



REVIEW

A review of inpatient ward location and the relationship to Medical Emergency Team calls



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ABSTRACT

Objective: To identify the relationship between in-hospital location and patient outcomes as measured by Medical Emergency Team calls.

Study design: A narrative systematic review of the literature.

Data sources: A systematic search of the literature was conducted in October 2014 using the electronic databases: Embase, Cochrane, Medline, CINAHL, Science Direct and Google Scholar for the most recent literature from 1997 to 2014.

Inclusion criteria: Non-randomised study designs such as case control or cohort studies were eligible. Articles were selected independently by two researchers using a predetermined selection criterion.

Data synthesis: The screening process removed manuscripts that did not meet the inclusion criteria resulting in an empty review with one manuscript meeting most of the criteria for inclusion. The protocol was revised to a narrative synthesis including a broader scope of studies. The search strategy was expanded and modified to include manuscripts of any study design that comprise both inlier and outlier patients. Two manuscripts were selected for the narrative synthesis.

Conclusion: Two recently published studies investigated the incidence of MET calls for outlier patients, and whilst MET calls were increased in outlier hospital patients, definitive conclusions associated with patient outcomes cannot be made at this time due to paucity of studies.

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1. Introduction

Since national implementation of Medicare in 1984 the central objective for Australia's public national health insurance scheme is to provide universal access to appropriate, competent and timely clinical care in Australia's Public Hospital system (Department of Human Services, 2014). More recently health professionals acknowledge that this altruistic objective is becoming exceedingly difficult to achieve, due to prolonged congestion of hospital beds and increased waiting times for health care within emergency departments (ED) (FitzGerald and Ashby, 2010). Emergency department crowding has been documented as an international problem and, in many countries including America, Italy and France, is becoming worse (Pines et al., 2011; Trzeciak and Rivers, 2003).

There are significant contributing factors that have given rise to the current congestion of hospital beds, such as the ageing population, which has led to an escalation in the number of acutely ill patients with increasing complexity and severity, availability of primary care services on a 24 hour basis and the rising cost of a visit to a general practitioner (GP) (Cowling et al., 2013). The number of acutely ill patients also appears to be rising disproportionately to the availability of hospital beds to enable appropriate clinical care to be delivered in a timely manner (Trzeciak and Rivers, 2003). The Australian Institute of Health and Welfare hospital statistics indicated that public hospitals endeavour to provide care with ever increasing numbers of patients, coupled with a relative decrease in the number of hospital beds by 2.1% per 1000 population since 2011–2012 (Australasian College for Emergency Medicine, 2009). This surge of patient pressure often results in overcrowding in EDs resulting in access block to hospital beds. This patient load pressure contributes to an unsafe clinical environment where both patients and staff are placed under stress and nurse clinicians are stretched in terms of time to provide clinical care to individual patients and are therefore at greater risk of errors in clinical judgement (Trzeciak and Rivers, 2003).

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Overcrowding is defined by the Australasian College for Emergency Medicine when the “Emergency Department function is impeded primarily because the number of patients exceeds the physical or staffing capacity of the Emergency Department” (page 4) (Australasian College for Emergency Medicine, 2009). Overcrowding of EDs has a direct impact on patients with evidence of an increasing incidence of adverse events along with rising numbers of patients on surgery waiting lists, and ambulance queues at ED doors that result in significant delays in access to emergency care (Forero et al., 2011). Geelhoed and de Klerk suggest Australia's health care system requires 4000 beds to achieve a safe occupancy rate of 85%, in comparison to current bed capacity values of 95%–100% (Black, 2004; Geelhoed and de Klerk, 2012; Lloyd et al., 2005).

In response to this critical health care issue, the Australian Government budgeted AUD \$160.5 million (EUR €104 million) between 2010 and 2015 to implement the National Emergency Access Target (NEAT) in an attempt to improve quality of patient care and flow in hospitals (NSW Government – Health, 2014). The ‘Four Hour Target’ was originally developed in the UK and adopted as the ‘Four Hour Rule’ by the Australian Government in 2010 (Forero et al., 2011; Lloyd et al., 2005; Weber et al., 2012). NEAT is one strategy of the National Partnership Agreement (NPA) that is focused on improving public hospital services and patient access to emergency care. The aim of this ED target is to discharge 90% of patients either to their home or a hospital ward within four hours of arrival (Stokes, 2011). For patients that require in-patient care after assessment in ED, one hospital management strategy has been to place patients into any available bed in a ward even if that ward does not provide the specialist clinical care that is congruent with the patient's diagnosis and treatment needs. These patients are often colloquially described as ‘outliers’. Patients who are allocated to a bed in a ward that provides the specific care they need that is consistent with their diagnosis are termed as ‘inliers’ (Perimal-Lewis et al., 2013).

In an Australian study that explored the relationship between patient location and adverse events, Perimal-Lewis et al. (2013) found a 40% increase in mortality in outlier patients. Perimal-Lewis et al. (2013) and Stowell et al. (2013) argue that having patients who are ‘outliers’ may not be an optimal solution to overcrowding (Perimal-Lewis et al., 2013; Stowell et al., 2013). Providing competent patient care requires specific and accurate knowledge of patient care requirements. To acquire these specific technical and non-technical skills, nurses work as part of a team in one specialty area to provide disease specific care for patients with clinical needs (Schmid-Mazzoccoli et al., 2008). This model of care builds depth in the knowledge and skills of the multidisciplinary team members (Santamaria et al., 2014; Schmid-Mazzoccoli et al., 2008). The concern towards overcrowding pertains to the inability of clinical staff to implement models of care or clinical pathways that have been proven to be effective for specific conditions. As a result, the fragmentation of care has been shown to occur and led to medication errors and increased length of stay for outlier patients (Alameda and Suárez, 2009; Perimal-Lewis et al., 2013; Stowell et al., 2013). Evidence for a causal link between the length of hospital stay, critical incidents, mortality and readmission of outlier patients is lacking and this relationship reported in commentaries is primarily anecdotal (Perimal-Lewis et al., 2013).

Adverse events in hospitals are often preceded by the patient deteriorating rapidly. Early warning systems are a hospital wide systematic approach purposed with the identification and management of deteriorating ward patients. These systems differ slightly between countries, as the name of the model may change, the set criteria of clinical parameters have small variances and the composition of multidisciplinary critical care team members differ yet the primary aim remains consistent (McGaughey et al., 2007). Critical care outreach is the preferred term used in the UK referring to response teams who identify at risk patients and provide a rapid response

for deteriorating patients (Barbetti and Lee, 2008). In Australia, the Medical Emergency Team (MET) was introduced in 1990 by Liverpool Hospital as an in-hospital clinical service that had been specifically developed to support clinical staff in the care of the deteriorating patient (Bristow et al., 2000). The MET provides an early response to at-risk patients who are identified by clinicians based upon specific clinical criteria such as the patient's decreased level of consciousness, change to respiration rate, tachycardia and/or bradycardia with the aim of stopping further clinical deterioration (Bristow et al., 2000). Generally, METs are activated to treat a deteriorating patient that has either been the result of inadequate patient assessment or the inability of the health care professional to identify subtle changes in a patient's condition rather than the initial deterioration of the patient's clinical condition (Schmid-Mazzoccoli et al., 2008). In addition, adverse events appear to increase during out of office hours as does an increase in mortality risk (Freemantle et al., 2012, 2015). Therefore, with increasing in-hospital patients who have an outlier status along with greater patient acuity that may result in higher levels of MET calls, this review seeks to provide a synthesis of current evidence on inlier and outlier patients' incidence of Medical Emergency Team calls.

2. Methods

2.1. Search strategy and study selection criteria

A systematic search of the literature was conducted in October 2014 using the electronic databases: Embase, Cochrane, Medline, CINAHL, Science Direct and Google Scholar for papers published from 1997 to 2014. The aim of the database search was to identify recently published peer reviewed literature that examined or evaluated the relationship between in-hospital location and the risk of adverse clinical events that require MET care in patients admitted to acute care hospitals.

To ensure a thorough and transparent systematic search, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance (Moher et al., 2009) was followed and a review protocol developed. Combinations of the following search terms in either the title or abstract were used: “hospital rapid response team” or “rapid response team” or “medical emergency team” or “emergency response team” or “medical emergency response” or “critical outreach team” or “crash call” or “crash care” or “outreach” or “critical care outreach” or “patient at risk team” or “emergency call” including the acronyms “MET or MER or RRT or ERT” AND “outlier or inlier”. Additionally, the reference lists of selected publications were screened to identify possible studies for inclusion in the review.

The search limit included non-randomised study designs such as case control or cohort studies and eligible studies must have been published in English between 1997 and 2014. Randomised controlled trials were not considered as they were unlikely to be ethically valid as a study design approach. All citations were imported to Endnote version X4. For the PICO model criteria (Table 1), the participants were outliers, with MET intervention and the comparators

Table 1
PICO model* for review.

PICO model		
P	Participants	Outliers
I	Intervention	MET
C	Comparator	Inliers
O	Outcomes	In-hospital mortality and length of stay

* Adapted from Finding the Evidence, Centre for Evidence Based Medicine, University of Oxford. <http://www.cebm.net/category/ebm-resources/tools/finding-the-evidence/>.

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