

Scoping Review

Evaluating the effectiveness of electronic booking systems for non-elective surgery

Citation Garrubba M. 2017. Data collection and outcome measures to determine effectiveness of electronic booking/communication systems for non-elective surgery. Centre for Clinical Effectiveness, Monash Health, Melbourne, Australia.

Background

Monash Health are implementing an electronic booking system for non-elective surgery. The Centre for Clinical Effectiveness were asked to review the available evidence for appropriate data collection and outcome measures to evaluate the effectiveness of electronic booking systems for non-elective surgery.

Objectives

1. What data needs to be collected to inform the effectiveness of electronic booking systems for the management of non-elective surgery cases?
2. What are appropriate outcome measures for determining the effectiveness of electronic booking systems for the management of non-elective surgery cases?

Search strategy

Medline, Google, Google Scholar, The Cochrane Library, The Health Foundation, The Kings Fund, TRIP database, Sax Institute, NSW Agency for Clinical Innovation and BMJ Quality Improvements Projects were all searched using a combination of the following terms: Electronic booking, non-elective surgery, emergency surgery, emergency theatre booking system, electronic booking system, data collection, outcome measures, implementation and evaluation.

Inclusion/Exclusion Criteria

The following criteria were applied to search results to identify relevant articles.

Population	Include: Patients requiring emergency surgery (Adult and Paediatric populations) Exclude: Patients requiring elective surgery
Interventions	Include: Electronic communication/booking systems
Outcomes	Data collection points: eg length of time on a wait list, time over the clinical recommended time for surgery Outcome measures: Patient wait time, LOS, mortality, impact on elective lists, reduction in costs
Context	Include: Hospital Emergency/Inpatient setting
Limits	Date: 2007 - Current Language: Publications in English.

Results

Summary of Findings

The search of the literature identified two papers which provided information on performance indicators and have been summarised below for interest of the reviewers.

Department of Health. 2010. [Good Practice in management of emergency surgery: A Literature Review](#). Department of Health, Melbourne Victoria.

In 2010, the Department of Health undertook a literature review to identify different approaches to emergency surgical services. Included in the review was an investigation into service delivery models for emergency surgery that had been implemented in Australia and internationally. In reviewing the literature, opportunities for how elective and emergency surgery demand can be balanced were identified. One of these opportunities included electronic theatre booking systems. The review found minimal research investigating which booking systems are most effective.

The review looked at two Australian hospitals who have introduced emergency theatre booking systems in Victoria but have not yet published literature presenting the empirical findings (The Royal Melbourne Hospital and The Austin Hospital). "Both hospitals found that the introduction of an emergency theatre booking system (ETBS) improved communication by increasing visibility of the operating theatre schedule across different units. The ETBS also enabled better patient tracking and identification of patients that were in danger of not being treated within priority timeframes."

Although not directly related to evaluating the electronic booking system for non-elective surgery, the literature review provides the following examples of clinical and operational performance indicators for emergency surgery:

Clinical performance indicators:

- **Readmission to hospital:** Total number of unplanned and unexpected readmissions within 28 days of discharge
- **Return to operating room:** The number of patients having an unplanned return to the operating theatre during the same admission
- **Death:** The total number of patient deaths following emergency surgery

Operational performance indicators

- **Patient wait times:** Long waiting times for emergency surgery operations increase a patient's risk of postoperative complications and morbidity, and indicate how efficiently an emergency surgery service is being managed
- **Patient length of stay:** The length of stay shows how quickly a patient is treated and discharged, which not only reveals the quality of patient care but also provides some indication of the costs that are borne by the hospital per patient
- **Postponement or cancellation of elective surgery:** This can be used to gain insights into the effectiveness of an emergency surgery service by understanding the extent to which it impacts on elective surgery. Hospital-initiated postponements (HIPs) and patient initiated postponements (PIPs) provide the reporting framework for these indicators
- **Improved emergency theatre utilisation:** Theatre utilisation data gives a sense of how much flexibility is available in the system, and provides an indication of wasted costs if theatres are not being sufficiently utilised.
- **Rate of after-hours emergency surgery as a percentage of all surgery:** Measurement of after-hours works shows how effective the theatre template is and gives more transparency around the working conditions for staff.
- **Turnaround times:** Turnaround times that are specific to the efficiency of the emergency surgery operating suite.

NSW Agency for Clinical Innovation. 2014. [Operating Theatre Efficiency Guidelines A guide to the efficient management of operating theatres in New South Wales hospitals](#). NSW.

The Operating Theatre Efficiency Guidelines have been developed as a best practice guide for the management and governance of operating theatres in NSW public hospitals. The guidelines provide information on operating theatre efficiency measures, management processes and cost considerations based on expert recommendations and best available information at the time of publication. Included is an example online emergency booking system which has been reproduced with permission of the Royal Prince Alfred Hospital and outlines the features of the system however does not provide information for effectiveness, risk or challenges to implementation.

Although not directly related to the online booking system, the guideline provides recommendations for operating theater performance indicators and measures.

Hospital OT performance indicators and measures

Category	Determination	Indicator / Measure	Target (if available)
Quality	Cat 1 - % of patients treated in 30days (Cal YTD)	KPI	100%
	Cat 2 - % of patients treated in 90days (Cal YTD)	KPI	97%
	Cat 3 - % of patients treated in 365days (Cal YTD)	KPI	97%
	OverDue Cat 1 (> 30days)	KPI	0
	OverDue Cat 2 (> 90days)	KPI	0
	OverDue Cat 3 (> 365days)	KPI	0
Activity	% Theatre Utilisation	KPI	80%
	Anaesthesia Care Time	Measurement	
	% 1st case on time theatre starts	Measurement	% and Av Time late start
	Theatre Attendances (YTD)	Measurement	
	Surgical Separations (YTD) #	Measurement	
	Surgical Separations (Var from YTD)	Measurement	
	% Cancellations on Day of Surgery – All	KPI	<2%
	% Patient Related	Measurement	
	% Hospital Related	Measurement	
	Late Start Minutes (average)	Measurement	
	Turnaround Time by session/case	Measurement	
Safety	<15 minutes ; Immediate Life Threatening - Cases exceeding Target Time	Measurement	Av Time exceeding benchmark
	<1 hour ; Life Threatening - Cases exceeding Target Time	Measurement	Av Time exceeding benchmark
	<15 minutes; Immediate Life Threatening (%)	KPI	95%
	<1 hour; Life Threatening (%)	KPI	85%
	<4 hours; Organ/limb Threatening (%)	KPI	85%
	<8 hours; Non critical, emergent (%)	KPI	85%
	<24 hours; Non critical, Non emergent, urgent (%)	KPI	85%
	<72 hours; semi urgent, not stable for Discharge	KPI	95%
	ED to surgery time for fractured hip	KPI	<48 hours
	Safe working hours	Measurement	
	Starting emergency cases between 1800–2200	Measurement	
	Starting emergency cases between 2200–0700	Measurement	
	Unplanned return to OT		
	% DOSA	KPI	90%
	% Target Planned Surgery performed as EDO or DO	KPI	80%

Conclusions

No papers evaluating electronic booking systems for non-elective surgery patients, specifically outlining data collection and outcome measures were identified. Information summarised in this review is relevant to performance indicators for operating theaters and emergency surgery only.

References

1. Department of Health. 2010. Good Practice in management of emergency surgery: A Literature Review. Department of Health, Melbourne Victoria. https://www2.health.vic.gov.au/getfile//?sc_itemid=%7B1705EA38-5544-4CA9-BA72-91F9121C7C35%7D
2. NSW Agency for Clinical Innovation. 2014. Operating Theatre Efficiency Guidelines A guide to the efficient management of operating theatres in New South Wales hospitals. ACI. NSW. https://www.aci.health.nsw.gov.au/_data/assets/pdf_file/0004/252436/operating-theatre-efficiency-guidelines.pdf