**Submission type:** Analysis and Commentary

**Title:** The effectiveness and safety of an emergency department short stay units: A rapid review

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**Word count:** 2,687

**Competing interests:** DM is a contributing editor at Open Medicine. KJK is an associate editor at Open Medicine.

**Funding:** This rapid review was produced under the auspices of the Knowledge to Action project, which was supported by the Canadian Institutes of Health Research (KAL-86796). The funding agency was not involved in any part of conducting the study or in preparing the manuscript.

**Contributor statement:** KK and EK wrote the first draft of this article, and DM revised it critically for important intellectual content. All authors contributed substantially to the methodological design; KK and EK performed the extraction and interpretation of the data; DM provided methodological and conceptual feedback. All authors gave final approval of the version to be published. KJK will act as guarantor for the manuscript.

[insert Box 1 here]

**INTRODUCTION**

Emergency department (ED) overcrowding has been defined as “a situation where the demand for emergency services exceeds the ability to provide care in a reasonable amount of time”.[1] ED overcrowding is a serious and ongoing issue across Canada; according to a 2006 survey of Canadian ED directors, 62% of respondents reported overcrowding to be a major or severe problem in 2004 and 2005.[1]

Short stay units (SSUs) have emerged as a potentially useful strategy for managing overcrowding in emergency departments. The theoretical benefit of SSUs is to ‘offload’ stable patients from the acute ED and to reduce the amount of unnecessary hospital admissions.  Typically, the focus of these units are on 1) expected short treatments such as blood transfusions, 2) further diagnostic investigations to finalize a medical diagnosis, and 3) safe discharge into the community such as social work involvement.  To prevent such units from being a ‘dumping grounds’, most SSUs have strict inclusion/admission criteria. Part of the difficulty is evaluating the value of SSUs is terminology – many other terms have been used to describe such units (e.g. Observation Units, Assessment Units, Clinical Decision Units). Typically though, SSUs are some type of extension of the ED with an overarching objective for improving “the quality of medical care through extended observation and treatment, while reducing inappropriate admissions and healthcare costs”.[2]

Using evidence to help inform the practice of healthcare has been a cornerstone of clinical practice for many years. There are well-recognized benefits in utilizing high-quality systematic reviews in implementing practice guidelines. However, the uptake of evidence-based decision making has been slow in the field of healthcare administration. Policy makers and administrators often work in a unique environment of strict and confining time restraints, making traditional systematic reviews of the literature impractical. This paper presents an example of a streamlined approach to synthesizing evidence: a *rapid review* scanning the published literature in a timely manner and presenting the relevant information in a practical *evidence summary*.

We completed this review in response to a request by members of The Ottawa Hospital (TOH) senior management team. They were contemplating introducing a SSU to help alleviate ED overcrowding; they wanted to know whether SSU’s were effective and safe. They needed an answer emergently and approached our rapid response service.

To frame the literature, we used the definition of SSUs as operationalized by our Ottawa Hospital stakeholder; specifically seeking and summarizing evidence that related to “an area of the hospital reserved for patients admitted directly from the ED who require a period of observation to resolve diagnostic uncertainty before being sent home or who are expected to recover within 48 hours or who require complex outpatient support arranged”.[3]

**METHODS**

Rapid reviews have emerged as a streamlined approach to synthesizing evidence in a timely manner – typically for the purpose of informing emergent decisions faced by decision makers in health care and health services settings. Despite the proliferation of rapid review products, methods informing their production are disparate and underreported.[4] In the absence of a standard protocol informing the conduct of rapid reviews, our rapid review service has evolved its own 8-step approach to guide their execution (Box 2; manuscript in preparation); this approach was used to guide this review.

[insert Box 2 about here]

Needs assessment between the OHRI and senior management of TOH identified SSUs as a high need topic for review (Step 1). Question refinement between the Ottawa Hospital Research Institute and nominated TOH stakeholder was used to narrow the scope of the SSU topic and develop and answerable question to guide the review (Step 2). A review proposal capturing the finalized review question, background information, proposed methods, deliverable, and timeline (January 10th to February 11th, 2011) was drafted by the research coordinator and approval of the proposal was sought and attained from the stakeholder (Step 3).

Using exemplar papers and the proposal document, an experienced Information Specialist developed and executed a detailed literature search (Step 4). The search strategy for published literature is listed in Appendix A and was limited to the following databases: MEDLINE and EMBASE on OVID; the Cochrane Library on Wiley (including CENTRAL, Cochrane Database of Systematic Reviews, DARE, HTA, and NHS EED), and the Centre for Reviews and Dissemination (CRD) databases. Additional references were also sought through searching the bibliographies of relevant items. Grey (unpublished) literature was identified through searching the Web sites of relevant specialty societies (e.g. American College of Emergency Physicians; Canadian Association of Emergency Physicians; Society for Academic Emergency Medicine) and organizations, HTA agencies, and through general Internet searching. The grey literature search was guided by and documented through *Grey Matters’*, the Canadian Agency for Drugs and Technologies in Health guide for grey literature (records available upon request.[5] Retrieved records were imported into Reference Manager® (a bibliographic database software) for removal of duplicates, and then uploaded into DistillerSR©, (an Internet-based systematic review software program) to be screened by reviewers.

Screening was conducted by two team members (one with methodological expertise, one with ED clinical expertise) (Step 5) using questions developed by operationalized eligibility criteria. A hybrid approach of a priori/iteratively defined eligibility criteria was used in order to maximize the efficiency (i.e. limit number of records to be screened) and meaningfulness (i.e. increase relevance or records) of the rapid review for our stakeholders. Thus, as per our previous rapid reviews, included citations had to have been published in English and be electronically available in full text (i.e. through University of Ottawa library subscription). Reports were excluded if they were published before 2000 in order to prioritize evidence of contemporary ED practice. Although primary studies are often included in rapid reviews, we chose to limit the evidence to only systematic reviews; this was due to the heterogeneity of the primary studies (determined during screening of title and abstracts) and limited time available for reconciling and interpreting the complexity of this evidence base.

Quality assessment, extraction and narrative synthesis of the included studies was done by one member of the team (Step 6). The quality of included systematic reviews was assessed using AMSTAR, an 11-item measurement tool created to assess the methodological quality of systematic reviews. A higher score indicates increased methodological quality.[6] For each systematic review, the primary objective, methods, findings, and relevant limitations was extracted and narratively described.

The extracted information was formatted into a cogent, user-friendly final report (Step 7).To help stakeholders get to the main points quicker, key messages of the report are presented on the first page of the rapid review report and each subsection is summarized in a ‘Bottom line’ statement. The report was submitted to end-users for feedback and approval (Step 8). The approved report was then circulated by our stakeholder to the clinical and management knowledge users of TOH.

**RESULTS**

A PRISMA flow diagram of the evidence identified by this rapid review is shown in Figure 1.

**a. Evidence on SSUs specifically**

A 2003 systematic review by Daly and colleagues (AMSTAR 6/11) in Australia assessed the evidence of short stay observation units with respect to efficiency of healthcare delivery and quality of services provided [7] Specifically, data from included studies was extracted according to the following domains: clinical outcomes, length of stay, re-presentation rates, ED efficiency and costs of care. Notwithstanding the fact that the reviews’ search date was over 10 years old, this was the best available synthesis of SSUs included in this rapid review. Twelve studies (1 Canadian) comparing observation units with routine care were included; between-study heterogeneity prevented quantitative meta-analyses and findings could only be presented narratively. Table 1 from this report, summarizing the study characteristics and main conclusions is included below. Based on the evidence, the authors concluded that “[SSUs] have the potential to increase patient satisfaction, reduce length of stay, improve the efficiency of EDs and improve cost effectiveness. However, [SSUs] have commonly been implemented alongside new clinical protocols, and it is not possible to distinguish the relative benefits of each. As demand increases, providing effective and cost-efficient care will become increasingly important. [SSUs] may help organizations that are attempting to streamline patient care while maintaining their quality of service delivery”.

**Bottom Line:** Evidence from one systematic review assessing evidence up to 2000 and including 1 Canadian study suggested SSUs may offer an effective and safe ED patient management option. Specifically, findings from the 12 studies reviewed suggested that SSUs may potentially lead to potential improvements in patient satisfaction, length of stay, ED efficiency, and cost effectiveness. Caution should be used in interpreting these findings however due to the methodological limitations of the included studies and the need for an updated search of the systematic review.

**b. Evidence on solutions for overcrowding (SSUs one of multiple solutions)**

A 2006 systematic review by the Canadian Agency for Drugs and Technologies in Health (CADTH) (AMSTAR 9/11) assessed the evidence on interventions to reduce overcrowding in the ED.[1] SSUs were captured in two before-and-after studies and were associated with positive outcomes; one study reported a decrease in ED length of stay for treat-and-release patients, while the other reported a decrease of patients who left before being seen and the number of ED diversions. Based on this evidence, the review authors categorize SSUs as one of the several interventions for which “limited evidence suggests that these efforts to address overcrowding at an institutional level should be encouraged and monitored; they have a high chance of success” (see Table 2 for overview of interventions assessed).

Of note, although the review attempted to assess the relative effectiveness of interventions aimed at improving ED overcrowding, the lack of direct comparisons, and the general trend for positive outcomes, restricted this aim. Consequently the reviewers could only conclude that “many interventions of varying complexity, intensity, and duration have been applied in an attempt to alleviate or control ED overcrowding. While most seemed to reduce overcrowding, it is difficult to determine the relative value of these interventions, and the lack of comparison studies makes it impossible to say which ones work best”.

A 2008 systematic review by Hoot and Aronsky (AMSTAR 2/11) in the United States assessed the evidence pertaining to the causes, effects, and solutions of ED overcrowding;[8] 4 studies assessing observation units (grouped under ‘solutions’) were included’. Study findings were summarized narratively and were generally positive with respect to process outcomes (e.g., decreased length of stay, rate of ambulance diversion, and number of patients leaving without being seen). Of note, while systematic methods were employed, the literature search was not comprehensive (i.e., only searched a single database, excluded non-English titles and grey literature) and extracted quality assessments were not used to frame study results. Based on the complexity of the included studies, the reviewers “refrain from making strong conclusions…based primary on judgment rather than numeric inference” and consider the review to be of value more as a “structured overview of the relevant literature” to “guide interested readers to the original articles”.

**Bottom line:** Evidence from two systematic reviews published in 2006 and 2008, respectively, assessed interventions aimed at reducing ED overcrowding. Several studies assessing SSUs were included and resulted in generally positive process outcomes. While the 2008 review by Hoot and Aronsky abstained from making conclusions based on the complexity of included studies, Bond and colleagues of the 2006 CADTH report conclude that there is sufficient (albeit limited) evidence to warrant implementation and further investigation of SSUs across intuitions in Canada.

**c. Other evidence**

A 2006 systematic review by Boudreaux et al. (AMSTAR 5/11) in the United States assessed the evidence on performance improvement methods for increasing ED patient satisfaction. Observation units were captured as one of several interventions with “one supportive study (and no negative studies) demonstrating improvement in at least one indicator of satisfaction”.[9] Of note, only observation units for specific conditions (e.g. asthma and chest pain) were captured in this review.

**Bottom line:** There is limited evidence from one systematic review indicating that SSUs may lead to improved patient satisfaction in specific clinical contexts.

**DISCUSSION**

Emergency room crowding has been identified as a key concern for many hospitals across Canada. Two landmark studies published in 2006 demonstrated an association between emergency department (ED)/hospital crowding and patient mortality.[10,11] Numerous other studies have demonstrated the significant adverse effect ED crowding has on various clinical outcomes, including delayed time to thrombolysis in myocardial infarctions, delayed antibiotic administration in pneumonias, and decreased quality of pain care.[12,13,14] It is now well understood that the problem extends beyond the ED, and that ED crowding is a symptom of much larger systemic problems within our hospital system. The American College of Emergency Physicians recently published a report recommending a series of possible solutions to help alleviate the problem, including the establishment of observation units/SSUs.[15]

Our rapid review aimed to assess the evidence supporting the safety and effectiveness of SSUs in the Canadian context. Although the evidence addressing SSUs and their effect on ED crowding is limited, authors of the included systematic reviews are cautiously optimistic and suggests further implementation and evaluation of SSUs in Canadian hospitals.

The most notable limitation of SSU evidence is the lack of a sophisticated evaluative design, common amongst evaluations of health services/administrative initiatives. In an attempt to move this evidence forward, CADTH provide valuable recommendations for future studies including the need for comparable and representative comparison groups, blinded or unbiased outcome assessments, concurrent controls, comprehensive outcome assessment, and prospective design. [1] Another significant limitation pertains to the unclear generalizability of the results due to the heterogeneity in how SSUs are defined and delivered, with huge variability seen in their setup and target patient population(s) from one institution to another. Also important is the fact that the most recent systematic review identified by this rapid review is almost a decade old and thus its findings may be outdated by contemporary evaluations and/or lack applicability to today’s healthcare environment. Finally, it is also worth noting that there is no quality evidence in the literature looking at cost-effectiveness of SSUs; this is an area where more information is sorely needed for proper evidence-based decisions.

There are some key benefits and limitations to using the rapid review process. One distinct advantage is their timeliness and thus the ability of rapid reviews to be helpful for management and policy users who are often faced with having to make emergent and emergency decisions. While timeliness is an important issue for rapid reviews, there does not appear to be any consensus as to what constitutes ‘rapid’. In their scan of this literature, Ganann and colleagues noted that rapid reviews took anywhere from one to nine months to complete.[4] We believe a timeframe closer to one month is more likely to be rapid. Rapidity, however, is also a potential limitation. To complete the process quickly requires short circuiting the traditional systematic review process to varying degrees which may result in an increase of error and/or bias. It is reassuring to know that Watt and colleagues compared the results and conclusions between four rapid reviews and systematic reviews addressing the same question and found few differences between the rapid reviews and systematic reviews in the results and conclusions. However, more research on this topic is clearly needed and cautious interpretation of the findings of our rapid review is warranted.

Another potential advantage of rapid reviews – at least the ones we are conducting – is their look and feel. Systematic reviews are often large documents that can be difficult to penetrate for key messages and the bottom line, both important for management and policy decision makers. Cognizant of this limitation, the format of our reports were initially based on that of the SUPPORT collaboration network [16] and has iteratively evolved through feedback with end-users. Key messages appear on the first page and the entire document is usually under 10 pages. As a companion to this manuscript, the original format of the SSU rapid review is provided in Appendix B.

**Acknowledgements**

Many thanks to Raymond Daniel, Information Technician, for acquiring and organizing references and to Chantelle Garritty, Senior Research Project Manager, for conceptual feedback. Thanks also goes to Dr. Alan Forster and TOH senior management team for their ongoing support of the rapid response service.

**Box 1. Purpose and key messages of SSU rapid review**

**Primary question:**

What is the evidence of the effectiveness and safety of emergency department short stay units?

**Purpose or report:**

This report summarizes evidence of the effectiveness and safety of short stay units (SSU) in the emergency department (ED). Its intention is to support knowledge needs of stakeholders considering the implementation of SSUs in The Ottawa Hospital.

**Key Messages:**

* Evidence from a moderately robust systematic review indicates SSUs may lead to improved clinical outcomes and efficiency in healthcare delivery. Yet, this systematic review is nearly a decade old. A rigorous and updated systematic review on this issue is strongly recommended.
* Most comparative evaluations of SSUs to date have involved before-and-after designs; consequently caution must be used in interpreting positive findings which may have also resulted from non-SSU improvement over time (e.g. changes in practice behaviors, increased hospital beds).
* There is a dearth of quality RCTs in both the literature assessing SSUs specifically, and ED overcrowding more globally. Evidence from the few RCTs reviewed are limited in generalizability due to the disease specific focus of the observation units evaluated (e.g. cardiac, asthma).

There is limited evidence from one systematic review indicating that SSUs may lead to improved patient satisfaction in specific clinical contexts

**Box 2. Outline of 8 steps informing KTA’s evidence summary approach**

1. Needs assessment
2. Question development and refinement
3. Proposal development and approval
4. Systematic literature search
5. Screening and selection of studies
6. Narrative synthesis of included studies (including assignment of evidence level)
7. Report production
8. Ongoing follow-up and dialogue with knowledge users

**Figure 1. PRISMA flow diagram**

Records identified through database searching

(n = 1,726)

Additional records identified through other sources

(n = 47)

Records after duplicates removed

(n = 1,648)

Records screened

(n = 1,648)

Records excluded

(n = 1,452)

Full-text articles assessed for eligibility

(n = 196)

Full-text articles excluded, with reasons

(n = 192)

Studies included in qualitative synthesis

(n = 4)

**Table 1. Comparative studies of SSUs**

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(from Daly et al. 2003; highlighting added with permission)

**Table 2. Evidence-based interventions for ED overcrowding and clinical practice**

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(from Bond et al. 2006, with permission)

**APPENDIX A. Search strategy for short stay units rapid review (Search date: Jan 20 2011)**

**Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>, EMBASE <1980 to 2011 Week 02> Search Strategy:**

1 ((short stay\* or observation\* or clinical decision\* or assessment\* or extended care) adj2 (unit or units or ward or wards)).ti,ab. (3566)

2 exp Hospital Administration/ (537672)

3 (hospital\* adj3 (organiz\* or organis\* or manag\* or administ\*)).ti,ab. (32706)

4 exp Hospital Units/ (263624)

5 ((hospital\* or emergency or trauma) adj2 (unit$1 or ward$1 or centre$1 or center$1 or department$1 or dept$1 or service$1 or ED or facility or facilities)).ti,ab. (159969)

6 exp Hospitalization/ (264058)

7 (hospitaliz\* or hospitalis\* or (stay$1 adj2 (length$1 or duration or period$1)) or ((patient$1 or inpatient$1 or in-patient$1 or hospital$1 or in-hospital$1) adj2 (admission\* or readmission\* or re-admission\* or admit\* or readmit\* or re-admit\* or discharg\*))).ti,ab. (460217)

8 or/2-7 (1227688)

9 1 and 8 (2181)

10 9 use prmz (981)

11 exp observation unit/ (88)

12 ((short stay\* or observation\* or clinical decision\* or assessment\* or extended care) adj2 (unit or units or ward or wards)).ti,ab. (3566)

13 11 or 12 (3581)

14 exp hospital management/ (350686)

15 (hospital\* adj3 (organiz\* or organis\* or manag\* or administ\*)).ti,ab. (32706)

16 exp "hospital subdivisions and components"/ (200964)

17 ((hospital\* or emergency or trauma) adj2 (unit$1 or ward$1 or centre$1 or center$1 or department$1 or dept$1 or service$1 or ED or facility or facilities)).ti,ab. (159969)

18 (hospitaliz\* or hospitalis\* or (stay$1 adj2 (length$1 or duration or period$1)) or ((patient$1 or inpatient$1 or in-patient$1 or hospital$1 or in-hospital$1) adj2 (admission\* or readmission\* or re-admission\* or admit\* or readmit\* or re-admit\* or discharg\*))).ti,ab. (460217)

19 or/14-18 (972575)

20 13 and 19 (1902)

21 20 use emez (1215)

22 10 or 21 (2196)

23 remove duplicates from 22 (1360)

24 23 use prmz (973)

25 23 use emez (387)