Project Title

Introducing Novel Digitalisation Tools to Improve Efficiency of Order Processing for Medication Delivery Service

Project Lead and Members

Project Lead(s): Tiew Wen Jun, Pharmacist

Project Members:

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Organisation(s) Involved

Changi General Hospital

Healthcare Family Group(s) Involved in this Project

Pharmacy

Applicable Specialty or Discipline

Pharmacy Operations

Aim(s)

- To enhance efficiency and accuracy of order processing
- To reduce manpower required for MDS order processing to free up staff for value-added tasks and patient care duties

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

We learnt that it is paramount to garner the support of our fellow colleagues for the project implementation to be successful because they are the users on the ground. Feedback channels are important to ensure that the opinions of our colleagues are considered, and improvements can be made to enhance user experience. It is also necessary to convince our stakeholders to gather the resources needed, and their approval is essential for the project to succeed. As such, we had to develop a concrete plan with clear objectives to promote the ideas to our stakeholders. In addition, data are required to convince our stakeholders about the need for these digitalisation tools, as well as to highlight their effectiveness post-implementation. The plan-do-study-act (PDSA) cycles are also adopted and useful in conducting rapid tests of change from conceptualisation to implementation for this project.

If we were to start the project again, we would like to have the opportunity to explore more IT options first before deciding the most suitable digitalisation tool. Also, data collection could be done earlier for the previous workflow so that we would be more prepared to account to our stakeholders.

Conclusion

See poster appended/ below

Additional Information

The motivation for this project stems from the desire to help our colleagues ease their workload, especially when manpower was limited during the pandemic. Furthermore, we would like to move towards the use of IT in pharmacy, in an effort

to automate processes such that are mundane, repetitive and non-value-adding. We would need to have an open mind and desire to innovate when we embark on quality improvement projects.

With these digitalisation tools in place, patients are able to benefit from the improvement in service quality and care model. With a paradigm shift in using IT and automation in the healthcare sector, we are able to keep up with the pace and evolving landscape.

Project Category

Care & Process Redesign

Value-Based Care, Productivity, Manhour Saving

Keywords

Digitalisation, Medication Delivery, Order Processing

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Introducing Novel Digitalisation Tools to Improve Efficiency of Order Processing for Medication Delivery Service

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Aim(s) (Project Background)

The data entry and order collation processes for Medication Delivery Service (MDS) are manual, manpower intensive and non-value-added tasks which pharmacy staff have to perform on a daily basis. This led to a significant reduction in manpower allocation for patient care, as well as accuracy issues with order processing. In order to overcome these problems, the MDS team leveraged various information technology (IT) tools to automate these processes, which aim to:

1. Enhance efficiency and accuracy of order processing
2. Reduce manpower required for MDS order processing to free up staff for value-added tasks and patient care duties

Changes (Methods)

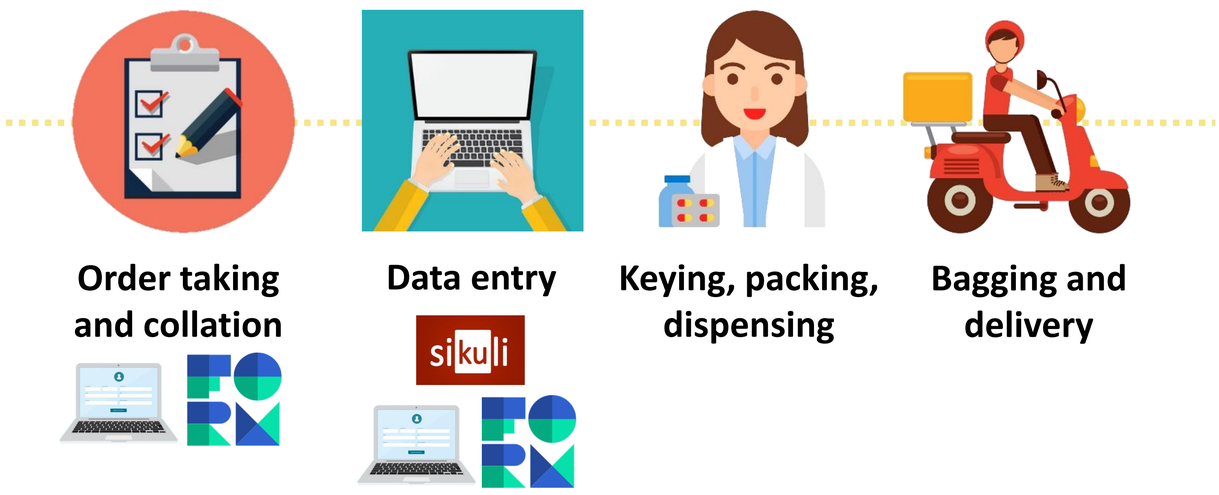

Figure 1: Implementation of PRS, SikuliX® and FormSG collator in the MDS order processing journey

Patient Registration System (PRS)

Previous workflow	• Delivery details and orders first written on order slips before being transcribed into Excel during data entry.
PDSA Cycle 1	• A system was created using macros in Excel to eliminate order slips and the additional step of transcribing. • Information stored electronically once form completed. • Delivery details auto-populated from database records.
PDSA Cycle 2	• Functional enhancements to improve usability and robustness 1. Auto-backup to prevent loss of data 2. Overwrite function to update patient particulars to database 3. Confirmation prompts for information verification 4. Addition of shortcut keys and hotkeys

SikuliX®

Previous workflow	• Data entry done manually for all orders.
PDSA Cycle 1	• Collaboration with Health Services Research to use SikuliX® to replace manual data entry. SikuliX® is able to identify and interact with graphical user interface components to allow the automation of repetitive tasks. A script was used to automate the repetitive process of data entry by extracting required information from OAS.
PDSA Cycle 2	• Script modified to prevent the following: 1. Program halt due to specific conditions not accounted for or inter-variability in interface across computers 2. Loss of data by adding auto-save function

FormSG Collator

Previous workflow	• FormSG orders received via MDS email was extracted individually for printing. This process was cumbersome and time-consuming. • Data entry done manually for all FormSG orders.
PDSA Cycle 1	• JavaScript application by FormSG used to export delivery details into Excel for processing, which eliminates the need for data entry.
PDSA Cycle 2	• Collaboration with IHIS to develop a script that extracts orders in the desired format for printing and exports delivery details into Excel for processing almost instantaneously.

Measures (Results , Outcomes and Figures)

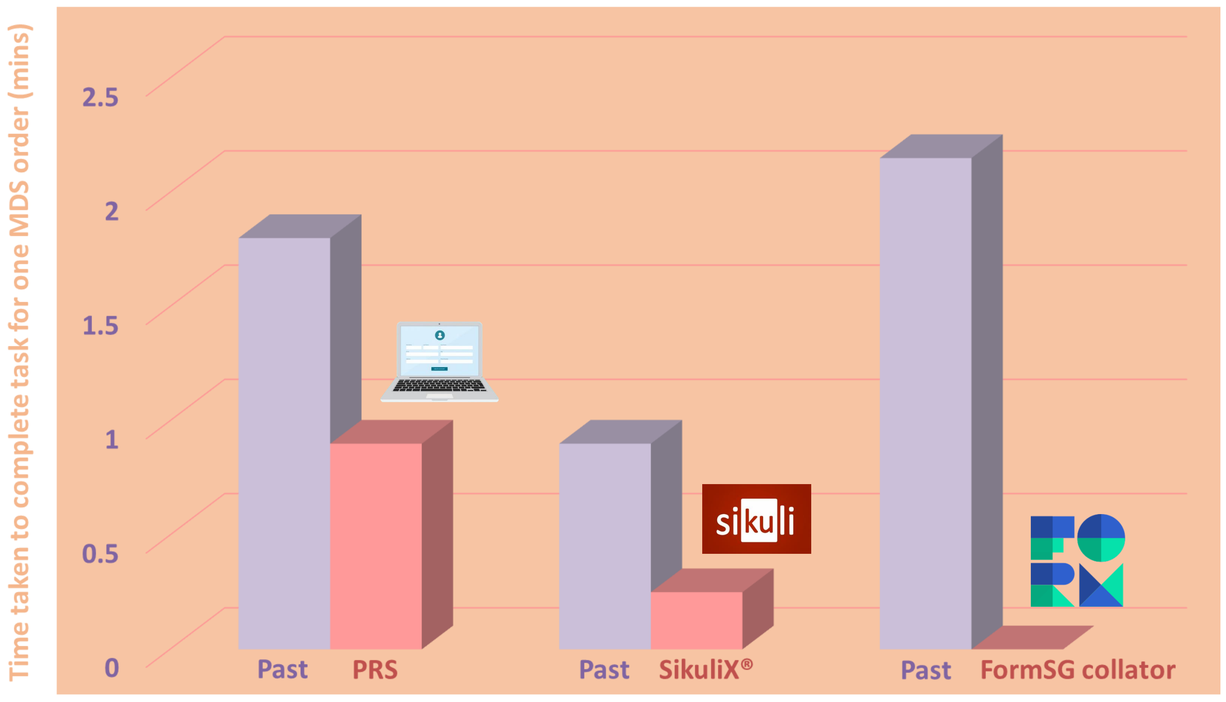

Figure 2: Comparison of time taken to process one MDS order between past and current workflow (PRS, SikuliX® and FormSG collator)

	Average time to data entry one order previously (minutes)	Average time to data entry one order via PRS (minutes)	Average no. of orders to data entry per day	Average time savings per day (minutes)
	1.80	**0.90***	**63**	**56.70**
sikuli	Average time to data entry one order previously (minutes)	Average time to data entry one order via SikuliX® (minutes)	Average no. of orders eligible for data entry by SikuliX® per day	Average time savings per day (minutes)
	0.90	**0.25***	**52**	**33.80**
FORM	Average time to process one order previously (minutes)	Average time to process one order via FormSG collator (minutes)	Average no. of FormSG orders per day	Average time savings per day (minutes)
	2.15	**0***	**75**	**161.25**

Total time savings per day = **4.20 hours**

*$p < 0.05$

Figure 3: Time and manpower savings with PRS, SikuliX® and FormSG collator

The implementation of PRS, SikuliX® and FormSG collator enabled the data entry and order collation processes to be more efficient and accurate. The automation capabilities of these digitalization tools eliminated the process of manually transcribing delivery details from physical order slips to computers, which was previously cumbersome, time-consuming and manpower intensive. As a result, there is an average savings of 4.20 manpower hours daily and 100% accuracy rate for data entry respectively (Figure 3).

Furthermore, approximately 50% of the pharmacy phone call enquiries is regarding MDS. Initially, pharmacy staff had to spend significant amount of time rummaging through physical order slips to answer such enquiries. These digitalization tools allowed delivery details to be stored electronically in the computer, hence data can be retrieved quickly and easily.

Conclusion

The creation of these novel digitalization tools helped to automate data entry and order collation processes for MDS, leading to higher efficiency and accuracy. These innovations significantly reduced the manpower required for MDS order processing, thus enabling pharmacy to focus on value-added tasks such as patient care. Currently, pharmacy is working on using Robotic Process Automation to further improve the speed and stability of these processes. With MDS increasingly becoming an important avenue for medication collection, it is crucial that pharmacy is equipped with such tools early to increase the scalability of MDS and cope with higher load in the future.

The experience gained from utilizing such tools have also led to them being used in other areas in pharmacy. SikuliX® script was written to automate data extraction from the pharmacy system for stock tallying during audits. This eliminates the need for staff to manually search the stock levels for each item, leading to significant time and manpower savings. Therefore, these digital tools are versatile and can be applied in a variety of ways to improve productivity and reduce manpower hours spent on repetitive manual work in pharmacy.