12. Health, Public Sector and Not-For-Profit
Competitive Session

How to evaluate redesigned clinical processes: Lessons learnt

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The challenges of evaluating clinical redesign programs: Lessons learnt

ABSTRACT: *Evaluation is integral to clinical redesign programs, yet there is limited literature to guide how such an evaluation might be designed or conducted. To address this void, this paper presents the lessons learnt through the development of an evaluation framework for a clinical redesign program within an Australian public hospital. The evaluation framework ensured that resource use, process management, patient satisfaction, and staff wellbeing were each connected with measures, targets and the aim of the initiative. Lessons learnt include: (1) the importance of mixed-methods research to devise the framework and to evaluate the redesigned processes; (2) the need for appropriate tools and resources to adequately capture change across the different domains of the redesign program; and (3) the value of developing and applying an evaluative framework progressively, rather than retrospectively.*

Keywords: Evaluation framework, Balanced scorecard approach, Redesigning healthcare organisations, Healthcare performance measures

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 (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, Bassham, et al., 2008; MacLellan, Cregan, McCaughan, O'Connell, & McGrath, 2008).

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 datasets 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 (Helfert, 2009; Nabitz, Schramade, et al, 2006; Reijers and Mansar, 2005; Zellner, 2011; O'Connell, Ben-Tovim, et al., 2008). It is therefore important to identify strategies that enable rigorous evaluation as well as lessons learnt through this process.

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 Patient Pathways program (Zeitz, 2008), comprised of a series of hospital improvements that addressed organisational issues 'from the perspective of the patient's journey' (Ben-Tovim, Dougherty, O'Connell, & McGrath, 2008, p. S14). Guided by business process management (BPM, Trkman, 2010), an evaluation

framework was devised to determine the capacity of the program to improve the patient journey. The framework was then operationalised using a balanced scorecard as a management tool (R. F. Smith, 2007). To determine the potential value of the framework, it was applied to the discharge planning improvement initiative as an exemplar.

The paper provides a review of BPM and the Patient Pathways program (Zeitz, 2008). Following this, the article describes the framework, its application to discharge planning, and a discussion of lessons learnt in this process. The paper then concludes with a discussion of key implications.

Business Process Management

To develop an evaluation framework for this clinical redesign program, BPM was chosen because of its focus on the '*achievement* of an *organization's objectives* through the *improvement, management* and *control* of *essential business processes*' (Jeston & Nelis, 2006, p. 11, italics in original). BPM encompasses all efforts to appraise and continually improve core activities (Trkman, 2010), helping an organisation to convert input into output (Daunorienė & Bagdonienė, 2008). The benefits associated with BPM can largely be categorised as internal, be they quantitative or qualitative; customer-oriented; and competitive advantage (see Hüffner, 2004). It has been shown to help improve service quality by sixty to ninety percent (Zairi, 1997).

Following concerns about the atheoretical nature of BPM (Karim, Somers, & Bhattacherjee, 2007; Melão & Pidd, 2000), Trkman (2010) identified 12 critical success factors. These are the areas that must demonstrate favourable change to ensure the success of BPM. These include strategic alignment; investment in information technology; performance measurement; the level of employee specialisation; organisational change; the appointment of process owners; the implementation of proposed change; the use of a continuous improvement system; the standardisation of processes; information; automation; as well as employee training and empowerment. Collectively, these factors are said to help an organisation continuously attain its goals within single projects and beyond in both the short- and long-term.

When applied to health services, BPM has demonstrated some success. It has helped to deploy new technology (Sánchez et al., 2008), reduce workloads (Hess, 2009), and improve organisational

outcomes (Helfert, 2009). This success was largely achieved by mapping and aligning processes. By connecting organisational procedures and eliminating waste, it is possible to pre-empt the effects of change throughout a health service. For instance, Snyder and colleagues (2005) used BPM to integrate an information system within a small healthcare network; this initially involved value-stream mapping to document and understand existing procedures (Damelio, 1996; Tapping & Shuker, 2003).

The balanced scorecard represents one way to implement BPM (Harmon, 2007; Hüffner, 2004; Jansen-Vullers & Netjes, 2006; Konterman, 2010). A balanced scorecard is, 'a management tool that provides senior executives with a comprehensive set of measures to assess how the organisation is progressing toward meeting its strategic goals balanced score' (R. F. Smith, 2007, p. 166). Assessment is eased through its illustrative quality – the scorecard presents a visual overview of key performance indicators to translate strategy into action (Auger & Raynault, 2006; Auger & Roy, 2004).

Ideally, the balanced scorecard incorporates four types of measures – namely, financial, customer-related, business-focused, as well as those related to innovation and learning (Harmon, 2007; R. S. Kaplan & Norton, 1992). This multifaceted approach represents a point of departure from traditional performance measures (R. Kaplan & Norton, 1996). It recognises that sole reliance on one measure, like financial indicators, can be deceiving. Because financial measures represent retrospective indicators of previous actions, such measures require support from prospective indicators of performance (Impagliazzo, Ippolito, & Zoccoli, 2009). Furthermore, a myopic approach to performance measurement risks the neglect of equally important factors, including 'skills, competencies, and motivation of employees; customer and supplier relationships; innovative product development; databases and information technologies; efficient and responsive operating processes; innovation in products and services; customer loyalty and relationships; and political, regulatory, and societal approval' (Kocakülâh & Austill, 2007, p. 73).

Notwithstanding its potential, the balanced scorecard can be difficult to implement within health services (Rabbani et al., 2007). This might be partly because of the need to garner adequate support and resources. These include a supportive organisational structure (Gumbus, Belthouse, & Lyons, 2003); performance indicators that gauge the active ingredients of care (Coop, 2006); and robust data (Pink et al., 2001).

To increase the likelihood of success, several lessons can be garnered from extant literature on the use of balanced scorecards within health services. These include the importance of: support from relevant stakeholders (Chang, Tung, Huang, & Yang, 2008); a robust foundation (Schneiderman, 1999), which includes 'processes to guarantee that the right things go on the scorecard, with properly defined metrics and rational, time-based goals' (H. Smith & Il-Woon, 2005, p. 71); identifying a small number of suitable yet diverse performance indicators that are regularly reviewed (Coop, 2006); establishing links between relevant datasets (Pink et al., 2001); and adopting a systems approach to ensure that other aspects of the organisation, both internal and external, are not neglected (Inamdar, Kaplan, & Bower, 2002). Informed by these lessons, a balanced scorecard was used to implement BPM principles in the development of an evaluation framework for the Patient Pathways program.

Patient Pathways Program

Introduced into the Royal Adelaide Hospital in Australia in 2004, the Patient Pathways program was designed to improve the patient journey by ensuring the delivery of effective, efficient, and timely services using clinical redesign methodologies (Zeitz, 2008). First, relevant hospital staff members convene to identify areas for improvement and appropriate aims. Second, processes within a given area are mapped to understand current practices and procedures, and identify areas for improvement. Third, the area is redesigned and changed accordingly, and subsequent effects are considered – as an iterative model, this stage can occur repeatedly to optimise the value of the new design. Fourth, the new design is evaluated and key lessons are communicated to others who may benefit. Fifth, the benefits associated with the new design are sustained by monitoring processes that influence patient journeys, forecasting the impact of impending organisational change, and planning accordingly.

One of the initiatives within the program is the Discharge Planning Pathway, which aims to discharge sixty percent of suitable patients before 11:00 am. The clinical redesign focussed on: recording an estimated discharge date (EDD) for all patients upon admission; recording delays in patient discharge; developing an event-led discharge process, 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; communicating discharge plans to patients, relevant

hospital staff members, and community service providers; ensuring one discharge per ward before 9:30 am; and increasing the number of weekend discharges.

Despite apparent process improvements, the Discharge Planning Pathway lacked systematic evaluation to demonstrate the associated outcomes. More specifically, its five cyclical stages did not appear to link organisational change with relevant organisational processes. Given the dynamic nature of health services (Wickramasinghe & Geisler, 2008), this represents a shortcoming that might be addressed by devising an evaluation framework premised on BPM. This is demonstrated in the following section.

METHOD

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 bona fide hospital processes; and the triangulation of these datasets to devise the framework. Each stage is described in turn.

During the first stage, the researchers and hospital staff members 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: EDD; 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 staff members, and community service providers, when appropriate. Secondary data collected for analysis included: discharge policies and procedures, process charts, minutes from relevant meetings, hospital reports, and hospital correspondence. Data were then analysed by integrating time and performance measures with qualitative research material (e.g., reports) to map discharge processes.

During the second stage, primary data were collected to understand current patient discharging practices. This involved observing the progress of patient journeys and reporting thick descriptions (Emerson, Fretz, & Shaw, 2005; Ponterotto, 2006; Sanger, 1996). Interviews were also conducted with relevant hospital staff members to explore current hospital practices. This involved a semi-structured, open-ended group 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.

By triangulating the secondary and primary datasets, the third stage involved developing and testing the evaluation framework. This involved: (1) mapping and modelling discharge processes using the event driven chain (EPC) methodology to identify process measurement points; and (2) developing a balanced scorecard to evaluate the outcomes associated with the Discharge Planning Pathway.

RESULTS

The mapping and modelling of discharge processes to develop the evaluation framework helped to identify key objectives and realistic targets to achieve timely patient discharge (see Table 1). These objectives and targets were aligned with the tasks and measures of the Discharge Planning Pathway and include recording an EDD for all patients upon admission; recording discharge delays; developing a model to facilitate event-led discharge; planning and monitoring community transition; communicating discharge plans to patients and relevant staff members; discharging sixty percent of suitable patients before 11:00 am, one of whom may be discharged before 9:30 am; and increasing the number of weekend discharges. Additionally, these objectives and targets capture change across the different domains in the evaluation framework, including staff wellbeing and patient satisfaction.

[INSERT TABLE 1]

Mapping and modelling the discharge processes helped to incorporate BPM principles (i.e., process modelling with functions, events, and measurement points) into a balanced scorecard to evaluate the Discharge Planning Pathway. These principles made the connections between the Patient Pathways program, the Discharge Planning Pathway, and performance measures explicit. This is illustrated in the following sections using two metrics – the EDD and the discharge timeframe. These two measures connect with other processes and steps in the Discharge Planning Pathway, from admission to transition to the community.

Process Mapping and Modelling

Using the EPC methodology (Keller, Nüttgens, & Scheer, 1992), patient discharge processes were mapped to reveal relationships between seemingly discrete hospital procedures and activities.

The discharge process functions and events connect the admission process, the EDD, the emptying and preparation of the hospital bed for the subsequent patient, and patient transition to the community. Collectively, these connections reveal the patient journey; the resources and information required through this journey; the staff members involved; the time that resources, information, and staff members are required through time measures; as well as the direction of information flow. Such detail allows for streamlining and process improvements to enhance planning, execution, forward planning, as well as the finite loading of resources. Additionally, time measures at each event allow for process measurements.

Process Measurements

Process measures assess process outcomes to reveal, understand, and ultimately improve process behaviour (Anderson, 1997; Robson, 2004). Comprehensive measurements are usually preferred and are collected from several key indicators. Within this study, outcome metrics associated with admission, discharge, and bed-release processes were identified. These include timely patient discharge, length of stay compared to national benchmarks sourced from the Health Roundtable (Healthroundtable, n.d.), and bed occupation. As part of the measurement regimen, variables that influence these outcomes were defined based on: (1) the discharge plan devised during patient admission; (2) an updated patient record with actual discharge times during the discharge process (i.e., patient is ready for discharge, patient is discharged, and patient is leaving the hospital); and (3) the times recorded at key events during the bed occupation and release process (i.e., patient is discharged, bed is ready for next use, and bed is released/available for allocation). For timely patient discharge, variables included estimated and actual discharge dates; for length of stay, they included admission and discharge times; and for bed-release, variables included patient discharge times and bed-release times.

As part of a balanced scorecard for the Patient Pathways program, the problems, drivers, actions, and targets associated with each element of the patient discharge processes were identified. For exemplary purposes, those related to the EDD and discharge timeframe are tabulated (see Table 2).

[INSERT TABLE 2]

Apart from process measurement using time measures as outlined, performance measures are required to improve patient discharge processes. In this case, performance measures were identified to evaluate the Patient Pathway program using a balanced scorecard. These included use of resources, process management, patient satisfaction and staff wellbeing.

Outcomes

Guided by data pertaining to patient discharge processes, a balanced scorecard was developed comprised of four key elements – namely, resources, process management, patient satisfaction, as well as staff wellbeing. The scorecard informed the evaluation framework (see Figure 1). This involved identifying strategic themes, objectives, measures, and targets for each element of the scorecard and linking these to patient discharge processes. Each element is addressed in turn.

[INSERT FIGURE 1]

Using the evaluation framework, resources required for particular initiatives can be readily identified – like the pharmacist required for dispensing discharge medications. Additionally, the resources are directly linked to processes associated with Discharge Planning Pathway and help to determine resource-use and improvement areas.

Processes can be accurately managed by examining patient records and timestamps. The inclusion of timestamps can also help to select and measure targets. Outcomes associated with process management within the balanced scorecard pertain to two key performance measures – namely, the EDD and discharge timeframe, as both are directly linked to discharge processes.

Patient participation in and satisfaction with the initiatives can be gauged by regular surveys. For example, patients identified the documentation of their EDD as integral to discharge preparation. Therefore, one of the schemes to facilitate timely discharge included increasing discharges between 9:00 am and 11:00 am, which also increased hospital capacity. The associated outcomes were positive – within a few months, patient discharge had improved from 40 to 43 percent, and 1,500 more patients had been discharged before midday, compared to 12 months prior.

This evaluation framework also encompasses staff wellbeing and productivity, which was only identified through the collection and analysis of primary data. Staff engagement and staff buy-in influenced the success of all efforts to improve discharge processes.

DISCUSSION

Although clinical redesign has gained popularity over the past ten years (NHS Improvement - The best of clinical pathway redesign, n.d.), there is limited empirical evidence of the ability of these initiatives to increase the effectiveness and/or efficiency of health services. To address the void in extant literature, this paper describes the development of a framework to evaluate one such program – the Discharge Planning Pathway. 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 links 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 am 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 program with established links between relevant datasets (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' (H. Smith & 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 healthcare 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, EPC 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 – namely, resource use, process management, patient satisfaction, as well as staff wellbeing – were connected with measures, targets, and (perhaps most importantly) the overarching aim of the initiative.

The limitation of this evaluation framework was 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 a number of initiatives within broader discharge planning pathway program. 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.

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TABLES

Table 1: Objectives, Targets and Measures of the Discharge Planning Pathway

Objectives	Targets
• Identify and record electronically an EDD for patients receiving elective surgery and communicating this to the patient at time of admission	• 100% of patients receiving elective surgery have an EDD recorded upon admission
• Identify and electronically record an EDD for emergency patients and communicating this to the patient or support person within 24 hours	• 80% of emergency patients have an EDD recorded
• Communicate discharge plans to patients, support persons, relevant hospital staff, and community service providers	• 90% of patients to be issued with a discharge letter within 48 hours of discharge
• Develop a model to facilitate 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 national benchmark
• Discharge patients between 9:00 am and 11:00 am daily	• 60% of discharges to occur before11:00 am
• Declare bed available following patient discharge via the patient management system	• 80% of beds to be available within 30 mins of patient discharge

Table 2: Example of Balanced Scorecard for Estimated Discharge Date

	Problem	Drivers	Actions	Targets
EDD	Limited planning of patient discharge	Participation of patients and support persons in discharge planning	Include EDD in the electronic patient management system	100% of patients receiving elective surgery to receive an EDD on admission
		Executive leadership	Display the estimated date on the patient bed-card	80% of emergency patients to receive an EDD within 24 hours of admission
		Clinician support	Educate hospital staff on patient discharge procedures	
Discharge Timeframe	Late patient discharge delays patient transfer from emergency department, recovery and a reduction in elective admissions	Demand for beds, which is typically from 11:00 am	Discharge patients between 9:00 am and 11:00 am	60% of discharges to occur before 11:00 am
		Awareness of patient discharge date and time among patients and support persons	Discharge one patient from each ward before 9:30 am	One patient to be discharged from each ward before 9:30 am
		Coordination of clinical decision-making and discharge processes	Inform staff and patients of discharge date and time through education and promotion of patient discharge procedures	99% of eligible patients to have an EDD displayed on bed-card

Table 3: Timely Patient Discharge Strategy

Perspectives	Strategic Themes	Strategic Objectives	Strategic Measures / Targets
Resource use	Optimisation of capacity	Immediate declaration of available bed	Bed turn
		Monitoring patient length of stay and meeting the health roundtable benchmark	80% of patients length of stay meets health roundtable benchmark
Process management	Timely discharge	Discharge occurs before 11:00 am	60% of patients discharged by 11:00 am
			1 patient per ward discharged by 9:30 am each day
		Discharge occurs across 7 days of the week	29% of discharges occur on the weekend
	All patients have an EDD	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 prior to admission
	Discharge plan	Patients have a discharge plan	75% of patients have a discharge plan documented within 24 hours
	Patients meet their EDD	Monitoring discharge dates	70% of patients meet their planned discharge date
	Communicate discharge plan in a timely manner	Patients receive appropriate information and have a discharge letter sent within 48 hrs	90% of patients have a discharge letter sent within 48 hrs
Patient satisfaction	Involved, aware, and satisfied with the patient discharge plan	Receive timely information about the discharge process	Patients are informed at least 24 hrs before the planned discharge time
Staff wellbeing and productivity	Receive clear guidelines about the discharge process	Coordinated and communicated discharge planning process	Guidelines are available to all new staff
	Manageable workloads	Align admissions (demand) with capacity through timely discharge	100% of clinical staff have access to patient-flow information through information systems

FIGURES

Resource Use			
Objectives	**Measures**	**Targets**	**Status**
Elective patients have estimated discharge date	Nº of patients with EDD	100%	68%
Emergency patients have estimated discharge date	Nº of emergency patients with EDD	80%	Unknown
Patients meet EDD	Nº of patients that meet EDD	70%	44.1%

Patient Satisfaction			
Objectives	**Measures**	**Targets**	**Status**
Patient awareness of EDD	Patient satisfaction survey	TBA	52%
Patient awareness of discharge plan	Patient satisfaction survey	TBA	55%
Patient participation in discharge planning	Patient satisfaction survey	TBA	85%

Goals
Timely patient discharge
Improved discharge communication
Participation of patients and support persons in discharge planning

Process Management			
Objectives	**Measures**	**Targets**	**Status**
Record EDD	Nº of bed-cards with an EDD	90%	Unknown
Inform patients	Nº of bed-cards with an EDD	90%	Unknown
Communicate EDD	Nº of patients who know their EDD	95%	Unknown

Staff Wellbeing and Productivity			
Objectives	**Measures**	**Targets**	**Status**
Clinician communication	TBA	TBA	Unknown
Staff awareness of relevant procedures	Nº of staff who can describe the process to record an EDD	100%	Unknown
Staff follow relevant procedures	TBA	TBA	Unknown

Figure 1: Evaluation Framework for the Estimated Discharge Date Initiative