

CADTH RAPID RESPONSE REPORT: REFERENCE LIST

Electronic Identification and Tracking Systems for the Prevention of Medication, Diagnostic, and Surgical Errors: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

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Research Questions

1. What is the clinical effectiveness of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting?
2. What is the cost-effectiveness of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting?
3. What are the evidence-based guidelines regarding the use of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting?

Key Findings

One health technology assessment, seven systematic reviews, one systematic review with meta-analysis, one meta-analysis, two randomized control trials, 14 non-randomized studies, and two economic evaluations were identified regarding the clinical and cost effectiveness of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting. In addition, three evidence-based guidelines were identified regarding the use of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting.

Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, economic studies and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2012 and February 28, 2017. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients in the healthcare setting (including acute and long-term care)
Intervention	<p>Electronic tracking and identification technologies (i.e., 1D and 2D barcoding, radiofrequency identification technology, real-time location systems) used for prevention of medication, diagnostic and surgical errors, e.g.:</p> <ul style="list-style-type: none"> • Tracking surgical device location (e.g., surgical sponges, surgical tools) during surgery; • Verifying correct medication, dose, and route of administration of pharmacological or nutritional therapy; • Verifying location of surgical site and correct procedure; • Monitoring administration of contrast dyes or substrates, registering contraindications (e.g.,

	<ul style="list-style-type: none"> implantable devices), and verifying protocols during medical imaging procedures; • Verifying identity during reading of medical imaging scans
Comparator	Q1 & 2: Alternative electronic patient identification systems; Manual tracking or identification methods; No tracking or identification method Q3: No comparator
Outcomes	Q1: Clinical effectiveness (e.g., prevention of treatment errors, improved clinical outcomes, reduced time to treatment, length of stay, re-hospitalization rate, ICU admissions, quality of life, mortality [overall and treatment related]); Harms (e.g., increased time to treatment due to technical errors, interference of tagging system with procedure) Q2: Cost-effectiveness outcomes (e.g. cost per quality-adjusted life year, cost per health benefit gained) Q3: Evidence-based guideline recommendations
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

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, economic evaluations, and evidence-based guidelines.

One health technology assessment, seven systematic reviews, one systematic review with meta-analysis, one meta-analysis, two randomized control trials, 14 non-randomized studies, and two economic evaluations were identified regarding the clinical and cost effectiveness of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting. In addition, three evidence-based guidelines were identified regarding the use of electronic tracking and identification technologies for the prevention of medication, diagnostic and surgical errors in the healthcare setting.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

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Note: Subscription required

Systematic Reviews and Meta-analyses

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Randomized Controlled Trials

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Appendix — Further Information

Previous CADTH Reports

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