**Overview**

The overall goal of this project was to improve the efficiency of the inpatient medication distribution and delivery process at UH by May 1, 2015. The number of medication credits, missing medications, and first dose deliveries processed led to large amounts of rework and excess motion for nursing and pharmacy staff. Not having needed medications and excess processing also led to poor staff satisfaction.

The proposed intervention was to move from delivering medications once a day to three times a day, so that more medication updates were captured. The updates were scheduled around the major med passes (0900, 1700, and 2100), so that the most updated orders would reach the floors.

Post-intervention outcomes showed favorable results.

**Problem**

The current use of the inpatient pharmacy robot at University Hospital, the Aesynt Robot Rx, has created numerous inefficiencies in the medication fill and distribution process.

The figure to the right shows all of the nursing and pharmacy tasks associated with the distribution of inpatient medications at UH. The current state utilized a single, once daily update process and delivery of medications for a 24 hour period leading to long lead times of 9 to 33 hours prior to administration and an overall increase in the volume of missing medications, first doses, and doses being returned to the pharmacy. Other problems:

- Repetitive tasks and workarounds
- More time spent looking for medications
- Delays in pharmacy and nursing tasks
- Decreased pharmacy and nursing staff satisfaction
- Increased costs.

A more efficient process is needed to improve distribution efficiency.

**Analysis**

The current inpatient medication distribution process was studied to identify opportunities for improvement. 66% of steps in the current state process were identified as non-value added activities.

Additional studies were conducted on medication order and administration data. There are three peak times that medications are delivered to patients throughout the day for which most orders are written. Also, patient admission, discharge, and medication discontinuation events were studied to understand where many of the medication credit returns may be resulting from throughout the day.

A model was built from the data to determine the frequency and time of day of deliveries that would provide the most return. In particular, two and three deliveries were tested. The expected savings can be seen in the table below.

**Actions**

- The change to three deliveries was put in place January 12, 2015.
- The period of January 13 – March 11, 2015 was used as the intervention trial period.
- Direct observation time studies were also conducted for a period of 3 weeks to study the time taken in dispensing first doses, performing returned medication credits, and cartfill deliveries in order to calculate cost savings from waste reduction efforts.
- Surveys were sent out to the nursing staff to assess perceptions of the new process.

**Results**

Results were studied post-intervention to evaluate the improvement. Adjusting for increased patient volumes, results were even more favorable than predicted by the model.

Daily first doses and return doses over the course of the two month period were reduced by 46.8% and 40.4%, respectively. Overall, total doses dispensed from the pharmacy was reduced 8.3%.

Waste reductions have the potential for the reallocation of $85,000 – $105,000 of pharmacist, pharma tech, and nurse time annually to more value-added activities depending on patient volumes.

**Next Steps**

- Survey results indicate lack of communication of how envelope process has been put in place leading to additional time that nurses spend searching for meds. Plan to implement a visual management document in the place of work to cue nurses on which envelope to look in for medications to facilitate communication.
- Continue to work on eliminating the root causes of missing medications.
- Finalize survey analysis.