

System Thinking

Prepared by:

Eddy Wang

Date:

10/04/2025

This version is exclusively for Eddy's Friends.

Executive Summary

It is a report on the examination of ED inefficiencies in a hypothetical public hospital. Systems thinking and value stream mapping are used as tools to decrease the patient turnaround time by 50%. Listing bottlenecks in the current state value stream map includes registration, initial assessment, system archetypes that are "fixes that fail" and "shifting the burden," availability of rooms, and provision of medical supplies. A proposed future state map recommends EHR for streamlined registration, cross-training of staff for flexible roles, standardization of room turnover procedures for timely room availability, and real-time inventory management for timely supply access. These strategies will increase patient throughput, staff productivity, and patient satisfaction. Potential risks, such as increased workload and reliance on technology, will be mitigated by strategic planning. It shares inclusive solutions for the sustainable improvement of EDs in their entirety.

Table of Contents

Executive Summary	2
1. Introduction and Background.....	2
2. Main Discussion.....	3
2.1 Analysis of the current state VSM of the emergency department based on System Archetypes	3
2.2 Identification & analysis of the system archetypes that may impede performance	4
2.3 Recommended new VSM with desired reduction in patient turnaround time	6
2.4 Discussion on intended and unintended consequences of the modified system	7
3. Recommendations	9
4. Conclusion	11
5. References	13

1. Introduction/Background

The emergency department is the keystone to the delivery of urgent care but often comes with inefficiencies, leading to long wait times and decreased patient satisfaction. This paper will discuss the optimization of a hypothetical public hospital's emergency department toward to cut in half the patient turnaround time through systems thinking and value stream mapping. Systems thinking allows for examination of the complex interdependencies and system problems causing delays, while value stream mapping explicitly outlines the bottlenecks in current patient flow. Proposed solutions would then be the implementation of EHR, automated check-in processes, and standardized treatment protocols, which tend to make operations streamlined, communication effective, and resources better utilized. This will improve operational efficiency at ED by addressing the root causes of inefficiencies and making strategic improvements that aim for enhanced patient care and are aligned with the paramount goal of the hospital to deliver high-quality and timely care (Ammenwerth et al., 2021, p. 8)

2. Main Discussion

2.1 Analysis of the Current State VSM of the Emergency Department Based on System Archetypes

The current value stream map of the emergency department in the hypothetical public hospital reveals several inefficiencies that lead to long patient wait times and operational overload. By applying systems thinking, we can analyze these issues holistically, considering how different elements within the Emergency Department are interconnected and interact to produce observed outcomes. Systems thinking helps us to not only address symptoms but also identify and address the root causes of inefficiencies (*Assessment 3 - Submission, 2024*).

Table 1 Current Problem Source: (Assessment 3 -VSM, 2024.)

Problem	Analysis
Patient Registration	The manual data entry during registration is slow and error-prone, worsened by insufficient staffing. This reflects the "shifting the burden" archetype.
Initial Assessment by Nurses	This stage is a bottleneck due to a mismatch between patient inflow and nursing staff, causing delays.
Availability of Treatment Rooms	Long wait times in treatment rooms persist because of slow turnarounds driven by nonstandardized cleaning protocols. This exemplifies the archetypal "fixes that fail," whereby cosmetic fixes are placed on top without really getting to the need for

	standardization and better team communication.
Provision of Medical Supplies	Delays in delivering medical essentials, due to the lack of a real-time inventory system, lead to frequent shortages and treatment delays. This exemplifies the "eroding goals" archetype, where accepted inefficiencies gradually lower performance expectations.

The current VSM highlights deeper systemic issues with process management, resource allocation, and technology integration within the ED. It is in regard to working through these complex interactions that systems thinking really comes into its own as a 'system' of thought processes. In this respect, identification and working with the system archetypes involved can develop comprehensive strategies that get at root causes for more effective and sustainable improvements in the patient flow and turnaround time (Assessment 3 -VSM, 2024 & MGT603 Module 3.1,2024).

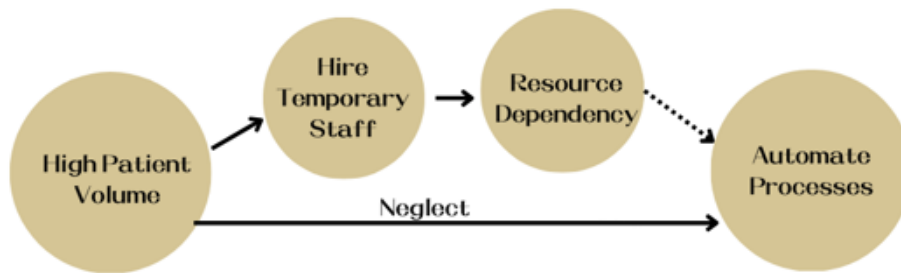
2.2 Identification and Analysis of the System Archetypes that May Impede Performance

Value stream mapping of the emergency department for this hypothetical public hospital has projected a series of inefficiencies and overload that impede its performance. Mapping these challenging operational issues through systems thinking and identification of proper system archetypes provides insight into their basic structures and dynamics that drive them (*What Is Value Stream Mapping - A Basic Introduction*, 2022).

1. Shifting the Burden

The "shifting the burden" archetype is exemplified by the habituation of the ED to resolve its immediate problems through the use of temporary fixes that avoid the roots. For instance, to deal with the surge in admissions during peak periods, the ED may hire additional staff members as a quick fix (*MGT603 Module 3.1, 2024, p. 24*). While this may give short-term relief, it still doesn't get to the root of inefficiencies in registration and assessment processes, some of which are manually entering data and integrating it into electronic health records. According to Ammenwerth et al (2021, p. 8), this is a sure way to divert attention from implementing long-term solutions that would enhance process efficiency, hence ensuring a reduction in reliance on additional staffing.

Figure 1 Shifting the Burden

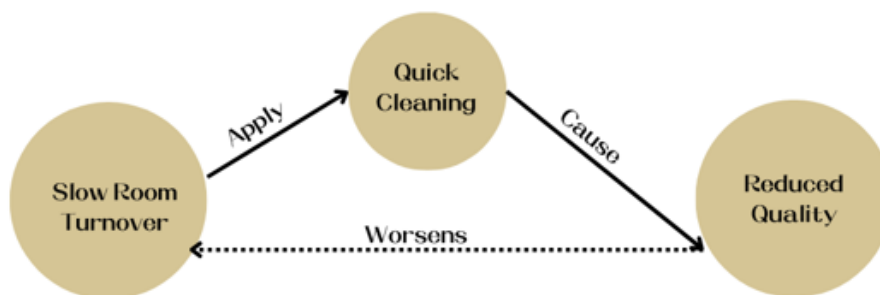


(Canvas, MGT603 CombinedReading 1 System Archetypes.pdf, 2024, p. 4)

2. Fixes That Fail

One of them is "fixes that fail," whereby short-term solutions bloom into long-term unintended consequences that raise the magnitude of the problem. Quick cleaning procedures in pursuit of quickening room turnover within the ED do not deal with the intrinsic need for standardization of cleaning protocols and improvement of nursing–housekeeping staff coordination activities. Such temporary measures may to some extent improve the availability of rooms, but they do not create a process that works recurrently to manage room readiness for new patients (*MGT603, Module 3.1, 2024, p. 25*).

Figure 2 Fixes That Fail



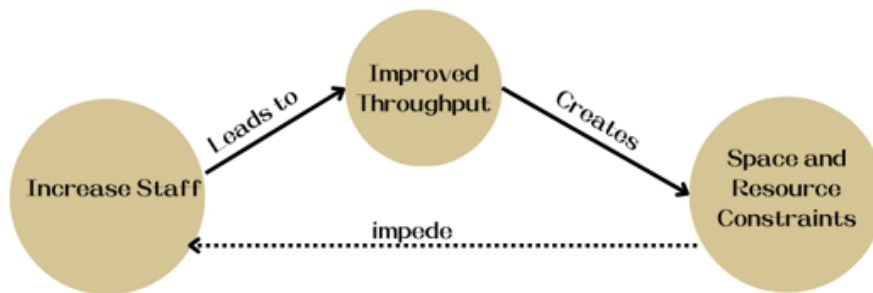
(Canvas, MGT603 CombinedReading 1 System Archetypes.pdf, 2024, p. 14)

3. Limits to Success

The "limits to success" archetype is the example of diminishing returns: initial efforts in improving performance meet constraints. Adding nurses or other staff in the ED to manage patients may initially improve throughput, but without changes to deeper, systemic issues such as communication breakdowns and document inconsistencies,

those efforts are going to top out. This archetype draws attention to the identification and alleviation of constraints that are limiting further success, for example, enhancing interdepartmental communication and streamlining assessment procedures (*MGT603, Module 3.1, 2024, p. 23*).

Figure 3 Limits to Success

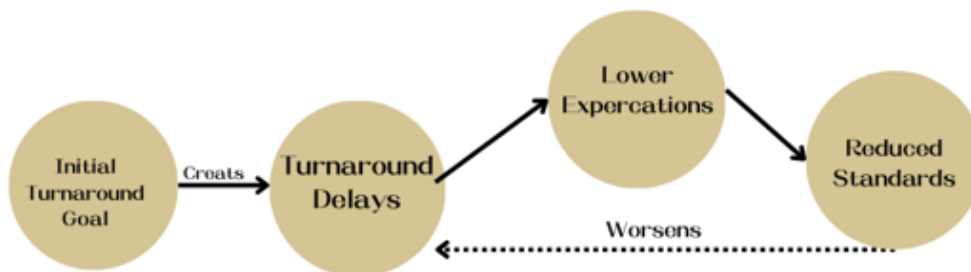


(Canvas, MGT603 CombinedReading 1 System Archetypes.pdf, 2024, p. 2)

4. Eroding Goals

The "eroding goals" archetype occurs when declining performance standards become normalized. In the ED, the absence of a real-time inventory system leads to frequent shortages and delays, which staff gradually accept, lowering expectations and fostering complacency. This highlights the need to maintain high standards and implement systems that ensure continuous improvement (*MGT603, Module 3.1, 2024, p. 24*).

Figure 4 Eroding Goals

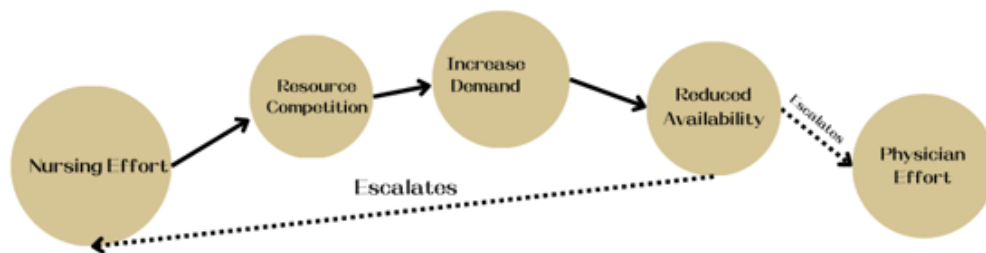


(Canvas, MGT603 CombinedReading 1 System Archetypes.pdf, 2024, p. 6)

5. Escalation

The "escalation" archetype can be seen in the competitive dynamics between different departments within the hospital vying for limited resources. As one department (such as the ED) attempts to improve its operations by reallocating resources, other departments may respond by doing the same, leading to an overall strain on hospital resources and potentially escalating conflicts. This archetype suggests the need for a holistic approach to resource management, ensuring that improvements in one area do not come at the expense of others (*MGT603, Module 3.1, 2024, p. 24*).

Figure 5 Escalation



(Canvas, MGT603 CombinedReading 1 System Archetypes.pdf, 2024, p. 8)

By identifying these system archetypes, the hospital can better understand the underlying dynamics contributing to its current performance challenges.

2.3 Recommended New VSM with Desired Reduction in Patient Turnaround Time

To achieve the desired reduction in patient turnaround time, a new value stream map is shown below.

Figure 6 New VSM

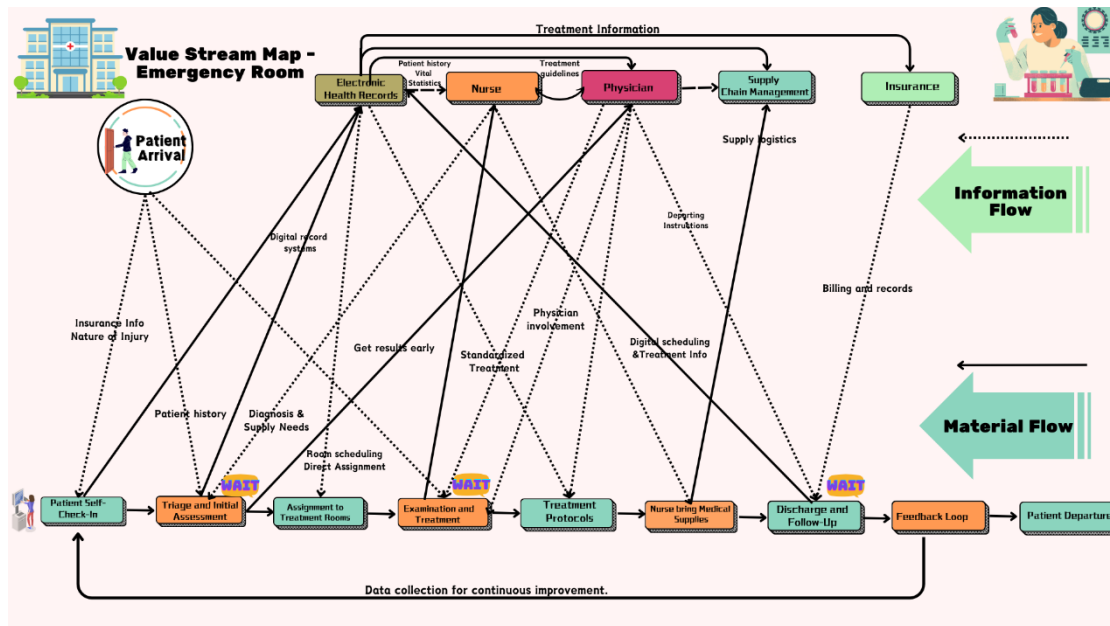


Table 2 New Value Stream Map Explanation

Strategy	Purpose
Streamlined Registration	Implementing an electronic health record system can significantly reduce data entry time and improve accuracy. (Ammenwerth et al., 2021, p. 8).
Resource Optimization	Cross-training staff to handle multiple roles, such as registration, technology changes, refine job description and initial assessments, will increase flexibility and responsiveness (Capko & Capko, 2011).
Standardized Room Turnover Procedures	Introduce standardized cleaning and preparation protocols for treatment rooms, which can help in the reduction of turnover time, thereby increasing room availability. This can still be streamlined further by collaboration between nursing and housekeeping staff with a supporting real-time scheduling system (Claudio et al., 2021, p. 708).
Supply Chain Management	Through inventory management and connection with EHR, real-time data communication can be achieved, providing services or drugs to patients faster and reducing waiting time.

2.4 Discussion on Intended and Unintended Consequences of the Modified System

The newly proposed value stream map for the emergency department is designed to enhance operational efficiency and reduce patient turnaround time by 50%. While the proposed modifications offer several intended benefits, they also present potential unintended consequences that need to be considered to ensure successful implementation and sustained improvements.

Intended Consequences

The new VSM will thoroughly reduce patient turnaround time in the ED by introducing an EHR and automating room assignments that reduce delays in overall patient processing and treatment. Accomplished with this streamlined approach will be the enhancement of patient satisfaction through faster service times and shorter waits, providing an overall smoother and more predictable journey through the ED. Real-time inventory management and standardized treatment protocols would help increase operational efficiency, thus reducing variability and waste in processes to really make use of resources and staff efficiently. The EHR system increases communication and accuracy of data by making the patient data available at every department, improving internal department communication and reducing manual errors in handling data. A feedback loop ensures continuous improvement through provisions for the ongoing evaluation and refinement of processes in view of patient feedback and helps engender a culture of improvement within the ED.

Unintended Consequences

While the new VSM for the ED is envisioned to bring improved efficiency and patient satisfaction, it also entails several other, perhaps unintended, outcomes that are important to control. One major issue is the growth of reliance on technology, which could result in disturbances during system downtimes or technical failures that would lead to great delays in ED operation. The technological advanced-based system means that it calls for organizational and operational changes; in other words, it calls for huge staff training which is an eventuality that may be resulted in initial staff resistance and probably being non-productive as they try to re-engineer themselves to fit the new processes. The ahead investments in terms of technology, training, and process redesign may also turn out to overburden the hospital budget and resources if not handled well. Moreover, the dependence on digital systems raises issues of data security and privacy, given that it is more predisposed to breach or unauthorized access to patients' information, a scenario in which a strong measure of cyber-security comes in to ensure safe operations of such sensitive data (Alhammad et al., 2024, p. 4). Finally, automation and self-services, a process, though efficient, may reduce the interactions between patients and staff. This could affect the relations in care taken by the patients and create a sense of impersonal transitions in the whole treatment experience.

Mitigation Strategies

Table 3 Mitigation Strategies

Challenge	Strategies
To Address Technology Dependence	Establish robust IT support and backup systems to minimize the impact of technical failures. Regular system maintenance and updates can prevent unexpected downtimes.

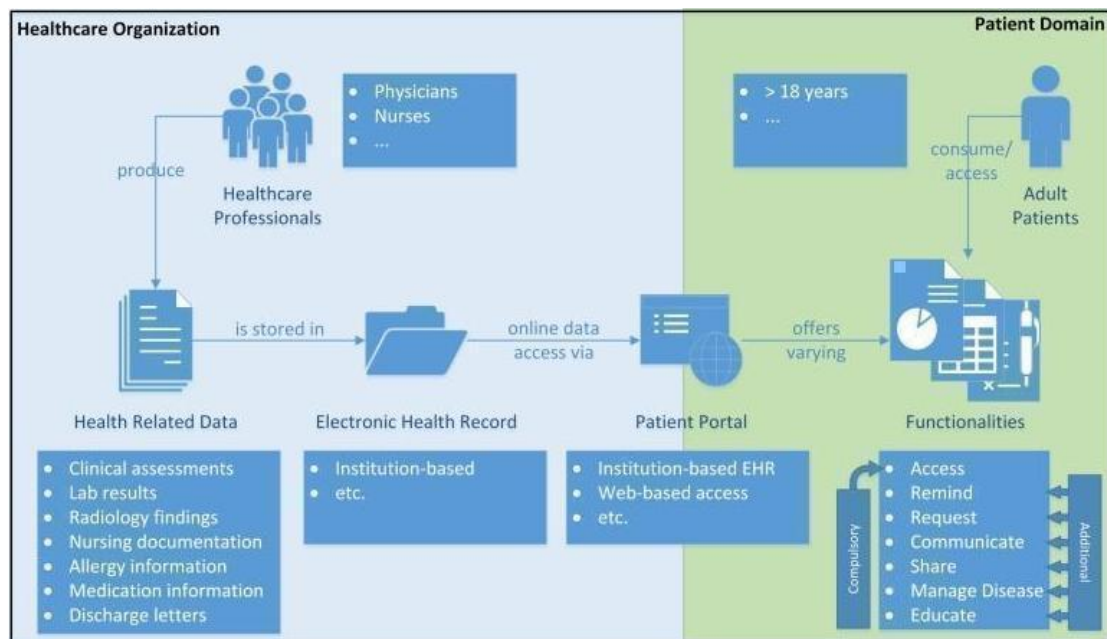
To Facilitate Staff Adaptation	Provide comprehensive training programs and ongoing support to help staff adapt to new technologies and processes. Encouraging a culture of learning can ease the transition (Capko & Capko, 2011, p. 2).
To Maintain Personal Interaction	Incorporate opportunities for staff to engage with patients during critical touchpoints, ensuring that the human element of care is preserved.

3. Recommendations

To optimize the emergency department's operations and achieve a sustainable reduction in patient turnaround time without compromising the performance of other hospital departments, the following holistic solutions are recommended:

1. Implement a Phased Integration of Electronic Health Records and Advanced Training Programs

Figure 7 patient access to electronic health records



Source: (Ammenwerth et al., 2021, p. 9.)

Objective	Ensure smooth integration of technology with minimal disruption and enhance staff proficiency in using new systems.
	The key to the implementation of a new VSM is strategic deployment of the

<p>Solution</p>	<p>EHR system department by department. Start in only one department, make adjustments and learn from it before deploying the hospital so as not to experience disruptions to operations throughout the facility. Coupled with proper training, continuous workshops and refresher courses are to be provided for staff to familiarize themselves with the new EHR system. In the process, the leadership should maintain communication with stakeholders to help overcome difficulties. This can prevent a great deal of potential resistance and enhance staff capacity, hence ensuring a successful implementation of the hospital-wide EHR system (Ali et al., 2023, p. 3).</p>
<p>Benefits</p>	<p>This incremental rollout of the EHR system reduces the risk of technological disruption, gives time to adapt and hence improve the system, and assures staff competency with comprehensive training for efficiency and reduced data-handling errors. Being able to manage the pace of the implementation will give the hospital an upper hand in ensuring a smoother transition and maximizing the benefits that can be derived from this new EHR.</p>

2. Develop and Implement Standardized Protocols Across Departments

<p>Objective</p>	<p>Enhance operational efficiency and consistency in patient care through standardized procedures.</p>
<p>Solution</p>	<p>This will be supplemented by the development of standard operating procedures, cutting across departments, for key processes in the emergency department: Patient intake, triage, treatment, and discharge. Development should obtain inputs from all relevant departments to have alignment and consistency across the hospital. A committee entrusted with the continuous review of these standards could be made responsible for reviewing the feedback, drawing new insights, and adapting to</p>

	<p>innovations so that procedures shall remain relevant and effective in changing technological times. There should be interdepartmental training sessions to avoid any kind of misunderstanding and to make people from different departments sit together, understand each other, so that all teams could be aligned by standardized practices. Teamwork is encouraged, raising operational efficacy, having staff better equipped to deliver consistently high-quality care (American College of Emergency Physicians, 2021, p. 2).</p>
Benefits	<p>The use of such protocols is a patient-centric practice that is safe and effective in enhancing patient care. Standardized protocols have the potential to reduce variation in care, enhance workflow, improve coordination of care, and modify practice through evidence-based care. On the other hand, it can alleviate patients' anxiety to the greatest extent and reduce their waiting time (American College of Emergency Physicians, 2021, p. 2).</p>

3. Strengthen Communication and Feedback

Objective	<p>Foster a culture of continuous improvement and responsiveness to patient and staff needs through effective communication channels.</p>
Solution	<p>Effective real-time communication should be achieved in the emergency department for effective communication and improvement, where information travels quickly across departments for prompt decisions to be made. The position of employees would therefore be better in sharing information at the right time and at the right place. It is supposed to link with the electronic health record system. It is through the reception of this feedback that the ED may identify areas for improvement and thereafter institute practical changes for improved patient care and staff satisfaction.</p>

Benefits	Implementing a real-time communication platform in the emergency department improves coordination, reduces misunderstandings, and eliminates delays arising from events of miscommunication, hence improving operational efficiency.
-----------------	--

4. Conclusion

This report focused on optimizing the emergency department of a hypothetical public hospital to reduce patient turnaround time by 50%. Through systems thinking and value stream mapping, we identified critical inefficiencies, such as bottlenecks in patient registration, assessment, treatment, and discharge processes. By implementing a new value stream map that integrates electronic health records, automates patient check-in and room assignments, and standardizes treatment protocols, the ED can enhance operational efficiency and patient satisfaction. While these changes bring significant benefits, including reduced wait times and improved communication, they also present challenges, such as increased dependence on technology and initial adaptation hurdles. By adopting phased implementation and comprehensive training, the hospital can mitigate these risks and achieve sustained improvements in patient care and departmental efficiency. This holistic approach ensures that the ED not only meets its objectives but also supports the overall performance of the hospital.

References List

Ammenwerth, E., Neyer, S., Hörbst, A., Mueller, G., Siebert, U., & Schnell-Inderst, P. (2021). *Adult patient access to electronic health records*. *Cochrane Database of Systematic Reviews*, 2021(2).

<https://doi.org/10.1002/14651858.cd012707.pub2>

Alhammad, N., Alajlani, M., Abd-alrazaq, A., Arvanitis, T., & Epiphaniou, G. (2024). *Patients and Stakeholders' Perspectives Regarding the Privacy, Security, and Confidentiality of Data Collected via Mobile Health Apps in Saudi Arabia: Protocol for a Mixed Method Study*. *JMIR Research Protocols*, 13, e54933.

<https://doi.org/10.2196/54933>

American College of Emergency Physicians, (2024). Policy Statement Standardized Protocols for Optimizing Emergency Department Care
<https://efaidnbmnnnibpcajpcgclefindmkaj/https://www.acep.org/siteassets/new-pdfs/policy-statements/standardized-protocols-for-optimizing-emergency-department-care.pdf>

Ali, S. K., Khan, H., Shah, J., & Nadeem Ahmed, K. (2023). *An electronic health record system implementation in a resource limited country—Lessons learned*. *Digital Health*, 9, 20552076231203660.

<https://doi.org/10.1177/20552076231203660>

Claudio, D., Cosgriff, V., Nino, V., & Valladares, L. (2021). An agile standardized work procedure for cleaning the operating room. *Journal of Industrial Engineering and Management (JIEM)*, 14(4), 701–717.

<https://doi.org/10.3926/jiem.3440>

Capko, J., & Capko, J. (2011). Cross training staff: Watch for trouble spots. *Urology Times*, 39(12), 43–44. <https://web-p-ebscobhost->

com.torrens.idm.oclc.org/ehost/pdfviewer/pdfviewer?vid=0&sid=0f2c4e9a-
cee0-447c-9dd2-4c608e9dd75b%40redis

Claudio, D., Cosgriff, V., Nino, V., & Valladares, L. (2021). An agile standardized work procedure for cleaning the operating room. *Journal of Industrial Engineering and Management (JIEM)*, 14(4), 701–717.

<https://doi.org/10.3926/jiem.3440>

Topic: Slides Deck Module 1 to 5. (n.d.). Retrieved August 14, 2024, from

https://mylearn.torrens.edu.au/courses/6678/discussion_topics/143462

Topic: Module 3 Slides Deck and relevant Materials. (2024.). Retrieved August 14, 2024, from

https://mylearn.torrens.edu.au/courses/6678/discussion_topics/136900

What Is Value Stream Mapping—A Basic Introduction. (n.d.). [Video recording].

Retrieved August 14, 2024, from

<https://www.youtube.com/watch?v=GQsq54OcgCA>