Proceedings of the 2008 College of Liberal Arts Forum on Faculty-Student Research

March 26, 2008

Rochester Institute of Technology

Effect of Emergency Department Crowding on Medical Staff Workload

Kathryn Coles
Psychology

Emergency department (ED) crowding has become a leading concern among medical professionals. In a random survey of 250 emergency departments across the United States, Schneider, Gallery, Schafermeyer, and Zwemer (2003) found that crowding was present in 100% of hospitals. The main contributor to ED crowding is the boarding of inpatients in the ED, which reduces the department's ability to see and treat new patients (Asplin et al., 2003; Schneider et al. 2003).

The ED personnel work under constant time pressure and hence effective time management and task prioritization are critical to physician

performance and patient safety. Crowding most directly impacts the temporal aspects of ED tasks; for example, interruptions are positively correlated with the average number of patients being simultaneously managed (Chisholm, Collision, Nelson, & Cordell, 2000), a direct result of crowding. Chrisholm et al. (2000) classified emergency physicians as 'interrupt-driven' and recorded their interruption rate at 30.9 per 180-minute time period. In an adult area of an academic ED, Fairbanks, Bisantz, and Sumn (2007) found that physicians were interrupted 6.9 times per hour while bedside nurses were interrupted 0.5 times per hour. Despite different results in the frequency of interruptions recorded in an ED, it is obvious that interruptions present an opportunity for error, as they require the physician or nurse to reallocate their attention from their current task to another task. Many interruptions, therefore, result in breaks-in-task. Chrisholm et al. (2000) recorded physician breaks-in task at 20.7 per 180-minute time period. In an observational study of a level-one trauma center, Brixey et al. (2007) identified people, pagers, telephones, and the environment (i.e. missing supplies) as mediums through which interruptions in the ED are delivered.

Despite the overwhelming evidence that crowding indeed is a problem in many EDs and its potentially very serious consequences, little systematic research has been conducted on the issue. Wears and Perry (2002) cite four main contributors to the absence of human factors and ergonomics (HF/E) in health care facilities. These factors include self-

blame by medical professionals, lack of resources, decentralization of authority, and persistence of the Guild and Workshop. Wears and Perry (2002) emphasized the need for ED to redirect focus of blame from humans in order to understand how the design of the system as a whole contributes to errors.

The application of human factors methods in emergency department research requires that the ED be viewed as a system; crowding can be partitioned into 3 components: input (emergency care, unscheduled urgent care, and safety net care), throughput (patient arrival, triage room placement, diagnoses and treatment, and ED boarding of inpatients), and output (ambulatory care, transfer to other facility, and admittance to hospital) (Asplin et al., 2003). Communication between personnel is a critical factor in the flow a patients from input to output. Fairbanks et al. (2007) conducted a prospective observational study of emergency physician and nursing staff communication patterns in an academic university using link analysis techniques, which focus on frequency and duration of communication events, and found that bouts of communication were frequent but brief and that the most face-to face communication was most common. The charge nurse was identified as the hub of communication between ED personnel and non-ED staff.

The purpose of this research is to use cognitive task analysis (CTA) techniques to clarify the effects of ED crowding on ED communication, physician workload, interruptions, patient flow, quality of

care and medical errors in collaboration with the University of Rochester and Strong Hospital. CTA helps describe how participants (in this case ED personnel) view the work they are doing and how they make sense of events (Crandall, Klein, & Hoffman, 2006). CTA methods will include interview, self-report, and direct observation of ED personnel. We will also seek to develop novel CTA techniques and objective measures of physician workload and examine these issues in the larger theoretical context of human performance in dynamic task environments under considerable time-stress.

[For a complete list of references please see page 228.]