

Project Title

Automation of Manual Billing with Computerized Physician Order Entry (CPOE) System

Project Lead and Members

- Tan Hui Ting
- Mabel Soh Sor Boh
- Low Jinrui

Organisation(s) Involved

National University Hospital

Project Period

Start date: 06-2016

Completed date: 07-2017

Lessons Learnt

Changing the system of posting charges from manual to system-integrated is a complex issue that requires multi-disciplinary collaboration and coordination.

- Harmonisation of billing practices
- **System Integration**
- Trial in 2 ward locations
- Training and Education
- **Progressive Rollout**

Project Category

Productivity, Technology, Informatics & Automation



CHI Learning & Development System (CHILD)

Keywords

Productivity, Technology, Informatics & Automation, Process Improvement, Workflow Improvement, Automate Manual Billing, Billing Process, Billing Automation, System-level Innovation, Change Management, Time Saving, Error Minimisation, National University Hospital, Nursing, Multi-stakeholder Collaboration, Ward Charging, Computerised Physician Order Entry System, Harmonise Billing Practices, System Integration, Progressive Rollout, Staff Training, Time motion Study, Job Satisfaction, IT skills, Billing Accuracy, Paperless Clinical Documentation

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Automate Manual Billing Using Computerised Physician Order Entry (CPOE) System

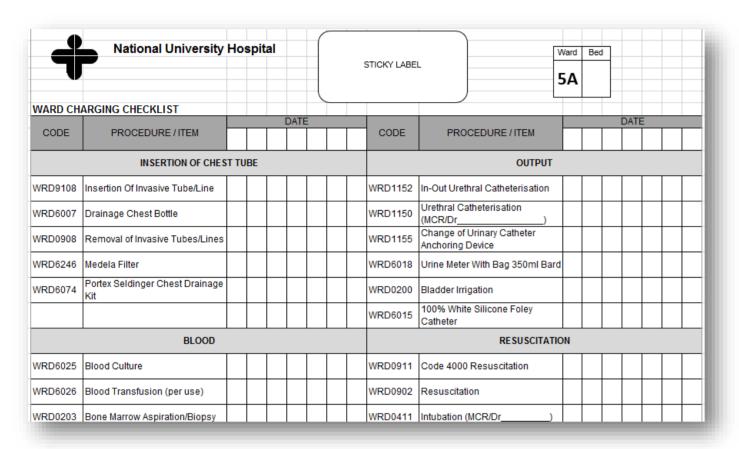


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A member of the NUHS

1. Background

Legacy paper-based billing process to charge patients for consumables and care rendered was manual: Ward charges were recorded into the hardcopy "Ward Charging Checklist" by nurses after each shift and then manually posted into the business system. This manual process was time-consuming and is prone to missing or wrong entries, which resulted in rework and missed revenue.



Sample of ward charging checklist

Staff charged according to the itemised code

2. Objectives

Computerised Physician Order Entry (CPOE) system is enhanced to support automated billing module. After treatment orders and nursing interventions are ordered or updated, CPOE system will transmit respective ward charges via interface to business system. This billing module also allows automation of specific ward charges on a daily basis after nurses initiated the intervention in CPOE system.

Through this implementation, NUH aims to:

- ✓ Harmonize billing practices in NUH inpatient wards
- ✓ Improve billing accuracy
- ✓ Improve staff productivity for billing

3. Methodology & Execution

Changing the system of posting charges from manual to system-integrated is a complex issue that requires multi-disciplinary collaboration and coordination.

Jul – Sep 2016

System Integration

CPOE System configuration for integration of CPOE orders and billing codes

Jan – Jun 2017

Training and Education

Use of system simulation and multimedia resources to aid communication and change management

- Leadership support
- Over-communication to staffs through broadcast platforms, classroom teaching and hands-on sessions
- System simulation and multimedia resources
 - Training video
 - Guide for reconciliation report
 - FAQ for ward scenarios

Juli Sep 2010

Harmonisation of billing practices

- Multi-disciplinary workgroup with representatives from Nursing, Operations and Finance
- Streamline and standardize ward charging practices
 - Eliminate excess billing codes
 - Review billing codes to bundle in commonly used consumables for procedures and services
 - Standardization of downtime billing checklist across all wards

Oct – Dec 2016

Trial in 2 ward locations

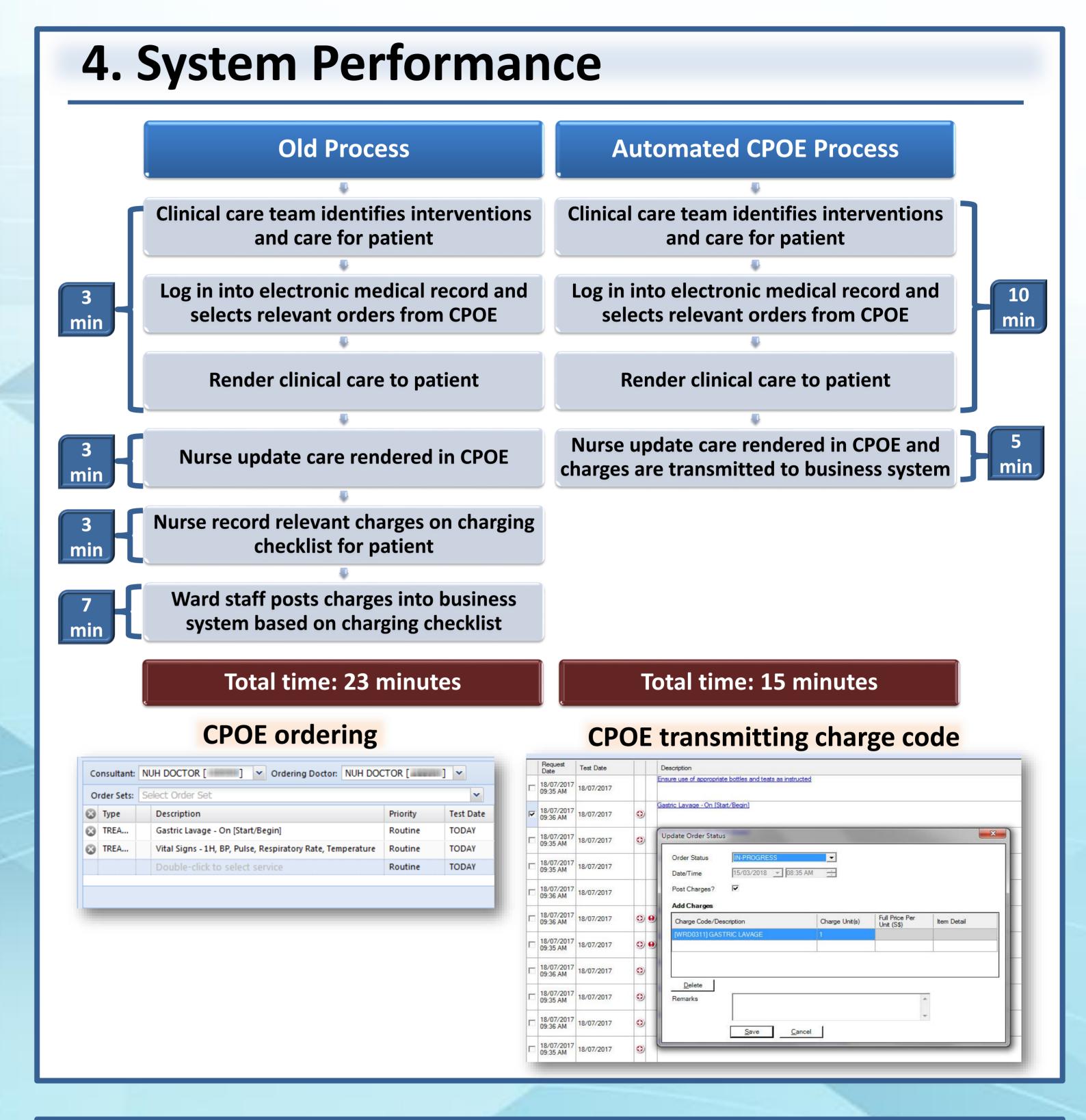
Feasibility test and proof of concept; Fine-tune work processes, identify and rectify undiscovered gaps

Apr – Jul 2017

Progressive Rollout

Hardware, software and staff readiness, consistent on-site support, regular review & quick resolution of issues

- Progressive roll-out by clusters to allow team to provide prompt and effective support
- Ground support by Nursing Informatics champions



5. Results

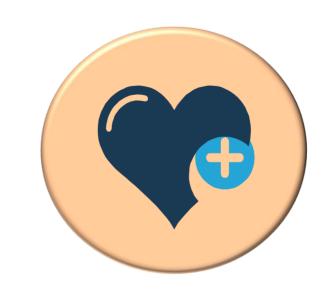


89% Improved billing accuracy

- Reduction in missed gross revenue from \$16 to \$2 per patient day.
- Random audit conducted to compare bills of patients with clinical notes (n=30+30)
- Estimated improved recovery of \$4.9M gross annual revenue (based on 350,000 patient days)

35% Improved staff productivity

- Reduction in time taken to bill patients from 23 min to 15 min per patient
- Time motion study to compare time need to manual vs system-integrated process (n=45)
- Estimated time savings of 2.8M minutes (based on 350,000 patient days)



Positive feedback from staff

- High utilization rate (above 90% are system-posted)
- Good hands-on training and rollout support
- Real time posting of charges within shift
- Better compliance for ordering and updating of clinical documentation
- Auto-daily charge mechanism saves effort
- New IT skills acquired

6. Sustenance & Conclusion

Automation of billing from CPOE system to business system (inpatient bills) allows for timely bill entry, which improves

- ✓ Billing accuracy
- Staff productivity for billing
- Clinical documentation
- ✓ Visibility on billing information and sources
- ✓ Staff IT skills and job satisfaction

This takes NUH a step further towards paperless clinical documentation, and has also been listed as a good practice in the recent MOHH GIA billing audit. The workgroup will continue to review of CPOE orders and billing codes, and meet regularly to address and resolve concerns/issues timely.