



# Transformation of Medication Delivery Process with Pneumatic Tube System

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## Background

Singapore General Hospital (SGH) Inpatient Pharmacy supplies all forms of medications to inpatient wards, including Initial, Routine, and Stat medications. The current medication delivery process requires the porter to manually deliver by hand, which is laborious. We aim to redesign the medication delivery process in order to free up our porters to focus on more meaningful tasks such as patient transfers, allowing for improved patient care and experience.

## Mission Statement

To transform the medication delivery process to reduce reliance on labour without compromising on timeliness of medication administration.

## Analysis

There are 2 types of medication sent by porters: STAT and Initial. STAT medications are urgent orders from doctors at any time of the day. Pharmacy verifies and prepares the required medication immediately upon order. Porter services will be used for delivery of medications to the respective wards. Upon reaching the wards, porters will search for the correct nurse for medication handover.

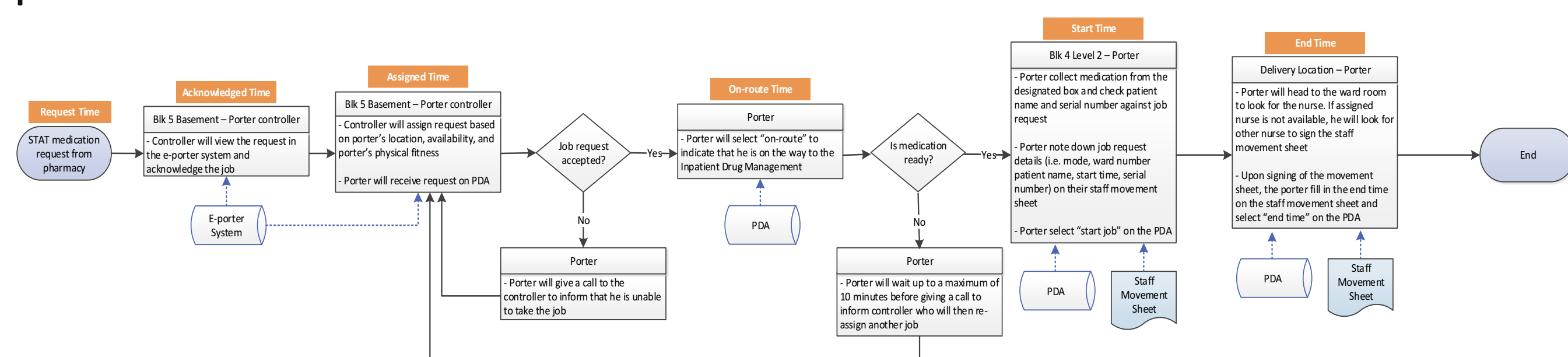


Figure 1: STAT medication delivery workflow throughout the day

Initial doses are the newly verified orders that will last till the routine orders are supplied on a daily basis. Porters are stationed at Inpatient Drug Management during peak periods to assist in the delivery. During non-peak periods, porters will be triggered at ad-hoc timings to deliver the medications.

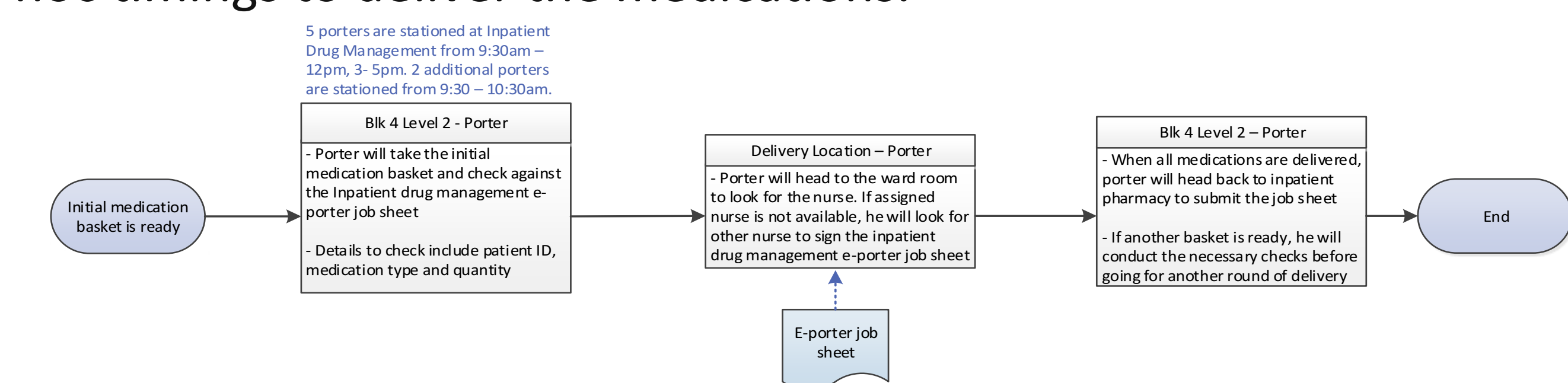


Figure 2: Initial medication delivery workflow during peak period

From data collected in May 2018, we found that there was a total of 1,044 STAT and Initial (non-peak) medication requests throughout the day and night from the inpatient pharmacy to various inpatient settings all over the hospital. As our porters are also responsible for other portering duties, such as patient transfers, blood, specimen, diet and medical notes delivery, a successful reduction in the number of medication deliveries will reduce the waiting time for other requests and thus improving overall patient care.

## Interventions

The team explored various solutions, before deciding to leverage on the Pneumatic Tube System (PTS). This solution is innovative as it is the first time SGH is using the PTS for medication delivery. It also utilises an existing infrastructure, which lowers the cost and implementation time. Enhancement to the PTS was proposed to cope with the additional workload, by installing an additional blower and procuring additional canisters. However, there was limited capacity that the PTS could support, hence the team had to decide on the best model that would maximize the usage of this enhancement. Other concerns surfaced during the planning stage includes infection control, system to provide alerts to the user, accountability and security of the medications sent.

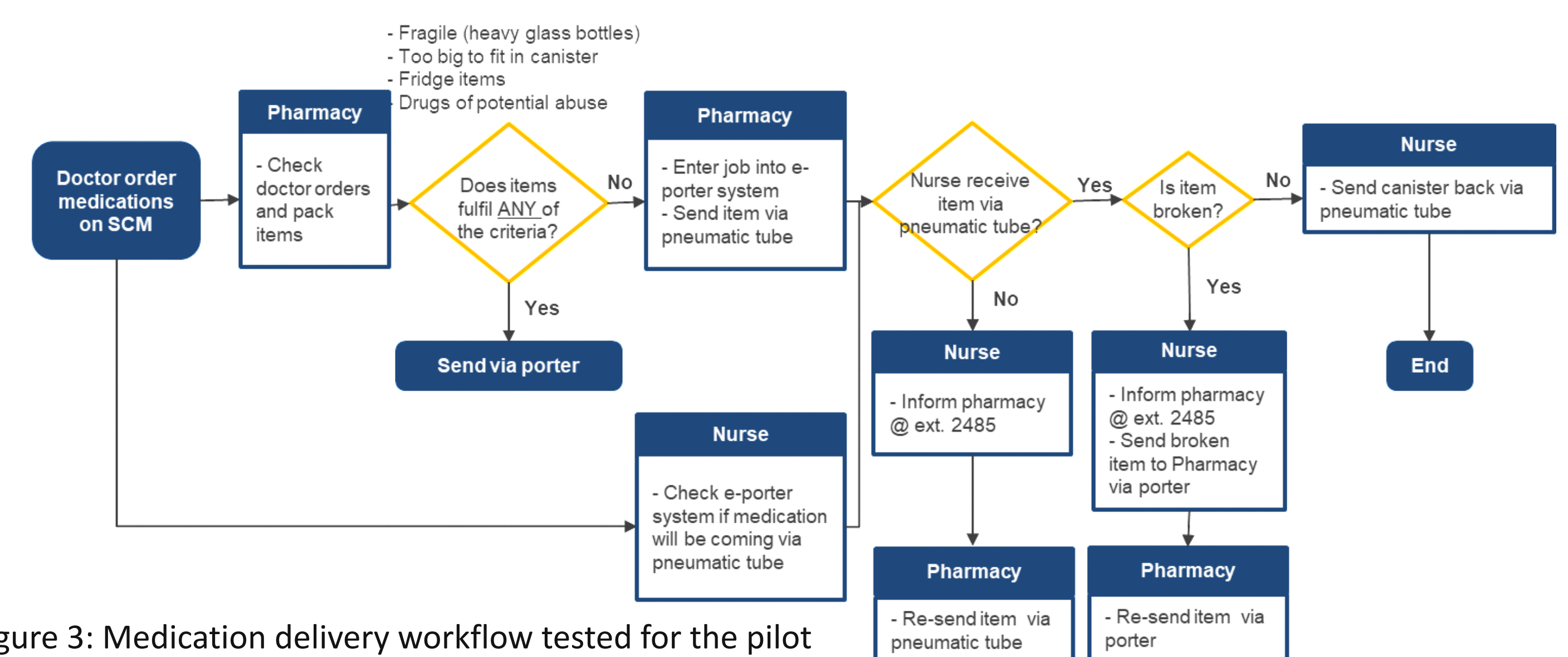


Figure 3: Medication delivery workflow tested for the pilot

The pilot was conducted in May 2019:

- STAT medication only in W63 for day and night delivery
- STAT and Initial medications for Block 4 and 5 wards for night delivery

While there were minimal changes to the workflow after the pilot, the team noted that STAT delivery in the day may not be ideal due to the required turnaround time. Hence, the team decided to continue with the STAT and Initial medications for Block 4 and 5 wards in the night, and extend the implementation to Initials medication delivery to Block 4 and 5 in the day, targeted for mid-2020.

## Results

There was a total of \$9,092 annual cost savings from the pilot:

- STAT medication only in W63 for day and night delivery (6 - 20 May 2019);
- STAT and Initial medications for Block 4 and 5 wards for night delivery (May - October 2019)

With the scale-up of the pilot implementation to include Initial medication delivery to Block 4 and 5 in the day, starting from mid-2020, an additional projected cost savings per annum of \$70,068 was estimated.

## Sustainability Plans

With the full roll-out in the horizon, the project team will provide full support to the implementation of the new processes, to reduce inconveniences faced by ground staff. This will allow us to raise the level of stakeholder buy-in to achieve long-term sustainability. In particular, we will be monitoring the capacity of the PTS to cope with the additional workload.