



Emergency department boarding times for patients admitted to intensive care unit: Patient and organizational influences



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ABSTRACT

Introduction: Critically ill patients can be subject to prolonged stays in the emergency department following receipt of an order to admit to an intensive care unit. The purpose of this study was to explore patient and organizational influences on the duration of boarding times for intensive care bound patients. **Methods:** This exploratory descriptive study was situated in a Canadian hospital in northern Ontario. Through a six-month retrospective review of three data sources, information was collected pertaining to 16 patient and organizational variables detailing the emergency department boarding time of adults awaiting transfer to the intensive care unit. Data analysis involved descriptive and non-parametric methods.

Results: The majority of the 122 critically ill patients boarded in the ED were male, 55 years of age or older, arriving by ground ambulance on a weekday, and had an admitting diagnosis of trauma. The median boarding time was 34 min, with a range of 0–1549 min. Patients designated as most acute, intubated, and undergoing multiple diagnostic procedures had statistically significantly shorter boarding times.

Discussion: The study results provide a profile that may assist clinicians in understanding the complex and site-specific interplay of variables contributing to boarding of critically ill patients.

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Introduction

In Canada, emergency departments (EDs) are an essential component of the healthcare system. It is estimated that the national annual number of ED visits is 12 million (Pines et al., 2011). In the province of Ontario, one in five residents seek ED services at least once a year (Han et al., 2007). In northeastern Ontario, the numbers of ED visits per capita is nearly twice that of the provincial average, indicative of the limited availability of primary healthcare services, community support services, health human resources, illness chronicity, socioeconomic resources and 'around the clock' availability of ED services (Canadian Institute for Health Information, 2006; Nolan et al., 2009; Wong et al., 2010; Villella, 2011). As a result of these increased service demands, the provisions of efficient assessments, time-sensitive interventions, and expedient discharges for all ED service users are compromised. Some suggest that the escalating demands have created an ED crisis (Lucas et al., 2009).

The imbalance between ED service demands and available resources has precipitated the practice of providing continuing care for patients in the ED after a decision has been made to admit them to an inpatient unit (Asplin et al., 2003; Emergency Nurses Association, 2006; Stephens et al., 2011). This global phenomenon is described by various labels including access block (Kilcoyne and Dowling, 2007; Forero et al., 2011), delays in ICU admission (Robert and Reigner, 2012) and boarding (Kellerman, 2010; American College of Emergency Physicians, 2011). For consistency in this paper, subsequent references to this phenomenon will be referred to as boarding. Boarding specific to critically ill patients awaiting transfer to an intensive care unit (ICU) has been attributed to multiple factors. These include, but are not limited to, the amount of time required to treat multiple patients with varying severity and complexity (Nugus et al., 2011), timely access to diagnostic services (Forero et al., 2011), an increased census of critically ill ED patients (Cowan and Trzeciak, 2005), and an insufficient number of available ICU beds (McCarthy et al., 2009). ED boarding of ICU admitted patients (ED-ICU boarding) is an issue that warrants attention from the nursing profession in order to optimize operational efficiencies and sustain quality care for critically ill patients.

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Background

Critically ill patients are described as the ‘sickest of the sick,’ requiring timely assessment, diagnosis, treatment, and expedient transfer out of EDs (Howell et al., 2010). McCarthy et al.’s (2009) retrospective review of medical records at four EDs found that boarding time for these patients ranged from 250 to 626 min. Patients assigned the highest acuity as measured by the Emergency Severity Index had the shortest boarding time. This index is a five-level triage scale that ranks patient acuity and by association, required resources. Gardner et al. (2007) have identified a similar association between acuity level and timeliness of care in EDs. They found that ICU bound patients had statistically significantly shorter average ED stays equating to 30 min less than non-ICU bound patients. More recently, Intas et al. (2012) found that patients with boarding times of less than 6 h were predominantly male, average 45 years of age, were non-febrile, had surgical needs, and were less likely to die in hospital. Yurkova and Wolf (2011) found that patients with admitting diagnoses of acute myocardial infarction and cerebrovascular accident spent less than 240 min in ED prior to admission to ICU. In comparison, prolonged boarding was significantly associated with lower acuity scores on the Emergency Severity Index. Serviá et al. (2012) identified that the average ED-ICU boarding time for patients with severe trauma was 120 min. This time was significantly reduced when patients were younger than 60 years, mechanically ventilated, received a high injury severity score, and a diagnosis of head trauma. Gardner et al. (2007) also reported an association between medication administration and ED length of stay. Receipt of three or more medications, and physicians’ orders for investigative procedures were found to significantly extend patients’ length of ED stay.

Clark and Brush Normile’s (2002) survey of emergency and critical care services found that emergency and ICU administrators are concerned regarding the negative implications of space deficits, staff shortages and lack of specialized skills relevant to the care of ED-ICU boarded patients. This finding has direct implications for ED nurses who are often responsible for the coordination of multiple human and physical resources to ensure efficient and safe care (Hodgins et al., 2011). For example, the negative relationship between safe medication administration and ED-ICU boarding has been documented (Clark and Brush Normile, 2007b; Kulstad et al., 2010). According to Stephens et al. (2011), ED-ICU bound patient safety is threatened by the presence of multiple methods of communication about their health status. To provide safe care, clinicians were vigilant over both written and electronic sources of patient information. The collation of disparate sources of patient information involved a rigorous process of ‘checking and rechecking.’ This process, although stressful and time consuming, was necessary for the implementation of safe clinical decisions.

In the context of boarding, ED clinicians may respond by purposefully engaging in processes to maximize patient flow in, through, and out of the ED. Nugus et al. (2011) ethnographically studied Australian ED clinician practices to minimize ‘access block.’ To optimize care for and the flow of all ED patients, clinicians prioritized services relative to patients’ urgency and acuity; placed the most critically ill in ED resuscitation bays; remained vigilant over the admission/discharge status of each patient; managed patients’ trajectories through the implementation of treatment and transfer pathways; and negotiated with various internal and external stakeholders to achieve ED discharge. Such initiatives have been recognized as conducive to minimizing boarding. Taylor et al. (2004) surveyed 17 EDs to identify the nature and extent of organizational changes in response to ED boarding. The two most frequent strategies were role sharing of triage by nurses and physicians, and nurse-initiated management of low acuity patients.

Patient mortality has also been identified as a variable of interest relative to ED-ICU boarding time. Chalfin et al. (2007) found that ICU patients in ED with coronary artery disease, multiple trauma, and respiratory diagnostic categories were boarded 360 min or less. For those boarded over 360 min, the most frequent diagnosis was sepsis. ICU mortality was significantly lower for patients boarded less than 360 min. Clark and Brush Normile (2007a,c) found that mortality rates were higher when ED patients were admitted to ICU on the weekend versus the weekday. In addition, they reported that longer boarding times were more likely to be associated with mortality. In contrast, Carter et al. (2010) reported no significant correlation between ED-ICU boarding times and hospital survival. In their study, the majority of ED-ICU patients boarded less than 480 min were younger, had higher acuity scores, fewer chronic co-morbid conditions, and more likely to be ventilated in comparison to those with longer ED-ICU boarding times.

Horwitz et al. (2010) reported that fewer than half of patients in the study sample of 364 American EDs were assessed in a timely manner and admitted within 360 min. Shortfalls were frequently associated with organization variables such as admitting procedures, laboratory testing and inpatient occupancy rates. In a rural Canadian context, Vlahaki and Milne (2009) reported that timely initial physician assessments were in accordance with Canadian Triage and Acuity Scale (CTAS) standards; a finding not consistent with their urban counterparts. This was partly attributed to the lower acuity and volume of critically ill patients in a rural setting. Hodgins et al. (2010) reported a weak negative association between the proportion of less urgent patients assessed by a physician in a timely manner and the number of ED boarded patients. More than half of all registered patients remained in this 314 bed Canadian regional hospital’s ED department longer than 120 min prior to transfer to an inpatient bed. Of these, over one third were awaiting admission to a critical care unit. Lucas et al. (2009) reported that, for critically ill patients, a statistically significant positive relationship was reported between average ED length of stay and ICU census. These researchers suggest that such a finding reveals the complexity of assessing, stabilizing and transferring the acutely ill out of ED.

With the exception of one study, the reviewed literature does not capture the nuances of ED-ICU boarding that occurs within the context of northern and rural ED nursing practice. The aim of the current study was to explore site-specific differences in the duration of ED-ICU boarding time by various patient and organizational characteristics within a northern and rural hospital in Ontario, Canada. To this end, the research questions asked: What is the duration of ED-ICU boarding? What is the influence of patient and organization variables on the duration of ED-ICU boarding? The responses to these questions are intended to develop an initial understanding of ED-ICU boarding within a northern and rural context prior to planning, implementation and evaluation of strategies to decrease ED-ICU boarding times.

Methods

Design

The exploratory descriptive design of this study was deemed suitable for presenting a preliminary portrayal of the duration of boarding time relative to selected patient and organizational variables.

Setting and sample

The setting was a single 39 bed ED, located within a tertiary care facility. The ED services approximately 160,000 urban and rur-

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