

## Process redesign for time-based emergency admission targets: staff perceptions of the impact on quality of care

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### **Abstract**

**Purpose** – Hospitals have used process redesign to increase the efficiency of the emergency department (ED) to cope with increasing demand. While there are published studies suggesting a positive outcome, recent reviews have reported that it is difficult to conclude that these approaches are effective as a result of substandard research methodology. The purpose of this paper is to explore the perceptions of hospital staff on the impact of a process redesign initiative on quality of care.

**Design/methodology/approach** – A retrospective qualitative case study examining a Lean Six Sigma (LSS) initiative in a large metropolitan hospital from 2009 to 2010. Non-probability sampling identified interview subjects who, through their participation in the redesign initiative, had a detailed understanding of the implementation and outcomes of the initiative. Between April 2012 and January 2013 26 in-depth semi-structured interviews were conducted and analysed with thematic content analysis.

**Findings** – There were four important findings. First, when asked to comment on the impact of the LSS implementation, without prompting the staff spoke of quality of care. Second, there was little agreement among the participants as to whether the project had been successful. Third, despite the recognition of the need for a coordinated effort across the hospital to improve ED access, the redesign process was not successful in reducing existing divides among clinicians and among managers and clinicians. Finally, staff expressed tension between production processes to move patients more quickly and their duty of care to their patients as individuals.

**Originality/value** – One of the first studies to explore the impact of process redesign through in-depth interviews with participating staff, this study adds further evidence that organisations implementing process redesign must ensure the supporting management practices are in place.

**Keywords:** Process redesign, Emergency department, Emergency services, Lean Six Sigma, Quality of care, Human resource management, Quality, Business process re-engineering

**Paper type:** Research paper

## Introduction

Throughout the world there is a focus on effective methods to increase patient throughput in hospital emergency departments (for example, Morris et al., 2012, Horwitz et al., 2010). There is a perception that inefficient processes, both in the emergency department and throughout the hospital, contribute to patients who need to be admitted to an inpatient bed waiting too long in the emergency department (National Health and Hospital Reform Commission, 2009). As an illustration of this perception of inefficiency the 2011 National Health Reform Agreement made between the Commonwealth Government of Australia and the Australian states and territories defined a commitment to improving patient access to emergency, elective and subacute services within public hospitals (Council of Australian Governments, 2011). Following the United Kingdom (UK) National Health Service (Department of Health, 2000), a component of this agreement was the introduction of the National Emergency Access Target (NEAT) in the emergency departments of public hospitals (Council of Australian Governments, 2011). The NEAT required Australian public hospitals to meet the target by 2015 of 90 per cent of all patients presenting to an ED to be admitted, referred or discharged within four hours. The target has been set to be achieved incrementally and the 2012 target was not achieved, with State EDs recording only 65 per cent of patients achieving their disposition in the four hour time period (Australian Institute of Health and Welfare, 2012).

Since the early 2000s Australian public hospitals have been eligible for bonus funding for meeting access targets. For example, the State bonus-funding framework in 2006-07 included a requirement for emergency department patients to be admitted to an inpatient bed within eight hours of ED presentation (Victorian Department of Human Services, 2006). Time-based admission targets has led to a focus on process redesign methodologies to improve the operation of the ED, with the State Government contributing funding (Victorian Department of Health, 2013). This study explores the quality of care implications of the ED redesign initiative using Lean Six Sigma (LSS) in one tertiary teaching and research hospital in Australia. This case study hospital was chosen because up until 2009 it had not achieved the target and had implemented LSS to reduce the time taken to assess and stabilise patients in the ED and admit, refer or discharge these patients within the eight hour timeframe.

## **Process redesign to achieve emergency access targets**

Lean Management and Six Sigma have become popular improvement methodologies (Vest and Gamm, 2009), with use in Australian emergency departments (King et al., 2006, Kelly et al., 2007). While there have been many papers published on the use of process redesign in health care, including Lean and Six Sigma, the consensus of recent reviews has been that poor methodological quality of the evaluation studies limits the evidence of effectiveness (Vest and Gamm, 2009, Dellifraigne et al., 2010, Tjahjono et al., 2010). Authors commented on poorly validated measurement instruments (Kaplan et al., 2010), use of subjective measures (Kaplan et al., 2010, Poksinska, 2010) and the lack of control or comparison groups or sufficient timeframe to confirm the effects (Vest and Gamm, 2009, Elkhuizen et al., 2006, Nicolay et al., 2012). Where there have been more robust studies, reviewers concluded that these methodologies were most effective for processes that “are repetitive and can be standardised” (Nicolay et al., 2012 p. 333), which is the opposite of most emergency care. Most recently, a systematic review suggested that where process redesign had been effective in encouraging practice change among health professionals, the changes appeared to be due to human resource management practices that were embedded in the process redesign methodologies (Leggat et al., 2015).

Quality of care is defined as the clinical effectiveness and safety of the treatment and care provided to patients, as well as the experience that patients have of that treatment and care (National Quality Board, 2011 p. 6). Clinical effectiveness and safety are rarely objectively measured, with process redesign studies relying on patient satisfaction as the primary measure of quality of care. Both positive (Dickson et al., 2009b) and negative patient satisfaction results (Dickson et al., 2009a) have been reported in process redesign initiatives in EDs. Previous studies have demonstrated that staff perceptions of quality of care can be used as a proxy for the actual quality of care that is delivered (Chuang et al., 2012, Raleigh et al., 2009, Yoon et al., 2007, Ahmed et al., 2014), and this study used staff perceptions to counter the lack of data on clinical effectiveness and safety. The overall study focused on the perceptions of staff involved in a process redesign implementation on the impact of the implementation, and this paper focuses specifically on the staff perceptions related to the impact on quality of care.

Although the evidence for process redesign in health care is inconclusive, in 2008 there was growing momentum for these methodologies in public hospitals (O'Connell et al., 2008). The consistent poor performance on the emergency targets and the availability of resources for process redesign led the case study hospital to initiate an extensive Lean Six Sigma (LSS) process redesign initiative. Although there were many LSS projects, this paper focuses on the eight hour ED project. The published process redesign studies focus largely on pre and post measurement of internal business process metrics, with less attention to the human aspects. To further explore process redesign we aimed to document the impact of the LSS process from the perspective of the staff involved in the process. Nugus and Braithwaite reported that ED clinicians enacted a complex relationship balancing both efficiency and quality (Nugus and Braithwaite, 2010) and we were interested in how this relationship might be influenced through the implementation of a process redesign initiative. This led to our research question: what were the perceptions of staff involved in the ED process redesign on the impact of the redesign initiative on the quality of care?

## **Method**

### **Study setting and participants**

This was a retrospective qualitative case study examining the process redesign project implemented in the ED of a large metropolitan hospital over an 18-month period from 2009 to 2010. Between April 2012 and January 2013 in-depth semi structured interviews were conducted with 26 key informants who were identified by the hospital as having had involvement with the project, including two who had left the hospital. The participants were identified using non-probability sampling and included nine managers, nine nurses, seven doctors and one allied health professional. Previous study has claimed that genuine process improvement cannot be achieved without employee participation (De Menezes et al., 2010), yet there are few studies that have captured the employee perspectives on the changes. Following Pope and Mays (1995) and Liamputtong and Ezzy (2005) in-depth interviewing was most likely to elicit the experiences and views of the participants in their own voice.

The interview questions were designed to obtain the in-depth perception of the participants of the impact of the LSS process. Participants were asked about the roles and responsibilities of LSS project participants and their perceptions of the process and the outcomes. The interviews were a rich source

of information and the validity of the data was assured through cross-checking of the data generated from different interview subjects and recursive questioning (Minichiello, 1991). All interviews were recorded with the permission of interviewees. Ethics approval was granted by the participating hospital and Victoria University Human Research Ethics Committee in 2012.

### **Data analysis**

Three independent coders analysed the transcripts using conventional thematic content analysis (Hsieh and Shannon, 2005), which is recommended for analysis of these types of data (Joffe and Yardley, 2004). An interactive approach was used to enhance the validity of the coding. In the first step the researchers identified the potential themes and established a detailed list of codes. Coding reached theoretical saturation when no new themes emerged. Initially the researchers identified 20 themes from the data. Use of NVivo (v.8) software ensured automatic collation of all data extracts within each code. In the second phase axial coding of related data extracts within and across categories was undertaken to identify relationships between the codes and the higher level recurring themes. This resulted in reduction of codes, with a final list of 12 main codes agreed by the three researchers. This paper focuses only on the findings related to the patient and quality of care theme. Within this theme interview participants remarked on access, continuity of care, patient safety, patient experience and clinical outcomes.

### **Findings and discussion**

We did not specifically ask the interview subjects about quality of care, but not surprisingly, given quality of care is a key issue in any hospital, the first finding was that all of the participants had opinions about the impact on quality of care. The second finding was that the stakeholders had different perceptions on the success of the eight hour project. This was remarkable because the outcomes of an initiative with this level of investment and visibility would surely have been made known to all of the participants and provision of process data is a requirement of the LSS method. In terms of the measures we heard from participants that the eight hour project increased the number of patients leaving the ED in eight hours from around 47 per cent before the project to over 70 per cent. *"I would say that's a significant improvement"* (Doctor 034), and *"As time went on, we showed that our mortality and morbidity didn't change. In fact our MET calls [in-house emergency for deteriorating*

*patients] have improved” (Manager 008). “The eight hour has been sustained, in fact – and it’s continued to improve” (Exec 012).*

However others suggested that the hospital never fully met the government’s eight hour target, and was in no position to be able to meet the new NEAT four hour target. In fact some doctors suggested the project had been a failure, because as a result of the ED targets, the hospital admission rate had gone up 35 per cent, which led to further bed blocking and greater risk of in-hospital complications for those patients admitted unnecessarily.

There were positive assessments of the project. *“I think it was a very productive process and I think it was received quite well by the staff. And it was probably a good thing to have some sort of direction on how to get people out of emergency” (Nurse 007).* But there were also negative views of the project and process, which outnumbered the positive. *“And I think that is probably the biggest learning I think that I’ve had in this whole project. Is that – is don’t do it the way we did it” (Manager 008).*

The detailed analysis revealed two themes. The first can be summarised as ‘while we’re meant to be working together, we don’t always agree and we’re not held to the same standards’. This finding suggests the hospital would have difficulty in achieving the coordination, collaboration and teamwork that has been identified as critical for delivery of high quality care (Berwick, 2002). The second was the stress experienced by staff that were caught between a production methodology with a focus on moving ‘products’ and their duty of care to their patients as individuals. Interview participants expressed the concern that the process redesign process had the potential to compromise patient centred care. Each is discussed below.

### **While we’re meant to be working together, we don’t always agree and we’re not held to the same standards**

Most of the interviewees indicated that the benefit of the process redesign initiative was that it made everyone aware that the emergency time-based targets would not be achieved if the rest of the hospital was not on board. This seems a simple concept and one that had been previously identified in the literature (Hillier et al., 2009), but we consistently heard from staff that:

*There was recognition during the Eight Hour Project that this is an organisational issue. Yes, Emergency needs to have a clean house. There's no question about that. But other people do contribute to this and it's not just emergency (Doctor 034).*

*Well yeah, the ED's doing what it can and maybe getting a little bit of improvement. But here's the elephant in the room, that there is this large chunk of time when there's no bed. The inpatient units have to care. They have to care that there are patients stuck in the ED for 10 hours or they will never change (Doctor 001).*

*To achieve the eight hour thing, you can't just fix ED; you've got to fix the hospital so you've got somewhere to put these patients (Doctor 003).*

*And when we defined the problem and did the measure we realised that this is – this wasn't just about ED getting patients out. It was actually all the processes in the hospital in some way had waste and had, you know, also were inefficient or ineffective (Manager 008).*

While this process redesign initiative enabled the focus to be changed from shortcomings in the ED to the recommended whole of hospital approach (Hoot and Aronsky, 2008), current research suggests that while a hospital focus is necessary, it is no longer sufficient, as aggressive time-based emergency targets will only be achieved with a whole of system approach. A 2012 article reported a 3.6% average annual increase above the population growth in ED presentations between fiscal 1999/2000 and 2008/09 and suggested that because more than 40% of the emergency department patients remained for more than 4 hours, it would be difficult to achieve the NEAT four hour target without "significant redesign of the whole system" (Lowthian et al., 2012 p. 128).

Despite the recognition of the need for a coordinated effort across the hospital to achieve high quality care (Berwick, 2002), the LSS process did not appear to resolve conflicts among participating staff. Instead of coalescing the health professionals around shared patient-focused goals, the process redesign methodology identified further divides between medical staff and non-medical health professionals, between managers and clinicians, and even among clinicians. These quotes illustrate these divides:

a) Non-medical and medical practitioners held to different standards

*And so I suppose from our aspect, some of the issues on the ward are directly related to the medical staff, and poor communication and things like that...from that aspect it was frustrating that they [medical staff] weren't involved in the process (Physiotherapist 032).*



*The junior doctors are only here for three months and they rotate different jobs the whole time they're here. They and the residents, you know, have a lot of work to do. And it's [the eight hour project] probably just not a priority (Nurse 031).*

*Why is it always us? Why aren't the medical staff expected to, you know, pull their weight? (Nurse 036).*

A systematic review on the impact of process redesign on practice change among health professionals identified five key factors for success: participation in the process, the establishment of protocols detailing health professionals' practice expectations, training and education, audit of the behaviour of the participating health professionals with feedback of the results to them, and mechanisms to hold the health professionals accountable for the changes (Leggat et al., 2015). The perceived lack of medical staff participation reported by these staff violates all of these requirements. The intent of process redesign methodologies is to ensure all players within the processes are involved in the analysis, planning and implementation (Mansar and Reijers, 2007) and this is considered to be particularly important when medical specialty groups strongly resist external conventions of other clinical groups (Ferlie et al., 2005). Where it is too difficult to require doctor participation, process redesign methodologies are unlikely to be successful (Leggat et al., 2015).

b) Clinician - manager conflict

The ongoing conflict between managers and clinicians in healthcare has received attention (Edwards et al., 2003, Glouberman and Mintzberg, 2001), with a recent study suggesting that the requirement for public health managers to work to externally imposed targets prevents them from responding to the problems of the clinicians (Sorensen et al., 2013). Our findings support this view, with a doctor commenting that the managers "... *don't see the patients, they see KPIs*" (Doctor 037). Studies have consistently identified the need for both managers and clinicians to work towards speaking the same language (Baathe and Norback, 2013, Sorensen et al., 2013), yet, this didn't appear to happen as part of this implementation.

Other comments exposing the clinician – manager conflict include:

*It was more about the project and the quality people than it was about the clinicians. So towards the end a lot of clinicians, particularly the senior ones, voted with their feet.*

*They didn't turn up. I don't think they were resistant. It was that they didn't have the time (Doctor 001).*

*And I thought they were actually going to go to the nuts and bolts of how – you know, what the actual problems were. And get the info from the people that worked the front line. But it wasn't. It was all, you know, high powered exec people, and people that were not really on the clinical floor (NUM 017).*

*We stopped talking about measures; we started talking about what's good for patients and what we would want for our patients (Nurse 005).*

c) Unresolved conflict among the clinicians

Despite the fact that it is more than two years since the project, the interviews uncovered ongoing clinical conflicts that had been unearthed, but not resolved by the LSS process. The most important conflict was the interpretation of the evidence regarding the clinical implications of ED length of stay. Some clinicians, and the majority of the managers, believed that the evidence suggested better patient outcomes if emergency patients were transferred to the inpatient ward as soon as possible; while others suggested that the analysis had not corrected for severity of disease and that the safest place for sick patients in general, but overnight in particular, was the ED. It was clear that despite the LSS process there was no clinical agreement on this fundamental issue. For example,

*And every registrar that has treated patients overnight and at weekends, the safest place, where staffing is maximal, is the Emergency Department. And they find the people who stay in the emergency department for only four hours with pneumonia have a lower mortality than people who stay in the ED for 10 hours. But they [the people who stay for 10 hours] will have higher mortality because they are sicker (Doctor 014).*

*You don't need to go too far to find evidence that clearly states if you've got people lying in an ED trolley for excessive number of hours, their outcomes are reduced (Exec 012).*

This lack of clinical agreement led to ongoing disagreements about optimal patient care:

*The trouble with when they're admitted in the ED is that the ward thinks we're looking after them, we [the ED] think they're [the ward] looking after them (Doctor 037).*

*And they [the ED] were starting to admit patients to our wards that we hadn't seen yet or agreed to accept (Doctor 003).*

*When we start talking about why don't ED and 4 South or Neuro or ICU work better? I don't think the time is there – realise we can't make that meeting every Tuesday, because we're shift workers (Nurse 011).*

The work of the ED has been described as a complex adaptive system, with patient care decisions influenced by the interaction between the ED and the rest of the hospital (Nugus et al., 2010). Our

findings are similar to the intractable professional boundaries found in other patient safety initiatives that led Turner and colleagues to suggest that “bespoke forms of intervention are needed across professional communities, and even medical specialties” (Turner et al., 2013 p. 540). Our findings further question the effectiveness of standardised approaches to quality and safety improvement and stress the need for effective management practices (Kaplan et al., 2014) that reinforce clinical staff accountability for patient care.

In addition, our data also found the divisions between those clinicians that worked within and supported the process redesign initiatives and those that did not, reported by Waring and Bishop (Waring and Bishop, 2010). We suggest that while these process redesign initiatives are meant to challenge established ways of practice, the processes used in this setting did not facilitate the substantial changes in the division of both power and labour.

### **Patient - product conflict for health professionals**

A concerning finding in relation to quality of care was that it appeared that as the staff adopted production process methodologies, they felt torn between their patients as ‘products’ and their natural duty of care to individuals. This was suggested by comments such as:

*It's about – it's a business. It's about getting them in, getting them out. That's what it's about (NUM 017).*

*The number of people arriving is the same. The work to be done on them is the same. It's just you've got less time to do it. So you've got to compress the work (Doctor 001).*

*And we are recording in our log books all the patients that they're transferring less than eight hours – four hours, who are medically unstable, and it – you know, they nearly kill patients (Doctor 014).*

*As it is, you don't have time to brush people's teeth. Or make their bedsides nice. So, not only do you not have time to care for your patients properly, but on top of that, you've got to do all of this other stuff (ANUM 029).*

*All they're focusing on is trying to get the patients out of the department [ED]. They're not actually trying to help the patients diagnostically and treatment wise (Doctor 014).*

Our findings suggest that if not properly managed there is a risk that process redesign methodologies may create dissonance among staff in regards to their role in ensuring patient-directed care. Others have expressed the concern that the dichotomisation of efficiency and quality in policy responses

does not fit with how health professionals complete their work (Nugus and Braithwaite, 2010) and any process redesign initiative must therefore focus specifically on the interaction between the quality and productivity or efficiency indicators.

### *Limitations*

This study was conducted in one hospital site and three years after the implementation, which is both a strength in determining the long term impact of the process redesign initiative, and a limitation, as the recall of the participants may have become biased over time.

### **Conclusions**

This study was not designed to evaluate the success of the LSS ED initiative. From an organisational perspective, the outcomes achieved through this project may well have justified the investment. Our focus was on the perceptions of the management and health professional staff who directly participated in the process redesign initiative. We focussed exclusively in this paper on their perspectives of the impact of the process redesign program on the quality of patient care delivered in this hospital, and our sample of staff highlighted significant concerns related to the quality of care. Based on the literature regarding effective process redesign, we believe that a more effective LSS implementation could have addressed the quality of care issues these staff identified. For example, previous study has stressed the need for participation in the process (Leggat et al., 2015, Drotz and Poksinska, 2014, Waring and Bishop, 2010), the establishment of accepted protocols detailing health professionals' practice expectations (Leggat et al., 2015, Waring and Currie, 2009) and mechanisms to hold the health professionals accountable for the changes (Leggat et al., 2015 ), that may prevent the endless cycles of small scale improvement with open resistance or subsequent return to the status quo that have characterised other process redesign initiatives (Waring and Currie, 2009, Radnor et al., 2012). The present study suggested that the implementation failed to involve the necessary staff, with limited participation of the medical staff. The conflicts among the health professionals suggested that the participants did not share agreed protocols that drove behaviour expectations, and therefore there were no mechanisms to hold these health professionals accountable for practice changes.

Similar to other process redesign studies the indicators were largely focused on business process metrics and while these are important, it is the interaction between these indicators and the quality of care outcomes that are most important in healthcare. There is clearly a need to have real time quality of care indicators available to be compared to the more easily defined and collected business process indicators largely used in process redesign initiatives. This is essential to address the tensions health professionals face between efficiency and quality (Nugus and Braithwaite, 2010).

This study further builds the evidence for successful process redesign implementation encompassing organisational management that ensures appropriate participation in the process, establishment of protocols detailing health professionals' practice expectations, quality indicators balancing the process indicators, and mechanisms to hold health professionals accountable for the changes.

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### **Competing interests**

The authors declare that they have no competing interests.

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