Project Title

Automating the Prescription Screening Process in Medication Delivery with Robotic Process Automation (RPA)

Project Lead and Members

Project lead: HWANG Yi Kun

Project members: TANG Ee Fhong, LIM Boon Hao, LEONG Chi Kay, TRAN Anh Nhi, Tirza GUNAWAN, Catrina DIAMSAY, Marc Carino GALANG, WONG Jian Wei, Nurul Nasirah Binte MUSA, Siti Aisyah KAMSARI, Solehah Binte ABDULLAH

Organisation(s) Involved

Singapore General Hospital

Healthcare Family Group(s) Involved in this Project

Nursing, Medical, Pharmacy, Allied Health

Applicable Specialty or Discipline

General Medicine, Infectious Diseases, Pharmacology

Project Period

Start date: Sep 2023

Completed date: Feb 2024

Aims

- First RPA use case to read electronic prescription lists by medication name, dose, frequency and duration.
- Row-by-row reading using a loop function, before comparing to an Excel list of acute medication regimens.
- Allows prioritization of clinical review by pharmacists.

- If assessed to be clinically urgent, patients are contacted within same day to arrange for urgent medication.

Background

With a 7-day processing time required for Medication Delivery Service (MDS) in SGH, patients prescribed with medications for acute medications, such as infections and hyperkalemia, risk experiencing treatment delay, potentially increasing healthcare costs from untreated conditions, hospital admission or emergency department visits

Methods

See poster appended/below

Results

- Average score obtained from 16 end users of the bot was 81.9 using Systems Usability Scale (SUS)
- Indicates high usability and overall positive user end experience

Conclusion

- First RPA use case to read electronic medication lists to address unmet clinical needs.
- Potential adoption of innovation by 8 other SingHealth using Maxcare prescription databases.
- Potential adaption of innovation for other use cases (e.g. detection of drug interactions, detecting primary non- compliance from uncollected medications).

Project Category

Technology

Digitalisation, Automation, Robotics Process Automation

Care & Process Redesign

Value Based Care, Safe Care, Patient Satisfaction, Access to Care, Waiting Time

Keywords

Medication Delivery Service, Acute Medication, Untreated condition, Manual Screening, Prescriptions, Electronic prescription list, Pharmacists, Urgent Medication, Systems Usability Scale

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Singapore General Hospital
SingHealth

Background

With a 7-day processing time required for Medication Delivery Service (MDS) in SGH, patients prescribed with medications for acute medications, such as infections and hyperkalemia, risk experiencing treatment delay, potentially increasing healthcare costs from untreated conditions, hospital admission or emergency department visits

Analysis of Causes

- Long waiting time at pharmacy deters self-collection of medications
- Manual screening of each prescription is inefficient and may not yield a high detection rate
- Existing manpower constraints → Prescriptions are not reviewed by pharmacists within 24 hours of prescribing

Solution

- First RPA use case to read electronic prescription lists by medication name, dose, frequency and duration
- Row-by-row reading using a loop function, before comparing to an Excel list of acute medication regimens
- Allows prioritization of clinical review by pharmacists
- If assessed to be clinically urgent, patients are contacted within same day to arrange for urgent medication

Assessment of RPA Feasibility

Criterion	Yes	No
Is the process voluminous?	✓	
Does the process involve only simple rules and logic?	✓	
Do the processes involve <5 different systems?	✓	
Is the data available in a structured, digital format?	✓	

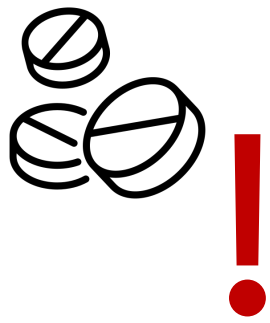
Table 1: RPA feasibility criteria. Process step is considered feasible it fulfills all 4 requirements

- Voluminous process of screening of more than 600 electronic prescriptions per day
- Involves only Maxcare and Microsoft Excel

Results

Cost Avoidance

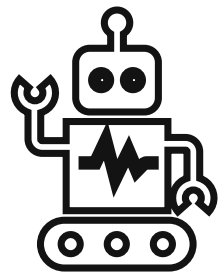
- Within a 6-month period between Sep 2023 and Feb 2024, 304 prescriptions recruited for MDS contained at least one acute medication regimen.



- **133** prescriptions assessed by pharmacists to be clinically urgent (**43.7%** screening accuracy)
- **90%** of urgent prescriptions contained antibiotics or antivirals, while the remaining contained medications to treat hyperkalemia (e.g. Resonium, Lokelma)
- Annual cost avoidance of **$4,987,500**[1]

Efficiency of Screening

- Screening of each prescription requires mean duration of **21.3** seconds, allowing **680** prescriptions to be screened within 4 hours
- Allows patients to be contacted within same day for urgent medication collection



User Experience

- Average score obtained from 16 end users of the bot was **81.9** using Systems Usability Scale (SUS)
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Conclusion

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[1] Assuming cost of each medication error in SGH is $18.705, based on WHO's estimation where cost associated with medication errors globally is approximately 1% of global health expenditure