Application of the TOC Thinking Process to an Emergency Department

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Abstract

The emergency department (ED) acts as a feeder to many hospitals as it determines a large proportion of admissions. The ED also acts as a buffer for many patients who cannot get care in other institutions due to insurance issues. EDs require a large investment, but frequently do not meet patients’ expectations for cost and quality of care. There is great need for EDs to improve their processes given the rising cost of healthcare.

Using the theory of constraints (TOC) thinking process application tools, this study identified problems at an ED in the Southeast United States and proposed specific changes. The research was able to identify core problems and root causes with TOC logic diagrams and involving ED staff using a modified Delphi method.

Keywords - Operations Management, Quality Management Systems, Quality Case Studies
Introduction

Emergency departments (EDs) in the United States are an essential part of the public health system because they provide urgent care to patients that do not have access to other medical services. The Emergency Medical Treatment and Active Labor Act (EMTALA) of 1986 assured that ED patients cannot be refused treatment, regardless of their ability to pay (Bitterman, 2002). Hence, EDs provide care to everyone in the United States. However, EDs often experience overcrowding, long wait times, and ambulance refusal, which creates prolonged pain for waiting patients and may produce poor patient outcomes. Additionally, EDs are frequently unable to respond to large community emergencies or natural disasters (Kent & Lous, 2005). This makes the ED a challenging place to work. The ED is a critical function as it is frequently the point of entry for hospitals and may place patients at risk if not run properly.

The quality of healthcare, especially in the United States, is rapidly becoming a source of contention. Patients perceive they are not able access high quality/affordable healthcare. Patients are demanding healthcare at a reasonable cost with improved customer service (Taylor III & Nayak, 2012). With increased patient volume, there is pressure to perform such that many EDs now have billboards advertising their low patient wait times. EDs are intended to process patients rapidly, from diagnosis to treatment to release, rather than hospitalization. However, unavailability of resources often prevent the timely care of patients. Similar to military medicine, emergency medicine has minimal control over the rate at which patients can be served due to uncertainties (Fitzgerald, Jelinek, Scott, & Gerdtz, 2010).

This study used the Theory of Constraints (TOC) to identify core problems and develop solutions for an ED. According to TOC, every system has a constraint, which limits its capacity to provide services or increase throughput. The flow of unbalanced systems have troughs of idleness or peaks of activity that exceed capacity. For example, traffic that exceeds the designed capacity of the road leads to gridlock (Richardson & Mountain, 2009). TOC offers a way to solve ED problems as it provides a framework for staff to deliver timely, high quality care, and reap a financial gain. It is a theory that fits the problem—a constrained healthcare system (Knight, 2011).

In an attempt to improve the ED patient flow, it is essential to focus on the constraint, which can be explained with the analogy of a chain. If a chain is pulled from both ends, it will break at the weakest point, which is the constraint. Unless the weakest link is optimized or strengthened, the overall effectiveness of the chain will not change. In TOC, the strength of the chain is measured by throughput. Thus, if the chain is managed properly in an ED, there will be an increased capacity to treat patients effectively.

The research sought to answer the following questions:

1. Can the undesirable effects (UDEs) in an ED be captured in sufficient detail using TOC to identify the root causes of the core problem?
2. Can TOC be applied to an ED to address the core problem, increase patient throughput, and improve effectiveness?
Review of Literature

Literature shows that TOC has worked within the healthcare system. TOC helped reduce wait time by 23% at a hospital in the United Kingdom and Holland (Stratton & Knight, 2010). Conforti (2007) applied TOC in an Italian hospital to resolve radiotherapy scheduling problems. A medical clinic in West Virginia used the five focusing steps of TOC to eliminate unnecessary procedures (Creasy & Ramey, 2013). Owens (2010) showed that a hospital in Toronto could use the TOC buffer system to reduce cost and increase the flow of patients within the system. A West Texas hospital ED used TOC thinking processes to determine why the institution was losing revenue and concluded that the core problem was triage services (Taylor III & Nayak, 2012). Thus, there is evidence to support the claim that TOC can improve healthcare systems.

What is TOC?

Also known as constraints management, TOC is a philosophy that was developed by Israeli physicist Eliyahu Goldratt in the 1970s. Goldratt first studied manufacturing companies and theorized they were making mistakes in their operations logic. He developed a software called Optimized Manufacturing Technology (OPT), which did not receive much attention due to licensing issues (Gulsun, Ozgurler, Kurtcan, & Guresen, 2009). Goldratt then attempted to explain OPT, later called TOC, in the Goal (Goldratt, 2004). The book was unusual in that it presented TOC using a fictionalized life story drama in a production setting (Rahman, 2002).

TOC emphasizes the importance of identifying system constraints or bottlenecks, which can leveraged for maximum effect. The theory states that every system has at least one constraint that controls the rate of throughput. Hence, a system can only perform well as well as the bottleneck (Sadat, 2009). Goldratt developed five focusing steps to improve system performance:

1. Identify the constraint—a system cannot function at full potential unless constraints within the system are identified.
2. Exploit the constraint—a system should make the best potential use of the constraint.
3. Subordinate the non-constraint—elements or factors with more capacity than the constraints are non-constraints. They must subordinate their activity with regard to the constraint. Decisions affecting constraints should be a priority.
4. Elevate the constraint—further improve the system by increasing the capacity of the constraint to increase throughput.
5. Return to step 1.—after making changes to the constraint, a new constraint may emerge. Hence, it is necessary to go back to step 1. Do not let inertia become the constant (Goldratt, 2004).

The Thinking Process

Several TOC archetypes have evolved over the last twenty-five years, including operations strategies, performance measurements, and thinking processes. This study focused on the TOC thinking process, which guide decision making when looking for ways to address the system constraint to increase throughput. The thinking process of TOC is composed of five distinct tools shown in Table 1. This research used three of the five TOC thinking tools, as each can also be
productive when applied separately (Dettmer, 1998). The tools applied were the Current Reality Tree (CRT), Future Reality Tree (FRT), and Evaporating Cloud (EC).

The thinking process asks three questions. The first question is “what to change?” This identifies the problems that are hindering an organization from achieving its goals. To address this question, the CRT ascertains the root causes of the core problem. The second question is “what to change to?” This identifies conflicts and erroneous assumptions that prevent positive change. The second question is answered by the EC, which tests assumptions and validates the desired state. The final question is “how to change?” The FRT answers this question by identifying potential solutions (called injections) to solve the core problem and identify any negative side effects of the solutions so they can be avoided (Mabin, Babington, Caldwell, Yee, & Moore, n.d.).

Table 1. The Thinking Tools and their Application

<table>
<thead>
<tr>
<th>Tool</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Reality Tree (CRT)</td>
<td>Illustrates cause-and-effect and identifies root causes</td>
</tr>
<tr>
<td>Evaporating Cloud (EC)</td>
<td>Identifies the conflict in a problem and tests assumptions to develop solutions</td>
</tr>
<tr>
<td>Future Reality Tree (FRT)</td>
<td>Verifies the effectiveness of the solutions or injections to the problem</td>
</tr>
<tr>
<td>Prerequisite Tree (PRT)</td>
<td>Identifies obstacles to implementing proposed solutions that could prevent success</td>
</tr>
<tr>
<td>Transition Tree (TRT)</td>
<td>Provides a path to develop an intended action plan to implement a solution</td>
</tr>
</tbody>
</table>

What to Change

In a system, there are symptoms of core problems called undesirable effects (UDEs). The core problem is a result of root causes. To identify the true root cause of the core problem, logical cause-and-effect thinking is used to uncover the relationships between the UDEs. The CRT, which is a logic tree, is used to reveal linkages between the UDEs by determining those that are causes and those that are effects. This helps determine what to change. A simple logic tree shown in Figure 1 shows the connection between causes and effects. The boxes, called entities, are connected by arrows that show the direction of the cause to the effect. In this case, both A and B are the cause and C is the effect. The ellipsis crossing the connection arrows represent a logical AND statement. If sufficiency logic is applied, this relationship is expressed as IF A and B THEN C.
Figure 1. Basic sufficiency logic tree

Figure 2 is an example of AND logic for a fire. All the three entities, A, B, and C, are essential for fire. The sufficiency logic is IF there is spark/heat AND fuel AND oxygen, THEN there is a fire. Conversely, without all three conditions present, a fire will not start.

Figure 2. Example of AND logic

Figure 3 is an example of OR logic. It shows that a car may last a long time. Any of the three entities, A, B, or C, may create the effect on their own. A car will generally last a long time if it is serviced on time, OR driven calmly, OR by listening for odd noises. The difference is that for AND logic, all causes together create an effect, whereas any OR cause may create the effect.

Figure 3. Example of OR logic
What to Change To

After identifying the core problem and its root causes, it is essential to identify the desired future state. This means designing a reality that is the opposite of the current state. The EC defines a common objective that is the opposite of the core problem and tests assumptions regarding the future state. The basic structure is shown in Figure 4. All the requirements and prerequisites are based on necessary condition logic (Cox III & Schleier, 2010). If any set of assumptions breaks the connections between the EC entities, the conflict or dilemma “evaporates” and a future state can be designed using the remaining logic. Otherwise, the development of solutions (called injections) is required to resolve the problem.

The conflict in the system is D and its opposite D’ (D-prime). The common objective is A. To attain the common objective, A must have both B and C. B must also have D and C requires D’. D and D’ are opposites and cannot coexist. The necessary condition logic of this relationship is expressed as:

- In order to have objective A, we must have requirement B \((A \leftarrow B)\)
- In order to have requirement B, we must have prerequisite D \((B \leftarrow D)\)
- In order to have objective A, we must have requirement C \((A \leftarrow C)\)
- In order to have requirement C, we must have prerequisite D’ \((C \leftarrow D’)\)

![Figure 4. Evaporating Cloud necessary condition logic](image)

Figure 5 is an example of an EC. The common objective (A) is to have a fair and accurate election. The validity of the underlying assumptions is verified with an assumptions table as shown in Table 2. The rationale for each connection is stated using necessary condition logic.
Table 2. Logic and assumptions verification of the EC

<table>
<thead>
<tr>
<th>In order to... we must</th>
<th>Because... (Assumptions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A↔B</td>
<td>Everyone wants their vote counted</td>
</tr>
<tr>
<td>In order to have a fair and accurate election, we must ensure all votes are counted.</td>
<td>Each vote is vital in a fair election</td>
</tr>
<tr>
<td>A↔C</td>
<td>Mistakes and errors cause voters to lose faith in elections</td>
</tr>
<tr>
<td>In order to have a fair and accurate election, we must reduce the possibility of fraud, error and mistakes</td>
<td>Mistakes and errors undermine a democratic system</td>
</tr>
<tr>
<td>B↔D</td>
<td>Machine miss votes</td>
</tr>
<tr>
<td>In order to ensure that all votes are counted, we must recount all votes by hand.</td>
<td>It’s hard to rely on technology</td>
</tr>
<tr>
<td></td>
<td>Machines can be used to rig votes</td>
</tr>
<tr>
<td>C↔D’</td>
<td>People are prone to making errors</td>
</tr>
<tr>
<td>In order to reduce the possibility of fraud, errors and mistakes, we must recount votes by machine.</td>
<td>People will intentionally tamper with votes</td>
</tr>
<tr>
<td></td>
<td>Machines are more accurate than people</td>
</tr>
<tr>
<td>D↔D’ If we recount votes by machine, we cannot recount votes by hand and vice versa. (Why can’t D and D’ coexist?)</td>
<td>Party officials want elections done their way</td>
</tr>
<tr>
<td></td>
<td>Laws control how elections are done</td>
</tr>
<tr>
<td></td>
<td>People are eager to get quick election results</td>
</tr>
</tbody>
</table>

Figure 5. Example of Evaporating Cloud.
If the assumptions for a connection (e.g. B←D) can be shown to be invalid, the dilemma or conflict evaporates. If; however, all the assumptions are valid, injections (solutions) must be developed to resolve the dilemma. Some possible injections could be to print copies of valid votes, compare the machine tally with the paper tally or provide statistics of human error versus machine error.

**How to Change**

Success is the implementation of the changes needed. There should be a defined roadmap of the improved future state with the specific changes. The FRT builds the desired system using sufficient condition logic (Dettmer, 1998). To develop the FRT, the needed injections are added to the CRT with their subsequent effect. If the injections result in the core problem being resolved, the system is ready for implementation (along with the potential use of the remaining TOC thinking tools). If negative consequences or unintended branches emerge from the injections, further analysis is required to trim the negative effects.

The TOC thinking process and emergency medicine have some similarities. Both seek to understand what to change. In medicine, that would be the correct diagnosis of a negative medical condition. Both seek to know what to change to; in medicine, the desired future state of wellness. Both seek to know how to change. For emergency medicine, this would be the application of a medical treatment. ED staff, using this thinking process, could improve the success of patients in the ED system.

**Methodology**

The study was conducted in an ED located in the Southeast United States that services approximately 120,000 people. Participants included doctors, nurses, administrators and technicians. ED administrators were briefed on the nature of the study and approved the information collection. ED staff who had direct contact with patients completed survey questions and provided feedback. The survey was distributed by the hospital administrator. The results from the questionnaires were assumed to be accurate and reflect the true perceptions of the respondent. It was also assumed survey participants sought to improve the care of patients in the system. Participation in the research was confidential and voluntary.

The survey asked participants to rank the top ten problems that prevent timely diagnosis, treatment, and discharge of patients. The purpose was to identify problems within the ED system, not problems that occur after patients have been released to go home or are transferred for further treatment. The staff was instructed to list the problems using complete sentences as undesirable effects (UDEs) and given five working days to complete the task. A second survey (using the Delphi method) asked for feedback on the list of aggregated problems. Using cause-and-effect logic and assistance from a TOC expert, eleven UDEs were compiled to create the first CRT. Participants were again given five working days for feedback, corrections, and additional comments. Clear instructions were given on how to read the CRT with ample space provided for feedback. Again, the feedback was compiled and incorporated into the CRT with the core problem identified.
An EC was developed based on the core problem with assumptions and potential solutions or injections. A third survey asked for feedback on the core problem using an EC with clear instructions and space for feedback. The Delphi cycle was repeated as before and feedback was compiled. The injections were then placed into CRT to create the desired effects and an FRT was constructed to address any remaining negative effects. The predicted effects of the injections from the solutions were reviewed and modified with the assistance of the TOC expert.

**Findings**

Thirty initial questionnaires were returned (37.5% response) with three hundred UDEs. The UDEs were grouped by common themes into eleven areas. Table 3 shows the rankings of the UDEs with their mean and standard deviation from the lowest mean to the highest. The lowest mean indicated the most important UDE.

<table>
<thead>
<tr>
<th>Rank</th>
<th>UDEs</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack of a health care professional</td>
<td>2.80</td>
<td>2.51</td>
</tr>
<tr>
<td>2</td>
<td>Lack of technical staff</td>
<td>4.18</td>
<td>2.81</td>
</tr>
<tr>
<td>3</td>
<td>Improper patient discharge protocol</td>
<td>4.36</td>
<td>2.67</td>
</tr>
<tr>
<td>4</td>
<td>Poor work relationship</td>
<td>4.56</td>
<td>1.50</td>
</tr>
<tr>
<td>5</td>
<td>Influx of patients</td>
<td>5.20</td>
<td>2.81</td>
</tr>
<tr>
<td>6</td>
<td>Delay in lab results</td>
<td>5.21</td>
<td>2.62</td>
</tr>
<tr>
<td>7</td>
<td>Inadequate equipment</td>
<td>5.25</td>
<td>2.41</td>
</tr>
<tr>
<td>8</td>
<td>Delay in reporting</td>
<td>5.88</td>
<td>3.46</td>
</tr>
<tr>
<td>9</td>
<td>Unavailability of bed</td>
<td>6.13</td>
<td>2.75</td>
</tr>
<tr>
<td>10</td>
<td>Inadequate supplies</td>
<td>7.11</td>
<td>2.37</td>
</tr>
<tr>
<td>11</td>
<td>Lack of transportation</td>
<td>7.50</td>
<td>1.87</td>
</tr>
</tbody>
</table>

**The Current Reality**

Cause-and-effect relationships were established between the ranked UDEs using sufficient cause logic. The main effect or core problem was that the ED was unable to meet patients’ expectations. The core problem is located at the top of the CRT as shown in Figure 6. All UDEs are connected to the core problem using arrows that point from causes to effects through intermediate UDEs. Some of the UDEs have no incoming arrows. These are potential root causes.

In Figure 6, the entities shown in a darker color identify the difference between the initial and final version of the CRT. The logic is read by following the arrows from the bottom to the top. It depicts a chain of cause-and-effect reasoning (IF...THEN) in graphical form. For example, starting from the entity on the bottom right and following the arrows upward, the CRT is read as follows:
• IF staff does not follow existing procedures between departments, THEN there is lack of communication.
• IF there is lack of communication, THEN there is confusion of responsibility on/from lab/services.
• IF there is confusion of responsibility on/from lab/services, THEN there is delay in lab results/patient processing.
• IF there is delay in lab results/patient processing, THEN there is backlog of patients in ED.
• IF there is backlog of patients, THEN ED is unable to meet patient’s expectations.

The same logic can be applied to each branch of the CRT, starting from the bottom and working upward.

The Evaporating Cloud

With the aid of the final CRT, the core problem or main effect was analyzed. In the current state, the ED is unable to meet patient expectations. The patients expect a positive outcome when they go to an emergency facility. This is the common objective. Using necessary condition logic, in order to achieve a positive patient outcome (A), the ED system must satisfy the requirements of both high-quality health care (B) and rapid response (C) with the prerequisite to diagnose and treat in a methodical manner (D), which is the opposite of diagnose and treat in a timely manner (D’). This logic is shown in Figure 7. If D and D’ are in conflict, the system cannot achieve the common objective. The validity of the EC was checked using the assumptions in Table 4. This indicated the assumptions were valid. Thus, the dilemma between D and D’ must be addressed with injections to resolve the core problem. The injection(s) must be able to evaporate the dilemma shown in the EC and address the root causes shown on the CRT that created the core problem.
Figure 6. Final CRT
Figure 7. ED Evaporating Cloud Dilemma

Table 5. Verification of EC

<table>
<thead>
<tr>
<th>In order to...</th>
<th>we must</th>
<th>Because…(Assumptions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A↔B</td>
<td>In order to have a positive patient outcome, the ED must provide high-quality care</td>
<td>• Patients who are treated well will return private healthcare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hospital reputation is important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ED will get Value Based Purchasing (VBP)* incentive based on quality</td>
</tr>
<tr>
<td>A↔C</td>
<td>In order to have a positive patient outcome, the ED must provide rapid response</td>
<td>• Patient time is essential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ED cost reduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Better time management and utilization of resources</td>
</tr>
<tr>
<td>B↔D</td>
<td>In order for ED to provide high-quality care, the ED must diagnose and treat patients in a methodical manner</td>
<td>• Some patients have non-emergency issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Scientific/systematic approaches produce better results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Some patients have the perception that they will never get adequate care</td>
</tr>
<tr>
<td>C↔D’</td>
<td>In order for ED to provide rapid response, the ED must diagnose and treat in a timely manner</td>
<td>• Effective patient flow creates capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Critical patients need fast treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quicker lab results mean quicker diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ability to admit or discharge patients in a timely manner</td>
</tr>
<tr>
<td>D-D’ (Why can’t D and D’ coexist?)</td>
<td></td>
<td>• Nature of illness determines urgency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Triage process sorts patients based on need</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Availability of doctors, nurses and proper equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Accurate and timely information from patients</td>
</tr>
</tbody>
</table>

*The Value Based Purchasing (VBP) program was put in place by the Affordable Care Act (ACA) in 2010 and became effective in 2013. VBP changes Medicare from a payer of claims to...
a purchaser of quality healthcare for its beneficiaries. The VBP program measures the value of care provided using criteria of care processes, positive outcomes, and patient-centeredness. (Borah et al., 2012).

**The Future State**

The next step was to develop the injections that provided direct desirable effects. The injections together with logic should produce the desired effects. These desired outcomes were connected to develop a future state. An FRT for the ED was created with four injections placed strategically into locations that would provide a countermeasure to a UDE. The four injections are noted in Figure 8 with the abbreviation INJ in different color boxes to help differentiate them from the other entities. However, these injections were not able to change all the UDEs to desirable effects (DEs). The unaffected UDEs are shown with bold outlines. The FRT is read like the CRT, using logical sufficiency language (IF-THEN).

The branches of the FRT for the injection of standard operating procedures (SOPs) in the lower right hand corner are read as follows:

- **INJ:** If the ED has well-documented and easy to understand SOPs for staff to follow, then there are existing SOPs between departments.
- **INJ:** If staff are encouraged to use SOPs in accordance to ED values, then staff will follow existing procedures between departments.
- If staff follow existing procedures between departments AND there are existing SOPs between departments, then there is good communication.
- If there is good communication, then there is understanding of responsibility for labs/services.
- If there is understanding of responsibility for labs/services, then there is improvement in lab results/patient processing.
- If there is improvement in lab results/patient processing, then there is fewer backlog of patients.
- If there is fewer backlog of patients, then ED is able to meet patients’ expectations most of the time.

The remaining injections and branches are read in a similar fashion, starting from the bottom and progressing to the top. Readers will note that two of the injections have been placed in more than one location because they resolve multiple UDEs.

As mentioned earlier, some UDEs were not affected by the injections. However, the desirable effects would likely produce some ability to meet patient’s expectations most of the time. Given this result, an additional desirable effect would be the favorable perception of the ED for those patients whose expectations were met. IF patients have a favorable perception of ED, THEN there is a potential for increased of revenue for the institution. As a result, a reinforcing loop would be created that would reverse two of the root causes (equipment budgets/oudated equipment) for the core problem. This additional effect is shown in Figure 9. However, four UDEs would still remain unaffected.
Figure 8. FRT with injections
Figure 9. FRT with a reinforcing loop of increased revenue due to favorable patient perception.
Conclusion

TOC focuses on the constraint within a system or organization, based on the current experience that results in a core problem. The TOC thinking process tools provided a road map to identify and address the problem. The purpose of this study was to apply TOC thinking process tools to an ED facility, identify the core problem, and develop viable solutions.

The study addressed two key questions. First, can the undesirable effects (UDEs) in an ED be captured in sufficient detail using TOC to identify the root causes of the core problem? Using the CRT, the following root causes were identified and answered this question:

- Staff not available to work with patients in the lobby
- Lack of staff to clean beds or provide services
- Lack of standard operating procedures so staff does not follow procedures
- No budget for new equipment or equipment is outdated
- Nurses are busy with other patients or cleaning beds or performing lab work
- Nurse to patient ratio is low
- No available transportation for patients
- The ED is used inappropriately as a source of primary care for patients without insurance or patients with non-emergency issues or the primary care provider does not accept the insurance

The primary reason the ED was unable to meet patient’s expectations was having a backlog of patients. The backlog of patients waiting to get services was a caused by several causal factors. One of the factors was the unavailability of beds because the ED did not have available staff to clean them. This forced the nurses to clean the beds. When the nurses were cleaning beds, they were not caring for patients. Another cause was the delay in lab results/patient processing. For this, the ED lacked either the specific lab service or the proper lab equipment. This meant the service had to be outsourced. There was also confusion on who was responsible because of a lack of proper standard operating procedures between departments.

Another causal factor contributing to patient backlog was the delay in making dispositions. This caused additional patient wait time before being treated or being discharged from the ED. With nurses cleaning the beds, no one was available to clear the patients. Doctors were also delayed in making dispositions because there were no clear operating procedures. In addition, the ED did not have available staff in the lobby. Nurses covered the lobby when they were not cleaning beds or writing reports.

When patients were released from the ED, they were either transferred to another facility or discharged. These patients occupied space in the ED waiting for families or a taxi to pick them up. Additionally, transportation services for discharged or transferred patients by third parties were not available after 11:00 p.m. Finally, the ED was used inappropriately as a source of primary care for patients without insurance or patients with non-emergency issues. Unfortunately, the ED had no control over these situations, but they still contributed to patient
backlog. Collectively, these root causes led to the main core problem of being unable to meet patients’ expectations.

On the second question, can TOC be applied to an ED to address the core problem, increase patient throughput, and improve effectiveness? With the core problem and its root causes identified, the desirable condition was evident. The common objective was to have positive patient outcome. However, in order to do so, a dilemma needed to be resolved. Should the ED diagnose and treat patients in a methodical manner or in a timely manner? These might seem mutually exclusive given that quality is often sacrificed to achieve speed. Conversely, if ED treated patients in a methodical manner, patients might not receive timely service. To solve this dilemma and address the core problem, four injections were introduced.

- Hire staff to clean beds instead of nurses
- Create easy to understand SOPs for staff
- Encourage staff to use SOPs in accordance to ED values
- Educate the public on the services the ED provides and what is needed before admission

The desired future state was captured and provided a road map for improvement. Thus, TOC was applied to address the core problem (unable to meet patient’s expectations), increase patient throughput, and improve effectiveness (positive patient outcome). Even so, a favorable public perception with increased revenue would not be able to eliminate all the UDEs. Not everyone has insurance even though the law stipulates it. In addition, some primary care providers do not accept certain insurance so patients will continue to seek medical attention at ED because they cannot be turned away. However, the ED could meet patients’ expectations most of the time if these changes were implemented. This would mean a great deal given that healthcare facilities are very interested in controlling costs while simultaneously providing high quality care.
References


