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

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1. BACKGROUND

The Cardiac Catheterisation Lab (Cath Lab) handles an average of 100 cases of cardiac interventional procedures a week.

With more than 5000 unique items to handle for different procedures, 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

To develop a computerised system to consolidate and digitise the manual just-in-time (JIT) inventory management system in the Cardiac Catheterisation Laboratory (Cath Lab).
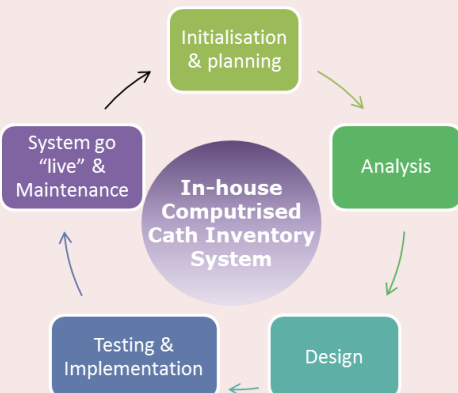
INCREASE
- Productivity in managing Cath Lab inventory
- Patients' safety with efficient inventory tracking

REDUCE
- Documentation time and errors due to manual transcription.
- Search time for inventory records
- Storage space required for manual records

3. METHODOLOGY

In-house Computrised Cath Inventory System
- Initialisation & planning
- Analysis
- Design
- Testing & Implementation
- System go "live" & Maintenance

Process Streamlining & Re-design

Step	Activity	Symbol
1	Case commences in lab, items used are recorded on a device billing form during case	1
2	Case detailed entered into book for recording	
3	Only 1 book is available to sequential for records purp concurrent cases possible	
4	Nurse Supervisors use the c complete billing form	2
5	Completed billing forms for and counted	
6	Billing forms are dispatched day	3
8	Business office checks thro acknowledges charges. Pat	

Step	Activity	Symbol
1	Case commences in lab, items used are scanned during case directly into online portal	1
2	Additional billing items are scanned after the procedure as required	2
3	Nurse Supervisors check the portal for their 'To do' list. Cases are checked, procedure billing codes are added	3
4	Charge form is submitted to Business Office	4
5	Business office checks through online charge form and acknowledges charge form. Patient is billed	5

CATH INVENTORY SYSTEM

USER NAME (e.g HNUCC)
PASSWORD
DOMAIN (e.g SHSC, SHHQ, SGHAD)
Login

Multi-stakeholder Partnership

Staff from Cath Lab, IT, MMD & BO developed the in-house computerised Cath Inventory System.

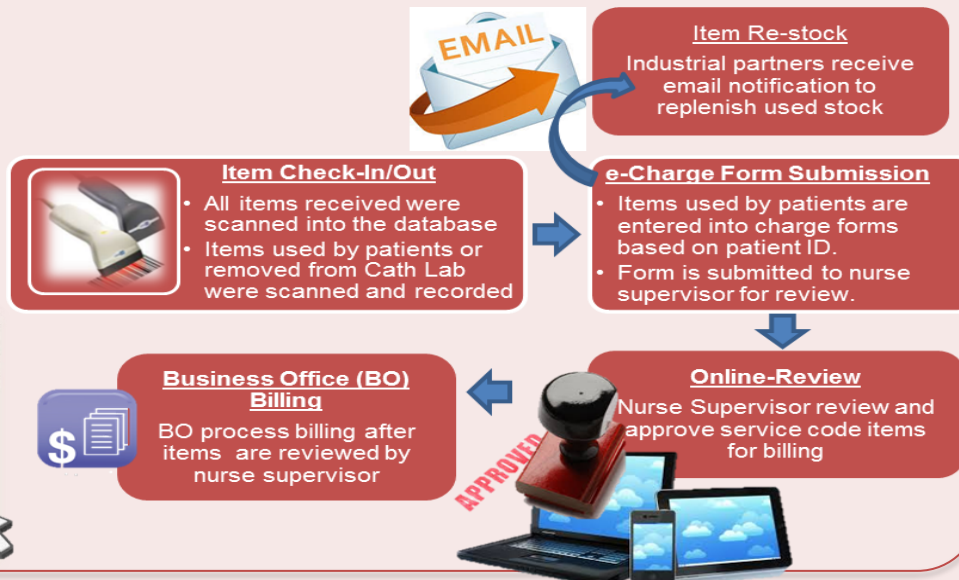### Computerised Cath Inventory Management Workflow

EMAIL

Item Re-stock
Industrial partners receive email notification to replenish used stock

Item Check-In/Out
- All items received were scanned into the database
- Items used by patients or removed from Cath Lab were scanned and recorded

e-Charge Form Submission
- Items used by patients are entered into charge forms based on patient ID.
- Form is submitted to nurse supervisor for review.

Online-Review
Nurse Supervisor review and approve service code items for billing

APPROVED

Business Office (BO) Billing
BO process billing after items are reviewed by nurse supervisor

4. RESULTS

The Cath Inventory system is a holistic system that allows inventory of consumable to be managed in a single electronic platform.

- ✓ All inventory items are tracked by lot numbers and recorded online. It eliminates manual tracking of stocks.
- ✓ Instantaneous search based on patient identifiers saves searching time
- ✓ Charge forms are submitted online. Delays are eliminates as collection of forms is not needed.
- ✓ Interim bill can be calculated and deposits can be returned to clients upon discharge even on weekends or public holidays
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- ✓ Managed Access ensures no patient identifiers were revealed to industrial partners.
- ✓ Patients can be identified immediately and informed of any implant recalls.

Managed access for to industrial partners to view item used from their own companies

Comprehensive search function

Automatic email notification to industrial partners

Implant Recall main page

Reporting module for better statistical data analysis
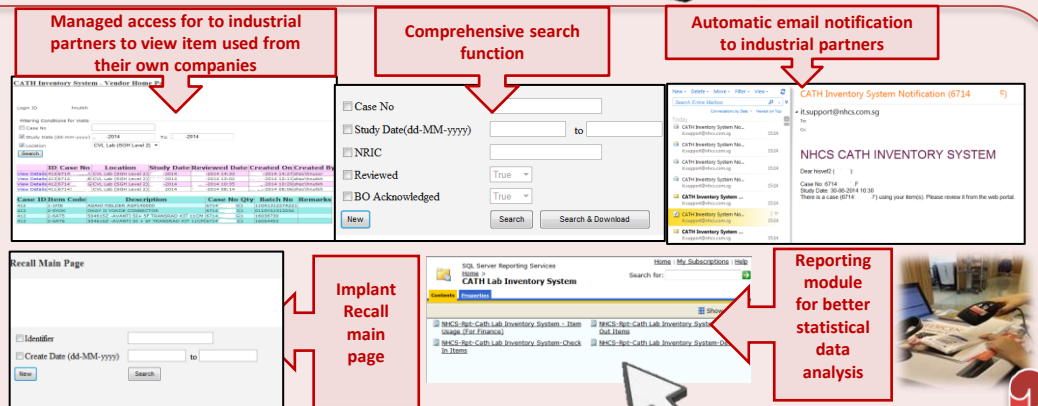
Tangible Benefits
- ❖ Simplified process **saves >1000 staff hours annually!**
- ❖ Near-instantaneous searches **reduced >110 staff hours annually!**
- ❖ Auto notification **improve lead time of topping up JIT items by 1 day!**
- ❖ Eliminate storage space for physical archiving of manual records and forms.
- ❖ Enable MMD to monitor stocks online

Intangible Benefits
- ❖ Less potential for errors and missing details as items are scanned in.
- ❖ Recalled Items' module ensure speed in event of product recalls, improving patient safety!

5. CONCLUSION

The computerised Cath Lab Inventory Management System has greatly eased inventory monitoring in the Cath Lab. Monitoring of statistics in item usage and Cath Lab consumables expenses, and the generation of procedures' descriptive statistics are made very simple with the new system. Implant recalls can be identified immediately through the 'Recalled Items' module. Processes are streamlined, improving productivity and patients' safety in the Cath Lab, allowing NHCS to serve patients better through passion and innovation in cardiovascular care.

6. FUTURE SPIN-OFF

Future updates to the Cath Lab Inventory Management System will expand on its framework to include additional features, building up to an overall Cath Lab Solution System. These additional features can strengthen our safety culture, such as monitoring of radiation exposure levels of staff and dose area product of patients per case, and the Cath Lab utilisation rate.