

# Computerised System to Consolidate and Digitise Just-In-Time (JIT) Inventory Management System



**Advisor:** A/Prof Lim Soo Teik<sup>1</sup>  
**Facilitator:** Veronica Kwok Hong Har<sup>2</sup>  
**Team Leader:** Tan Kiang Hon<sup>2</sup>  
**Team Members:** Victor Effendie<sup>3</sup>, Pauline See Poh Ling<sup>2</sup>,  
 Sharity Tan Man Wei<sup>2</sup>, Winnie Tan Mui Hui<sup>4</sup>, Koh Poh Ching<sup>5</sup>, Tan Boon Lian<sup>6</sup>



**National Heart Centre Singapore**  
 SingHealth

<sup>1</sup>Deputy Director, NHCS, <sup>2</sup>Department of Nursing, <sup>3</sup>Health Care Informatics, <sup>4</sup>Finance Department, <sup>5</sup>Material Management Department, <sup>6</sup>Business Office

## 1. BACKGROUND

The Cardiac Catheterisation Laboratory (Cath Lab) handles an average of 100 cardiac interventional procedures a week. With more than 5000 unique items to handle for different procedures, the staff encountered the challenge of rapid inventory turnover which required timely replenishment by vendors, who come in periodically to check items used under JIT stock control.

Using a manual system, inventory levels are monitored in various record books which is often time consuming and prone to error. Billing of patient is also done separately using hard copy of charging form which is collected by Business Office (BO) during office hours

## 2. OBJECTIVES

### Cath Lab & MMD

- Use of ICT to monitor inventory levels automatically
- Electronic approval of item used
- Viewing of stock balance by Material Management Department

### Industrial Partners

- Receive automatic and instant alerts on item used.
- Decrease daily visits to Cath Lab for checking of stocks

### Business Office

- Log on to view chargeable items and procedure codes for Billing of patients electronically

## 3. METHODOLOGY

- Development of an in-house computerised Cath Inventory system
- System was developed by studying various computerised inventory management systems

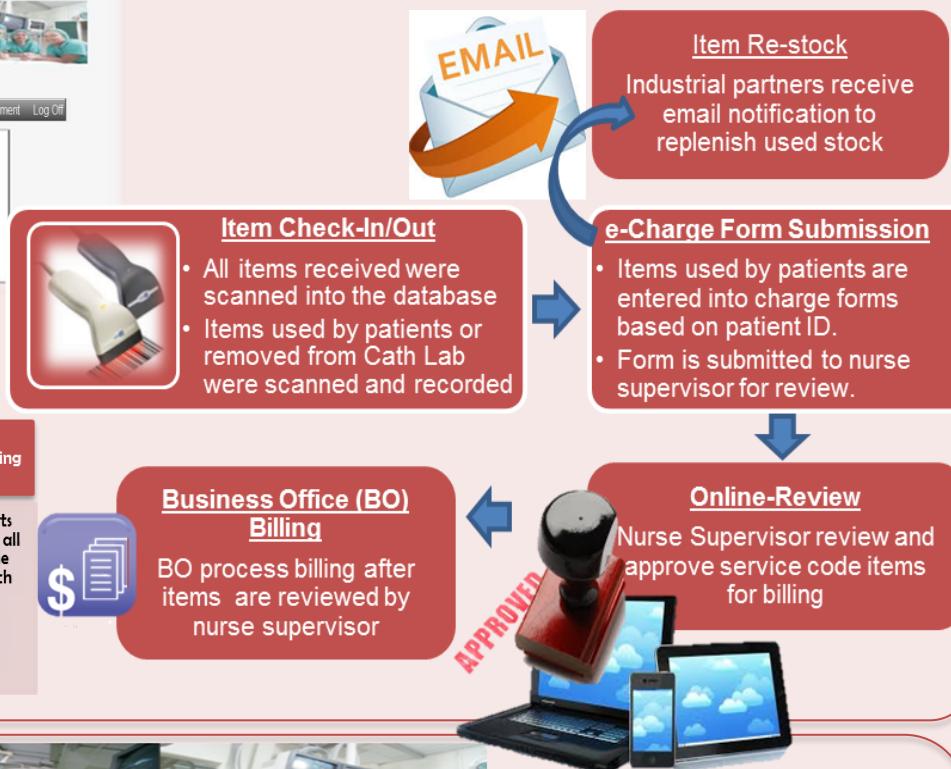
CATH INVENTORY SYSTEM



Modules in Cath Inventory Management System

Item Check In/Out	Item Management	Vendor Management	e-Form Submission	To Do List	In-house Reporting
<ul style="list-style-type: none"> <li>Inventory checked in/out by item barcodes</li> </ul>	<ul style="list-style-type: none"> <li>Item update by bulk or by on Item Code</li> </ul>	<ul style="list-style-type: none"> <li>Allow vendors to receive email notification</li> <li>Vendors can view items from their own company only</li> </ul>	<ul style="list-style-type: none"> <li>Users to enter items used by patient ID.</li> <li>Form routing /submission for next level review</li> </ul>	<ul style="list-style-type: none"> <li>Allow reviewer to manage list of submitted cases pending their approval</li> <li>Allow Business Office to bill approved cases</li> </ul>	<ul style="list-style-type: none"> <li>Generate reports of items used in all cases, searchable by various search criteria such as date, interventionist, and items used</li> </ul>

### Computerised Cath Inventory Management Workflow



## 4. RESULTS



Main Page Check In/Out Items Form Submission Item Management Vendor Management To Do List User Management Doctor Management In-house Reporting Platform

Items are check in/out online. It eliminates manual recording of stocks.

Ease of monitoring of stock levels in Cath Lab

Forms are submitted online. It eliminates delays due to:

- Manual filing of device billing form
- Case details entered into record book

- Eliminate Unnecessary trips for industrial partners. Items for replenishment can even be checked when out-stationed
- Managed Access ensures no patient identifiers were revealed to industry partners

- Nurse Managers can check items and bill concurrently from the same system
- Inventory items are blinded. Billing office only sees chargeable items and procedure codes.

Improve multi-disciplinary partnership. Alert multiple parties simultaneously

Various item usage reports can be generated for better statistical data analysis

**Auto notification improve lead time of topping up JIT items by 1 day!**

**Near-instantaneous searches; reduced >110 staff hours; search time annually!**

**Simplified process saves >1000 staff hours annually!**

**5. CONCLUSION** The Cath Lab Inventory Management System has greatly eased inventory monitoring in the Cath Lab. Processes such as inventory management and billing processes are streamlined by merging them into a single electronic system instead of requiring separate manual entries. The project has strengthened our partnership with various internal departments and our industrial partners allowing NHCS to serve patients better through passion and innovation in cardiovascular care.

**5. FUTURE SPIN-OFF** Future updates to Cath Lab Inventory Management System will include additional features such as auto-generation of reports for items below threshold levels and for finance department to track remaining inventory value.

Moving forward, NHCS Operating Theatre (OT) will be potentially implementing the system to manage OT inventory.