



The emergency department “carousel”: An ethnographically-derived model of the dynamics of patient flow



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ABSTRACT

Emergency department (ED) overcrowding reduces efficiency and increases the risk of medical error leading to adverse events. Technical solutions and models have done little to redress this. A full year's worth of ethnographic observations of patient flow were undertaken, which involved making hand-written field-notes of the communication and activities of emergency clinicians (doctors and nurses), in two EDs in Sydney, Australia. Observations were complemented by semi-structured interviews. We applied thematic analysis to account for the verbal communication and activity of emergency clinicians in moving patients through the ED. The theoretical model that emerged from the data analysis is the ED “carousel”. Emergency clinicians co-construct a moving carousel which we conceptualise visually, and which accounts for the collective agency of ED staff, identified in the findings. The carousel model uniquely integrates diagnosis, treatment and transfer of individual patients with the intellectual labour of leading and coordinating the department. The latter involves managing staff skill mix and the allocation of patients to particular ED sub-departments. The model extends traditional patient flow representations and underlines the importance of valuing ethnographic methods in health services research, in order to foster organisational learning, and generate creative practical and policy alternatives that may, for example, reduce or ameliorate access block and ED overcrowding.

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Introduction

Models and strategies to enhance the throughput of emergency department (ED) patients have generally overlooked the way individual staff actually generate patient flow, and the organisational learning this demands. Patient flow models are dominated by technical approaches which have done little to address “boarding” – also called “access block” – in the ED of admitted inpatients, and consequent ED overcrowding. Overcrowding occurs where the number of patients being treated exceeds the staff or physical resources, and boarding is the inability of patients to be granted an inpatient bed within what particular jurisdictions regard as a reasonable time (ACEM, 2009). A perspective that accounts for the interplay of broad-based social influence and human agency (that is, free action in the face of systems-level constraints) has the

potential to expose new conceptualisations and improve the quality and efficiency of the patient journey through health services.

Increased demand for hospital services, combined with a reduction in bed capacity in the last 20 years in most health systems, has led to overcrowding in EDs and boarding in Australian hospitals (Forero and Hillman, 2008). Overcrowding can lead to: decreased compliance with clinical guidelines; inappropriate decision-making (Holroyd et al., 2004); and an increase in the levels of adverse events (Diercks et al., 2006). Boarding has been associated with increased likelihood of patient death (Fatovich, 2005). ED overcrowding and boarding are considered key factors in ambulance diversions and the failure of staff to meet waiting time targets in metropolitan EDs (Forero and Hillman, 2008; Rathlev et al., 2004).

The influence of actors beyond the ED (such as inpatient departments) means that we need to explore dynamic rather than static models of ED flow (Bain et al., 2010; Wiinamaki and Dronzek, 2003; Coats and Michalis, 2001; Plsek and Greenhalgh, 2001; Paul et al., 2010; Walters and Dawson, 2009; Asplin et al., 2003). The ED is a dynamic system, and also a constituent component of broader

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social structures, such as the hospital, the health service, and the national community. Collaborative learning of ED roles involves multiple webs of individual agents that are interdependent, mutually influencing each other and the system itself (Nugus et al., 2010; Forero et al., 2011).

The ED's role has developed to categorise complex patients for potential inpatient admission (Dodier and Camus, 1998; Nugus et al., 2010). Human agency needs to be taken into account in understanding ED patient flow. Sociological and health services research has shown that emergency categorisation, admission and discharge are influenced by judgements and behavioural responses of emergency clinicians (nurses and doctors) to actual and perceived work pressure concerning administrative as well as clinical considerations (Dingwall and Murray, 1983; Hillgoss and Cohen, 2012; Hughes, 1989; Jeffrey, 1979; Nugus et al., 2009; Vassy, 2001; Wears et al., 2007). However, specific studies relating to patient flow tend to conceive it as a linear process, without taking into account sociological insights into human agency and constraints within health systems.

Earlier research, such as that of Lane and Huseman (2008) and Schull et al. (2006), building on quantitative models, developed qualitative accounts of acute patient flows, derived from subjective views presented in interviews and workshops, and an expert panel, respectively. To extend such research, we sought to design a model of staff activity in patient flow that accounted for independently-observed behaviours, as well as subjective views of the actors. Our study, based on direct observation, aimed to insert the active agency of staff into the understanding of patient flow, and to represent patient flow visually, to augment available and future mathematical models of patient flow. The benefit of a visual conceptual model is that it is not only architectural, but also represents staff generation of patient throughput, as a guide for simulation of interventions to enhance patient flow.

The carousel model that we develop is based on the metaphor represented by the dynamic rotation of a circular platform with a fixed number of seats for riders. The "seats" traditionally take the form of rows of wooden horses or other animals mounted on posts, many of which are geared to move up and down to simulate galloping, to the accompaniment of looped circus music. In this allegory we replace "seats" with "beds", and "music" with "decision-making". To develop the carousel model, we deliver a detailed and descriptive account of the organisationally significant work of emergency clinicians.

Methods

Given the significance of human agency in relation to patient flow, our research question was: How can the responses of emergency clinicians to the demands for patient flow be represented conceptually? The focus was broadly on the organisational work of emergency clinicians. One of the investigators (PN) undertook an in-depth, systematic, qualitative analysis, using ethnography (Hammersley and Atkinson, 1995) in the EDs of two public tertiary referral hospitals in Sydney, Australia, conducted over a full year. The observer was a sociologist without previous clinical knowledge, and served as a non-participant observer. The research was grounded in the sense that interpretations emerged through the research process rather than involving the testing of a pre-conceived hypothesis. The hospitals were large trauma centres, meaning that trauma patients are regularly transferred there from smaller, rural and regional hospitals. Each of their EDs received approximately 50,000 patient presentations per year.

Ethnography is characterised by prolonged engagement in a field setting to discern patterns of behaviour and meaning among participants (Nugus and Forero, 2011). This involves examination

of processes that happen in real time-place situations, and in context of day-to-day work (Spradley, 1980). It allows the researcher to openly observe first-hand what people do, rather than what they merely say they do.

The present ethnographic research involved formal and informal observations. Formal observations included the observer accompanying three ED doctors and three ED nurses, from each of the two EDs, over two full shifts each (12 clinicians and 24 shifts, over approximately 200 h). These were the focal participants but, of course, many other staff members were observed while accompanying particular individuals. Human Research Ethics Committee approvals were obtained from the researchers' academic institution and the hospitals in which the research was conducted. Names of participants have been changed in the presentation of findings to protect their identities.

Informal observations involved unplanned movement around the ED, the central nurses' station serving as a key observation point. The systematic sample of participants, and observation of them over whole shifts, both enabled and required the first-named researcher to document as much as possible of their talk and activity. The observer identified which aspects of the verbal communication and activity were not documented, or were documented poorly, and could be excluded from analysis. All observations were conducted using field notes, supplemented by 56 unstructured field interviews with emergency doctors and nurses. Field interviews were used to clarify the participants' interpretations of particular events or conversations throughout each shift. They were conducted in the ED on duty time. The 12 clinicians who were accompanied for observation were interviewed following shifts, and various other clinicians were approached opportunistically for interviews. Interview questions and observations were focused on perspectives and behaviours concerning the non-clinical, or organisational aspects of ED work.

The challenges of fieldwork were also documented. Observation was time-intensive. It was also emotionally demanding, requiring management of the presentation of self. For example, it involved moving, at a moment's notice between performing invisibility and performing interest. It was also challenging to explain the research to clinicians. The clinicians were not accustomed to ethnographic research and the research focus was emerging, making it difficult to explain. The researcher explained that the project was about the under-researched organisational work of emergency clinicians that complements clinical work. Commencing with informal observations helped build relationships through which the emerging focus of the project could be discussed with clinicians. The fieldwork produced more than 800 pages of interview and observational fieldnotes.

The interpretations were co-constructed with the other authors and with clinicians. Our analysis was also grounded in that there was an iterative cycle of data collection, analysis and verification (Nugus, 2008). The unit of thematic analysis was "patient flow". Thematic analysis followed three levels which generally followed stages in the analytical process. The first stage and level (conducted by PN) isolated organisational activities and talk relating to the progression of patients through the ED, distilling such data from activities and talk that were, in relative terms only, exclusively clinical. The carousel model was initially proposed after this first stage of data analysis. It was subsequently tested for face validity, elaborated and refined. The second stage (conducted by PN and JB) produced a more limited set of sub-themes, including: categorisation; forward motion; managing scarce time, space and material resources; decision-making; problem-solving; supervision; and internal and external boundary-work and negotiation. The third stage and level of thematic analysis (led by PN, RF and JB) involved negotiation with other researchers and clinicians during which the model was discussed and refined. The final theme

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