2023

Standardize to Optimize: A contemplation of Pyxis, inventory, and workflow

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Standardize to Optimize: A Contemplation of Pyxis, Inventory, and Workflow

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Background

- Automated dispensing cabinets (ADC) are commonly used within hospitals to store and distribute medications in a timely manner.
- ADC use creates a more efficient workflow and decreases medication errors through unit dose drawers and pockets within ADCs.
- Optimization of ADCs has yet to be fully defined. The paucity in data has created a knowledge gap on standard optimization methods.
- ADC medication stockouts can create delay in medication administration, increase pharmacy refill times, and decrease pharmacy productivity.
- Additional costs and reduced storage space are associated with unused medications in automated dispensing cabinets.

Purpose

- Evaluate ADC efficiency through periodic automatic replacement (PAR) level adjustments.
- Correlate number of vends and number of fills with increased medication minimum and maximum levels.

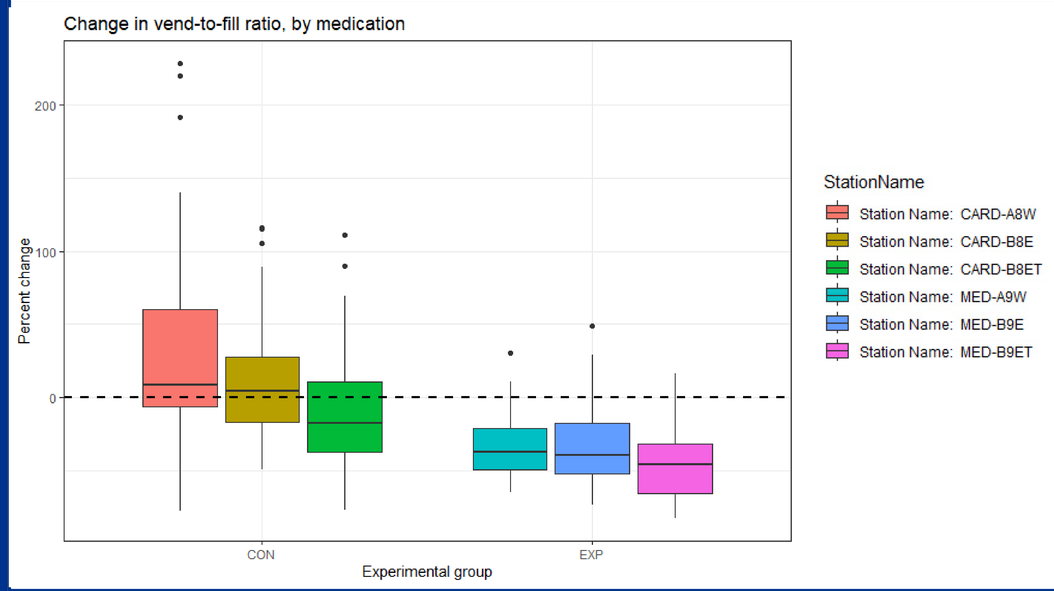
Objectives

- Primary outcomes
  - Vend to fill ratios of the top 50 medications per Pyxis machine.
- Secondary outcomes
  - Number of medication refills
  - Number of medication vends

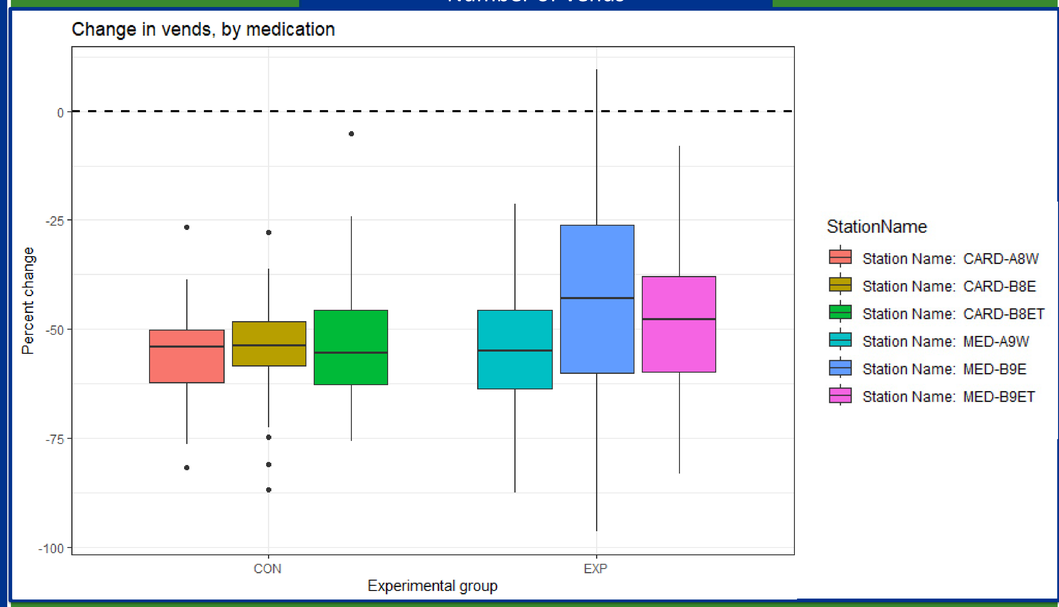
Methods

- Study design
  - Prospective study
- Inclusion criteria
  - Top 50 medications used from each Pyxis from two different hospital services (3 Pyxis machines per service).
    - Identified through RxAuditor 90-day report.
    - Service lines with similar ADC usage
- Exclusion criteria
  - Medications with lower number of vends outside of the top 50 medications for each service
  - Medications with multiple pockets in the same ADC
  - Non-unit dosed medications
- Interventions
  - Removal of unused, non-essential medications from ADC
  - Increase PAR minimum levels for one hospital service's top 50 ADC medications

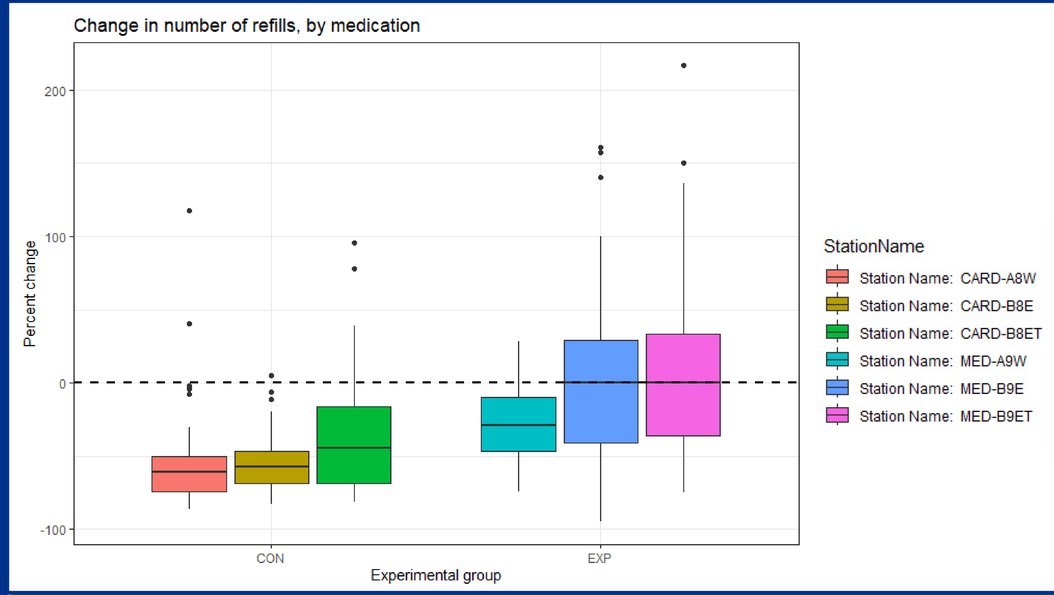
Change in Vend to Fill Ratio



Number of Vends



Number of Refills



Discussion

Results

Change in Vend to Fill Ratio

- Inversed relationship with vend to fill ratio with increasing PAR
- Primarily increase in number of refills with experimental group

Change in Number of Vends

- Decreased among all ADCs
- Non-significant change between control versus experimental group

Change in Number of Refills

- Ratio of 1.88 increase in refills by increasing PAR minimums one additional day
- Strong inversed relationship suggests minimum PAR levels are triggered more frequently in top 50 used medications.

Optimization Data Limitations

- Rx Auditor data was extrapolated beyond 90 days.
- Current medication usage may fluctuate within different ADCs.
- Only top 50 medications were evaluated and correlations cannot be extrapolated to less frequently used medications.
- Limited data on medication stockouts and expired medications

Going Forward

- Continue with current minimum medication PAR levels
- Validate complete ADC medication standardization
- Combine medications with multiple pockets into one standard pocket for each ADC
- Validate correlation with reduced number of PAR levels to test efficiency

- Complete analysis of all medication usage loaded into ADCs
- Complete analysis of medications loaded into ADCs from various services throughout the hospital
- Complete a detailed statistical analysis on medication stockouts, variations, medication returns in relations to PAR maximum level adjustment

References

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2. O'Neil DP, Miller A, Cronin D, Hatfield CJ. A comparison of automated dispensing cabinet optimization methods. Am J Health Syst Pharm. 2016 Jul 1;73(13):975-80. doi: 10.2146/ajhp150423. Epub 2016 May 23. PMID: 27217517.
3. Mann J, Dipper A, Rowe E, Hatfield C. Lean six sigma in the pharmacy department. Pharmacy Times. Sept 2014; 3(5).