Patient-centric medication management system to improve patient safety and optimize services at Johns Hopkins Aramco Healthcare, Saudi Arabia

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Introduction/ Background

Our hospital is an integrated delivery network, including a 330 bed tertiary care hospital, responsible for the provision of healthcare to approximately 360,000 beneficiaries and an ambulatory medication management outpatient service which offers care for approximately 1.5 million outpatient visits per year, with 2.4 million medication prescriptions dispensed annually.

The Primary Care Pharmacy is the busiest ambulatory location amongst all ambulatory pharmacies, dispending approximately 4,000 prescriptions daily. Issues such as long wait times, manual work processes, suboptimal facility structure, and patient/pharmacist physical barriers collectively resulted in a low staff morale, patient complaints, and an increased risk of medication dispensing errors.

Aim

Medication errors are property of the system as a whole rather than results of the acts or omissions of the people within the system. Therefore, an integrated approach involving a combination of physical design change and medication management system automation is required. Pharmacists play a key role in such changes as they can identify and prioritize areas for improvement.

Goals:
1. Reduce incorrect quantity dispensing errors by 50 percent within 1 year of implementation
2. Reduce average patient waiting time (serving time) by 50 percent within 1 year of implementation
3. Increase mean score patient satisfaction rates by 20 percent within 1 year of implementation
4. Increase near miss and clinical intervention reporting rates by 20 percent within 1 year of implementation

Methodology

Sample results are shown below from the primary care pharmacy – similar results are noted from specialty pharmacy and Hasa pharmacy

Main key performance indicators and data extracted electronically:

1. Number of reported near misses and errors involving wrong quantity filled/dispensed
2. Number of reported near misses and errors involving wrong medication dispensed
3. Mean average patient waiting time
4. Mean score of patient satisfaction rates
5. Number of pharmacists reporting electronic clinical interventions

Timeline:

Phase I: barcoded robotic dispensing for loose tablets (PARATA® ROBOTIC DISPENSER)

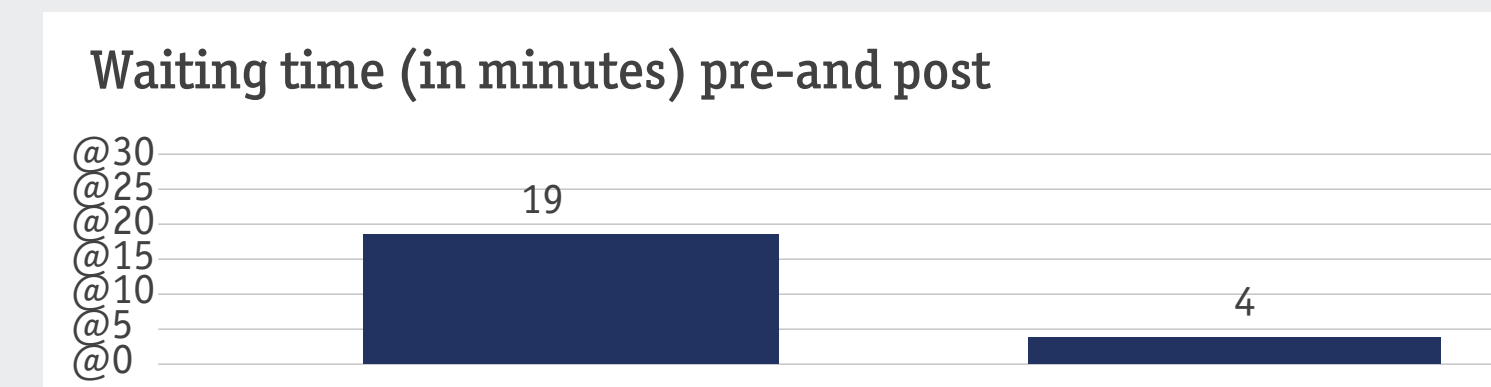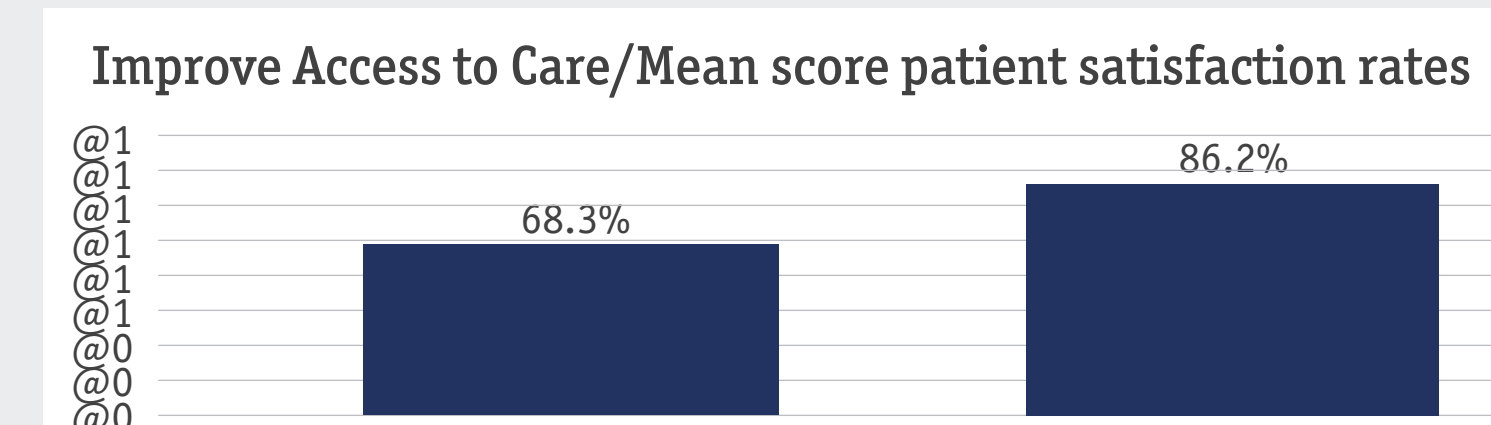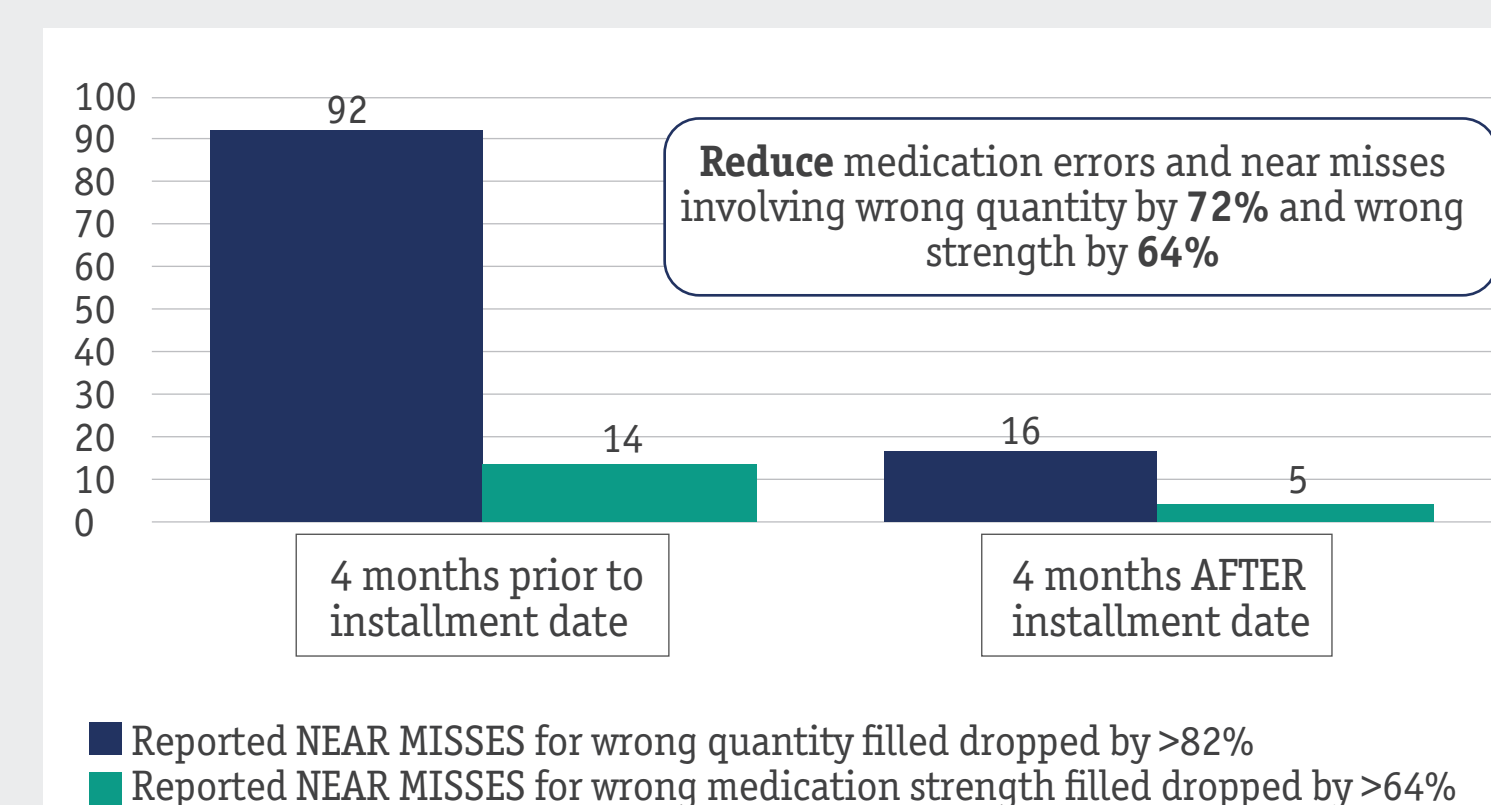Phase II: barcoded robotic dispensing for medication packs (CONCIS® ROBOTIC DISPENSER)

Phase III: Patient counseling area construction and physical redesign to complement the automation project and ensure privacy and patient centered model

2016 piloted in primary care pharmacy
2017 fully implemented in specialty pharmacy
2018 fully implemented in Hasa pharmacy

Results

- 82% reduction of reported near misses and errors involving wrong quantity filled/dispensed within 4 months of implementation
- 64% reduction of reported near misses and errors involving wrong medication dispensed within 4 months of implementation

- Reduction of mean average patient waiting time (serving time from moment of obtaining ticket till served at the window) from 19 minutes to 4 minutes within 1 year of implementation
- Increase of mean score patient satisfaction rates from 68.3% to over 85% within 1 year of implementation
- Increase of total approved clinical intervention rate from 15.33 interventions per 1000 prescriptions to 43.6 interventions per 1000 prescriptions

Reduce medication errors and near misses involving wrong quantity by **72%** and wrong strength by **64%**

- 4 months prior to installment date: 92, 14
- 4 months AFTER installment date: 16, 5

Reported NEAR MISSES for wrong quantity filled dropped by >82%
Reported NEAR MISSES for wrong medication strength filled dropped by >64%

Improve Access to Care/Mean score patient satisfaction rates
- 68.3%
- 86.2%

Waiting time (in minutes) pre-and post
- 19
- 4

Number of Reported electronic medication near misses, per 1000 prescriptions

	Pre	Post
Frequency of Reporting per 1000 Prescriptions	15.22	45.17

Post implementation, On average: For each 1000 medication orders, more than 45 are changed by a clinical pharmacist to prevent an adverse event, counsel patients properly, or optimize treatment.

Conclusions

The success of the initial implementation of this automation model led to its application in all our remaining ambulatory pharmacy settings accomplishing an increase in both patient and staff satisfaction, increase in counseling manifested by an increase in clinical interventions, and a decrease in patient waiting time and dispensing errors. Automated dispensing robots offer sustainable and system based safety modules.

By pairing patient-centric physical design with state-of-the-art medication management outpatient robotic technology, our hospital is one of the few pioneers in the Middle East for creating a system-focused, patient-centric culture of safety for the organization. We applied the integration of two different outpatient robotic dispensing technologies with the electronic healthcare host system for outpatient medication management. The success of this model led to its application in the remaining ambulatory pharmacy settings accomplishing an increase in patient and staff satisfaction, increase in patient counseling manifested by an increase in clinical interventions, and a decrease in patient waiting time and decrease in dispensing errors

Bibliography

Johns Hopkins Aramco Healthcare Pharmacy is one of the few pioneers in the Middle East for applying the integration of two different outpatient robotic dispensing technologies with the electronic healthcare host system for outpatient medication management and then pair with a physical environment re-design to obtain optimal patient safety and satisfaction

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