How Can Human Technology Improve the Scheduling of Unplanned Surgical Cases?

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INTRODUCTION

Human technology in health care includes managerial knowledge required to marshal a health care workforce, operate hospitals and equipment, obtain and administer funds, and, increasingly, identify and establish markets. In this article, the authors focus on human technology and improvement of decision-making processes in the context of operating theatre scheduling of unplanned surgical cases.

Unplanned surgery refers to unscheduled and unexpected surgical procedures in distinction to planned, *elective* surgery. The management of unplanned surgery is a strategic function in hospitals with potential clinical, administrative, economical, social, and political implications. Making health care management decisions is complex due to the multidisciplinary and the multifocussed nature of decision-making processes. The complexity of multidisciplinary and multifocussed decision-making is further exacerbated by perceived professional identity differences.

This article presents findings from interviews with doctors and nurses about the scheduling of unplanned surgical cases. The interviews focused on current decision-making determinants, the acceptability of using a model to guide decision-making, and enablers and barriers to implementing the model. The key finding was the limited practicality of a model to guide the scheduling of unplanned surgery. While it could guide decisions around clinical determinants, logistical determinants, and ideal timeframes, it would have difficulty reshaping inter- and intra-professional dynamics.

LITERATURE REVIEW

The scheduling of unplanned surgery typically involves negotiating (and renegotiating) established surgery lists, whereby patients requiring nonelective surgery are attended to before those requiring elective surgery (Gabel, Kulli, Lee, Spratt, & Ward, 1999). However, delayed patient access to unplanned surgery can inflate economic costs (Jestin, Nilsson, Heurgren, Påhlman, Glimelius, & Gunnarsson, 2005; Pollicino, Haywood, & Hall, 2002). Poor patient health necessitates more health care services, including prolonged hospital stays, ongoing access to health care professionals, and medication. The tension between *health care cost containment* and the *high cost of surgical operations* is a powerful incentive for health care organisations to improve the management of the surgical suite (Gabel et al., 1999). Thus, an investigation of current scheduling practices of unplanned surgical cases is well-justified.

Empirical research on the scheduling of unplanned surgery is limited. This is somewhat reflected in the *ad hoc* practices found in some operating rooms when organising surgical queues (Fitzgerald, Lum, & Kippist, 2004). In Canada for instance, it was found that the waiting times for elective surgery were not only determined by the number of patients on the waiting list, or by how urgently they required treatment, but also by the *management* of the waiting list (Western Canada Waiting List Project, 2001). To ensure consistent practice, criteria were developed to guide decision-making processes. However, clinicians who managed the waiting lists were somewhat reluctant to change their management practices, preferring to adhere to less-standardised, conventional methods (Martin & Singer, 2003).

In the United Kingdom, surgical lists are typically compiled in an unplanned manner, and the negotiations and modifications that follow are also extemporised (Hadley & Forster, 1993). Even when theatre lists *are* established, they are seldom observed, often because of the need to accommodate patients who require unplanned surgery (Ferrera, Colucciello, Marx, Verdile, & Gibbs, 2001). This gives rise to extended surgery delays. Given such inconsistencies, the National Health Strategy (NHS) Executive circulated a national directive to guide good practice (Churchill, 1994). The directive emphasised the significance of operating room services, the prominence of patient care, the effective management and supervision of operating room use, staff morale, and communication, efficient transportation for patients, and dependable activity and cost information.

A standardised approach to manage operating room lists is also lacking in New South Wales (NSW), Australia (NSW Health, 2002a). This is not to suggest that NSW public hospitals lack direction for scheduling unplanned cases. Many have adopted priority codes to guide these decisions (NSW Health, 2002b). These help health care professionals to classify patients from highest to lowest priority based clinical need and/or timeframes.

However, research in NSW suggests that, in addition to clinical determinants, other factors influence the scheduling of unplanned surgery (Fitzgerald et al., 2004; King, Kerridge, & Cansdell, 2004); notably, logistics and inter- and intra-professional dynamics between staff involved in the process. Current policies for scheduling surgery, particularly unplanned surgery, fail to acknowledge these, providing little direction for accepted practice.

A review of literature on surgical decision-making practices suggests that the normative model of decision-making is *decision theory* (Gordon, Paul, Lyles, & Fountain, 1998; Magerlein & Martin, 1978; Parmigiani, 2002; Wright, Kooperberg, Bonar, & Bashein, 1996). Its ability to comprehensively consider information from diverse sources, especially in situations of great uncertainty, makes it particularly valuable.

Decision theory in operating theatres manifests through several models, including *queuing theory* (NSW Health, 1998) and the *Poisson distribution model* (Kim & Horowitz, 2002). Queuing theory commonly operates on a *first-come-first-served* basis, whereby priority is determined by chronology. However, in the case of unplanned surgery, where patient health outcomes are at-risk, this is illogical; and in the absence of explicit queuing rules, the theory causes confusion (Fitzgerald et al., 2004). In contrast, the Poisson distribution model operates with greater autonomy and is able to represent occurrences of a particular event—like unplanned surgery—over time or space. Using the Poisson distribution model for unplanned surgery would allow for the random arrival of patients, for assuming independence from other patient arrivals, and it supposes independence from the state of the hospital system (Clemen & Reilly, 2001). However, the model does not account for the multifactorial nature of clinical determinants and their relationship with time. Nor does it guide decisions in an environment where logistics and professional dynamics influence efficiency. Therefore, research into decision-making practices is needed to explore the tensions affecting the applicability of different queuing models.

Clinical Determinants and Time

Most operating rooms classify unplanned surgery according their relative urgency (Gabel et al., 1999). Although formalised classification systems are often lacking (NSW Health, 2002a), hospitals typically use a triage system to consider clinical determinants when scheduling both planned and unplanned surgery. Clinical decision-making practices therefore involve elements of rational choice theory (Johnson, 2000). It is deductive, based on evidenced-based practices that maximise patient health, and is therefore judicious.

However, there is no consistent system to allocate priority *between* unplanned cases (King et al., 2004). Furthermore, there is little quality auditing of the way clinical priorities are assigned. It is therefore possible that other factors determine the scheduling of unplanned surgery; critics of decision theory allude to this (Kahneman & Tversky, 1979; Redelmeier, Rozin, & Kahneman, 1993).

The unpredicted and often urgent nature of unplanned surgery suggests that *time* is an important factor when scheduling such surgery. Indeed some triage guidelines are entirely time-based, whereby certain clinical conditions must be done within a certain timeframe to prevent further loss of quality of life; there are thus serious time pressures within the operating room (Gabel et al., 1999) that may have direct consequence for clinical decision-making.

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