>
<tr>
<td>Baranchuk et al., 2009, NRS¹</td>
<td>To test the potential for electromagnetic interference (EMI) between wireless communication devices and electrocardiography (ECG) machines. Wireless local area network (WLAN)</td>
<td>EMI was incorrectly diagnosed in 18% of cases EMI confused with atrial fibrillation or flutter (52%), ventricular arrhythmias (22%), pacemaker dysfunction (26%) Abstract made no specific mention of WLAN in the results</td>
<td>Authors concluded that EMI led to impaired ECG interpretation.</td>
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<td>Hietanen &amp; Sibakov, 2007, NRS²</td>
<td>To test the effect of mobile communications devices on medical life-support devices Terrestrial Trunked Radio (TETRA) 380 phones (function like a 2-way radio) powered to emit at maximum power level</td>
<td>TETRA 380 devices interfered with medical equipment at distances ≤3 m</td>
<td>Authors concluded that TETRA phones caused considerable EMI in hospital devices and have the potential to result in life-endangering situations.</td>
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<td>Stroud et al., 2006, NRS³</td>
<td>To compare EMI of cellular telephones and walkie talkies on patient-connected medical equipment.</td>
<td>Signal distortion, false alarms, and the need for equipment reset were seen with some equipment. Extreme signal strengths resulted in device failure requiring the replacement of some components. 4 watt output from walkie talkies resulted in significantly more EMI than cellular phones.</td>
<td>Authors concluded that with the exception of emergency services, walkie talkies should be prohibited in hospitals.</td>
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ECG = elecrogardiography; EMI = electromagnetic interference; m = meter; NRS = non-randomized studies; TETRA = terrestrial trunked radio; WLAN = wireless local area network
REFERENCES SUMMARIZED

Health technology assessments
No literature identified.

Systematic reviews and meta-analyses
No literature identified.

Randomized controlled trials
No literature identified.

Non-randomized studies


Guidelines and recommendations
No literature identified.

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca
APPENDIX – FURTHER INFORMATION:

Practice guidelines and recommendations- rigour or methods unclear


Review articles


Additional references


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See pg 2: Impact On Medical Devices