Project Title

Optimizing Supply of Non-Standard Consumables with SingHealth Order Management System (OMS)

Project Lead and Members

Project lead: Wong Kok Cheong

Project members: Zhang Yanli, Lai XuanHua, Arlene Ramos, Ong Ling, Goh Poh Hong, Loi Foo Chin, Koh Xin Yu, Nurfarahlyna Bte Mohd Osman, Wong Hai Hong, Chow Sook Fung, Reenah Ang, Tan Ai Bee, Adrian Wong, Mindy Chiang, Ricky Heng, Rahimah Bte Jasmin, Stanley Sia, Janet Chua, Goh Jhin Hin, Yoong Ying Ying, Aditi Jain, Jaye Wong Guocong

Organisation(s) Involved

Changi General Hospital

Healthcare Family Group(s) Involved in this Project

Nursing, Pharmacy, Healthcare Adminstration

Applicable Special or Discipline

Healthcare Administrator, Pharmacology,

Project Period

Start date: September 2022

Completed date: August 2023

Aims

The objective of this project is to develop a streamlined enterprise solution that facilitates a harmonised and integrated ordering and fulfilment process for frontline healthcare personnel (nurses and therapists), enabling them to order and receive

non- standard consumables for patient care in shorter turnaround time, resulting in better productivity and job satisfaction.

Background

Traditional ways of ordering non-standard consumables were inefficient with inherent 'wastes' in the processes such as manual form filling, multiple hand-offs, batch collection and manual sorting of orders by different stakeholders along the supply chain. These "wastes" often resulted in long turnaround time for the orders to arrive and caused frustrations for nurses who were unable to complete their tasks without the wound dressings, especially for urgent requests for patients' wounds, thus compromising care. A Lean study done in 2012 showed the turnaround time could reach as long as 5 to 6 hours during peak hours.

The manual processes were also prone to human errors (e.g. transcribing errors, loss of form), resulting in unnecessary reworks, missed billings or inventory errors.

For Rehab services, the therapists were using the Rehabilitative Services Management System (RSMS) to place orders for rehab devices for patients, but this was restricted to only inpatient areas while the therapists in the outpatient areas and Emergency Department were using manually written note-slips to pass to the Patient Service Assistants (PSAs) to key into the OAS to charge the patients. The legacy RSMS, implemented in 2003, was also becoming defunct and there was a need to change to a new ordering system which can cover both inpatient and outpatient.

The idea of using electronic ordering as a more efficient solution was mooted by Nursing in 2014 and a project team comprising of staff from Nursing and Pharmacy (and later from Rehab services) was formed to explore possibilities and resources to achieve the vision of having a fully integrated electronic ordering and fulfilment system for the ground users.

Methods

The team obtained funding support and collaborated with Synapxe (formerly known as IHiS) to start reviewing the requirements of ground users and explored existing ordering solutions in the market. After thorough reviews and discussions on the options available, it was decided that the existing market solutions were not able to meet CGH requirements and that a bespoke ordering system would be more appropriate. A call-for-tender was called in 2021 and the project was awarded to EGIS Healthcare Technologies Pte Ltd which has good track records in developing solutions for local healthcare institutions. The project kicked off from September 2022

Results

See poster appended/below

Conclusion

See poster appended/below

Project Category

Technology

Digital Health, Data Management, Data Platform

Care & Process Redesign

Quality Improvement, Agile Methodology

Keywords

Manual form, Wound Dressing, Transcribing Errors, Inventory Errors, Rehabilitative Services Management System, RSMS, Rehab devices, Emergency Department, Patient Service Assistants, Electronic ordering, Order Management System

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Changi General Hospital
SingHealth

Optimizing Supply of Non-Standard Consumables with SingHealth Order Management System (OMS)

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Background & Problem

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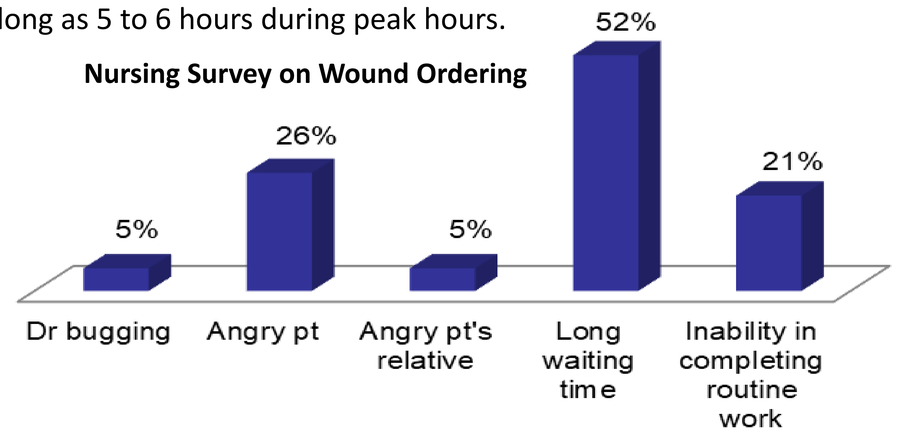

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Aim of Project

The objective of this project is to develop a streamlined enterprise solution that facilitates a harmonised and integrated ordering and fulfilment process for frontline healthcare personnel (nurses and therapists), enabling them to order and receive non-standard consumables for patient care in shorter turnaround time, resulting in better productivity and job satisfaction.

Methodology

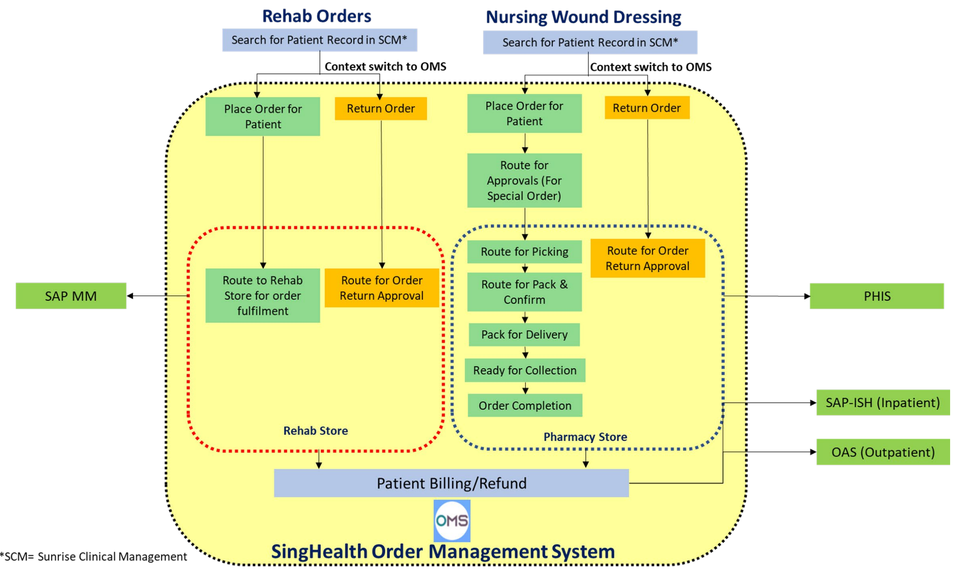
The team obtained funding support and collaborated with Synapxe (formerly known as IHiS) to start reviewing the requirements of ground users and explored existing ordering solutions in the market. After thorough reviews and discussions on the options available, it was decided that the existing market solutions were not able to meet CGH requirements and that a bespoke ordering system would be more appropriate. A call-for-tender was called in 2021 and the project was awarded to EGIS Healthcare Technologies Pte Ltd which has good track records in developing solutions for local healthcare institutions. The project kicked off from September 2022.

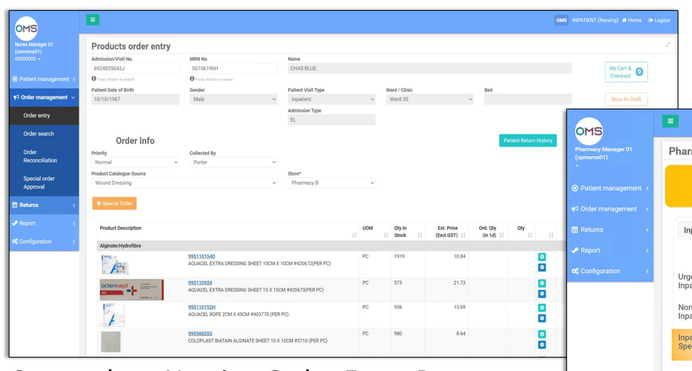
EGIS introduced the team to Agile methodology to develop OMS, which included frequent scrum 'sprints' for 12 weeks whereby the team would meet to review and approve the improvements done from last sprint before planning for the next sprint (i.e. progressive development). This methodology allowed the team to receive on-going feedback from users to allow vendor to respond quickly to evolving requirements. The team also adopted the popular "online-shopping" approach to design the UI to ensure better user experience in easy navigation for items they want to order before submitting the orders with a click. The Gantt chart below outlines the timeline of the project:

Key Milestones/Activities	FY22												FY23											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Presentation to SRB & Approval Forums for Award																								
Award - Letter of Award																								
Requirement Analysis & Validation by Selected Vendor																								
Detailed Technical Design with Sign-Off																								
Solution & Interface Development																								
System Integration Testing																								
User Training																								
User Acceptance Testing & Sign-Off																								
OAT, TDS, Vulnerability Scan, SSAT clearance																								
CGH Implementation																								
Post Live Support																								
Project PIR Preparation & Sign-Off																								

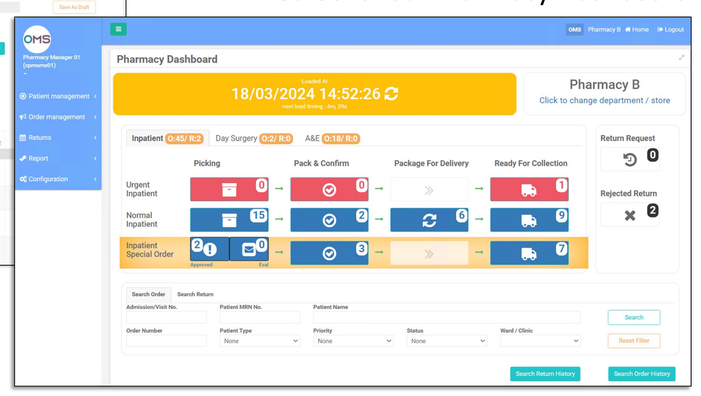
Solution

After 12 months of planning, development and testing, the SingHealth Order Management System (OMS) was developed and Go-Live from August 2023. OMS is a bespoke digital system developed in CGH as a based system to provide a common platform for a harmonised and integrated ordering and fulfilment process for non-standard consumables supplied and distributed by various departments to patients. This system was deemed to be a cluster project by SingHealth senior management and IT Governance for eventual harmonization across SingHealth institutions. The OMS workflow is illustrated in the diagram below:





Screenshot: Nursing Order Entry Page



Screenshot: Pharmacy Dashboard

Outcome & Benefits (6 month Evaluation)

1.Time Savings for Various Sub-Workflows*

Time Savings: (in mins)	Baseline	New	Time Saved	% Saved
Inpatient Non-Urgent Order (Nursing)	67	22	45	67
Inpatient Urgent Order (Nursing)	15	10	5	33
Fetching Order Forms (Portering)	25	0	25	100
Processing Non-urgent Order (Pharmacy)	15	10	5	33
Processing Urgent Order (Pharmacy)	15	4	11	73
Sorting of Packed Items for Delivery (Portering)	10	0	10	100
Processing of Therapist Order (Rehab)	10	5	5	50

*Time saved have been redirected to other value adding tasks based on feedback from supervisors (workforce transformation)

2.User Experience Survey (616 respondents)

- ✓**98.2%** (Agree + Strongly Agree) that it is easy to use OMS – top reason: "*Easy to place order*"
- ✓**85.5%** (Agree + Strongly Agree) that there is time saving with the use of OMS as compared to previous workflow
- ✓Overall User Experience with OMS = **7.41** (on a scale of 1 to 10)

Future Plans

1. As OMS is built on a low code platform, the team will continue to develop and enhance the features and expand the range of products in the catalogue, based on user feedback and suggestions.
2. Share and scale OMS to other SingHealth institutions from March 2024 onwards.

Lessons Learnt

1. Strong team morale and commitment was critical in making the original vision in 2014 to became a reality despite many challenges and set-backs during the long journey.
2. Establishing strong working relationship with vendor based on a 'win-win' approach ensured that project was smoothly executed with issues amicably rectified in timely manner.
3. Using Agile Methodology to develop solutions was more effective than the traditional Waterfall Methodology as it encourages continuous interaction with users.