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Case report

Mapping the process of emergency care at a teaching hospital in Ghana

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ABSTRACT

Emergency Department (ED) overcrowding has become a global concern as the number of countries with formalized emergency care systems has expanded, and the burden of trauma and non-communicable diseases in low and middle-income countries increased. In light of this, the international Emergency Medicine literature has outlined the need for operational projects in low and middle income countries which focus on the process of care. Despite this, there is limited published literature describing these types of projects. We share our experience mapping emergency care processes at a teaching hospital in Ghana as a case study of Lean's application in a relatively resource limited setting. From this work, we conclude that process mapping, a critical first step in further process re-design, is a cost effective, low tech activity which can be feasibly used in low resource environments to initiate quality improvement.

1. Background

1.1. Overcrowding

Emergency Department (ED) overcrowding has become a global concern as the number of countries with formalized emergency care systems has expanded, and the burden of trauma and non-communicable diseases in low and middle-income countries increased.[1–4] Overcrowding, defined as a situation in which the identified need for emergency services outstrips available resources in the ED,[5] has a critical impact on both the safety and the overall quality of care. This phenomenon has been cited as a crisis by several governmental organizations,[6,7] and has been shown to lead to delays in diagnosis and treatment, decreased patient satisfaction, and poor patient outcomes.[6,8]

In light of these challenges, the international Emergency Medicine literature has outlined the need for operational projects in low and middle income countries which focus on the process of care.[9,10] Despite this, there is limited published literature describing these types of projects. We share our experience mapping emergency care processes at a teaching hospital in Ghana as a case study of Lean's application in a relatively resource limited setting.

1.2. Process mapping

Lean, a quality improvement strategy established by Toyota in the 1970s,[11] has been increasingly applied to healthcare in the last two decades.[12] More recently, it has been used for process re-design in emergency care in order to identify and address operational inefficiencies that contribute to issues such as ED overcrowding.[13–18]

Lean analytical methods are designed to create a deep understanding of the current realities of complex processes (rather than intended function),[14,19] and rely strongly on the engagement of front line workers to that end.[12] The first step of this method is creating a process map,[14] in this case depicting the patient's journey, which engages staff in defining all of their roles and responsibilities through the patients care pathway.[20]

Process mapping is a low cost intervention that takes little training to facilitate. The information from these sessions has been shown to lead to important process redesign, as well as result in greater resource efficiency and higher quality of care.[14,20–22] The majority of the literature exploring the application of lean methodology has been in developed countries.[23,24] Indeed, only one article to date describes the application of process mapping in Emergency Care in a resource constrained setting.[25] Thus, despite the wide adoption of Lean in North American Healthcare, this strategy has not yet been broadly

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Table 1
Ad-Hoc focus group script.

What areas of the process do you each see as potential sources of delay, or poor care?
What do your colleagues seem frustrated about?
What are you frustrated about?
What are areas you or your colleagues have tried to change in the past?
Are there areas that are perceived as poor secondary to resource constraints (but could perhaps have a process based solution that could improve them)?

adopted in resource-limited settings where resource efficiency is of critical importance.

2. Organizational context

Korle Bu Teaching Hospital (KBTH) in Accra, Ghana was founded in 1923 and is a 2000 bed tertiary care academic facility that serves as the leading national referral center in Ghana.[26] Despite its size, the demand for services at KBTH routinely outstrips available resources. As a result of this mismatch, overcrowding in its emergency care facilities is a significant issue despite relatively low annual and daily patient volumes.

3. Problem

In its 54-bed adolescent and adult non-trauma emergency unit (SME), annual patient volumes were 8164 in 2013 and 7960 in 2014, with associated average lengths of stay of approximately 2.5 and 2.2 days. Critically ill patients routinely waited at triage for bed placement or left without being seen due to non-availability of beds. The SME leadership and staff recognized process inefficiency as a major barrier to effective, accessible, and acceptable emergency care delivery.

4. Solution

To address this issue, the KBTH SME leadership partnered with a US resident with a background in healthcare consulting (ELA) to design and facilitate a series of multidisciplinary process mapping sessions over several days. The aim was to create schematic representations of the movement of patients throughout the care pathway, with the objective of identifying both the high and low value steps in care delivery which could ultimately lead to process re-design.

In addition to improving the care being delivered at KBTH, the project hoped to provide further insight into the broader application of Lean methodology in other resource limited settings for further quality improvement.

4.1. Project implementation

The project team, led by the KBTH SME clinical coordinator (SS) in partnership with ELA, spent the first week of the project meeting with SME leadership to discuss the goals, methods, and potential outcomes from a process mapping exercise. Following this, ELA spent the next weeks shadowing key processes with frontline staff in the SME. These informal observational sessions centered on spending shifts with key stakeholders in specific role groups (such as nursing, medical officers, accounts staff, healthcare associates and supervisors on duty). Ad hoc interviews and focus groups conducted during this time allowed staff a space to identify constraints and opportunities for improvement in their practice environment. ELA used a template script to prompt these discussions (see Table 1).

Following this, three key role groups were identified for process mapping: Nursing, Accounts and Medical Officers (resident physicians). Representatives from each role group were invited to attend the process mapping sessions. Each role group mapping team consisted of 4–8 participants. The teams were convened separately and spent 1–2 h participating in a facilitated group process mapping session. These sessions, which were conducted using post-it notes on the wall as the medium, resulted in mapped process flow diagrams depicting the current state. The facilitator script only included prompts related to the mapping the current process for SME patient flow from arrival to discharge. Despite this, each of the three groups used some portion of the time to analyze, rather than transcribe, the current process. In doing so, they identified several areas of waste and redundancy along with ideas for improvement. A running list of their improvement ideas was also generated during these sessions.

Once each process session was complete, the map was photographed and subsequently transcribed using Lucidchart Software. After the process maps had been digitalized, ELA met with each member of the three process mapping teams individually to debrief the session and review the map. This resulted in further revisions to the process map, and ultimately this iterative process resulted in three finalized process maps.

4.2. Project output

Three process maps were created to reflect the current process in each department (see Appendix 1–3). In addition to the process maps, the staff identified several areas to avoid unnecessary delays and improve care. Among these were improvement ideas related to both the structure and process of care. Examples of the structural improvements identified by the group included signage to help mitigate the frequent work interruptions and delays caused by lost families seeking directions, and a code cart to avoid time spent searching for needed

Table 2
Improvement ideas resulting from process mapping sessions.

Issue	Solution
Patient's families often get lost on their way to the cashier resulting in a delay	Create a mechanism, such as signs on the wall or floor to help direct them
Patients are often not seen in order of acuity	Create racks of charts based on their triage color
Difficult for Medical Officers to know when a consult has seen a patient	Create 'flags' in the charts that consults, or nursing staff, could raise once a consult has left a note to help the medical officers know when this has been done
Significant time is spent looking for supplies	Group supplies (such as those needed for a medical code) for all procedures
Triage often operates in isolation	Involve house officers in the triage process and have hourly check ins between triage and one of the nurses in main clinical area
Significant delays related to wait for specialist consults	Discuss scheduling with consult services to determine opportunities for improvement (such as ensuring consult resident is in clinic and not the OR)
Nursing on the male and female ED wards are often not informed of patients' care plans	Move towards a 'group rounding' structure with nursing participating in doctors' rounds
Nursing on the male and female wards delay transfers to inpatient wards when patients cannot settle their ED bills immediately since they mistrust that the patient will subsequently return to pay	Training for all staff nurses on inpatient wards around the process for discharge of patients with outstanding ED bills