Lean Thinking and UK Healthcare Industry

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Patients arrive at a hospital through planned and unplanned cases and patients needing surgery. In the operation theatre (OT), staff members prepare for surgery. After surgery, patients are sent to the ward for recovery, where they spend hours or days. This is due to the inefficiency in the logistic system which has delays or long waiting times for new patients. The waiting time of the patients indicates a true logistical behavior – similar to the manufacturing industry, where raw materials are processed to produce the finished goods and then finished goods are dispatched to market. A century ago, Frederick W. Taylor focused on inefficiencies of this kind in manufacturing industries (Mango and Shapiro, 2001). In line with industrial philosophy, lean thinking can improve the efficiency of the healthcare system (Young et al., 2004).

The Toyota Production System (TPS) or lean thinking was introduced by the Vice President of Toyota Corporation, Taiichi Ohno (Management Today, 2006). In manufacturing organizations, lean thinking has worked effectively (Mango and Shapiro, 2001). This can provide better flow of patients and resources in a hospital, where errors can be examined immediately and actions taken to avoid repetition (Young et al., 2004). Value stream mapping (VSM) can also provide the processing steps in a hospital environment. Based on this information, the non-value steps can be eliminated and kaizen events can be conducted to improve the efficiency of the system (Management Today, 2006).

In the UK, the National Health Services (NHS) has started lean thinking to reduce waiting time from Accident and Emergency (A & E) (Management Today, 2006). In most UK hospitals, the movement of patients from one department to another is complex and consists of long distances. These inefficiencies confer the difficulties in scheduling and decrease the utilization of the resources (Walley, 2003; Proudlove et al, 2003; Proudlove and Boaden, 2005). It has been observed that 95% of UK hospitals operations are non-value adding activities (Jones and Mitchell, 2006).

"A long trolley wait today is a newspaper headline tomorrow– particularly in London and the South East" (Alberti, 2003). Furthermore, it is reported that emergency patients are now spending less than 4 hours from arrival to discharge. But still major changes are required outside A & E, because A & E overcrowding is a signal of healthcare system stoppage on numerous steps (DOH, 2005; Trzeciak and Rivers, 2003).
Generally, ambulance diversion transpires when there is no empty bed in an intensive care unit (ICU) or disruption between emergency and scheduled cases. The latter means, there is no smooth flow in the OT (Litvak et al, 2001). Increasing the number of beds or opening new units is not the solution to reducing the overcrowding of patients, as many hospitals have done (Altinal and Ulas, 1996). But still, there is the same situation—overcrowding of patients and, eventually, hospitals lose money (Mango and Shapiro, 2001). Therefore, the solution is to improve the efficiency in A & E and its connected units by (1) identifying the value and non-value tasks, which cause higher cycle times, and (2) improving operational settings — In USA, one hospital has been improved its operational settings and improvement enabled them to admit 400 additional patients (Flanagan and Kjesbo, 2004).

From the observation of a busy hospital, the most important factor causing A & E diversion is the daily variability in operation room (OR) elective surgical case load (Litvak et al., 2001). Normally scheduled cases are disrupted by emergency cases. This problem can be minimized if there is some percentage of emergency surgery forecast in routine scheduled surgery (IHI, 2003).

Lean Approach to Integrated Healthcare System

The given target for A & E is 4 hours for NHS trusts between arrival, transfers, and discharge. Therefore, the parameters for non-value added tasks which cause a higher processing/cycle time, setup time, and longer lead time of the patient journey must be identified. Figure 1 indicates the

journey of the patient throughout the system. The patient enters in A & E then goes to an observation bed, where the treatment of the patient is determined. Then from A & E, the patient either transfers to another department, i.e. medical, surgical, or moves to orthopaedic ward, or is discharged from A & E. when these wards are full, it means A & E is in dangerous situation (Ramakrishnan, 2005). The gridlock of patient flow can bring delays in transfer and of course diversion of emergency patients takes place and surgery cancellation is also a possibility (Clark, 2005).

Patients who are medically ready to discharge not only affect the care and satisfaction of other patients but delays are a key source which increase the bed occupancy. In general, these problems occur when there is delay in discharging patients. These patients tend to increase the bed occupancy in medical/surgical/orthopaedic wards. When these wards are full, new admitted patients are sent to ICU or other units of hospital. As a result, A & E becomes full and existing patients can not be transferred out to ICU or to medical/surgical/orthopaedic floors. Finally, new patients can not be admitted to the hospital through A & E and A & E is forced to divert patients (Clark, 2005). In fact, these kinds of conditions are sign of a sick hospital (Lvatts et al., 2002).

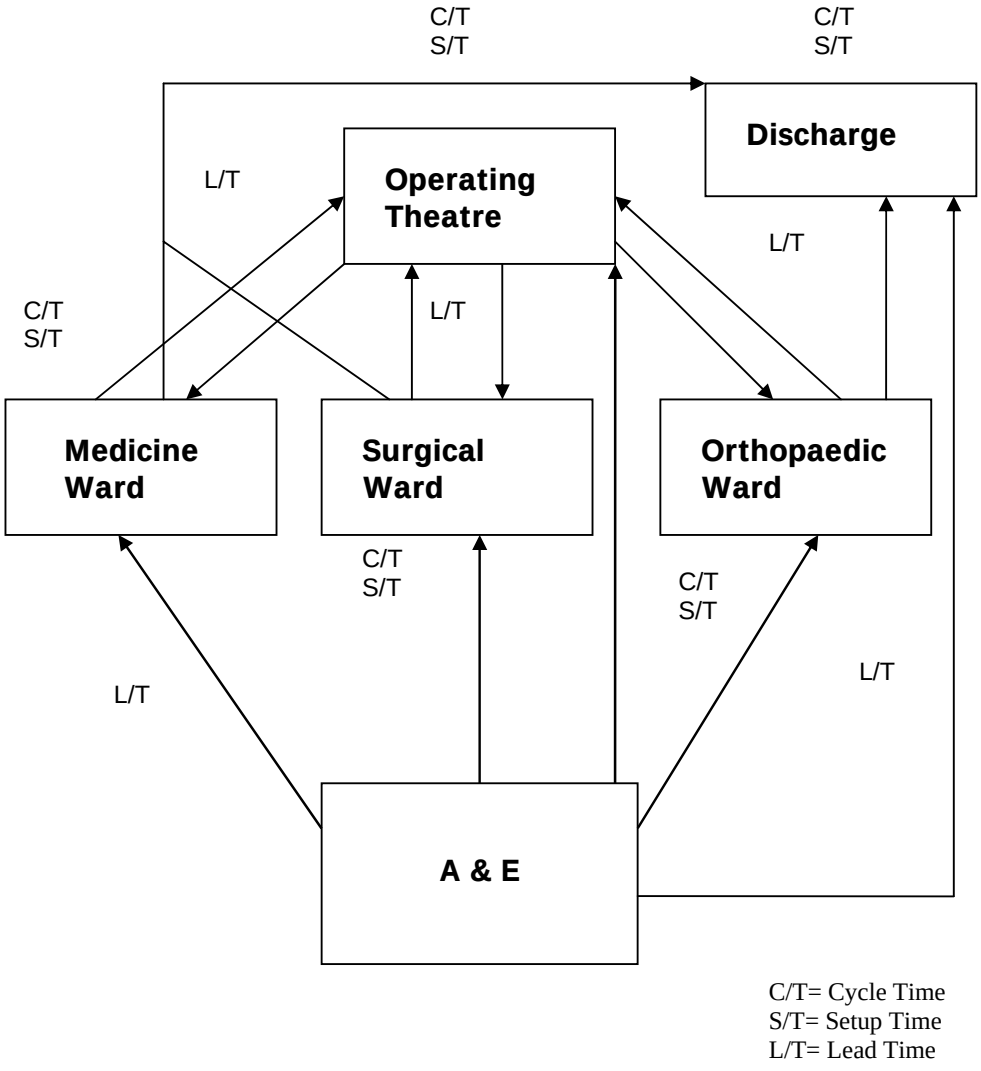

Figure 1: The complex system of a hospital

As emergency patients are directly moved to the OT, there might be planned cases already in the surgical ward which causes a disruption between emergency and planned cases. Therefore, the lack of beds or the diversion of an ambulance occurs. To minimize disruptions, improving the flow of operation or saving time is an important factor.

The operative process includes the entire turnover process in the OT. OT turnover time is the difference between closure time of one operation and the incision time of the succeeding operation (Maleki and Kram, 2003). The turnover process includes three sequential phases: (1) finishing the first cases, (2) readying the room, and (3) preparing the next patient. There are various steps in each phase that must be performed chronologically to ensure a sterile environment. Readying the OT consists of cleaning and setting up the OT for next patient. Setup means, collecting all equipments and placing it in the proper place, as in the 5S lean technique (Maleki and Kram, 2003; Westwood et al., 2007). 5S and kanban techniques can reduce cycle time or setup time and in the end the overall lead time of the patient journey can be abridged into the system. A triangular cycle of 5S, scheduling and kanban is shown in Figure 2, which can dramatically shorten the delay from OT operations or smooth the flow in the OT.

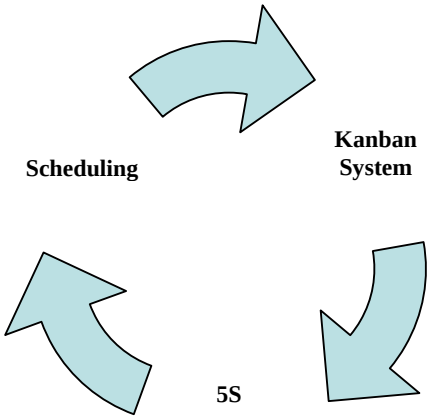

Figure 2: Lean Approach to OT

This is the right time to think like Toyota and implement the lean thinking at every single unit of NHS trusts. Lean philosophy mainly consists of Kanban, 5S, and scheduling techniques. In TPS, proper scheduling yields continue consumption of each part and here kanban system and 5S philosophy support the scheduling to produce the finished goods at right time. Kanban is also known as the sub-system of the Toyota (Gross and Mcinnis, 2003). When demand fluctuates then kanban acts as in just in time (JIT) basis, to produce the necessary items at necessary time and at necessary quantities (Monden, 1993). The kanban can inform the staff where patients came from and how many patients are in waiting and the bed status as well (Ben-Tovim, 2003). The healthcare Industry is a very large, complex, and inefficient industry. The major challenge is to implement the value adding activity across the A & E and resolve the operational issues to improve patient flow (Mango and Shapiro, 2001).

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Biography

Fawad Ahmed Rajput is a new researcher. He graduated in Industrial Engineering from Karachi, Pakistan. He worked in the automotive industry using lean thinking. He also has Master's degree by research in IE from the University Science Malaysia (USM), Malaysia. Currently, he is focused on research using lean thinking in healthcare settings. Fawad can be reached at fawadiss@yahoo.com.