



In association with
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Health Service Operation Management
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Introduction

Operations management in healthcare refers to **overseeing the day-to-day practices of a healthcare facility that impact the client experience and organizational goals.**

These practices are typically broken down into three components: administrative, financial, and legal. The operations manager can help oversee costs and ensure service levels are met. And, when operations managers transform processes, they lead to better outcomes for patients, from reduced wait times to better-trained staff to improved overall processes. Thus, "health care operations" includes the sale, transfer, merger, or consolidation of all or part of the covered entity to or with another covered entity, or an entity that will become a covered entity as a result of the transaction, as well as the due diligence activities in connection with such transaction. **Planning, organizing, and strategizing the daily operations and routine** is the primary function of operations management. A well-planned implemented strategy can help in meeting the deadlines and production goals of an organization. Examples of health care operations include patient case management, coordination of care within and without a practice, financial management, and medical practice human resources.

Referring to the research paper by Ong, Jayagobi, Raut and Chong (2015), Answer the following questions:

1. What is the area of improvement the hospital was trying to address in its quality improvement project? What was the impact of the problem in the hospital that was the subject of focus in the quality improvement project?

The area of improvement the hospital was trying to address in its quality improvement project.

The existing problem was due to recent studies that have shown that the incidence of bloodstream infections caused by obligate anaerobic bacteria is low in the general pediatric population (Brook, 2002; Grohs et al., 2007). These reports are compounded by the finding that young children have a lowest risk of developing anaerobic bacteremia compared with adults (Goldstein, 1996). Others (Iwataand Takahashi, 2008; Morris et al., 1993) recommended that anaerobic blood cultures only be performed for patients who are immunocompromised or suspected to be suffering from intra-abdominal sepsis or head and neck infections. Despite

these developments, the practice of ordering paired blood cultures (aerobic and anaerobic) is still prevalent in pediatric wards. From the given research, the areas of improvement in the hospital will be addressing the quality improvement project is through the reduction of infections in pediatrics population and decrease the cost of the las especially blood cultures. Optimization of the sepsis care units by decreasing the number of blood stream infections which are majorly improving the quality. reducing of hospital re admissions and reduction of administration errors along with improving more of electronic as well as medical record documentation services. (Weiner et al., 2006).

The impact of the problem in the hospital that was subjecting to focus in the quality improvement project.

The impacts of the problem in the hospital, were rising in healthcare costs which have resulted in increased financial burdens on patients and hospitals. The overutilization of laboratory tests has contributed to the huge healthcare costs (Stratton, 2000). In addition, an estimated USD \$21 is charged for manpower, use of treatment room, and consumables when performing blood cultures. The amount taken from children is limited due to difficulties in obtaining blood (Freedman and Roosevelt, 2004). This limits the positive detection of bacterial isolates from blood cultures as bacteremia rates improve significantly when the volume of blood tested increases (Freedman and Roosevelt, 2004). These problems push for the focus in the quality improvement projects which were given through safer as well as effective quality system of the healthcare with timely service that has been provided to the patients with efficient as well as equitable care given in all the areas and to the all the patients with patient centered approach. The problem will be focusing with standardization of the process as well as variations that are occurring because of the problem that has been arising this will be enabling for achieving predictable result and to improve the outcome for the patients as well as the healthcare system. (Weiner et al., 2006).

2. What is the scientific rationale that this improvement project is based on?

Improvement science is about finding out how to improve and make changes in the most effective way through having early detection of infection, reducing the infection rate and enhancing the quality of care with less financial costs. It is about systematically

examining the methods and factors that best work to facilitate quality improvement. (Foundation, 2011). This was done through multidisciplinary approach from the doctors, nurses and lab technicians. The sound scientific rationale reflects not only 'how' (strategy), but 'why' (topic) a particular action has been chosen to resolve a particular problem. This clearly demonstrates the relationship of these elements in the light of patient assessment and nursing diagnosis. (P & Robertson, 1990). The overriding goal of improvement science is to ensure that quality improvement efforts are based as much on evidence as the best practices they seek to implement. Improvement science is an emerging concept which focuses on exploring how to undertake quality improvement well. It inhabits the sphere between research and quality improvement by applying research methods to help understand what impacts on quality improvement.

3. Why it was important to conduct this quality improvement project?

It was essential to lead the quality improvement project, as the quality improvement projects include orderly, information directed drives or cycles intended to work on clinical consideration, patient wellbeing, medical care tasks, administrations and projects or for growing new projects or the services like showing assessments, patient or worker service studies (Puri & Tadi, 2022). The rising costs, unindicated anaerobic blood cultures result in increased workload for healthcare staff. The anaerobic blood cultures consist of 2% of the workload for junior doctors and 6% of the workload for microbiology laboratory staff. The important point is working on the health of the population, upgrading patient encounters and results, and lessening the cost of care, to further develop the experience of health care provider. Generally working on the quality and execution in the medical services climate can assist providers with solid, financially savvy and supported medical care processes and empower them to accomplish their objective of further developing consideration of care delivery and improving patient results. (Puri & Tadi, 2022).

4. What were the objectives of the quality improvement project?

The **aim** of the quality improvement project was to reduce the number of unindicated anaerobic blood cultures, reducing by that the median usage of unindicated anaerobic

blood cultures by 50% within 6 months in the pediatric wards. If successful, this study will result in savings in terms of money and resources while still maintaining the quality of healthcare services provided. It was critical to carry out this quality improvement project in order to pinpoint the sources of waste and operational inefficiencies within the hospital in order to raise the standard of patient care (Puri & Tadi, 2022). Quality enhancement the project's goals were to identify waste sources, develop and implement treatments to reduce waste, and assess the impact of these interventions on the hospital's daily operations. (Falk & Tinker, 2012). The quality improvement project's goals were to, create and put into practice treatments to decrease the cost of labs, decrease the infection rate, msre monitoring of blood culture results, enhance the patients' satisfaction and outcomes, and assess the effects of these interventions on the hospital's daily operations. (Falk & Tinker, 2012).

Quality objectives are specific, measurable goals that a company sets to improve its quality management system. They are typically derived from the organization's quality policy and are aligned with its strategic objectives. Businesses use quality objectives to improve their products, services, and operations. Additionally, they should be reviewed regularly to ensure that they remain relevant and up-to-date. With quality objectives in place, businesses can track their progress and identify areas for improvement. (Ossian, 2022). The objective of the quality improvement project were the followings:

- Increase customer satisfaction by 10% for the next two quarters.
- Reduce product defects by 25% within the next 6 months
- Improve on-time delivery by 5% within the next year
- Ensure that all employees receive quality training by the end of the year
- Achieve 100% compliance with all quality standards by the end of next quarter

5. What are the different types of wastes in operations management? Which waste (s) did this study address?

There are eight types of wastes which are included as follows:

1. **Overproduction:** Producing more or sooner than needed. Higher costs for storage and labor to move and manage material; hindrance to workspace flow.

2. **Waiting:** Employees are waiting for instructions, tools or material to complete tasks. Machines aren't used to full capacity or at all. Costs resulting from lower productivity of employees or machines.

3. **Inefficient operations:** Operations that aren't efficient or necessary and don't add value for the customer. Products are over processed (Example: made to higher specifications than customers need). Excess scrap material accumulates at workstations which results in higher production and material costs.

4. **Transport:** Excess movement of materials, products or information. Items being moved more than needed, often crisscrossing paths and hindering other movement in the facility which results in longer lead times, increased transportation costs.

5. **Inventory:** More inventory than needed results in excessive handling of inventory items results in higher costs for inventory storage space, management and maintenance; possible spoilage and other losses.

6. **Motion:** Unnecessary movement of people or activities: Employees spend excess time getting, moving or searching for tools, material or information. Excess injuries, errors, accidents and production delays.

7. **Poor quality:** Poorly made or designed products or services. Employees use incorrect processes; scrap material accumulates due to rework; high rates of defects, rework, returns and customer complaints which can lead to delivery delays; longer lead time; higher costs for labor, material and equipment to rework products.

8. **Misused resources:** Underutilized or mismatched employee skillsets. Employees are not performing to expectations, poor engagement, opportunity cost of underused skills.

Transportation, inventory, motion, waiting, overproduction, defects, and skills are among the many wastes in operations management. The study concentrated on **waiting waste, poor quality and misused resources** or the loss of time caused by inefficient processes. (Ambujakshan, 2023). Waste is inefficiency that directly and negatively impacts your business, operations, customers, profit and growth. "Let's say there is redundant or incorrect data entry that happens during your customer order fulfilment," Ambujakshan says. "Each error is a non-value-added activity and is a waste. Reducing that not only improves productivity, but also improves your employee morale. Identifying waste is eye-opening and also a steppingstone to operational management.

6. What improvement framework did the quality project embrace? Describe its components and provide scientific evidence about its robustness?

A quality improvement framework or the basic structure of this study was very firm in determining the exact number of the patient being tested for blood cultures. It determines the conditions in which blood cultures were tested and the amount of blood cultures bottles which were used in each test. It was made through multidisciplinary approach from all employees including the doctors and the nurses in order to have a proper use of culture bottles, decreasing by that the excess use of bottles and decreasing also the cost on the hospital. In addition, staff education including the doctors, nurses and lab technicians has a great role in the awareness of using the bottles when necessary and being involved in the process of cutting the cost and use resources in a better way that serves the patients' test and results by decreasing the financial burdens on the hospital and the patient at the same time. The most common quality improvement frameworks used in our hospital, the Model for Improvement, the Institute for Healthcare Improvement, Lean, Six Sigma, reviewed the frameworks in side-by-side manner to align common components and highlight differences.

The **robustness** in this quality improvement project lays in the whole process since the beginning till the end. There were regular updates and follow up and reinforcement from higher management including the infectious disease service, head of the department of pediatrics, director of nursing, and senior doctors and nurses. Reinforcement by the higher management involved timely reminders that helped to reinforce the true clinical indications for performing anaerobic blood cultures. The proper education of the staff has a great effect on the results. Since the start of the project, there has been a steady decline in the number of anaerobic blood cultures processed and replaced. In the first week of this study alone, there was a decline of 50%. This continued to reduce in subsequent months after further intervention. The median number of anaerobic blood cultures declined from 75 to a nadir of 17.5 per week (Fig. 1) by week 4 of the project. We can say that the project achieves its goals properly and adequately. Coded the key strengths for each framework and grouped into concepts became the core components of our framework. (Tripathi et al., 2021). The world of investing, robust is characteristic describing a model's, test or system ability to perform effectively its variables or assumptions is altered.

7. Why were there inclusion and exclusion criteria for this improvement project?

Inclusion and exclusion criteria are used to determine who can or cannot participate in a study. Consistent, reliable, uniform, and objective inclusion criteria are used to identify the study population. (Tripathi et al., 2021). To ensure that the results of a study are externally valid, researchers must think about the impact their inclusion and exclusion criteria will have on the external validity of the study.

The term "inclusion criteria" refers to a predetermined set of characteristics used to choose participants for a study. Inclusion and exclusion criteria are used to determine whether or not a subject is eligible to participate in a study. (Tripathi et al., 2021). Exclusion criteria are a set of predefined definitions used to screen out participants or to require those who have been accepted to withdraw from the study.

Inclusion criteria for the project were all pediatric patients younger than 16 years who were admitted to the pediatric medical wards. Exclusion criteria were patients who were immunocompromised, had head and neck infections, and patients with intra-abdominal infections. These criteria are further supported by recommendations that anaerobic blood cultures should only be performed for patients who are immunocompromised or suspected to be suffering from intraabdominal sepsis or head and neck infections (Iwata and Takahashi, 2008; Morris et al., 1993). This study was conducted over 6 months and included 6 pediatric wards, excluding all high-risk wards such as the children's intensive care unit, surgical wards, hematology–oncology wards, and the high dependency unit.

8. What interventions did the hospital improvement team develop? What were the assumptions that these interventions were based on?

Change was affected through the rapid cycle change methods, involving a series of Plan-Do-Study-Act (PDSA) cycles. A question-and-answer survey was disseminated to doctors to understand the current variations in blood culture practices in pediatric wards. Staff members were then taught using strategic and opportunistic educational sessions.

Various **interventions** were put in place and piloted in a single pediatric ward for 1 week. These included:

- limiting the number of anaerobic blood culture bottles available in each ward
- putting up wall-mounted reminders
- bottle tags and indication forms
- educational lectures
- brochures were provided for staff members.

After a successful pilot run, the interventions were rolled out to the rest of the general pediatric wards.

9. Did the improvement project achieve its objectives? Discuss the results and analyze the effectiveness of the achievements. What was the primary measure that the project used to demonstrate a success?

According to this definition, a project's success is measured in terms of benefits and stakeholder satisfaction, or in terms of how much of the project's objectives are achieved. (Osman, 2022). Stakeholders need to know that the project has been reframed in light of the current scenario. Describe the failures that have led to the current project's success, as well as the lessons learned from those failures.

The following discussion about the results reveals that the project **meets its objectives**. The **primary outcome measure** was the number of unindicated anaerobic blood cultures performed and the counter measure of the number of replenished anaerobic blood culture bottles at the ward level. Similarly, the number of aerobic blood cultures performed and the number of blood culture bottles replenished at the ward level were also monitored.

Monitoring of outcome measures was done on a weekly basis. These parameters were then plotted onto run charts, and the medians were calculated. This temporal view displays process performance and allows us to determine the changes that resulted **in improvement**. A before–after study chart was chosen to compare the effectiveness of the interventions. The *t* test was used to determine the significance of results. Ninety percent of the medical staff surveyed were unaware of any clinical guidelines regarding anaerobic blood cultures. In addition, 100% of the medical staff surveyed were completely unaware of the costs involved in processing anaerobic blood cultures. A series of educational lectures and visual materials were designed and distributed.

After the first week of the project, various interventional measures were implemented: reducing the number of anaerobic blood culture bottles available to five per ward. By restricting the number of bottles per ward, doctors were more likely to reserve these bottles for conditions with clinical indications requiring anaerobic cultures as part of all septic workups.

Since the **start** of the project, there has been a steady **decline in the number** of anaerobic blood cultures processed and replaced. In the first week of this study alone, there was a decline of 50%. This continued to reduce in subsequent months after further intervention.

By the **end** of the project, there was an **80% reduction** in the number of anaerobic blood cultures performed and processed. The workload on the microbiology laboratory staff was also significantly reduced.

From the start of this project, the most obvious reason for the overuse of anaerobic blood cultures was the fact that **physicians simply forgot** the true indications of anaerobic blood cultures. Educating staff about the true indications and the costs of anaerobic blood cultures helped to manage this. **Proper education** in addition, with restrictive measures and various reminders put in place in wards, the weekly number of anaerobic blood cultures remained **low**. The number of unindicated anaerobic blood cultures was sharply reduced successfully over 4 weeks to a nadir of 17.5 per week, which was an **80% reduction**. This translates to cost savings of USD \$145,560 per annum. according to the Infectious Disease team's electronic data records, there were **no cases of missed infections** attributed to anaerobic organisms. The findings from this study have significant implications for **improving workflow**, resource utilization, and reducing healthcare costs

In conclusion, this project has helped to identify the shortcomings of routine anaerobic blood cultures for septic workups in the pediatric population. As such, what this quality improvement project translates to is improved clinical practice with increased awareness amongst staff members, reduction in unindicated blood cultures, reduction in workload of microbiology laboratory staff, and significant projected **cost savings for both patients and the hospital**. Positive reinforcement from higher management and senior staff has led to a sustained improvement.

Part B

Compare and contrast the just in time concept with the focused factory concept in terms of their applicability to a healthcare operational setting.

Introduction

JIT and FF concepts are widely implemented in manufacturing industries, and their applicability to healthcare is being explored by healthcare professionals and researchers. This essay compares and contrasts the JIT and FF concepts in terms of their applicability to a healthcare operational setting. In this regard, operational concepts such as Just-in-Time (JIT) and Focused Factory (FF) have gained significant attention in healthcare operations management. **Just In Time**, is basically “What you want”, “when you want”, and “How much you want”. Over the years, healthcare organizations have adopted various operational management techniques to enhance efficiency and reduce operational costs. Healthcare is a critical industry, which deals with human lives, and it is crucial to optimize its operations to deliver efficient and effective care to patients. **The FF concept**, on the other hand, emphasizes on organizing the manufacturing process around focused product lines to enhance efficiency and minimize costs. This paper compares and contrasts the applicability of JIT and FF concepts in healthcare operations. (Jenkins, 2021)

A. Just-In-Time (JIT) Concept:

So as summary of comparison, we can say that traditional way sees the inventory as an important thing where as the JIT see it as a problem. In traditional way it takes longer time to set up where in just in time it takes a short time. We have a low flexibility in the traditional way where in Just In Time it is high. Traditional way is a push system but the JIT is a pull system. (Harrison, 2005)

The JIT concept is a lean manufacturing approach that aims to deliver products or services in a timely manner, exactly when they are needed, and in the exact quantity required by the customer in a healthcare setting. JIT involves the delivery of medical supplies, equipment, and medication to patients just in time for their use. The JIT concept is basically defined as the management concept which actually involves the providing of a particular service from a doctor or nurse or any other professional

healthcare practitioner will be providing the delivery of a service or a product only upon the demand and can be used by that of the health care clinics and the hospitals which will be acting as the tool for maximizing the expenditure in relation to that of the logistics. **Example:** If we take some of the examples then we can relate a type of the inventory management technique which will actually be reducing the total waste and the elimination which resulted from that of the non-value-added items. According to the particular concept of the focus factory basically relates to a provider organization which will be delivery in the high quality and the highly specialized care for its particular group of the patients and for a certain procedure or treatment.

There are five principles for JIT manufacturing:

1. **Total quality management:** Quality must always have a higher priority over cost.
2. **Production management:** Important to sustain the quality in the process. JIT uses the pull system as opposed to the push system. This allows the demand to set the tone for the production.
3. **Supplier management:** It is important to establish a long-term relationship with the suppliers, and by doing this you can grow with your suppliers.
4. **Inventory management:** The main emphasis is the goal of zero inventory and to achieve this, you must eliminate safety stock. Reduction in working process will reduce the number of defects in the event of problem.
5. **Human resource management:** You need companywide involvement across all the department, motivation is needed from managerial stand point to maintain continuous improvement. High employee interaction is essential for employees to work together to change the process for better. (Finkel, 1991).

Applicability of JIT to a Healthcare Operational Setting:

JIT in **healthcare** is originated in the manufacturing sector, but it has been successfully applied in various industries, including healthcare. The JIT concept is applicable to a healthcare operational setting, where it can be used to optimize the flow of patients, information, and materials. JIT can be used to manage inventory levels of medical supplies and equipment, reducing waste, and ensuring that they are available when

needed. JIT can also be applied to patient flow, where patients are scheduled for appointments just in time for their *medical procedures, reducing waiting times, and enhancing patient satisfaction*. (Jenkins, 2021). JIT can also be used to optimize the use of healthcare professionals, where staff is scheduled just in time to meet the needs of patients, reducing idle time and increasing productivity. (Skinner, 2014)

Advantages of JIT in Healthcare:

JIT can enhance the quality of healthcare services by ensuring that the right supplies and equipment are available just in time for use. JIT can also reduce the inventory levels of medical supplies and equipment, reducing storage and maintenance costs. JIT can enhance patient satisfaction by reducing waiting times and providing prompt and efficient healthcare services. JIT can also reduce the lead time for medical procedures, allowing patients to receive treatment faster, which can enhance health outcomes. (Skinner, 2014).

So, what does Just In Time do?

- It **reduces waste**: Waste could be anything that does not add value to the product but still has some cost.
- It **exposes problems caused by variability**: if you remove the inventory, you will have a bigger picture of what are your problems. It achieves a streamline production by reducing also the inventory.
- It can also help in the followings:
 - Reduce space requirements
 - Reduce lead times
 - Increased productivity
 - Greater flexibility Reduced scrap
 - Rework better relationship with suppliers
 - Simplified scheduling and control activities
 - Increased capacity
 - Increased equipment utilization
 - Better use of human resources
 - More product variety
 - Reduced need for indirect labor

Disadvantages of JIT in Healthcare:

JIT can have the following disadvantages:

- It requires a stable and predictable demand for medical supplies and equipment
- It can be difficult to achieve in a healthcare setting with unpredictable patient demand
- It increases the risk of stockouts, where supplies and equipment are not available when needed
- It compromises patient safety
- It can lead to increased stress and pressure on healthcare professionals, who need to work under tight schedules and deadlines. (Skinner, 2014).

B. Focused Factory Concept:

The FF concept is a manufacturing strategy that focuses on organizing the manufacturing process around a focused product line. The FF concept emphasizes specialization, whereby each factory is specialized in producing a particular product or a group of related products. (Skinner, 2014). The FF concept aims to enhance efficiency and minimize costs by focusing on a particular product line, eliminating unnecessary activities, and optimizing the manufacturing process. In healthcare, the FF concept can be applied in various operational settings, including the organization of healthcare facilities, healthcare service delivery, and healthcare technology management. The FF concept in healthcare is aimed at improving the efficiency of healthcare operations by focusing on a particular product line or service, and optimizing the manufacturing process. FF involves the implementation of a dedicated facility or department that is designed to produce a specific set of products or services, and is staffed by highly skilled professionals who are trained in the production process. (Skinner, 2014)

Applicability of FF to a Healthcare Operational Setting:

FF can be used to focus on a specific set of medical procedures, such as *orthopedic surgery or neurosurgery*, and optimize the production process to deliver high-quality services. The FF concept is applicable to a healthcare operational setting, where it can be used to improve the quality and efficiency of healthcare services. FF can also be used to optimize the use of healthcare professionals. (Skinner, 2014).

Advantages of FF concept:

- It **reduces cost and/or increases profit**. The FF concept minimizes costs by eliminating unnecessary activities and optimizing the manufacturing process. This leads to reduced operational costs, improved financial performance, and improved profitability.
- It **enhances the quality of care**: The FF concept focuses on a particular product line or service, which leads to improved quality of care. By specializing in a particular service or product line, healthcare providers can optimize (Skinner, 2014).
- It **improves efficiency** and provides a **faster response** to the customer: The FF concept focuses on a particular product line, thereby eliminating unnecessary activities and optimizing the manufacturing process. This leads to improved efficiency in healthcare operations, enhanced patient satisfaction, and improved quality of care.
- It aims **to reduce complexity**: by focusing on a limited set of products or services, and optimizing the production process to deliver high-quality products or services.

Conclusion:

In conclusion, operations management impacts the overall productivity and profitability of any business enterprise. It measures the efficiency of managers and other workers, hence accelerating individual and company's progress. Operations management is the company's engine room where prudent decisions and plans emerge. Therefore, an operations managers must need to take into account many factors when producing a product. They must make a decision to balance the cost and quality of their product or service when deciding whether to outsource, be innovative with technology or have inventory. Also, to choose to use globalization as a strategy for the business. The manager needs to abide by all legal policies and choose to have or to not have a business that is corporate socially responsible. The management of these key factors will contribute to the success or failure of the business so the manager's choices impact enormous amounts on how their business functions.

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