Warehouse Inventory and Material Process Flow Improvement in a Compounding Pharmacy

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Abstract

Pharmaceutical inventory management aims to improve the control over critical raw materials and its traceability, when used in the compounding of total parenteral nutrition (TPN) and reduce waste of expired materials. A compounding pharmacy dedicated to patient specific TPN products uses a variety of drug additives and components and raw materials that vary in final product quantity usage day after day. Improving inventory performance through lean six sigma approaches has been the objective of this research. By implementing Lean methodology with DMAIC tool, the material process flow in the Compounding Pharmacy has been able to reduce stock cost, material waste, diminish documentation errors, and has effectively controlled and monitored the raw material inventory.

Introduction

The lean six sigma DMAIC concept has been utilized in this research to determine the assignable causes of the inventory process flow variations and implement actions that shall control, and trace inventory used in a compounding facility. The project scope is to establish an improved process to reduce material waste, human errors in documentation, and effectively monitor and track all raw materials used for the finished product. The goal is to prevent any deviations in procedures related to traceability of materials and to improve the inventory system in a short timeline.

Background

Deficiency in inventory and material process flow has been identified in the compounding facility which has occurred that materials in the warehouse were not being used as per the first-in and first-out (FIFO) concept. Furthermore, the documentation and traceability of raw materials used during daily production have been a point of focus in internal audits because traceability of some materials such as disposables was not granted.

The approach of this research is to use the DMAIC methodology to determine the root cause of the events and identify effective solutions that can be implemented to prevent the recurrence of material waste and documentation errors.

Methodology

DEFINE

PROJECT CHARTER

CURRENT SITUATION
- Poor organization in cool room warehouse
- Poor process flow
- Material waste not used and expired
- Documentation errors in material lot/ expiry date used
- Traceability of materials used not efficiently established

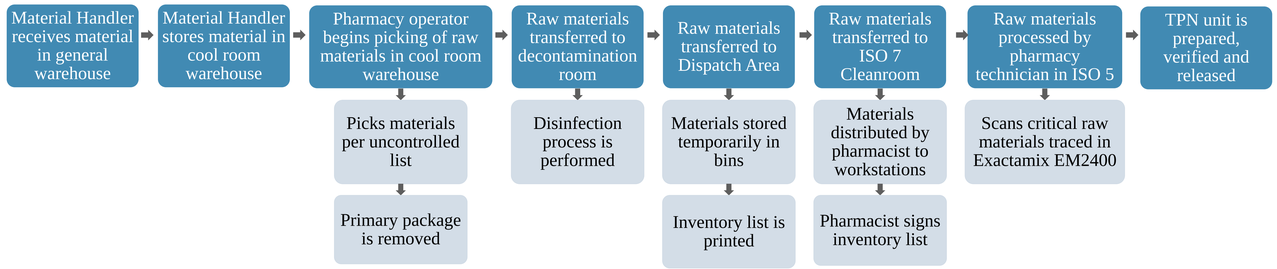
PROJECT GOAL
- Implementation of improved system within 30 days
- Optimize traceability of materials
- Drive consistency adequacy and thoroughness in tasks
- Reduce costs in waste

BARRIERS TO SUCCES
- Commitment to FIFO & Segregation
- Optimized inventory management software

KEY ACTION
- Gemba walk
- Process Flow Chart
- Fishbone Diagram
- 5S
- Cost Analysis

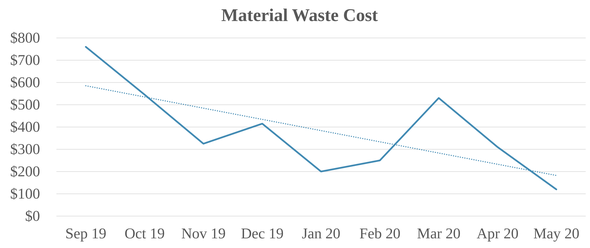
MEASURE

PROCESS FLOW CHART

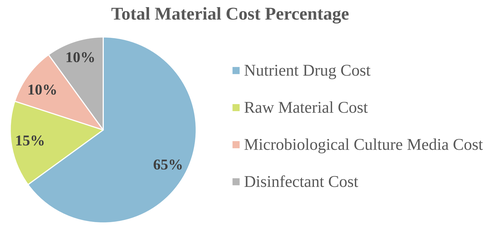


ANALYZE

WASTE COST AND TOTAL MATERIAL COST PERCENTAGE CHART



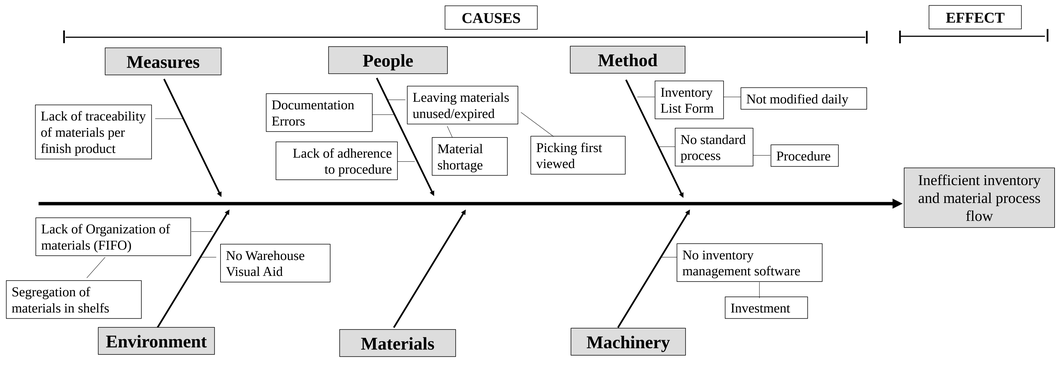
Material waste cost data generated from September 2019 to May 2020.



Evaluation of all material cost in percentage graph. Items identified to be left unused or expired were culture medias, disinfectants and raw materials.

IMPROVE

FISHBONE DIAGRAM



CONTROL

- Visual Aids in Cool Room Warehouse
- Creation of controlled form for traceability
- Audit Forms and Inventory Area

Results and Discussion

During the process of identifying the causes of deficiency in inventory management and material process flow, several factors were identified and mitigated following the lean six sigma methodology. For example, the implementation of visual aids to help identify which material lot numbers are in use and which ones should not, have significantly reduced the waste in materials unused/expired. Moreover, the implementation of a controlled form for the traceability of all raw materials used for the production of the TPN units has been effective and assures, with the revision of a pharmacist, that all raw materials and additives used in the compounding process performed per operator in each ISO 5 environment and Compounder is traced. This procedural form adds consistency to the process performed. Since the implementation of visual aids and an audited controlled form for traceability, no deviations have been identified. No waste related to unused/ expired materials has been detected during walk-throughs in the warehouse and waste cost analysis performed by operations management.

Conclusions

The existing inventory and material process flow were analyzed, and improvements were proposed. From the research conducted, the deployment of lean six sigma methodology in the organization has provided the identification of factors that contributed to the deficiency observed within the inventory organization, raw material process flow, and documentation of each lot/expiry used. The decision to review this process was due to observations identified within internal audits related to deviations to procedures, where traceability of all raw materials was not granted. The simple actions implemented for organizing and standardizing the documentation for traceability of all materials used for the compounding of the total parenteral nutrition have been reliable and effective in mitigating the deviations previously identified and the costs in waste of unused materials.

Future Work

It is suggested that in the future, an inventory system software be used to facilitate the counting of inventory and record the traceability of all materials in a better effective manner.

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