Protocol: A systematic review of the impact of CPOE systems on clinical care indicators in Emergency Departments

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1. Background

Several studies have investigated the impact of computerised provider order entry (CPOE) systems on work within Emergency Departments (EDs). These have provided examples of the ways in which such systems can enhance timely access to relevant information and how electronic decision support systems can facilitate improved quality and safety of care. There has been no systematic review which brings together this evidence to allow summative assessments of the ways in which CPOE can support improve quality and safety of care in this setting, as well as the ways in which the work of clinical staff is affected by system introduction. The aim of this systematic review is to examine the evidence of the impact of CPOE on clinical care indicators in ED.

2. Method

2.1 Protocol

The conduct of this systematic review is based on PRISMA statement guidelines.

2.2 Eligibility

Study eligibility criteria:

- the study was conducted in an ED setting (or, if conducted across multiple hospital departments, provided distinct ED outcomes)
- a CPOE system was utilized as the intervention
- the study reported quantitative outcome measures of the impact of the intervention

Report eligibility criteria:

- published between January 1990 and August 2010
- English language
- abstract or full-text

2.3 Information Sources

The following electronic databases will be searched:

- Medline (via OvidSP)
- Embase (via OvidSP)
- Inspec (via OvidSP)
- Cinahl (via EBSCOhost)

Other sources to search:

- Oregon Health and Science University CPOE Bibliography (CPOE.org)

The reference lists of articles, whose abstracts are reviewed for eligibility, will be checked and additional citations handsearched.

2.4 Search

To identify articles pertinent to our area of interest we developed a search strategy that combined keywords and subject terms related to the intervention (CPOE) and setting (ED). We initially identified relevant keywords via articles which had provided us with background knowledge and prompted us to conduct a systematic review in this area. Subject terms were then identified through preliminary exploration of the electronic databases. These preliminary searches yielded excessively large numbers of citations, many of which were

unrelated to our area of interest. Thus we refined the search strategy by adding keywords pertaining to the primary functions of the intervention. The functions of the intervention were used because: a) we did not want to limit the search based on a specific outcome measure, as we wished to review the broadest range of outcome measures; and b) CPOE is known by various terms, the synonyms of which were leading to the large number of citations, so utilising the functions allowed a more focused search strategy. As such, the search strategy we developed had three dimensions: keywords and subject terms pertaining to the intervention (CPOE); keywords pertaining to the functions of the intervention; and keywords and subject terms pertaining to the setting (ED) (Figure 1).

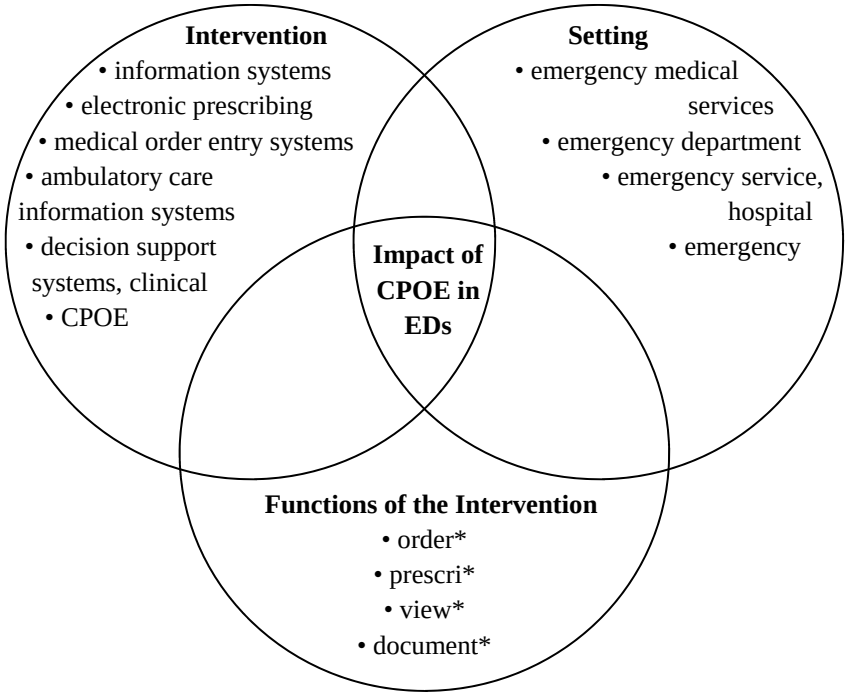

Figure 1. Diagrammatic representation of the search strategy

To maintain a uniform approach the same search strategy will be applied to all three databases searched via OvidSP, and the equivalent terms will be substituted in the search strategy applied via EBSCOhost.

2.5 Study Selection

All citations obtained through the search will be independently reviewed by at least two reviewers to determine eligibility for abstract screening. Only titles which are clearly

unrelated to the area of interest are to be excluded based on title review. The abstracts, and full-text where abstracts are unavailable, of articles will also be independently reviewed by at least two reviewers. The full-text of articles that appear to meet the eligibility criteria will be comprehensively reviewed by all the reviewers. Discrepancies arising at any stage throughout the study selection process are to be resolved by in-depth discussion and subsequent consensus by the reviewers.

2.6 Data Collection Process

Data will be extracted and documented in a data table by at least two reviewers. The accuracy of the data table will subsequently be verified by at least two other reviewers. Where data in an article appears to be missing or is unclear, an attempt will be made to contact the study authors to acquire additional information or obtain clarification.

2.7 Data Items

To aid the data collection process a table will be developed into which data extracted from each study will be documented. Data items will included: the aim of the study; the study design, sample (number and type of orders) and date the study was conducted; the outcome measures; the key findings; the study conclusions; and the technical features of the CPOE system. Additional data items that will be examined and characterized include whether: the outcome measures pertained to efficiency, effectiveness, patient outcome or patient safety; the study findings had clinical importance; the mechanisms for the success or failure of the intervention were evident; and changes to work processes resulting from the intervention were reported. The limitations of the studies will also be reviewed. The extraction of these data items will aid in quality assessment of the studies.

2.8 Synthesis of Results

The results of the systematic review will be analysed by a multi-level framework that will consider a) the type of order examined eg, medication, imaging, laboratory etc; b) the impact or otherwise of decision support; c) descriptions of the level of technical integration of the system; and d) clinical care indicators and their relationship to patient care.

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