

# Enhancing Operations of Medical Consumables in Public Healthcare Institutes (PHIs)

## A. Problem Statement (Current State)

The healthcare industry faces increasing demands and a growing shortage of healthcare professionals.<sup>1,2</sup> Healthcare professionals and practitioners can potentially boost efficiency, minimise cost, free up their time and focus on more critical work with the help of advanced technologies, features, and innovations. (i.e., Process redesign, automating or streamlining irrelevant/repetitive/time-consuming tasks, adopting sophisticated manufacturing and supply chain solutions)<sup>3</sup>

The following are the current challenges:

- 1. Need for a more efficient and organised solution (e.g., process, system, tools) to manage hospital medical consumables:** The Nursing team seeks innovative and complementary ideas and methods to improve efficiency in the following areas.
  - a. Managing the retrieval, usage, and auto par level monitoring and top up of hospital stock and non-stock medical consumables (excluding medication) from the department clean utility, decentralised storage areas and decentralised ward supply carts.
  - b. Reduce manual effort and time spent on:
    - i. Collating the varying mix of consumables needed for different patient profiles via Artificial Intelligence (AI) technology with Resource management systems.
    - ii. Data entry and reconciliation to capture hospital medical consumables (excluding medication) used for each patient.
    - iii. Requests for par level changes due to bed surge/increase in consumable demands because of influx for specific patient groups (e.g., dressing set usage due to a complex wound).
    - iv. Able to facilitate dispensing consumables based on the type of procedure without manual picking. This can save the time of manual picking, reduce the

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<sup>1</sup> Lee, B., & Lim, J. (2022, December 14). *Commentary: Singapore needs more doctors, but setting up a fourth medical school isn't the answer*. CNA. Retrieved February 6, 2023, from <https://www.channelnewsasia.com/commentary/singapore-doctor-get-medical-school-healthcare-system-3138696>

<sup>2</sup> RSM Chio Lim LLP. (2022, March 29). *Navigating workforce shortages in healthcare sector*. RSM Singapore. Retrieved February 6, 2023, from <https://www.rsm.global/singapore/insights/our-expert-insights/navigating-workforce-shortages-healthcare-sector-0>

<sup>3</sup> Haleem, A., Javaid, M., Pratap Singh, R., & Suman, R. (2022). Medical 4.0 technologies for healthcare: Features, capabilities, and applications. *Internet of Things and Cyber-Physical Systems*, 2, 12–30. <https://doi.org/10.1016/j.iotcps.2022.04.001>

issue of missing out items, and reduce existing practice on manual pre-procedure prepared trolleys for various procedures.

2. **Improve billing accuracy and reduce manual billing interventions:** Frequent manual interventions and manual data capture of hospital consumables (excluding medications) result in extensive time spent reconciling billings. This is a common issue across inpatient settings.
3. **Prevent missed/no charging,** which frequently happens in decentralised storage places. The decentralised storage places were created to improve workflow efficiency in clinical areas and reduce clinician, especially nursing non-clinical time. However, in the current system, charging is manual or clinician-dependent, resulting in missed/no-charges leading to financial leakages.

## B. Challenge Statement

How might we enhance the hospital medical consumables management processes to reduce manual operations, improve staff productivity, efficiency, and waste prevention in the end-to-end management of medical consumables, including ordering, top-up with predictive capability, and timely charging?

## C. What are we looking for? (To-be State)

1. Join us on this discovery and collaborative journey through HealthX to explore technology-enabled solutions to achieve the desired state:
  - a. **Enhanced productivity and efficiency** – aide staff to prepare and issue consumables for patients and alleviate manual, burdensome, and time-consuming tasks leveraging solutions not limited to automation and process redesign, inventory management systems, smart shelf and sorting systems, video AI, etc.
  - b. **Improved resource management supplies accuracy** – ensure accurate capture of consumables supply and usage to facilitate accurate billing and inventory management.
  - c. **Predictive capability** – to predict patient acuity and care needs concerning the needs for consumables so that proactive or just-in-time top ups can be done without manual activation. In healthcare, the predictive capability can enhance patient safety, especially when involved in a lifesaving scenario.
  - d. **Integration with relevant hospital systems** – including Next-Generation Electronic Medical Records (NGEMR), billing systems such as the National Billing System (NBS) and SAP, and any other relevant applications (e.g., tools, dashboards) that may collectively be used to facilitate management of medical consumables.

2. Overall performance requirements:
  - a. **Intuitive User Experience:** All nurses and hospital operational staff must be able to quickly self-help with the digital solution with minimal guidance.
  - b. **Scalable:** The proposed solutions must be easily scaled across Singapore Healthcare Clusters (Hospitals) and with potential roll-out to Nursing Homes within one to two years, following successful trials and refinements.
  - c. **Well-secured:** Any recommended solutions must undergo regular risk assessment and adhere to the cybersecurity standards to secure private health data/protected health information.
  - d. **Cost-effective:** The proposed solutions must be cost-effective to support the solution to scale across hospitals and other potential healthcare settings (i.e., nursing homes).