

Developing an evaluation framework for clinical redesign programs: lessons learnt

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Abstract

Purpose – The purpose of this paper is to present lessons learnt through the development of an evaluation framework for a clinical redesign programme – the aim of which was to improve the patient journey through improved discharge practices within an Australian public hospital.

Design/methodology/approach – The development of the evaluation framework involved three stages – namely, the analysis of secondary data relating to the discharge planning pathway; the analysis of primary data including field-notes and interview transcripts on hospital processes; and the triangulation of these data sets to devise the framework. The evaluation framework ensured that resource use, process management, patient satisfaction, and staff well-being and productivity were each connected with measures, targets, and the aim of clinical redesign programme.

Findings – The application of business process management and a balanced scorecard enabled a different way of framing the evaluation, ensuring measurable outcomes were connected to inputs and outputs. Lessons learnt include: first, the importance of mixed-methods research to devise the framework and evaluate the redesigned processes; second, the need for appropriate tools and resources to adequately capture change across the different domains of the redesign programme; and third, the value of developing and applying an evaluative framework progressively.

Research limitations/implications – The evaluation framework is limited by its retrospective application to a clinical process redesign programme.

Originality/value – This research supports benchmarking with national and international practices in relation to best practice healthcare redesign processes. Additionally, it provides a theoretical contribution on evaluating health services improvement and redesign initiatives.

Keywords Balanced scorecard, Evaluation, Business process management, Patient journey, Clinical design

Paper type Research paper

Introduction

The patient journey through a hospital is not always effective or efficient. It is hindered by an array of factors including (but not limited to) officious admission and discharge practices; communication difficulties between teams comprised of multiple professions and disciplines; and geographical distance between related departments, among other factors (Alikhan *et al.*, 2009; Van Vaerenbergh, 2009). Patient journeys that are ineffective or inefficient can be costly to health services, the public purse, as well as



patients (O'Connell *et al.*, 2008). One approach that can improve this journey is clinical process redesign (Ben-Tovim *et al.*, 2008b; O'Connell *et al.*, 2008).

Clinical process redesign is a healthcare improvement method that involves reconfiguring processes and services associated with the delivery of clinical care to make them safer, more efficient, and more satisfying for patients and staff alike (*Medical Journal of Australia (MJA)*, 2008). Clinical process redesign is associated with several benefits. These include increased efficiency in the delivery of hospital services, increased patient access to these services, and improved capacity to meet demand (Ben-Tovim *et al.*, 2008a).

Despite the potential value of clinical process redesign, it is often difficult to evaluate. This is largely because healthcare processes are seldom well-defined or discrete (Rohner, 2012); furthermore, evaluation often requires complete data sets from a range of sources. This might partly explain why the evaluation of clinical process redesign is often limited to a single process or event, or to the basic assessment of cost, flexibility, time, and/or quality (Zellner, 2011). It is therefore important to identify strategies that enable rigorous evaluation.

This paper describes the development of an evaluation framework for a clinical process redesign initiative and the lessons learnt. The initiative was a component of the Royal Adelaide Hospital (RAH) Patient Pathways programme (Zeitzi, 2008). The Patient Pathways programme is comprised of a series of hospital improvements that addressed organisational issues “from the perspective of the patient’s journey” (Ben-Tovim *et al.*, 2008b, p. S14). Guided by business process management (BPM, Trkman, 2010), an evaluation framework was devised to determine the capacity of the programme to improve the patient journey. The framework was then operationalised using a balanced scorecard as a management tool (Smith, 2007). To determine the potential value of the framework, it was applied to the discharge planning improvement initiative as an exemplar.

The paper commences with an overview of the patient journey within hospitals and then describes the RAH as the research setting. Following this, the paper expounds BPM and the Patient Pathways programme. It then describes the evaluation framework; demonstrates its application to discharge planning; and discusses key lessons garnered during this process. The paper then concludes with a discussion of key implications for both researchers and practitioners.

Patient journey

The patient journey is defined as:

[...] all the sequential steps in providing a patient’s clinical care; it includes the movement of a patient (from emergency department to ward or x-ray department) and the movement of a sample or document relating to the patient (e.g. blood specimen, medical record, etc.) (*MJA*, 2008).

Notwithstanding operational idiosyncrasies, many hospitals in western nations manage the patient journey in a piecemeal fashion (O'Connell *et al.*, 2008). With departments established around particular specialities, patients are admitted into one silo, receive services and support from other silos, and are discharged by yet another silo.

The process by which a hospital receives, supports, and discharges its patients is not always effective or efficient. Reflecting on the Australian health system, Menadue (2006) conceded, “the patient requires great skill in navigating the plethora of disconnected programs” (para. 1). Evidence of this disconnect can be sourced from several sources (O'Connell *et al.*, 2008; Van Vaerenbergh, 2009), some of which draw

attention to overcrowding (Litvak and Bisognano, 2009). For instance, in an Australian study of emergency departments, more than 40 per cent of patients receiving care were found to be waiting for ward beds, and 77 per cent of those had been in the department for over eight hours (Australasian College for Emergency Medicine, 2007). Similarly, the National Health and Hospitals Reform Commission (2009) labelled the Australian health system as “fragmented [...] [and] ill-equipped” (p. 3).

Ineffective and inefficient patient journeys are associated with organisational costs, economic costs, and personal costs. Organisational costs include the misappropriation of limited resources, including equipment and staff time. For instance, access block – which occurs when a patient remains in an emergency department for over eight hours consequent to the limited availability of an inpatient bed – is associated with decreased efficiency in the emergency department and increased inpatient stays (Richardson and Mountain, 2009; Forero *et al.*, 2010). Given the interconnected nature of hospital departments, access block is likely to hinder patient journey throughout a hospital (Fitzgerald and Sloan, 2008). As such, it can reduce the efficiency of the surgical, intensive care, pharmaceutical, and diagnostic imaging departments, among others. Although available research is limited, indications of economic cost might be sourced from projects that have improved the patient journey and consequently saved money. For instance, a pilot project to improve the patient journey for Australian Indigenous peoples from remote locations found considerable financial savings could be made using a Remote Area Nurse Liaison Service (Lawrence *et al.*, 2009). Similarly, the Palmetto Richland Hospital in the USA anticipated considerable savings consequent to improved patient flow (Litvak and Bisognano, 2009). By modifying the way its operating rooms are used, it anticipated adding US\$8 million to the annual margin. The ineffectiveness and inefficiencies of the patient journey also imply personal costs. For instance, access block is associated with increased risk to patient health (South Australian Coroner, 2003). This has implications for not only the patient, but also their carers and family members.

Evidence suggests that the ineffectiveness and inefficiencies of the patient journey is largely associated with four factors; namely, operational issues, organisational factors, governance arrangements, and social change. Operational issues include the availability of resources – including trained staff, equipment, and information technology (Van Vaerenbergh, 2009); communication structures; as well as layout – both of individual departments and of the hospital (Graban, 2009). Organisational factors include coordination between departments and the services therein (Ben-Tovim *et al.*, 2008b); employment conditions, such as working hours (Van Vaerenbergh, 2009); the availability of orientation programmes and professional development, including clinical supervision; as well as morale. Governance arrangements refer to “interactions” among structures, processes, and traditions that determine strategic decision-making practices (Graham *et al.*, 2003); it also highlights “responsibility” for performance and direction (Anheier, 2005). Governance arrangements that can influence the patient journey include professional autonomy (Ben-Tovim *et al.*, 2008b); collaboration, particularly between clinical, medical, and administrative leaders (Alikhan *et al.*, 2009); as well as funding and reporting arrangements (Department of Health and Ageing, 2009). Social change can also influence the patient journey. This includes an ageing population; the increasing number of patients under 25 years who access emergency departments as a substitute for primary care (Booz Allen, 2007); the increasing number of patients who require intense and/or continued hospital treatment (Duckett, 2007), thus overcrowding hospital departments (Fatovich *et al.*, 2009); as well as changing patient expectations, largely consequent to improved access to health information.

Given the systemic nature of the aforesaid problems, they are likely to require long-term solutions that require long-term planning. After all, “Every system is designed to get the results it gets” (O’Connor, 1997, p. 897). As such, a holistic redesign of hospital systems is required, rather than bandaids, to improve the patient journey (Alikhan *et al.*, 2009).

Informed by these lessons, the RAH implemented the Patient Pathways programme (Zeitz, 2008). As an example of the Australian public health system, the RAH provides a context for this research to reveal how innovative approaches can be used to understand complex hospital processes, identify areas for improvement, and implement sustainable change.

Research setting

The RAH is a major state-wide referral centre, providing a range of medical, surgical, diagnostic, emergency, and support services in addition to specialty services including a burns unit, trauma care, spinal injury care, and renal transplant services. It is also the largest accredited teaching hospital in South Australia (Royal Adelaide Hospital, 2009). The RAH is driven by a mission to maintain and improve the health and well-being of its community. To support this mission, the RAH introduced a series of initiatives in 2004, which together represent the Patient Pathways programme (Zeitz, 2008). Patient Pathways has helped to improve the patient journey and expedite patient return to the community. For instance, hospital stays have decreased by 12 hours, which was achieved by redesigning hospital processes.

The programme is premised on five cyclical stages that denote the Patient Pathways Improvement Model (see Figure 1; Giles, 2005, p. 40). The first involves convening relevant hospital personnel to identify areas for improvement and appropriate aims. The second involves mapping processes within an identified area to understand current practices and procedures, and identify areas for improvement. Informed by this information, the third stage involves redesigning the identified area, changing it

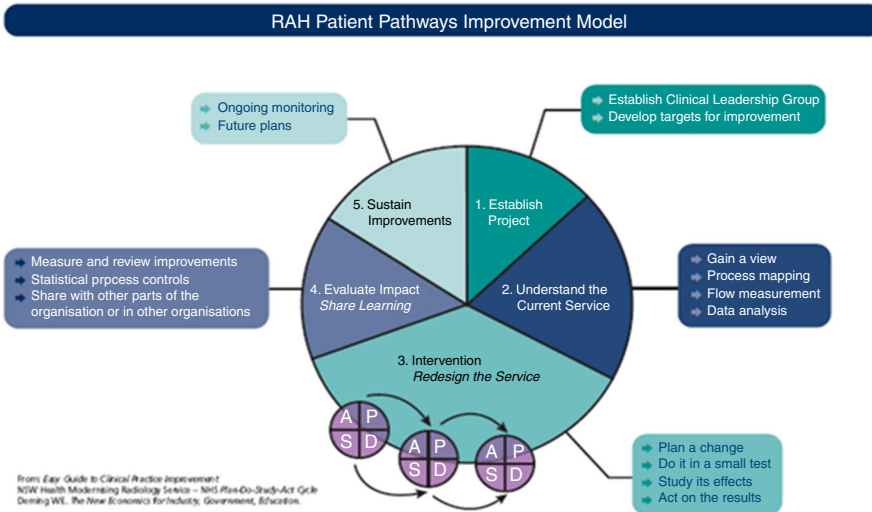


Figure 1.
Patient pathways
improvement model

Source: Giles (2005, p. 40)

accordingly, and reflecting on subsequent effects – as an iterative model, this stage can occur repeatedly to optimise the value of the new design. Although the third stage requires an examination of effect, the fourth stage involves a comprehensive evaluation of the new design. This can involve mixed-methods research to determine effects for managers, clinicians, and patients. The fourth stage also involves disseminating key lessons to others who may benefit, particularly adjoining departments and other hospitals. The fifth stage involves sustaining the benefits associated with the new design. This involves monitoring processes that influence patient journeys, forecasting the impact of impending organisational change, and planning accordingly.

The Patient Pathways Improvement Model has informed the development of several initiatives, all of which aim to optimise the patient journey. This is achieved by providing a seamless service to patients in a safe, effective, and efficient way. One of initiatives emanating from this model is the Discharge Planning Pathway programme. The programme involves: recording an estimated date of discharge for all patients upon admission; recording delays in patient discharge, relative to the estimated dates; encouraging event-led discharge, whereby patients are discharged in accordance with clinical guidelines and are not subject to unnecessary delay; planning and monitoring the transition of patients into the community – this may involve the organisation of transport, medication dispensation, and/or a residential care placement; communicating discharge plans to patients, relevant hospital personnel, and community service providers, when appropriate; discharging eighty per cent of patients (who are suitable for discharge) before 11:00 a.m., one of whom may be discharged before 9:30 a.m.; and increasing the number of weekend discharges.

Since the inception of the Patient Pathways programme, the RAH has witnessed some notable achievements. For instance, between 2006 and 2007, the number of outlier patients – that is, “patients [...] in a ward inappropriate for their condition simply because of the unavailability of a more appropriate bed” (Garling, 2008, p. 990) – decreased from 20,427 to 11,129; this represents a reduction of over 45 per cent. Furthermore, in 2007-2008, the relative stay index – a comparison between the actual and expected number of hospital days, adjusted for the complexity of episodes of care (Department of Health, 2010) – decreased by over one per cent. In addition, the length of patient stay decreased by 12 hours.

Despite achievements associated with the Patient Pathways Improvement Model, there remain some opportunities for improvement. For instance, it does not include a systematic approach for developing improvement targets, or ensuring these align with both stakeholder and organisational needs. Furthermore, the model does not appear to be responsive to change. Given the dynamic nature of health services (Wickramasinghe and Geisler, 2008), it is important that the model has the elasticity required to quickly accommodate change – more specifically, it requires a capacity to link organisational change with relevant organisational processes.

These opportunities suggest the potential value of BPM. Coupled with the balanced scorecard, the principles of BPM are likely to augment the capacity of the model to improve the patient journey. This is explicated in the following section.

BPM

Given the influence of organisational systems on organisational effectiveness (Walton, 1986), much research has examined the relationship between process management and business success; and most of this research reveals a positive correlation (Skerlavaj *et al.*, 2007). For example, Hung (2005) found the two constructs of BPM – process

alignment and people involvement – is significantly related to organisational performance. The benefits associated with BPM are influenced by the reason(s) for using it – or the driver(s). Those that are internal to an organisation include the need to reduce lead-time or cost (Burlton, 2001) and the importance of quality (Pritchard and Armistead, 1999), while external drivers include “globalisation; changing technology; regulation; the action of stakeholders; and the eroding of business boundaries” (Armistead *et al.*, 1997 cited in Lee and Dale, 1998, p. 215). The benefits associated with BPM can largely be categorised as internal – be they quantitative or qualitative, customer oriented, and competitive advantage.

Despite concerns about its atheoretical nature (Trkman, 2010), BPM has a demonstrated role in organisational success. According to Hung (2005), this role is amplified when there is alignment between strategic objectives and business processes; executive commitment; and staff empowerment. When applied to health services, BPM has helped to deploy new technology (Sánchez *et al.*, 2008), reduce workload (Hess, 2009), and improve organisational outcomes. These successes were largely achieved by mapping and aligning processes, which in turn make it possible to pre-empt the effects of organisational change. BPM can be implemented using different approaches, including the balanced scorecard.

Balanced scorecard

According to Smith (2007), “A *Balanced Scorecard* is a management tool that provides senior executives with a comprehensive set of measures to assess how the organization is progressing toward meeting its strategic goals balanced score” (p. 166, italics in original). Ideally, the balanced scorecard incorporates four types of measures (Kaplan and Norton, 1996) – financial, customer related, business focused, as well as those related to innovation and learning.

Following demonstrated success in the private sector, the application of balanced scorecard in health services has enabled managers, clinicians, and practitioners to attain organisational goals. For instance, after it was applied in a North American children’s hospital, the balanced scorecard helped to reduce patient costs in the intensive care unit by almost 12 per cent (Meliones, 2000) – this helped to transform an annual loss of US\$11 million to a gain of US\$4 million. Similarly, following its implementation within an entire Taiwanese hospital (Chang *et al.*, 2008), there were increases in: revenue (by over 7 per cent over two years); the percentage of admissions from the emergency department to an intensive care unit in less than three hours (an increase of over 30 per cent in one year); services delivered to patients who experience disability and/or socio-economic disadvantage; satisfaction among inpatients; and research projects. After assessing 44 relevant scholarly articles, the authors concluded, “the BSC [Balanced Scorecard] improved patient, staff, clinical, and financial outcomes” (p. 21).

Despite support for the balanced scorecard, it is prudent to be cognisant of its shortcomings – particularly those relevant to health services. For instance, it is said to be ill-equipped to: respond to crisis (Impagliazzo *et al.*, 2009); accommodate case-mix variation (Pink *et al.*, 2001); or track meaningful change in public health (Auger and Roy, 2004). The balanced scorecard can also be difficult to implement within health services (Rabbani *et al.*, 2007). It requires: time – approximately two years – to develop and implement a balanced scorecard system (Chan and Ho, 2000); resources; support; and sound communication (Chang *et al.*, 2008; Verzola *et al.*, 2009).

To prevent some of the shortcomings associated with the balanced scorecard, several lessons can be garnered from a review of extant literature. In addition to

resources, the likelihood of success increases with: a robust foundation (Smith and Il-Woon, 2005); the adoption of a systems approach (Inamdar *et al.*, 2002); the purposeful selection of suitable performance indicators – including patient satisfaction (Coop, 2006); visual displays that effectively communicate the balanced scorecard and associated benchmarks, outliers, and data issues, to relevant stakeholders; the use of complementary methods of control; and perhaps most importantly, *bona fide* engagement between and involvement from relevant stakeholders (Auger and Raynault, 2006). Informed by these lessons, the balanced scorecard was used to implement BPM in the RAH.

Methodology

This project involved three stages. These included: the collection and analysis of secondary data; the collection and analysis of primary data; and the development of a framework to evaluate the healthcare redesign process and performance in four areas – notably, resource use, process management, patient satisfaction, as well as staff well-being and productivity. Each stage is described in turn.

The aim of the first stage was to understand the timely patient discharge component of the Patient Pathways programme – this component was selected as it encompassed a range of processes with functions, events, and measurable targets that could guide the evaluation criteria in the third stage. During the first stage, the researchers and hospital personnel identified secondary data that would inform the development of the evaluation framework. These included data collected over a four-year period (2005-2008) pertaining to: an estimated discharge date; patient discharge times; adherence to clinical guidelines on patient discharge; delays in patient discharge; the planning and monitoring of patient transitions into the community; as well as the communication of discharge plans to patients, carers, relevant hospital personnel, and community service providers, when appropriate. This period was purposefully selected because it provided a comprehensive suite of data across all domains to test the evaluation framework. Secondary data collected for analysis included: discharge policies and procedures, process charts, minutes from relevant meetings, hospital reports, and hospital correspondence. Data were analysed by integrating time and performance measures with qualitative research material – for example, the reports – to map discharge processes.

During the second stage, primary data were collected over four months (March to June, 2009, inclusive) to understand current patient discharging practices. This involved observing patient journeys over a period of one week by a team member of the research team; and reporting thick, descriptive field-notes (Ponterotto, 2006). Relevant hospital personnel were also consulted to understand current hospital practices. This involved a semi-structured, open-ended interview with eight clinicians and 15 managers. Interviews were digitally recorded and transcribed verbatim for analysis. The field-notes and transcripts were analysed by a constant comparative analysis method involving systematic coding and categorising data into distinct themes (Boeije, 2002).

The third stage involved developing the evaluation framework. More specifically, processes were mapped and modelled by incorporating several tasks and measures using the event-driven process chain (EPC) methodology to identify process measurement points (Keller *et al.*, 1992). The tasks included: tracking event-led discharge, where patients are discharged in accordance with clinical guidelines; planning and monitoring the transition of patients into the community – this may involve the organisation of transport, medication dispensation, and/or a residential care placement; communicating discharge plans to patients and carers, relevant hospital

personnel, and community service providers, when appropriate; and increasing the number of weekend discharges. The measures included: recording an estimated discharge date for all patients upon admission; recording delays in patient discharge, relative to the estimated date; and discharging eighty per cent of patients (who are suitable for discharge) before 11:00 a.m., one of whom may be discharged before 9:30 a.m. Once the processes were mapped and modelled, a balanced scorecard was devised to evaluate the Patient Pathways programme. Following this, the framework was validated by evaluating one component of the programme. Three components (steps) of the proposed evaluation framework is summarised (see Figure 2).

Results

Secondary data analysis

An analysis of the secondary data suggested that examining and modelling current discharge practices and possible improvements enabled hospital personnel to identify key objectives and realistic targets to achieve timely patient discharge (see Table I). These objectives and targets were aligned with the tasks and measures of the Discharge Planning Pathway programme. It also helped to identify feasible success measures for future initiatives within the broader Patient Pathways programme. Collectively, these guided the application of BPM principles – that is, process modelling with functions, events, and measurement points – and the development of a balanced scorecard to evaluate the patient discharge initiative.

BPM. The application of BPM principles revealed connections between the RAH mission and objectives, the Patient Pathways Improvement Model, the Discharge Planning Pathway programme, and performance measures (see Figure 1). This is illustrated with reference to two measures – the estimated discharge date and the discharge timeframe – both of which were directly connected with other processes and steps in the Discharge Planning Pathway programme – for example, from admission to discharge to transitional care services. Furthermore, these measures spanned the entire patient journey and could be used to evaluate process improvements associated with a number of initiatives.

Process mapping and modelling. As the first step to develop a balanced scorecard, the patient discharge initiative was mapped and modelled using the EPC methodology. This helped to: identify key functions and events; reveal relationships between

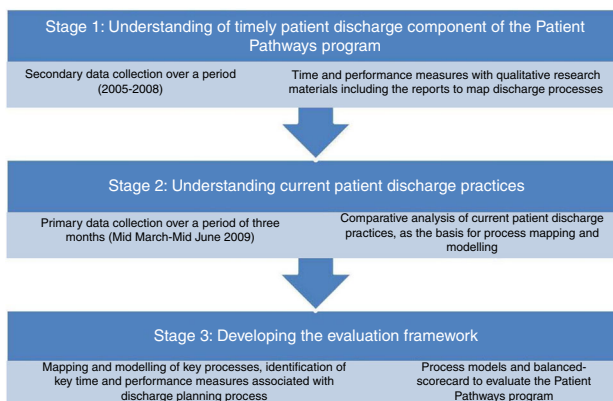


Figure 2.
Three components
(steps) of the
proposed evaluation
framework

Table I.
Objectives, targets,
and measures of
timely patient
discharge

Objectives	Targets
Identify a discharge date for patients receiving elective surgery prior to admission	100% of patients receiving elective surgery have an estimated discharge date recorded
Electronically record an estimated discharge date for patients receiving elective surgery and communicate this to the patient at time of admission	100% of patients receiving elective surgery have an estimated discharge date recorded
Electronically record an estimated discharge date for emergency patients and communicate this to the patient or support person within 24 hours	80% of emergency patients have an estimated discharge date recorded
Communicate discharge plans to patients, support persons, relevant hospital personnel, and community service providers, when appropriate	90% of patients to be issued with a discharge letter within 48 hours of discharge
Encourage event-led discharge for key patient groups	70% of patients to be discharged by the estimated date 80% of patients' length of stay to meet the benchmark established by the Health Roundtable
Discharge patients between 9:00 and 11:00 a.m. daily	60% of discharges to occur before 11:00 a.m.
Declare bed available following patient discharge via the patient management system	80% of beds to be available within 30 minutes of patient discharged

seemingly discrete hospital procedures and activities; and demonstrate how the four dimensions of the balanced scorecard – namely, resource use, process management, patient satisfaction, as well as staff well-being and productivity – could be embedded into the evaluation framework, using objectives, measures, targets, and the current status of each dimension. The EPC methodology involved three key steps. First, hospital reports, minutes from relevant meetings, and process charts were reviewed to identify and link inputs (including resources and information), process components, as well as outputs. Consequently, six key components were identified – namely, patient arrival, triage and registration, diagnosis, treatment, observation, and discharge. Second, timestamps were used to identify measurements for these processes. Third, improvement strategies were identified.

These three steps resulted in process models of current patient journeys, commencing with patient admission and culminating with patient discharge. Two key processes within the patient journey include admission within the broader discharge planning process and the discharge process (see Figure 3). When the patient is ready for discharge within the ward, a discharge process is triggered. Each process consists of key functions and events that are connected using logical operators, as per the EPC methodology. For example, an estimated discharge date is recorded based on an assessment of patient condition prior to admission within the broader function of, “Commence broad discharge plan”, and maybe reviewed during admission. Similarly, a discharge process that is triggered by the event, “Patient is ready for discharge”, is represented by key functions (e.g. preparation for discharge; inform family and organise transport; liaise with service providers, etc.) and events (e.g. patient is discharged from the ward; patient is waiting in the ward; and patient is leaving the hospital). In this case, the process crosses three departmental areas – namely, the ward; the discharge transit lounge; and the rehabilitation unit (if patients require rehabilitation). The discharge process functions and events connect with the admission process through the estimated discharge date. For example, the event,

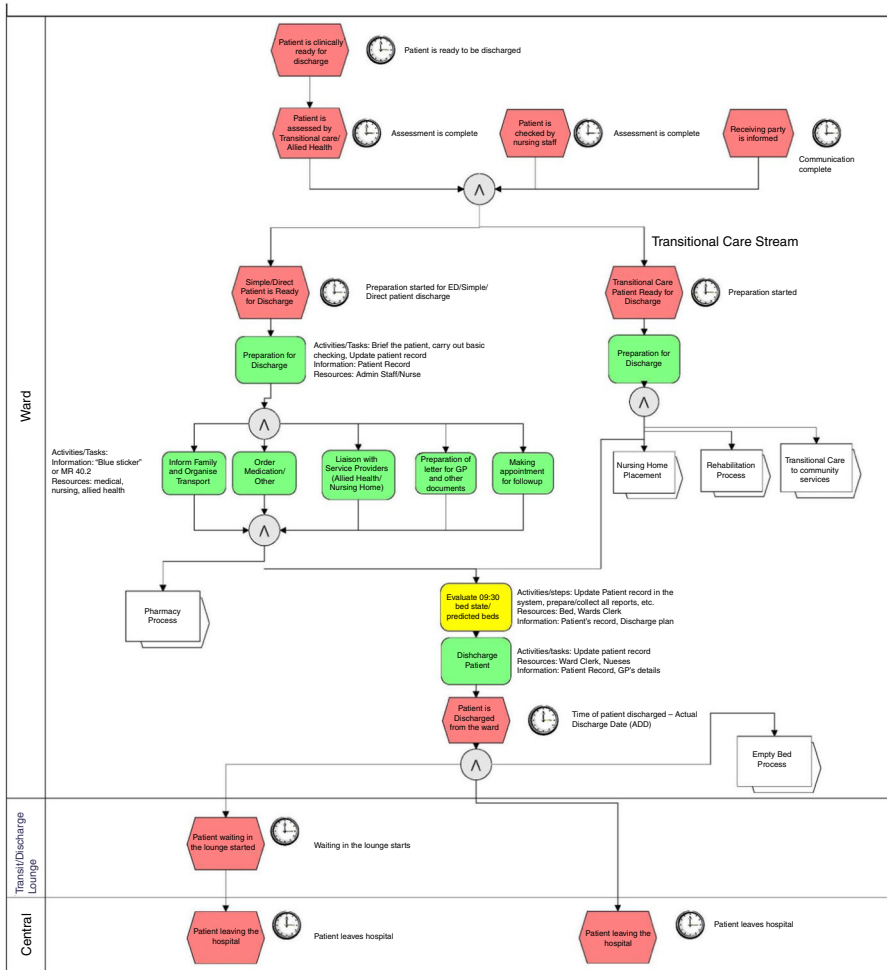


Figure 3. Discharge within broader discharge planning process

“Patient is discharged”, triggers other functions and processes, including the initiation of the empty bed process. The empty bed process is an integral part of the broader discharge process as it influences the admission process by communicating the availability of beds, or lack thereof. The empty bed process is equivalent to capacity reduction concepts, commonly used in manufacturing environments. Releasing the bed for next use as part of this process automatically reduces capacity use – in this case, by one bed. Although the process commences with the event, “Patient is discharged”, it can also be triggered during the function, “Discharge patient”, with the preparation for the activities or tasks involved. The process involves various functions – including cleaning the bed and updating bed availability – and terminates with the event, “Bed is ready for next use”.

Overall, processes are presented by their events, functions, process paths, and logical connections. Each event was identified with appropriate time measures, while functions were connected with key data elements – for example, activities, tasks,

information, and resources – as the basis for process modelling. Together, these process models accurately revealed the patient journey; the resources and information required through this journey; the personnel involved; the time that resources, information, and personnel are required; and the direction of information flow. This modelling enables the process to be improved.

Time measures at each event within the enhanced process model form the basis for process measurements. Therefore, setting time measures at the process level is a first step towards process measurements and eventual process improvements. Furthermore, the dynamic nature of current processes requires processes to be measured and dynamically modelled. Aspects of process measurements and improvements using enhanced process models are discussed in the subsequent section.

Process measurements of patient discharge. Process measures assess process outcomes to reveal, understand, and ultimately improve process behaviour (Robson, 2004). Comprehensive measurements are usually preferred and are collected from several key indicators. Within this project, outcome metrics associated with admission, discharge and bed release (i.e. capacity reduction) processes were identified. These include timely patient discharge, length of stay, and bed occupation. As part of the measurement regimen, variables that influence these outcomes were defined. For timely patient discharge, variables include estimated and actual discharge dates; for length of stay, variables include admission and discharge times; and for bed release, variables include patient discharge times and bed release times.

Estimated discharge date. An estimated discharge date, which is recorded at the time of patient admission, is required for process measurements and improvements (including resource requirement improvements) throughout the patient journey. As noted, evaluation of the entire Patient Pathway programme is based on balanced scorecard evaluations of each initiative. The use of the estimated discharge date is described, based on each key element. Table II summarises problems, drivers, actions, and targets of this initiative and forms the basis of broader evaluation criteria.

The data summarised in Tables III and V were extracted from internal reports, such as the Discharge Planning Summary scorecard and the Percentage of Patients Discharged before 11:00 a.m. Communication Board. The number of patients who received an estimated discharge date on admission increased from 35 per cent in 2007 to 62 per cent in 2008, representing an increase of 27 per cent. However, the available information does not differentiate between emergency patients and those receiving elective surgery, which in turn limits the ways data can be analysed.

Problem	Drivers	Actions	Targets
Limited planning of patient discharge	Participation of patients and support persons in discharge planning Executive leadership Clinician support	Include estimated discharge date in the electronic patient management system Display the estimated date on the electronic patient bed-card Educate hospital personnel on patient discharge procedures	100% of patients receiving elective surgery to receive an estimated discharge date on admission 80% of emergency patients to receive an estimated discharge date within 24 hours of admission

Table II.
Example of balanced scorecard for estimated discharge date

Table III.
Provision of
estimated discharge
dates upon patient
arrival in 2008

Departments	Patients with estimated discharge date (%)
Orthopaedic and trauma	74
Surgical specialties	68
Internal medicine	56
Cardiovascular	55
Ward A	89
Ward B	84
Ward C	60
Ward D	56
Ward E	21
Cancer centre	52

Note: $n = 62$

An analysis of the secondary data revealed considerable variation in the capacity of each department – and the wards therein – to provide patients with an estimated discharge date upon arrival. For instance, while the orthopaedic and trauma service was best able to provide patients with an estimated discharge date upon arrival, the cancer centre was least able (see Table III). Similarly, while a ward within the cardiovascular service was best able to provide patients with an estimated discharge date upon arrival and discharge patients before 11:00 a.m., another ward was less able. The reasons for such variation remain unknown. Similarly, it is unclear whether and how these capacities influence the patient journey.

Discharge timeframe. The discharge timeframe is a key measure that connects the patient journey from admission to discharge, and influences the admission of other patients. The balanced scorecard of the discharge timeframe is similar to that of the estimated discharge date – however, this measure shapes the entire process. Key aspects, like the problems, drivers, actions, and measures associated with this initiative are summarised (see Table IV), and form part of the criteria to evaluate the Patient Pathway programme.

Problem	Drivers	Actions	Measures
Patient discharge late in the day	Demand for beds, which is typically from 11:00 a.m.	Discharge patients between 9:00 and 11:00 a.m. daily	60% of discharges to occur before 11:00 a.m.
Patient transfer from the emergency department	Awareness of patient discharge date and time among patients and support persons	Discharge one patient from each ward before 9:30 a.m. Inform staff and patients of discharge date and time through education and promotion of patient discharge procedures	One patient to be discharged from each ward before 9:30 a.m. 99% of eligible patients to have an estimated discharge date displayed on the patient bed-card
Recovery of emergency patients	Dispensation of discharge prescriptions		
Admission of elective patients	Availability of patient transport		
Access to elective surgery	Delayed clinical decision making resulting in unexpected patient discharges		

Table IV.
Balanced scorecard
for discharge
timeframe

Guided by the internal reports, another discharge outcome relevant to the discharge timeframe is the number of patients discharged before midday, which represents the traditional discharge time. The number of patients discharged before midday increased from 4,552 (34 per cent) in 2005 to 14,528 (42 per cent) in 2008. However, reasons for the negligible progress observed between 2007 and 2008 remain unknown.

Akin to earlier observations, there was considerable variation in the capacity of each department – and the wards therein – to discharge patients before 11:00 a.m. While the orthopaedic and trauma service performed well (45 per cent discharged), the cancer centre did not (32 per cent discharged). Similarly, while ward A within the cardiovascular department was best able to discharge patients before 11:00 a.m., wards D and E had a limited capacity to perform this function. As per previous, there are no apparent reasons for such variation, and no clear indication on how this variation influences the patient journey.

Patient satisfaction. In addition to the time-related measures of patient discharge outlined earlier, patient satisfaction is considered key to evaluating the overall success of the Patient Pathways programme. Therefore, patient satisfaction with the discharge planning and process was deemed to be an important balanced scorecard measure. Given that only 52 per cent of patients were advised of their discharge date and time, and that only 32 per cent received a discharge information sheet, there was much room to improve patient satisfaction.

Balanced scorecard

A balanced scorecard was devised to evaluate the Patient Pathways programme. For three key reasons, a balanced scorecard was deemed appropriate for this project. First, it could help to determine how the different initiatives within the programme contribute to its overarching aim. Second, it could help to determine the effect of these initiatives on patients, staff, and resources. And third, it could accommodate the dynamic and complex nature of the hospital.

The balanced scorecard included four domains – namely, resource use; patient satisfaction; process management; as well as staff well-being and productivity. These were determined by analysing secondary data and clarifying how the different initiatives influenced each domain (see Table V). However, this high-level evaluation did not indicate the status of each objective. For example, effective resource use helped to: establish the strategic objectives of the immediate declaration of bed availability; monitor the length of patient stay with targets of immediate bed turns; and meet the Health Roundtable benchmark on length of stay – however, the status of relevant measures was not recorded.

The balanced scorecard was trialled with reference to the estimated discharge date initiative (see Figure 4). This involved a number of objectives, measures, targets, and the current status under each dimension. Although targets for each measure of resource use and process management were established, those for patient satisfaction, as well as staff well-being and productivity were not. Furthermore, the status of various measures was not recorded. As such, the evaluation of the estimated discharge data initiative was limited to a few objectives and measures at current times. For example, resource use is determined with an estimated discharge date for both elective and emergency patients and associated measures (i.e. the number of patients with discharge dates); however, the objective of meeting their estimated discharge date is not evaluated. Nevertheless, this exemplar demonstrates the potential value of the balanced scorecard as the four perspectives are identified (resource use, process management,

Perspectives	Strategic themes	Strategic objectives	Strategic measures/target
Effective resource use	Optimisation of capacity	Immediate declaration of available bed Monitoring patient length of stay and meeting the length of stay Health Roundtable benchmark	Bed turn 80% of patients' length of stay meets the Health Roundtable benchmark
Patient satisfaction	Involved, aware and satisfied with the patient discharge plan	Receive timely information about discharge processes	Patients are informed, as a minimum, 24 hours before the planned discharge time and day
Process improvement and management	Timely discharge	Discharge occurs before 11:00 a.m. Discharge occurs before 9:30 a.m. Weekend discharge	60% of patients are discharged by 11:00 a.m. 1 patient per ward is discharged daily by 9:30 a.m. 29% of discharges occur on the weekend
	All patients have an estimated discharge date	Emergency and elective patients are aware of their discharge date	80% of emergency patients have a discharge date documented within 24 hours 100% of elective patients have a discharge date documented before admission
	Discharge plan	Patients have a discharge plan	75% of patients have a discharge plan
	Patients meet their estimated discharge date	Discharge dates are monitored	70% of patients meet their planned discharge date
	Discharge communication in a timely manner	Patients receive appropriate information and have a discharge letter sent within 48 hours	90% of patients have a discharge letter sent within 48 hours
Staff well-being and productivity	Staff receive clear guidelines about discharge processes Staff workloads are manageable	Discharge planning is coordinated and communicated Admissions (demand) are aligned with capacity through timely discharge	Guidelines are available to all new staff 100% of clinicians have access to the Capplan dashboard and the patient-flow board

Table V.
Timely patient
discharge strategy

patient satisfaction and staff well-being, and productivity) with three specific objectives and measures, which serve as the basis for a holistic evaluation framework to evaluate the Patient Pathway programme.

Given the demonstrated value of the balanced scorecard, it is likely to aid the evaluation of the different initiatives that form part of the Patient Pathways programme. Each initiative involves resource use – including equipment, space, and staff. Consider for instance, the “weekend discharge initiative”, which requires a dedicated discharge lounge; the “dispensing of discharge medications initiative”, which requires a dedicated pharmacist to educate patients on medication use; and the “discharge between 9.00 and 11.00 a.m. initiative”, which involves the use of transit lounges.

Related to this, each initiative involves staff whose well-being needs to be ensured. Towards this aim, staff have been encouraged to actively shape and develop each

Resource Use			Patient Satisfaction				
Objectives	Measures	Targets (%)	Current Status	Objectives	Measures	Targets	Current Status (%)
Elective patients have an estimated discharge data	No. of patients with an estimated discharge date	100	68	Patient awareness of their estimated discharge date	Patient satisfaction survey	TBA	52
Emergency patients have an estimated discharge data	No. of emergency patients with an estimated discharge date	80	Unknown	Patient awareness of their discharge plan	Patient satisfaction survey	TBA	55
Patients meet their estimated discharge date	No. of patients that meet their estimated discharge date	70	44.1	Patient participation in discharge planning	Patient satisfaction survey	TBA	85

Process Management			Staff Well-being and Productivity				
Objectives	Measures	Targets (%)	Current Status	Objectives	Measures	Targets	Current Status
Record estimated discharge date	No. of patient bed-cards with an estimated discharge date	90	Unknown	Clinician communication	TBA	TBA	Unknown
Inform patients	No. of patient bed-cards with an estimated discharge date	90	Unknown	Staff awareness of relevant procedures	No. of staff who can describe the process to record an EDD	100%	Unknown
Communicate the estimated discharge date	No. of patients who know their estimated discharge date	95	Unknown	Staff follow relevant procedures	TBA	TBA	Unknown

Goals
<ul style="list-style-type: none"> • Timely patient discharge • Improved discharge communication • Participation of patients and support persons in discharge planning

Figure 4. Evaluation of the estimated discharge date initiative

initiative, thereby increasing a sense of ownership. And to ensure timely communication on the status of each initiative, a dashboard-like tool was developed to visualise their performance (Fitzgerald *et al.*, 2010). Most initiatives also involve processes that need to be measured and managed. This can be aided through the use of timestamps.

Finally, each initiative shapes patient experience with, and opinion about the hospital. As such, the balanced scorecard explicitly recognises the need to determine patient satisfaction and use this information to improve the patient journey. Consider the “discharge between 9.00 and 11.00 a.m. initiative”. Established following patient consultation, it increased patient discharge from 40 to 43 per cent by September 2007 – and by November, an extra 1,500 patients had been discharged before midday, relative to the previous 12 months.

Discussion

Although clinical redesign has gained popularity over the past ten years (National Health Service Improvement, 2011), there is limited empirical evidence of its ability to increase the effectiveness and/or efficiency of health services (Currstine *et al.*, 2007). To address the void in extant literature, this paper described the development of a framework to evaluate one such programme – namely, the Discharge Planning Pathway programme. The paper demonstrates that, although evaluating clinical redesign programs can be complex, the challenges are not insurmountable. Using BPM and a balanced scorecard, the evaluation framework connects strategic drivers, process improvements, targets, and measures that together bring clarity to patient discharge processes.

Developing the evaluation framework highlighted the need for a small number of suitable yet discrete performance indicators (Coop, 2006). Single indicators, like the percentage of patient discharges before 11:00 a.m. or clinical outcomes, do not adequately capture the potential value of clinical redesign processes. Given their uni-dimensional nature, single indicators simply reflect one outcome associated with a complex process. Furthermore, they are unlikely to gauge the effectiveness or efficiency of the various components within (and connected to) the process.

Developing an evaluation framework for the Discharge Planning Pathways highlighted the need to create measures for the various elements of the programme with established links between relevant data sets (Pink *et al.*, 2001). The framework helped to “guarantee that the right things go on the scorecard, with properly defined metrics and rational, time-based goals” (Smith and Il-Woon, 2005, p. 71). It also brought together the relevant aspects into a logical form that should make clinical sense to staff and in turn engage them with the improvement process.

Evaluating clinical redesign only through a clinical lens limits the opportunity to understand the management of health services. Adopting a systems approach is important to ensure other aspects of the organisation, both internal and external, are not neglected in measuring the success of the clinical redesign process (Inamdar *et al.*, 2002). As demonstrated in this paper, the application of concepts grounded in management research, such as business process change and associated change management, enabled a different way of framing the evaluation, ensuring measurable outcomes were connected to inputs and outputs. Furthermore, the EPC methodology revealed the importance of both patient discharge time and bed availability for a subsequent patient.

The use of BPM and the balanced scorecard facilitated a broader approach to evaluate clinical redesign programs. It ensured the different domains of the Discharge Planning Pathway programme – namely, resource use, process management, patient

satisfaction, as well as staff well-being and productivity – were connected with measures, targets, and (perhaps most importantly) the overarching aim of the initiative.

The limitation of this evaluation framework is its retrospective application to an existing clinical process redesign initiative. This is largely because several elements had already changed and improved during the implementation of several initiatives within a broader discharge planning pathway programme. Ideally, an evaluation framework would be created when an initiative commences. Furthermore, an evaluation framework should represent the diverse stakeholders connected with the process, measure the appropriate elements, and use a systems approach to ensure management and clinical improvements are captured.

One implication of using BPM in health service management is that managers may require support to use tools they may not be familiar with. Furthermore, the four elements of the balanced scorecard may require adjustment to reflect current service objectives, measures, and targets to strengthen the value of redesign project evaluations.

This research, which involved relevant personnel to map and redesign processes using mixed-methods, helped to identify viable objectives, measures, and targets across four areas. It also helped to determine the associated effects for managers, clinicians, and patients. Furthermore, the research verified the value of tools like BPM and the balanced scorecard, and it demonstrated the need to evaluate change as it advances, rather than *post hoc*.

In summary, the lessons garnered through the development of the evaluation framework presented in this research include: first, the importance of mixed-methods research to devise the framework and evaluate the redesigned processes; second, the need for appropriate tools and resources to adequately capture change across the different domains of the redesign programme; and third, the value of developing and applying an evaluative framework progressively, rather than retrospectively.

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