Improving Dispensing Workflow and Patient Safety using Human Factors Principles at National Cancer Centre Singapore Oncology Pharmacy

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INTRODUCTION

The National Cancer Centre Singapore Oncology Pharmacy serves an average of 150 patients/day. In an environment where workload is high and there is pressure for accurate and timely delivery of chemotherapy, medication near miss incident rates remain at a level that is above target despite human vigilance. Near Misses can potentially translate into actual medication errors, which can have severe consequences due to the narrow therapeutic index of chemotherapy drugs. Human factors principles can help to optimize the interactions between staff and the system in which they work to reduce human error.

OBJECTIVES

1. To identify problems in dispensing workflow at the National Cancer Centre Singapore Oncology Pharmacy.
2. To establish and evaluate interventions for improving patient safety.
3. To reduce dispensing near misses rate per 1000 prescriptions at Oncology Pharmacy from 0.76 to 0.38 within 15 months.

METHODOLOGY

1. Conduct a survey for oncology pharmacy personnel using the "Human Factors and Safety Analysis Form" and do a gap analysis.
2. Initiate interventions in workflow encompassing work procedure, task performed, staff training and guidance.

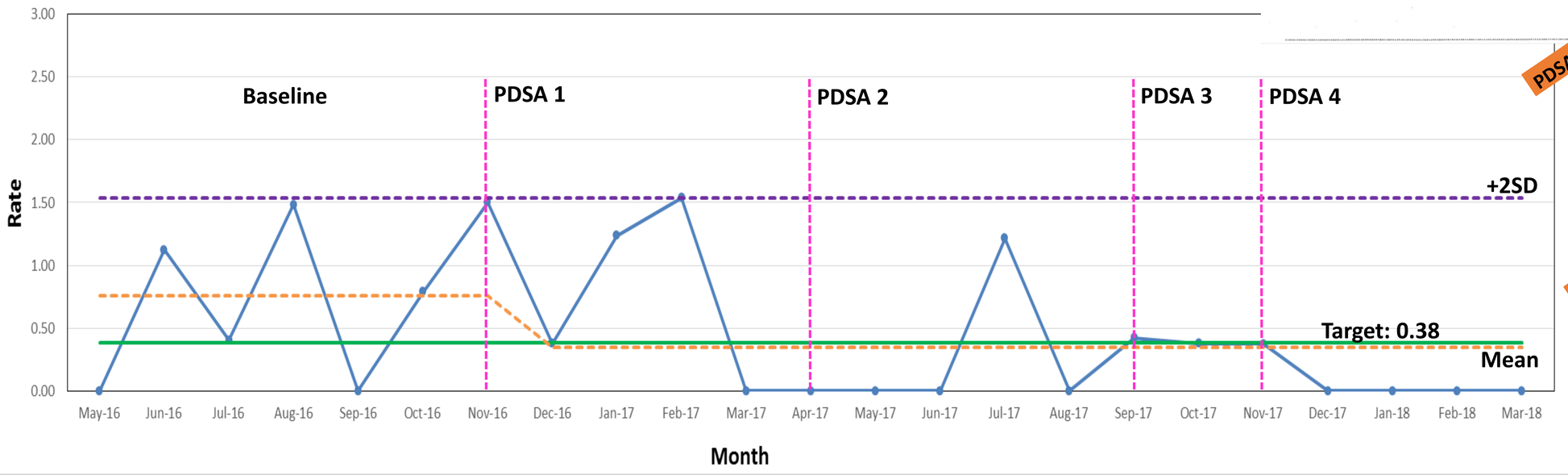
RESULTS

6 staff comprising of 4 pharmacists and 2 pharmacist technicians with different years of experience were surveyed (approximately 1/3 of staff strength).

Summary of Issues faced by Staff

Pharmacist (P)	Pharmacist Technician (PT)
Work Description and Characteristics	
• High frequency in which the work is performed (4)* • System is not tolerant to errors (3) • Unclear what to do for trial chemotherapy cases (1)	• High frequency in which the work is performed (2) • Perform tasks based on experience rather than knowledge (1) • Need to ask for pharmacist's help to make date changes to chemo orders and to calculate chemo doses (1) • System is not tolerant to errors (2)
Job Demands	
• Visually demanding (4) • Frequent need for decision-making, including deciding if there is a need to consult the oncologist (2) • Job requires frequent multi-tasking or performing parallel tasks (4) • Work is done under time pressure (2) • Worker needs to be highly concentrated and attentive (3) • Occasional radical shifts in job demands (4) e.g attend to hypersensitivity reactions, called upon to review patients	• Visually demanding (2) • Will consult Pharmacist in decision-making (2) • Job requires frequent multi-tasking or performing parallel tasks (2) • Occasional radical shifts in job demands – e.g. receive large deliveries of drugs (1)
Team Work	
• No specific team member who determines the course of work (4) • Division of responsibility and labor is unclear due to undesignated and overlapping tasks (3) • Information is largely communicated verbally between team members (4) • Not working together in fixed teams (6)	
Job Risks and Safety Measures	
• Stress if error is committed (2) • Threats by patient e.g. write to the press, complaint letter to medical board (1) • Tempted to take shortcuts during checking if under severe time pressure (1)	

*() number in bracket denotes the number of times issue was mentioned.



RESULTS

Gap Analysis

From our analysis, we identified several areas that we would like to review and improve upon:

- High mental workload of pharmacists over prolonged duration of time
- Job scope of Pharmacist Technicians
- Unclear division of labor

RISK MITIGATION STRATEGIES

PDSA 1 - Redesigned Workflow:

- Each task in the process is streamlined into dedicated tasks – Clinical checks & Physical checks
- Clearly defined roles for Pharmacy staff
- Upskilled pharmacist technicians for redeployment from printing orders to picking/packing/ dispensing.

Current Workflow

	1st check	2nd check + Dispensing
Receive Q number →	PT/P prints chemotherapy order & drug labels → Drug labels are sent into the lab for preparation →	Any PT/P checks prepared drug and matches it to chemo order. Place into checking Q →	P checks chemotherapy order, picks IV and PO medications and checks physical drug →	Another P repeats all checking steps and dispenses drug out

P1 - 1st clinical check (Pharmacist)
P2 - 2nd clinical check (Pharmacist)
P3 - Final physical check (Dispensing Pharmacist)
PT - Pharmacy technician
Floater - Any pharmacy staff

Redesign Workflow → **PDSA 1**

	2nd check	Dispensing
Receive Q number →	P1 verifies chemotherapy order; prints order & drug labels → PT/ Floater sends drug labels into lab, picks IV and PO medications →	PT/ Floater checks prepared drug and matches it to chemo order. Place to checking Q →	P2 double checks chemo order →	PT/ Floater sends drug labels into lab, picks IV and PO medications

PDSA 2 - Implementation of chemo worksheet form with checkboxes

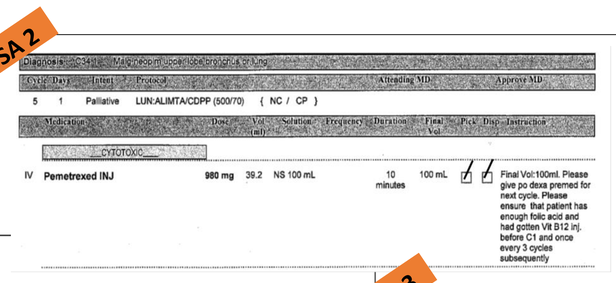
Prevents inadvertent omission of drugs during dispensing process. Picker and P3 needs to tick checkbox that corresponds to item picked/dispensed.

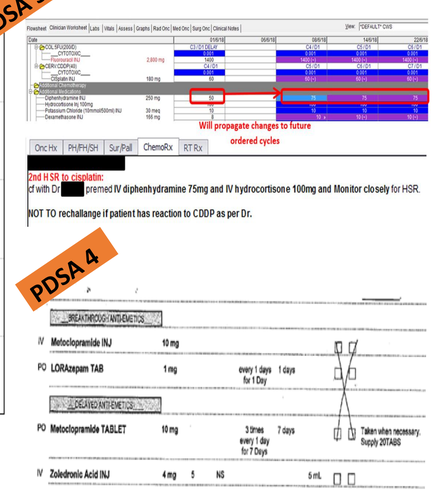
PDSA 3 - Amendment of MOSAIQ orders by pharmacists for supportive care medications

Reduces reliance on free-text instructions for dispensing (reduces mental load on pharmacists checking orders). These instructions are usually written by oncologists/pharmacists who intervene with oncologists on a communication window ("ChemoRx") in MOSAIQ chemotherapy prescribing system.

PDSA 4 – Crossing out of items that are irrelevant to the dispensing process during order verification

Prevents dispensing of items that are not required by the patient. Chemotherapy is ordered using preset templates in MOSAIQ – not all items listed on the template needs to be dispensed e.g. standby nausea/vomiting medications for breakthrough vomiting, PRN ("when necessary") items that may not need to be dispensed every cycle.





CONCLUSION

With the redesigned workflow using Human Factors Principles and risk mitigation strategies implemented, the project team has reduced the average dispensing near misses rate per 1000 prescriptions at Oncology Pharmacy from 0.76 to 0.37 within 15 months. The team will continue to monitor the result for sustainability.

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