Kit Processing Software for Managing Emergency Kits: Setting up for a safer process?

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Introduction

- Manually pulling drugs, assembling emergency kits and relying on manual checking has shown to lead to significant errors. Stocking errors range from 5-35% based on fielded data with hospitals across the country.

- Kit Check™ is a hospital pharmacy kit restocking system. It was designed to reduce time spent preparing kits, cost of kits, and number of errors.
- Over 400 hospitals currently use the system. Brigham and Women's Hospital in Boston, MA reported zero errors refilling thousands of operating room trays after implementing the system. University of Maryland Medical Center was able to report a drop in errors from 1 in 20 kits to 1 in 4,000 kits[1].

- The system is centered around labels that can be encoded with a specific drug name, NDC, lot number and expiration number. Once the labels are checked for accuracy, entire kits can be scanned for what drugs are missing, extra, expiring soon or expired. Kits can then be verified as complete and assigned a location in the hospital.

- At the Hospital of Central Connecticut (HOCC), the system is utilized for assembling and refilling code carts, rapid sequence intubation kits, anesthesia carts (A carts), and other emergency kits.

Methods

- Work observations and workflow policies for pre- and post-Kit Check™ implementation were reviewed.
  - Prior to obtaining Kit Check™: Managers manually documented time spent at each medication dispensing station based on in-person observation of technicians refilling A carts
  - Post-implementation: Reports available on Kit Check™ allowed the pharmacy to keep track of more data points without needing in-person observation

- Reports used for analysis of the current workflow with Kit Check™ included:
  - Kits needing reworking: caught if there were any kits with expired medications
  - User activity: monitored the time it took to refill A carts
    - Allowed for a direct comparison to a piece of the previous workflow
  - Items tagged: identified timing for tagging items as well as what items and in what quantity those items are used
    - Used to assess par levels and to identify potential areas for cost savings

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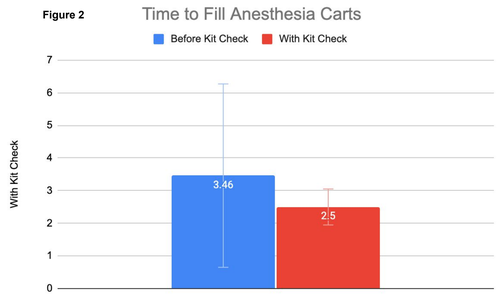
Results

- Prior to Kit Check™, medications were manually pulled for each kit by pharmacy technicians and checked by pharmacists. After kits were refilled, they were not checked daily but were reviewed on a routine basis. It was possible with this workflow to get occasional mistakes or phone calls for medications that needed to be refilled. Stock outs and misstocks were hard to capture and monitor for identifying ways to improve.

Figure 1

Figure 2



- With Kit Check™ implementation, the process has changed to attaching tags (shown in Figure 1), which are verified by at least one pharmacist with coded NDC, lot number, and expiration. No major issues have been reported with transitioning this workflow.

- The pharmacy technicians have reduced time refilling A carts, taking an average of 2.5 ± 0.522 minutes to refill an A cart compared to 3.46 ± 2.81 minutes seen previously (shown in Figure 2).

Intervention	Propofol	Ketorolac	Succylocholine	Glycopyrolate
Reduced par level	by 3	by 2	by 2	by 5
Savings in drug	$131.04	$34.44	$1,136.66	$226 to $294
Savings in tags	$35.91	$23.94	$26.22	$59.85

- The new system has allowed for cost savings with the ability to closely monitor par levels and track usage of medications. Par levels on several medications have been reduced based on their usage. Purchasing less medication has allowed HOCC to save money.
  - Example: Glycopyrrolate par levels were decreased by five vials in all operating room locations based on usage reports run from Kit Check™ (one-time savings shown in the table above).

- Drawers get scanned nightly for A carts, leading to less stock outs. This scanning also allows the pharmacy to leave drugs in a kit for longer.
  - Staff is able to keep closer tabs on inventory without having to set an earlier date for medications to come back to the pharmacy for review.

- Kit Check™ allows for a safer process of managing kits by enabling pharmacy to monitor for proper kit contents, medication quantities and expiration dates daily.
  - One way to track errors on Kit Check™ is through a report that looks at the number of kits that need reworking.
  - Over a 4-week period, there were zero medications that had expired and remained in the anesthesia carts.

Conclusions

- Through this review, it was affirmed that Kit Check™ provides a viable option for managing hospital kits with reducing errors and allowing for cost and time savings.
  - Examples of this conclusion: tracking kits and finding zero expired medications, directly observing an overall reduction in time to refill A-carts, and lowering par levels for medications with the ability to track medication use more accurately
  - Pharmacy technicians and pharmacists are completing less monentenous checks of emergency kits with the updated workflow. Since implementing the new system, there have been no major issues reported.
  - Overall time spent on kits may not be dramatically decreased. However, it can be argued that the system has allowed for safer medication management and lowered cost associated with emergency kits.

Possible Pharmacy Interventions

- Other hospitals within the Hartford Healthcare system that do not utilize Kit Check™ may be able to evaluate their current workflow with emergency kits. After evaluation, they may decide if a system like Kit Check™ could improve outcomes in time, safety and cost.
- Under the Hospital of Central Connecticut, a new system may be added to an additional campus.

Limitations

- This review was conducted with limited data points from the workflow in place prior to using the new system.
- Kit Check™ does not report times in less than one-minute intervals. As such, the time to fill A-carts had to be reported in whole numbers and may not be the best estimate of time spent on each cart.

Future Directions

- Further tracking of rate of errors may show the system's consistent benefit.
- Further evaluation of medication par levels over time may reveal additional opportunities for reduced waste and cost savings. Advanced Segment Optimization is a Kit Check™ report that may be utilized in the future to assist in this ongoing process.
- Future comparison of cost associated with the system (mainly the tags) and the cost savings generated from using the system may be completed.

References

1. Kit Check™. (2019, July 2). *Case Study: Brigham and Women's Hospital 100% Pharmacy Kit Accuracy*. https://kitcheck.com/stories/100-percent-pharmacy-kit-accuracy-brigham-womens-hospital/#:%7E:text=Manually%20restocking%20kits%20yielded%20an,or%20a%205%25%20error%20rate.