Sustainable and Transferable Inventory Management System for Small Healthcare Facilities

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Abstract

Managing the costs of supplies within healthcare facilities has been a task that has plagued the health industry for many years. Many facilities are accustomed to using a par system approach, which involves bringing an inventory item to an amount sufficient for daily operation. The par method often requires daily inspection by a healthcare worker, which reduces time spent performing value added tasks. Employees at small healthcare facilities have multiple responsibilities, therefore they cannot afford to spend much time on inventory management. A proposed approach is the Kanban method, which allows for strict monitoring of inventory items without the need of constant inspection. Items are organized according to the ABC classification system, with B and C items complying by a special case of the Kanban method, the two bin system. To implement such a system, healthcare employees must undergo training of inventory management principles. The educational training is a major component that allows employees to effectively sustain the inventory management system, as well as reproduce it across other residences on their campus. The purpose of this project was to develop an inventory management system for a small healthcare facility that is sustainable and transferrable.

Keywords

Inventory Management System, Consolidated Framework for Implementation Research, Healthcare, RE-AIM Framework

1. Introduction

As of 2010, healthcare costs in the United States have been estimated at 2.6 trillion dollars [1] with inventory accounting for approximately 30-35% of the total cost [2,3]. This means that roughly a billion dollars is spent each year managing the flow of items within healthcare facilities across the nation. According to the researchers at the Center for Innovation Healthcare Logistics at the University of Arkansas, high costs may be due to inefficient inventory best practices [4].

Many healthcare facilities do not have an effective method to maintain organization within the storeroom. This lack of organization leads to inefficient inventory management. Items that are not given a designated location known to all employees and are shelved haphazardly will lead to over ordering and having items expire. In most healthcare facilities, the inventory manager(s) are generally healthcare workers, mainly nurses, who have many other pressing responsibilities, primarily patient care. Therefore they do not have the necessary time to effectively manage item flow [5]. Lack of organization can also lead to an issue of an overstocked storeroom, which may be caused by having multiple employees placing orders for the same items and not designating one employee to handle all inventory requests [2]. Not having an effective method to maintain organization within the storeroom has led to over ordering items and in turn has caused inventory costs to increase.

The high cost of inventory has led many stakeholders in healthcare to seek other ideologies to help reduce inventory costs [6]. Many have turned to the success the manufacturing industry has had with lean management techniques for solutions to the inventory management problems that exist within healthcare [7,8]. In the case of inventory management in healthcare, lean would focus on issues of reducing over ordering, creating a clean storeroom for

easier stocking and retrieval of items, and maintaining effective inventory practices to help reduce cost so that employees can focus on providing their patients with quality care.

Researchers believe that the percentage of inventory costs can be reduced to 6-13% with the implementation of an effective inventory management system [9]. However, to work towards reducing inventory costs, healthcare facilities need an effective and efficient inventory management system that can be implemented. Some healthcare facilities, mainly large hospitals, throughout the United States have hired consultants specializing in supply chain to help develop these systems [1]. Smaller healthcare facilities may not be able to afford hiring a consultant to implement a system and educate employees on how to maintain that system [10]. Therefore, an inventory management system is needed that is easy to implement and manage in facilities with limited staff that have multiple responsibilities, without the aid of a consultant.

The purpose of this project is to define an implementation process for a transferrable and sustainable inventory management system for a small healthcare facility. Small healthcare facilities have little, if any, opportunity to employ a consultant to introduce inventory management techniques [10]. Therefore healthcare personnel are given the responsibility of making sure items are ordered weekly, while complying with the other demands of their job. This presents a problem for many nurses, because they do not have the time to physically count items and provide quality care to patients. The implementation of a Kanban system may help reduce the amount of time healthcare personnel spend managing inventory.

2. Background

Lean management has had a profound impact on several industries including manufacturing and healthcare. Lean implementation in manufacturing has resulted in supply chain improvements. The development of a more effective material restocking process by adjusting batch size, has allowed for more space in the warehouse and a reduction of inventory costs [11]. In healthcare, a 425-bed hospital in West Central Ohio improved their supply chain by implementing automation technologies that linked several departments within their facility. With this communication and data availability among departments, the hospital was able to streamline nurses' workflow, improve inventory management, and maintain better control of supply costs [12].

While there have been numerous examples of effective implementation of lean concepts at large healthcare facilities, limited literature focuses on lean management at small care facilities. This may be because many small facilities do not possess the resources to implement extensive lean strategies or tools. Many large care facilities can designate a team of administrators and employees to work solely on implementing lean principles [13]. The limited staff available at small healthcare facilities prevents this from happening. Having a small staff means that healthcare personnel assume many responsibilities including caring for patients, managing a unit, and performing administrative duties. These responsibilities limit the amount of time healthcare personnel can devote to projects that do not directly affect patient care. Patient care is the number one priority, so anything that detracts from that may not receive the appropriate time to function properly.

2.1 RE-AIM Framework
The RE-AIM framework serves as a guide to make the case for a quality improvement project that involves implementing simple inventory management techniques in small healthcare facilities. The RE-AIM framework [14] was originally developed to evaluate the effectiveness of public health and community-based interventions. Since its development, the use of this framework has grown to encompass many fields including sports injury prevention, environmental change, and quality improvement. The five dimensions that are used to assess the interventions are reach, effectiveness, adoption, implementation, and maintenance. Each dimension is defined below:
- *Reach*: The individuals willing to participate in an intervention or program.
- *Effectiveness*: The positive and negative effects on important outcomes.
- *Adoption*: The individuals who are willing to initiate an intervention or program.
- *Implementation*: The individual's adherence to the intervention protocol(s) with regards to consistency, time, and cost.
- *Maintenance*: The degree to which an intervention or program becomes part of organizational practices.

This framework is applicable to the proposed inventory management system because it allows us to understand why the intervention is needed and helps to analyze the impact of the intervention at the individual and organizational level. With each dimension, there is a "how" question that should be asked of the researcher. These questions are critical because they help researchers, employers, stakeholders, and others invested in improvement projects to evaluate the intervention before implementation takes place.

3. Methods

3.1 The Setting

The healthcare facility in which the inventory management system was implemented is located in Chicago, IL. It is comprised of eight individual residential facilities that are home to roughly 600 patients. The residence that was targeted for the quality improvement project is the largest on campus, housing approximately 120 patients. This residence will serve as a model for staff so that the inventory management system can be transferred to the other residences on campus.

The head administrator and four nurse managers at the targeted facility were involved with the design of the inventory management system. These individuals are the primary decision makers concerning inventory management and they determine who can be allowed to retrieve items from the storeroom. One of the nurse managers in attendance also served as the inventory manager and had been in the role for seven years. The storeroom manager was not involved with the development of the inventory management system, but was integral during the implementation process.

3.2 Intervention

Designing and implementing the inventory management system was completed in two phases. The first phase, storeroom management, was completed within seven full working days. Storeroom management consists of organizing all items by similar attributes into categories and rearranging the storeroom so that items can be easily stocked and retrieved. After the first phase was completed, the inventory manager wanted to begin the second phase immediately so the system could be in operation for at least a month before her retirement. The second phase, inventory management system, was completed within two weeks. The purpose of this phase was to implement a Kanban system for items requiring strict monitoring and a two-bin/box system for items that do not need strict monitoring. Specific details about the design and an assessment of the implementation phases are provided in the Results chapter.

3.3 Data Collection

Approximately one month after the completion of the quality improvement project, a survey that was created using Qualtrics was sent to the head administrator who disseminated it to the four nurse managers. A list of the questions and how they align with the RE-AIM framework is shown in Table 1. The survey questions focused on the functionality, sustainability, and transferability of the new inventory management system. These questions were designed to gather user perceptions about the inventory management system, opportunities for improvement, and sustainability.

3.4 Theoretical Framework

To help guide an assessment of implementation process, the Consolidated Framework for Implementation Research (CFIR) was used as a resource. CFIR is a combination of many implementation theories and is structured to gather information about what works in an intervention and why. This framework has five domains, explained below: the intervention, inner setting, outer setting, characteristics of the individuals involved, and the process of how the implementation is achieved [15].

- *Inner Setting*: The features of the structural, political, and cultural contexts through which the implementation process will proceed.
- *Outer Setting*: The economic, political, and social context within which an organization resides.

- *Characteristics of Individuals*: The cultural, organizational, professional and individual mindsets, norms, interests, and affiliations.
- *The Intervention*: The characteristics (adaptability, complexity, cost) of the intervention being implemented.
- *Implementation Process*: The interrelated formally planned or spontaneous sub-processes that work towards effective implementation.

Table 3.1: Post Implementation Questions and RE-AIM Framework Alignment

	Reach	Effectiveness	Adoption	Implementation	Maintenance
1. Were there any modifications to the new inventory system prior to it being put into effect?				✓	
2. How has the organization benefitted from the new inventory system?		✓			
3. How sustainable do you think the new inventory system will be within the organization?					✓
4. Do you believe this inventory system approach can be easily translated to different neighborhoods and residential facilities across the campus? Why or why not?	✓		✓		
5. Did the inventory system achieve the goals expressed by the organization (decreased costs, inventory in storeroom kept at a minimum)?		✓		✓	
6. How easily was this improvement approach learned by those that interact with the system?			✓	✓	
7. How well received was this inventory system improvement by users in the organization?		✓	✓		
8. Since this inventory system approach may be translated to other facilities on campus, what advice would you give for a more successful transition?			✓	✓	
9. What improvements would you make to the inventory system so that it better aligns with the organization's capabilities?	✓		✓		✓
10. How has your role within the inventory management system been impacted by the changes?					✓

4. Results

4.1 Characteristics of the Intervention

The first step towards implementing the new inventory management system was to categorize all items with similar attributes, which can reduce the amount of time spent searching for them. While performing this task, waste was discovered in the form of expired and no longer used items. The expired items were discarded and items no longer used were gathered for donation to other healthcare facilities. After the waste was removed, the remaining items were arranged in seven categories: medical, diapers, formula, respiratory, hygiene, office supplies, and miscellaneous. Miscellaneous items include disaster kits, emergency care kits, pillows, and other items not essential to daily care. Each category of items was given a designated location in the storeroom based upon frequency of retrieval and weight of item. Items that were used daily such as formula and diapers were located near the entrance of the storeroom, so that time spent stocking and retrieving them could be reduced. Formula, which is packaged and transported to the units in cases of 12-24 cans depending on the brand, is a heavy item. Restricting placement of formula to the middle and lower shelves may reduce the storeroom manager's potential risk of injury.

In addition to categorizing items by product type, color codes were assigned. The purpose of the color codes is to simplify inventory stocking and retrieval by associating a color with a particular group of items. The healthcare facility does not have a specialized color coding system in place for any other function, which will not create confusion for healthcare personnel designated to retrieve items. A color code chart was developed by the inventory manager as shown in Table 2. When assigning colors, the inventory manager matched color with category function. For example, respiratory items concern the patient's ability to breathe. Nurses associate a patient breathing properly

as having a pinkish color. Therefore when an employee needs to retrieve a respiratory item, they will go to the pink section of the storeroom because this color is associated with breathing/life.

Table 2: Inventory Color Chart

Category	Color
Medical	Red
Diapers	Orange
Formula	Blue
Respiratory	Pink
Hygiene	Yellow
Office Supplies	Green
Miscellaneous	Black

The storeroom's purpose is to house materials in a secure, clean, and organized setting. In order for the storeroom to fulfill its purpose, the placement of items must be designed so that the storeroom manager can efficiently and effectively retrieve and stock items without confusion. With the input from the inventory manager, improvements to the current storeroom included:

1. All items were classified by the ABC classification method.
    a. Helps determine which items require strict monitoring such as diapers and formula.
    b. Drives the location of more expensive items so that a visual check of inventory levels can be performed. More expensive items are located in the front of the storeroom near the entrance.
2. Less frequently used items and non-heavy items are located on the top shelves if space is limited elsewhere.
    a. Reduces the risk of potential injury to healthcare personnel, by eliminating the need of a step ladder to retrieve commonly used items.
3. ID labels for all items contains: product name, supplier name, order quantity, reorder point, location in storeroom, color code (label can represent color or a dot can indicate the color)
    a. Identifies items for easier completion of weekly orders
    b. Easier to locate items by category with color code present
4. Location of items was designated by aisle letter, shelf number, and row number. This concept is similar to that of a grocery store. Eight aisles consisting of 3-5 shelves were created for the item categories. Each aisle was labeled with a placard that provided item category and color code.
    a. Relates to a concept (grocery shopping) that is familiar to everyone.
    b. Ensures every inventory item has storage space in the storeroom that is logical and easy to locate.
5. Items that are retrieved and stocked often, as well as items that are of high value, are stocked near the entrance of the storeroom.
    a. Reduces the amount of time the storeroom manager spends retrieving and stocking those items.
    b. Hoarding is an issue, so having the more costly items near the entrance allows the inventory manager to perform a quick visual check of their levels.

After organizing the storeroom for easier retrieval and stocking of inventory items, the next phase was to implement the Kanban system. Kanban, which means card or signal, contains information about the item including name, supplier name, quantity per container, and location in storeroom. The Kanban system's goal is to maintain inventory at a minimum by supplying items only when needed. This system is used primarily for A classified items because it allows for strict monitoring. The healthcare facility documents weekly item purchase orders and has a record of this information dating back to at least five years.

After examining purchase orders for the previous year, it was determined that the A items would include diapers, formula, and gravity pump bags. It was determined that all diaper and formula associated items would be classified as A items as well because nurses were over using them. There was an issue with nurses using aloe touch wipes, a B item, on all patients after a diaper change even though the item is designated for patients with sensitive skin. The inventory manager decided to keep the stock in her office for strict monitoring, which eventually overcrowded her space. Classifying items such as aloe wipes as A allows for strict monitoring and frees up office space.

The A items account for approximately 70%-75% of the total weekly order budget. When the quantity of an item reaches its reorder point, the Kanban acts as a signal and alerts the storeroom manager that the item needs to be

ordered. This card is replaced in the "Kanban reorder bin," located in the storeroom, so that the inventory manager will know an item needs to be ordered that week. After the order has been placed, the cards will be placed in a "Kanban re-file bin". When the shipment arrives, the storeroom manager will return the card to the appropriate reorder point position.

The two-bin system is a special case of the Kanban method. It is primarily used for C classified items, as well as B items not requiring strict monitoring. Inventory for an item is separated into two bins. The first bin contains the order quantity minus the reorder point. The order quantity is the number of items that minimizes ordering and holding costs. The reorder point is the number of items that will last until the new order arrives. When the first bin is emptied, the storeroom manager retrieves the Kanban card for that item and places it in the reorder bin, which informs the inventory manager to order that item. The second bin contains the reorder point quantity, which will last until the new shipment arrives.

Two modifications of the two-bin system were adapted because of limited spacing in the storeroom. First, instead of using two bins, each item was given one bin that measured two feet long. The Kanban card divided the reorder point quantity from the rest of the items. For example, the order quantity for deodorant is twelve and the reorder point is three, then the Kanban card would be placed in front of three remaining deodorants. Slack is accounted for in the reorder point. This change to one bin allowed items to fit comfortably in the storeroom and created a considerable amount of space.

The second modification was to keep in compliance with health regulations. Some items cannot be removed from their original packaging, so the two-bin system now becomes the two-box system. Identifying the reorder point for these items requires a visual check. Items need to be reordered either when the box is half empty or three-quarters empty. The storeroom manager indicates the level for reordering on the box and it is also indicated on the item label.

The last step of implementation was to create a checklist to ensure sustainability of the system. The four main points of the checklist are to reduce waste, improve quality, implement better systems, and maintenance. The checklist serves as a reminder on how to properly maintain the new system as well as focus on continuous improvement.

4.2 Inner/Outer Setting

The healthcare facility identified the need for an easier approach to manage inventory after their inventory manager fell ill and no other nurse manager understood how to properly place orders for the week. The system that was in place at the time was similar to the PAR method. The inventory manager would physically count each item and order the necessary stock needed for the following week. The other nurse managers did not know the quantity needed for each item, which led to extensive time spent compiling purchase orders and over ordering.

During a meeting with the team, they expressed being open to any changes that would allow them to control over ordering and decrease the amount of time compiling purchase orders as long as the solution was cost effective. The healthcare facility annually receives about 60% of its funds from the government, 25% from donations, and 15% from other sources such as fees. All money received is used to keep the program running, pay staff, and hold fundraising events, so there is not much funding left to invest in quality improvement projects. Therefore the inventory management system must be of minimal cost and use resources that are readily available. This facility has a budget for office supplies, so creating color coded item labels, Kanban cards, and signs providing information on item location was not a burdensome expense. The only required purchase was placards that designated the aisles where items were placed.

4.3 Characteristics of the Individuals

The healthcare personnel at this facility, especially those in managerial positions, are devoted to providing quality care to the patients and ensuring that the organization is recognized as one of the top residential care facilities in the country. Many of the nurse managers have been employed at the facility for 20-40 years, so they have a familial connection with the organization. Caring for patients has always been the employees' priority, but growing with the organization means added responsibilities. The nurse manager involved with the intervention assumed the role of inventory manager seven years prior. Having that much experience managing inventory provided a smooth transition from the PAR-like method to the Kanban system. After implementation was completed, the manager had

no issues operating the system. In fact, during a recent visit to the facility, the head administrator provided an update on current inventory practices. She noted that the amount of time spent ordering items as well as stocking and retrieving items has decreased, which means more time can be devoted to patient care. Also, due to the implementation of the Kanban system, the facility has also seen a decrease in their weekly costs.

Essentially most of the employees seemed comfortable with the changes to the storeroom and inventory management system after training was completed. A survey respondent noted that at the in-service for supervisors, "they seemed very impressed at the initial condition of the store room. They commented that it was orderly and brighter. They liked the use of the Kanban Cards, but when told of their part in placing the cards in the holder for ordering, they were afraid they might forget. But overall they were very impressed with the whole system". There was an eagerness to use the new system because they bought into the idea that any improvements providing a potential reduction of workload and helping the organization save money would benefit both employees and the organization. The dedication the employees have to the organization contributed greatly to the success of this quality improvement project.

Approximately ten employees have authorization to retrieve items from the store room due to their supervisory position. A couple of the ten employees believed no intervention was needed. They were comfortable with the current setup of the storeroom, because they knew the location of the items they needed to care for patients and felt the addition of Kanban cards would be another responsibility. In fact, one of the survey respondents noticed hesitation in some employees and said, "The advice I would give would be to approach the change with an open mind. I think there was concern that the new system would be "more work" but it isn't."

4.4 Process

Learning that some healthcare personnel do not have a basic understanding of lean concepts is an example of why managing inventory is such a problem for healthcare facilities across the country. During the planning stage of the intervention, a proposal that explained an inventory management system using basic lean principles was submitted to the inventory management team. Unknown at the time, the inventory management team found the content of the proposal confusing. It was not understood until the material was presented in person. One respondent stated, "We found at the beginning it seemed a little mind boggling, but when Shree met with the ordering team and explained the process, it made sense." After the presentation was given, the team was able to provide helpful feedback such as color code designation and eliminating the use of the top shelves for employee safety.

Implementation occurred in two phases. First, storeroom management tasks such as moving items to their designated location, assigning color codes and developing labels were performed. Second, the inventory management system was implemented. Implementing both phases went smoothly except for developing item labels and Kanban cards, which proved to be the most time consuming tasks of the intervention. The healthcare facility has hundreds of items in their storeroom, so there were many instances of items not having a label or Kanban card. The labelling process took approximately two weeks to complete working six hours a day, whereas all other tasks were finished in a few days. Reflecting on this part of the intervention, the inventory manager stated, "It was very tedious at the beginning, when making labels and Kanban Cards. That process took up a lot of time. Even after we thought everything was completed, we found some products unlabeled and without Kanban cards. This was adjusted and everything fell into place."

When a new system has been implemented or any new changes are introduced into an environment, it is often difficult to accept change immediately. In fact one respondent noted that "…there was some skepticism at first (change is hard)". After the inventory management system was implemented, employees were able to benefit from the storeroom organizational component immediately, which allowed them to believe that the change would be good for them and the healthcare facility. Seeing that the storeroom organization proved to be beneficial, employees did not mind buying into the inventory management component of the system. Convincing employees that one change can be beneficial, made it simpler to introduce other components of the system.

5. Discussion

The aim of this project was to provide a guide for designing and developing an inventory management system for a small healthcare facility. This was achieved by focusing on the issues of lack of time healthcare personnel have due to multiple responsibilities, limited experience healthcare personnel have with lean principles, and sustaining the system after implementation. To address these issues, organizing the storeroom for easier stocking and retrieval of items was performed first. All items were categorized into seven groups and color coded for identification purposes. Items in the storeroom were rearranged so that more frequently used items were located near the entrance and heavy items were removed from the top shelves to reduce the risk of injury. Labels containing product name, supplier name, location in the storeroom, color code, quantity order, and reorder point were provided for each item.

The next phase of the project was to implement the inventory management system. Before this could occur, the ABC classification method was used to determine the appropriate level of monitoring for each item. Based on these classifications, a Kanban or two-bin/two-box protocol was developed for each item. The Kanban system provided the inventory manager with more time for other responsibilities because physically counting each item to determine if it needed to be ordered was no longer necessary. Employees that retrieve items were trained on how the Kanban method works so that the system can be sustained.

5.1 Sustainability

One of the biggest issues after implementing lean in an organization is maintaining the system. Many facilities struggle with system maintenance because proper measures have not been put into place. The first step to ensure sustainability is to train all healthcare personnel who interact with the system about proper storeroom and inventory management procedures. After implementation was complete, the inventory manager held an in-service in the storeroom to explain how the new system functions. Detailed explanations were given on why items in the storeroom were rearranged and given a color code. Preventing injury was a selling point to personnel because many discussed not wanting to use a ladder to retrieve items in fear of falling. Demonstrations were given on how to operate the Kanban system, so that all employees were informed on how it operates.

Another step to ensure sustainability is to create signage outside and throughout the storeroom. Creating signs to indicate where items are located in the storeroom as well as a grid displaying the storeroom layout was placed on the entry door so that employees know where to go to retrieve a particular item. In the storeroom, each aisle has been labeled by category and color coded accordingly. Signs that explain the color coding system have been added as well. The purpose of these signs is to reinforce storeroom management by constant reminder as well as reduce the amount of time employees spend searching for items. Employees do not have much time to spare, so having signs to direct them to the item needed will allow them to continue to provide quality care for their patients.

In addition to creating signage to help reduce time spent searching for items, the Kanban system reduces the amount of time the inventory manager spends counting inventory. Previously, the inventory manager spent a day counting and ordering items for the next delivery. With the implementation of the Kanban cards to signal that an item needs to be ordered, the inventory manager does not have to physically count items each week, which allows more time to complete her other responsibilities.

5.2 Lessons Learned

One of the lessons learned was that every issue a healthcare facility will have pertaining to managing item flow will not get solved just by implementing an inventory management system. Hoarding is an example of that. During the initial meeting with the inventory management team, hoarding was one of their main concerns. Unfortunately no inventory management techniques can solve that issue, but the new system provides a better way to track sudden increases in item flow. An increase in item flow can be caused by many things including hoarding or an emergency event, however knowing about an increase in item flow alerts the inventory manager of a potential issue. Further investigation will be needed to determine the problem.

When implementing an inventory management system in a small healthcare facility, make sure at least three people are involved in that process. One person should have knowledge of how the storeroom operates. Another person should have extensive knowledge on managing inventory. The final person should serve as a backup when the inventory manager is unavailable. An issue at this facility was that the current inventory manager was retiring and the nurse assuming that role was not involved with the implementation, primarily due to other obligations. Serving as the inventory manager's backup before, she was familiar with the previous system, however after the assuming the role inventory manager, she had to be brought up to speed about the new process. It also takes time for the nurse to adjust because he/she is adding another responsibility to an already dense workload. Having this person present during the implementation process may reduce any setbacks and anxiety that come along with a new role.

Having expert knowledge of inventory practices makes it easier to take control of the intervention and develop it accordingly. Healthcare personnel feel compelled to relinquish control since they have minimal knowledge of inventory management. It must be remembered that the employees will be the individuals operating the system, so they must be aware of what occurs at each phase of the process. Keeping employees involved may encourage sustainability of the system.

Lastly, make sure that the inventory and storeroom managers provide input. When developing the color codes for the item categories, the inventory manager immediately took charge of that task because of how nurses associate colors with patient-centered tasks. The color red was designated for medical items. Red is the color of blood and medical items include gauze, bandages, syringes with needles, and cotton balls. These items are used to either stop the flow of blood or to draw blood from the patient. The connections of colors to patients to devices needed for a task is one example of how valuable input from employees is when implementing the system.

5.3 Future Steps

The quality improvement project primarily focused on designing and implementing a sustainable inventory management system in a small healthcare facility. The next step is to understand how to tailor the system when it is transferred throughout the facility as well as to other small healthcare facilities across the country. One solution to this issue may be in the development of storeroom management and inventory management flowcharts.

The flowcharts can serve as an assessment of the current state of the storeroom and inventory management process to determine areas that may need improvement. The flowcharts could resemble the sustainability checklist created for this healthcare facility. The checklist allows the facility to continuously improve by eliminating waste/wasteful activities, ensuring items are organized and labeled properly, and ensuring that all required personnel are trained on how the inventory management system functions. Creating flowcharts to resemble the checklist will allow other healthcare facilities to analyze their current storeroom and inventory management systems and determine their efficiency and effectiveness.

Another solution that can be taken is the creation of a manual detailing the process to implement the storeroom and inventory management system explained in this paper. Many healthcare personnel are not familiar with lean management techniques used to make improvements within an organization. Creating a manual that describes the implementation of the storeroom and inventory management system will provide an example that other small healthcare facilities can replicate.

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