

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

# Standardized Hospital Order Sets in Acute Care: Clinical Evidence, Cost-Effectiveness, and Guidelines

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**Authors:** Camille Dulong, Hannah Loshak

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## Research Questions

1. What is the clinical evidence regarding the use of standardized hospital order sets in the acute care setting?
2. What is the cost-effectiveness of the use of standardized hospital order sets in the acute care setting?
3. What are the evidence-based guidelines regarding the use of standardized hospital order sets in the acute care setting?

## Key Findings

Eleven non-randomized studies were identified concerning the use of order sets in acute care settings for adult and pediatric patients.

## Methods

A limited literature search was conducted on key resources including Medline via OVID, 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. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and February 5, 2019. 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**

<b>Population</b>	Adult and pediatric patients in acute care setting (tertiary, community, and regional hospitals)
<b>Intervention</b>	Standardized order sets for acute care services (including surgery)
<b>Comparators</b>	Q1,2: Usual care; No standardized order sets Q3: No comparator
<b>Outcomes</b>	Q1: Clinical effectiveness Q2: Cost effectiveness

	Q3: Guidelines
<b>Study Designs</b>	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.

Eleven non-randomized studies were found regarding the use of standard order sets in acute hospital settings for adult and pediatric patients. No relevant health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, economic evaluations, or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

## Overall Summary of Findings

The first non-randomized study (NRS)<sup>1</sup> identified examined the effectiveness of standardized order sets compared to handwritten order sets in larynegectomy patients. A variety of outcomes were considered including errors or deviations from evidence-based guidelines, thromboembolic complications, length of hospital stay, readmission rate or return to surgery and death. Overall, handwritten order sets had much higher error rates but there was no difference in post-surgical complications and length of hospital stay between standardized order sets and handwritten order sets.<sup>1</sup>

Three NRSs<sup>2,5,8</sup> were identified regarding the effectiveness of computerized admission order sets in patients with chronic obstructive pulmonary disease (COPD). Two of these studies<sup>2,5</sup> determined whether the implementation of the order sets were effective in reducing length of hospital stay and readmissions in patients and prescribing errors. Both of these studies<sup>2,5</sup> found that hospital length of stay was reduced after the order set implementation but readmissions or rehospitalizations remained unchanged. The other study<sup>8</sup> determined that appropriate dosing of vancomycin increased in COPD patients after the implementation of computerized provider order sets (CPOE).

Three NRSs<sup>3,6,9</sup> determined effectiveness of CPOE order sets in a variety of patient populations including vaginal birth patients, knee or hip replacement patients, cardiovascular surgery patients, organ transplant patients, acute ischemic stroke and patients with pneumonia. Generally, these studies<sup>3,6,9</sup> concluded that CPOE order sets were efficient and effective in improving the administration of intravenous tissue plasminogen activator for acute ischemic stroke patients<sup>6</sup> and the extent of prolonged stay in vaginal birth and hip or knee replacement patients<sup>3</sup>. However there was conflicting results between the two studies measuring mortality<sup>6,9</sup> as to whether CPOE order sets actually improved or worsened mortality among pneumonia patients<sup>9</sup> and acute ischemic stroke<sup>6</sup> patients.

Two NRS<sup>4,10</sup> assessed whether the use of insulin order sets improved glycemic, hyperglycemia, hypoglycemia and capillary blood glucose in hospitalized and non-critically

ill patients. The first study<sup>4</sup> found no improvement in optimal ranges for capillary blood glucose, hyperglycemia and hypoglycemia in hospitalized patients after the implementation of these order sets while the other study<sup>10</sup> found hemoglobin A1c testing and mean daily blood glucose levels improved in non-critically ill patients.

A pediatric respiratory NRS<sup>7</sup> determined the effectiveness of implementing order sets in those patients treated for respiratory illnesses like asthma, bronchiolitis, and pneumonia. Overall, the researchers concluded order sets improved hospital utilization costs and decreased asthma length of stay, and medication changes while readmission remain unchanged in these patients.

To close, an NRS study<sup>11</sup> comparing order sets to free text in congestive heart failure patients found order sets improved length of stay and mortality among patients while readmissions did not differ significantly among order set and free text groups.

## 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

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[PubMed: PM26121450](#)
11. Krive J, Shoolin JS, Zink SD. Effectiveness of evidence-based congestive heart failure (CHF) CPOE order sets measured by health outcomes. *AMIA Annu Symp Proc.* 2014;2014:815-824.  
[PubMed: PM25954388](#)

## Economic Evaluations

No literature identified

## Guidelines and Recommendations

No literature identified.

## Appendix — Further Information

### Previous CADTH Reports

12. Standardized hospital order sets in acute care: clinical evidence, cost effectiveness, and guidelines. (*CADTH Rapid response report: summary of abstracts*). Ottawa (ON): CADTH; 2012: <https://cadth.ca/sites/default/files/pdf/htis/nov-2012/RB0538%20Standardized%20Order%20Sets%20Final.pdf>. Accessed 2019 Feb 19.

### Systematic Reviews – Standardized Order Sets Not Specified in Abstract

13. Gates PJ, Meyerson SA, Baysari MT, Westbrook JI. The prevalence of dose errors among paediatric patients in hospital wards with and without health information technology: a systematic review and meta-analysis. *Drug Saf.* 2018;16:16. [PubMed: PM30117051](#)
14. Vélez-Díaz-Pallarés M, Pérez-Menéndez-Conde C, Bermejo-Vicedo T. Systematic review of computerized prescriber order entry and clinical decision support. *Am J Health Syst Pharm.* 2018;75(23):1909-1921. [PubMed: PM30463867](#)
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[PubMed: PM27713674](#)
23. Haddad SH, Gonzales CB, Deeb AM, et al. Computerized physician order entry of a sedation protocol is not associated with improved sedation practice or outcomes in critically ill patients. *BMC Anesthesiol.* 2015;15:177.  
[PubMed: PM26644114](#)
24. Urban MK, Chiu T, Wolfe S, Magid S. Electronic ordering system improves postoperative pain management after total knee or hip arthroplasty. *Appl Clin Inform.* 2015;6(3):591-599.  
[PubMed: PM26448800](#)

## Economic Evaluations – Standardized Order Sets Not Specified in Abstract

25. Okumura LM, Veroneze I, Burgardt CI, Fragoso MF. Effects of a computerized provider order entry and a clinical decision support system to improve cefazolin use in surgical prophylaxis: a cost saving analysis. *Pharm Pract (Granada).* 2016;14(3):717.  
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