

A Communication Tool to Improve the Patient Journey Modeling Process

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Abstract—Quality improvement is high on the agenda of Health Care Organisations (HCO) worldwide. Patient Journey Modeling is a relatively recent innovation in healthcare quality improvement that models the patient’s movement through the HCO by viewing it from a patient centric perspective. Critical to the success of the redesigning care process is the involvement of all stakeholders and their commitment to actively participate in the process. Tools which promote this type of communication are a critical enabler that can significantly affect the overall process redesign outcomes. Such a tool must also be able to incorporate additional factors such as relevant policies and procedures, staff roles, system usage and measurements such as process time and cost. This paper presents a graphically based communication tool that can be used as part of the patient journey modeling process to promote stakeholder involvement, commitment and ownership as well highlighting the relationship of other relevant variables that contribute to the patient’s journey. Examples of how the tool has been used and the framework employed are demonstrated via a midwife-led primary care case study. A key contribution of this research is the provision of a graphical communication framework that is simple to use, is easily understood by a diverse range of stakeholders and enables ready recognition of patient journey issues. Results include strong stakeholder buy-in and significant enhancement to the overall design of the future patient journey. Initial results indicate that the use of such a communication tool can improve the patient journey modeling process and the overall quality improvement outcomes.

I. INTRODUCTION

“There is much interest in problems concerning how to deliver health care safely, efficiently and effectively” [24]. This is demonstrated by the number of countries that have nominated healthcare improvement as a priority issue and the allocation of substantial federal budgets for quality improvement initiatives in countries such as Australia [1], the United Kingdom [14], Canada [7] and the United States [11].

Health care redesign and in particular patient journey redesign involves analysing the overall processes involved

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with the movement of a patient through a healthcare system, typically a hospital, and then analysing how this journey can be improved via the removal of wasted and excessive activities, process duplication and improved communications between the patient, their carers and the clinicians involved with the journey itself [9, 19, 20].

However modeling the patient’s flow through a Healthcare system cannot be done in a vacuum. Several contributing dimensions must also be considered and incorporated into the final workflow. This paper will consider how the application of a ‘multi-layered patient flow’ communication tool can be used to improve the patient journey modeling process and the overall quality improvement outcomes.

The tool encourages group communication, is quickly developed and easy to understand, promotes ownership of problems and their solutions and allows for simple identification of required action plans. All critical factors in bringing healthcare quality improvements to fruition.

The proposed tool draws on techniques from several disciplines including operational research, computer science, business and management and healthcare quality improvement.

The paper is structured as follows: i) A brief review of the contributing cross-discipline techniques and their deficiencies in relation to patient journey modeling; ii) A description of the ‘multi-layered patient flow’ communication tool; iii) A demonstration of the communication tool via a midwife-led primary care case study; and iv) Discussion of the case study results and planned future work.

II. BACKGROUND

Seila [24] suggests that developing health care models requires health system managers and care givers to collaborate with modelers. However he points out that this can be difficult due to the different cultures and values held by both groups. This necessitates a cross-discipline approach as employed by the ‘multi-layered patient flow’ communication tool which brings together several complimentary techniques including Joint Application Development (JAD), Process reengineering and Workflow modeling. A brief description of each follows.

A. Joint Application Development

Joint Application Development (JAD) was a process originally developed for designing computer-based business systems in the early 1980's [29]. As JAD has evolved to be used in a wider variety of situations, not just systems development, it has now been described as “*a joint venture among people who need to make decisions affecting multiple areas of an organization*” [29]. The key enabler to the success of this technique is the use of a facilitator whose role it is to guide the process and structure of the sessions whilst encouraging the participants to share their knowledge and expertise to arrive at a problem solution design. The aims of such facilitated workgroups are to achieve a shared understanding of the issues facing the group, a sense of common purpose and a mutual commitment to action [23]. The aims of JAD are very relevant to healthcare quality improvement initiatives, however JAD as a practice does not provide any specific diagrammatic techniques to aid in the overall redesign of the patient's journey.

B. Process reengineering

Process reengineering techniques have been used extensively in the business, manufacturing and computing domains [10, 12, 28] for many years but it is only in the recent past that process improvements in healthcare have been achieved through the use of similar reengineering approaches.

Several terms are used in the literature to refer to the concept of process reengineering in healthcare including: patient journey modeling, patient flow redesign, clinical practice/pathway improvement and redesigning healthcare [18, 22, 25, 27]. This paper will use the terms patient journey modeling and patient flow.

The process of patient journey modeling has at its centre the needs and wants of the patient in relation to their progress through a healthcare system for a given service [19, 20]. This is typically in the context of a hospital but applies equally to general practice medicine and specialist services. Each time a patient interacts with a healthcare worker (including administration staff, management and clinicians) or is moved around the hospital it is tracked and described. The goal is to collect required information only once, reduce the number of times a patient is moved, eliminate excessive activities, remove duplicate communications and provide clear and concise information to the patient. Typically the current patient journey is initially modeled, and quality and process improvements are determined. The redesigned future patient journey is then modeled and an implementation plan derived.

Common patient journey modeling techniques used in healthcare include the Institute of Healthcare Improvement's Breakthrough Series Model for Improvement (MOI) and Lean Thinking's Value Stream Modeling [4, 16, 28].

i) Breakthrough Series Model for Improvement

The Institute of Healthcare Improvement (IHI) founded in the U.S. in 1991 is a not-for-profit organization driving the improvement of health by advancing the quality and value of

health care. IHI developed the Breakthrough Series to help health care organizations make “breakthrough” improvements in quality while reducing costs. The primary enabler of the Breakthrough Series is the Model for Improvement (MOI) involving iterative Plan, Do, Study, Act cycles. Although this method promotes collaborative process improvement sessions through the use of cross-discipline teams it does not specify a graphical tool that can be used to promote communications across the disciplines during the patient journey modeling sessions.

ii) Lean Thinking

The UK's National Health Service (NHS) modernisation programme is recognized as a leader in healthcare quality improvement and has conducted major process reengineering projects over several years [21]. One of the primary reengineering methods employed in these projects is the Lean Thinking approach. Originating in Japan to improve car manufacturing processes, Lean Thinking's value stream mapping technique has been used to model healthcare processes in several countries with varying degrees of success [5, 6, 13]. This technique graphically depicts the movement of an object, in this case a patient, through a selected workflow and highlights duplication and wastage. However this technique takes time to understand and lacks the ability to include/overlay relevant policies/guidelines, staff roles and IS system usage as an integral part of the patient's journey through the Health Care Organisation (HCO).

C. Workflow modeling

Workflow is concerned with the automation of procedures where documents, information or tasks are passed between participants according to a defined set of rules to achieve, or contribute to, an overall business goal [15]. This includes the analysis and subsequent definition and redesign of the processes involved. Acknowledging the relationship and support provided by technology, or the lack thereof, is important to the overall quality improvement effort.

Several aspects of the workflow model support the redesign of patient journeys however this technique still lacks the ability to define patient journey metrics or relate relevant policies and guidelines to the processes involved in the workflow. Due to its focus on automation the application of this technique in its raw state may also divert attention away from the main focal point, patient flow.

III. MULTI-LAYERED PATIENT FLOW

The research described uses a constructive research process [17] enriched by aspects of a participatory action research environment [3].

The ‘multi-layered patient flow’ communication tool is used in a facilitated meeting environment involving all of the stakeholders affected by the patient journey under review. Participants may include management, IT support staff, healthcare workers and patients. The sessions are run by an experienced facilitator whose role it is to use the tool as a communication medium to encourage discussion and

involvement amongst the participants and translate what is said into a resulting diagrammatic.

The communication tool has at its center the visual representation of the processes involved with the patient's journey overlaid with the different aspects contributing to that journey including staff roles, information creation/movement, policies/legislation/strategic objectives and metrics including time and cost. The approach allows layers to be swapped in and out of the conversation depending on the context being discussed at the time. For example if the group is discussing staff roles as they relate to work processes then only these 2 layers of the tool need to be displayed. If the group then wishes to bring in details about the information that is created or moved as part of these processes then this layer can be added. This allows the diagram to be built up gradually over time as more and more of the information is uncovered and understood. Table 1 names the communication tool's layers and provides a brief description of each layer's contents.

Table 1. Communication tool layer names and content description

Layer Name	Content Description
Patient Movement	Shows when, where and how many times a patient attends the service or is moved as part of their journey.
Staff Roles	Shows what role a staff member plays and when and how that role is involved in the patient journey.
Processes	Names and relates the processes involved in the patient journey.
Information Creation/Movement	Shows the creation and flow of paperwork and information to systems that is required by the processes.
Policies/legislation/strategic objectives	Names the policies/legislation/ strategic objectives that must be adhered to during the enactment of the processes.
Metrics	Details the measurements that are be used to determine the effectiveness of the patient journey. Should include time as a minimum.

To aid in easy identification of the layers, each layer uses colour and standard workflow shapes as additional cues. The diagrams described and shown in this paper were created using Microsoft Visio. The names used to describe the workflow shapes are as per that software.

Patients are shown using a red person figure. Staff roles use a black person figure for front-line healthcare providers and a grey person for administration staff. Processes are depicted with blue oblongs with decisions shown as yellow 'decision' diamonds. When a decision causes a process to complete, this is shown by a white 'terminator' symbol. Information is represented by green 'documents' for paper and white 'manual input' symbols for computer input. A 'manual operation' symbol is used to show details stored on

a whiteboard etc... Also shown in the 'Information creation/movement layer are notes relating to the information capture. These are shown as grey oblongs. Policies/legislation/strategic objectives that affect the enactment of the patient journey are shown as pink 'document' shapes. Metrics are depicted in white oblongs with totals shown in red.

IV. MIDWIFE-LED PRIMARY CARE CASE STUDY

The use of the communication tool is now demonstrated through a patient journey within the Ryde Hospital's Maternity department. Ryde provides midwife-led primary care maternity services for identified low-risk women through the public healthcare system. A woman may be allocated to a dedicated midwife (caseload) or the regular shift-working midwives (core) depending on midwife availability and the woman's expected delivery date. High-risk or emergency cases are transferred to the nearest tertiary hospital where regular gynecological/obstetric care is available. The Ryde Midwifery Group Practice (RMGP) model [26] of care was proposed in 2004 in line with the National Midwifery Guidelines for Consultation and Referral (2004) [2].

The case study contained in this paper outlines only the first stage of the current patient journey model and depicts the woman's interaction with the RMGP model, up to the commencement of the Booking Interview [8]. (The complete patient journey model also includes the processes involved in the booking interview and assessment of the woman's suitability to be cared for at Ryde.) The general workflow for determining if a woman is a candidate for the RMGP model is currently manual.

Figure 1 shows an example of the resulting communication tool diagrammatic in action. It details the patient journey from the point of first contact by the woman up to the finalization of the call, by the midwife to the woman, to make the booking interview appointment time. The diagram shows all six layers of the tool and should be read top-down from left to right. The following reading of the diagram clearly depicts where wastage, duplication and time delays are occurring and sets the scene for clear plans of action to be put in place. A numbered asterisk on the affected section of the diagram highlights each point below.

- 1) *The clerical booking procedure requires the woman to complete 3 separate forms. Several sections are duplicated across these forms and some sections are simply crossed out. The woman is required to sign 8 times. Wording used on these forms is generic to the Hospital admission system and is not suitable for the primary care model used at Ryde.*
- 2) *The woman's details relating to her allocation to the Caseload or Core midwife team are recorded in 4 different places. A bookings folder by date, the midwife's individual diary, a bookings diary/allocation folder by midwife and a whiteboard holding the total number of women currently allocated per midwife per month.*

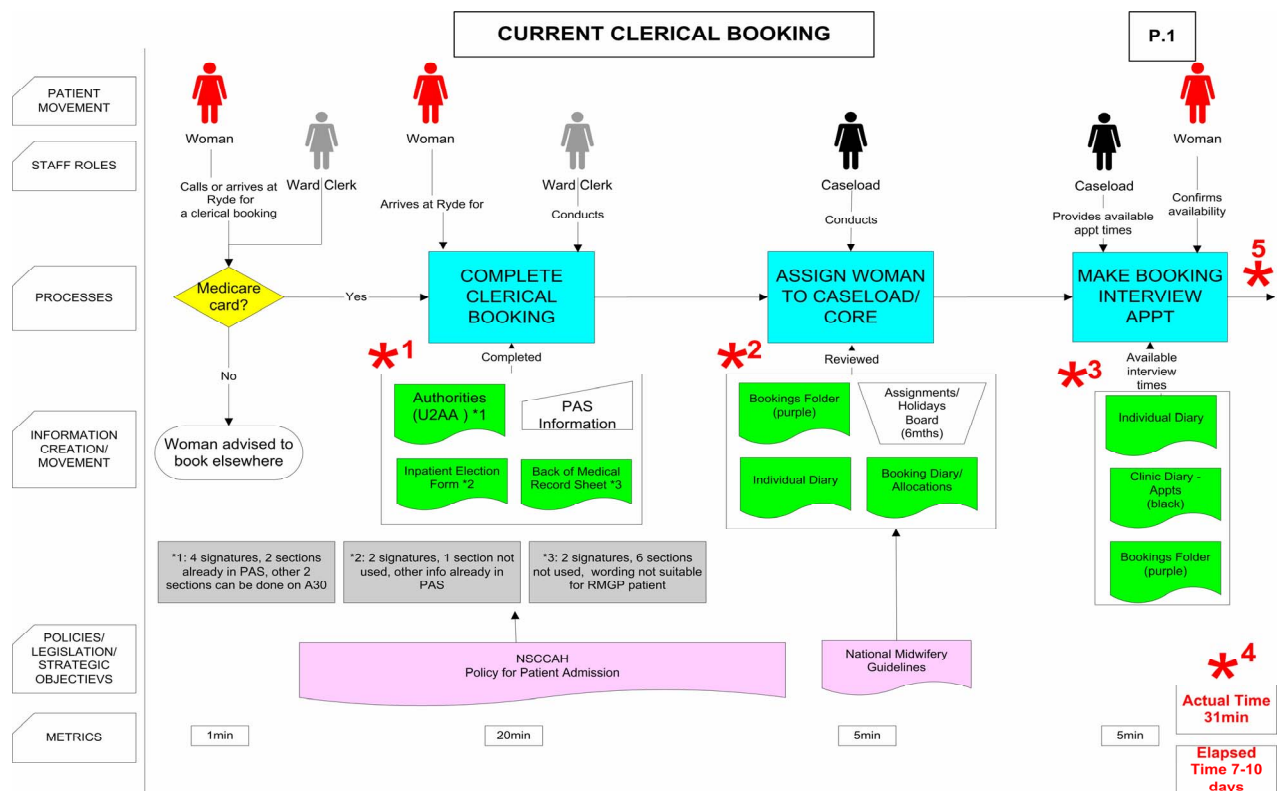


Figure 1. Proposed Communication Tool Diagrammatic in action

- 3) *The booking interview appointment time is recorded in 3 separate places: The midwife's individual diary, the clinic appointment diary and the bookings folder.*
- 4) *The actual time taken to complete each of the processes in this part of the patient journey is 31 minutes. However depending on when the woman comes into Ryde for her clerical booking it may be up to 10 days before her Booking Interview appointment time is confirmed.*
- 5) *Although is it not readily seen on this page of the patient flow model, if during the subsequent Booking Interview the woman is assessed as a high risk case then she will be advised to book at the nearest Tertiary hospital and all of the work undertaken to date will be redundant.*

V. RESULTS

The sessions conducted using the proposed 'multi-layered patient flow' communication tool were quite casual and very interactive. There were 4 sessions conducted over a 4-week period, each no more than 2 hours in length. Stakeholders involved included the Nurse Unit Manager (NUM), caseload and core midwives, the Ward Clerk and the Nurse Unit Educator (NUE). After an initial hesitation about the meaning of the shapes, the group quickly grasped what they were being asked to do and readily participated.

There were some disagreements about what the current procedure actually was but the clarification of these issues led to increased understanding of who did what, where each person played their part and how this affected the patient. By the second session the group actively corrected the

facilitator if they drew the wrong shape or called it the wrong name. The group thought they had the current procedure 'nailed' on two occasions before the current patient journey was finally agreed. This was a direct result of being able to 'see' the complete patient journey from beginning-to-end, something not previously possible. This led to the group correcting errors they had made in previous sessions.

Once the current patient journey was agreed, the stakeholders immediately began to ask what could be done to fix the problems they had uncovered, demonstrating ownership of the problems and their solutions. As a direct result of this work Ryde has now implemented a new clerical booking form and has refined the number of times and in what places information is captured and stored. Most importantly a new Assessment Questionnaire is being developed that will allow a woman's suitability to be cared for at Ryde to be assessed 'prior' to her attending a booking interview. The midwives have set their own metric on the accuracy of the assessments to be made using the new assessment questionnaire at 90%. The future patient journey, incorporating all of the quality improvements, has also been modeled using the same communication tool.

The case study outcomes suggest that the proposed communication tool addresses the inefficiencies of the previously discussed methods by: i) providing a simple to use graphical framework that encourages cross-discipline communication; ii) focusing on the flow of the patient whilst still acknowledging additional contributing dimensions such as clinical policy governance; iii) allowing the dimensions to

be discussed in isolation or as groups via layering and iv) encouraging problem recognition and solution ownership by affected stakeholders.

VI. CONCLUSION AND FUTURE WORK

This paper proposes a 'multi-layered patient flow' communication tool aimed at enhancing overall quality improvement outcomes. The tool uses a cross-discipline approach that caters for the complexities involved in healthcare redesign and the diversity of the stakeholders involved. It also overcomes some of the key deficiencies the current redesigning care methods, being employed in healthcare, exhibit. It has been used successfully to improve a midwife-led primary care service offered by a public hospital. Use of the tool as part of the case study confirmed that the tool encourages group communication, is quickly developed and easy to understand, promotes ownership of problems and their solutions and allows for simple identification of required action plans.

The authors are planning to further test the communication tool in other settings including the modeling of a maternity care service for indigenous women in a non-hospital environment.

This research forms part of a broader research effort to develop a meta-methodology for the design and modeling of patient journeys. Further testing and research as part of the larger project may lead to additional refinements, including the definition of new layers, being incorporated into the communication tool in the future.

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