Project Title

Closed Loop Barcoded Patient-Specific Blood Products System

Project Lead and Members

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Organisation(s) Involved

National University Hospital

Project Period

Start date: 12-2017

Completed date: 12-2017

Lessons Learnt

Streamline Workflow

Nursing representatives from various disciplines wards were engaged to review existing blood transfusion service process workflow together with stakeholders from pharmacy and blood transfusion service. Project team successfully streamlined blood transfusion related workflow with detailed coverage of scenarios based processes.

Project Rollout & Support

Project team conducted regularly check point meeting to address any issues raised from doctors, ward nurses and Blood Transfusion Service team. Patient-specific

barcode label generation and verification are being monitored closed to ensures safety.

Project Category

Safe Care, Process Improvement, Productivity

Keywords

Safe Care, Process Improvement, Productivity, Technology & Automation, Quality Improvement, Workflow Streamlining, Review & supply Process, Project Rollout & Support, Patient Safety, System Enhancement, Blood Transfusion Service, Cost Saving, Time Saving, National University Hospital, Nursing, Closed Loop Medication Management System, Blood Products Order, Live Dashboard, Reduce Order Variation, System Traceability, Reusability of Capabilities, Barcode Scanning Technology, Patient-Specific Blood Product Barcode

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Closed Loop Barcoded Patient-Specific for Blood Products Order; Supply and Administration

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Background

NUH implemented Closed Loop Medication Management System (CLMMS) since 2009. This, however, did not include blood product ordering and administration process. Despite having known its adverse effects which could be fatal; the Review and Supply process remained manual and in return demanded intensive human resource, this did not error proof the administration process despite meticulous checklist in place.

Main challenges are identified as:

1. No patient-specific blood products barcode
2. No visibility for Blood Transfusion Service (BTS) to intervene orders
3. Manual print & fax from ward to BTS for blood products orders
4. Numerous phone calls from ward to BTS to confirm fax receipt
5. Manual verification during blood products administration

Methods

System Enhancement

Since December 2017, Blood Transfusion Service staff are able to review blood products orders timely with the live Dashboard within the system, this also serves to improve significantly the patient safety component by reducing variation in prescribing practices. The system automates blood products supply process by scanning identifiable information into Electronic Medication Record System (eMARS), followed by generating patient-specific barcode for intended blood product. The system further enables nurses to verify patient unique blood product via barcode scanning, invalid blood products orders and/or wrongly supplied products will be alerted by system prior commencing the administration process.


Unique supply barcode that is generated by system has the ability to validate:

- Patient MRN
- Blood Product Item Code
- Supply Batch ID
- Product Code
- ISBT No / Donor Unit No

Streamline Workflow

Nursing representatives from various disciplines wards were engaged to review existing blood transfusion service process workflow together with stakeholders from pharmacy and blood transfusion service. Project team successfully streamlined blood transfusion related workflow with detailed coverage of scenarios based processes.

Blood Transfusion Service (BTS) Process Workflow
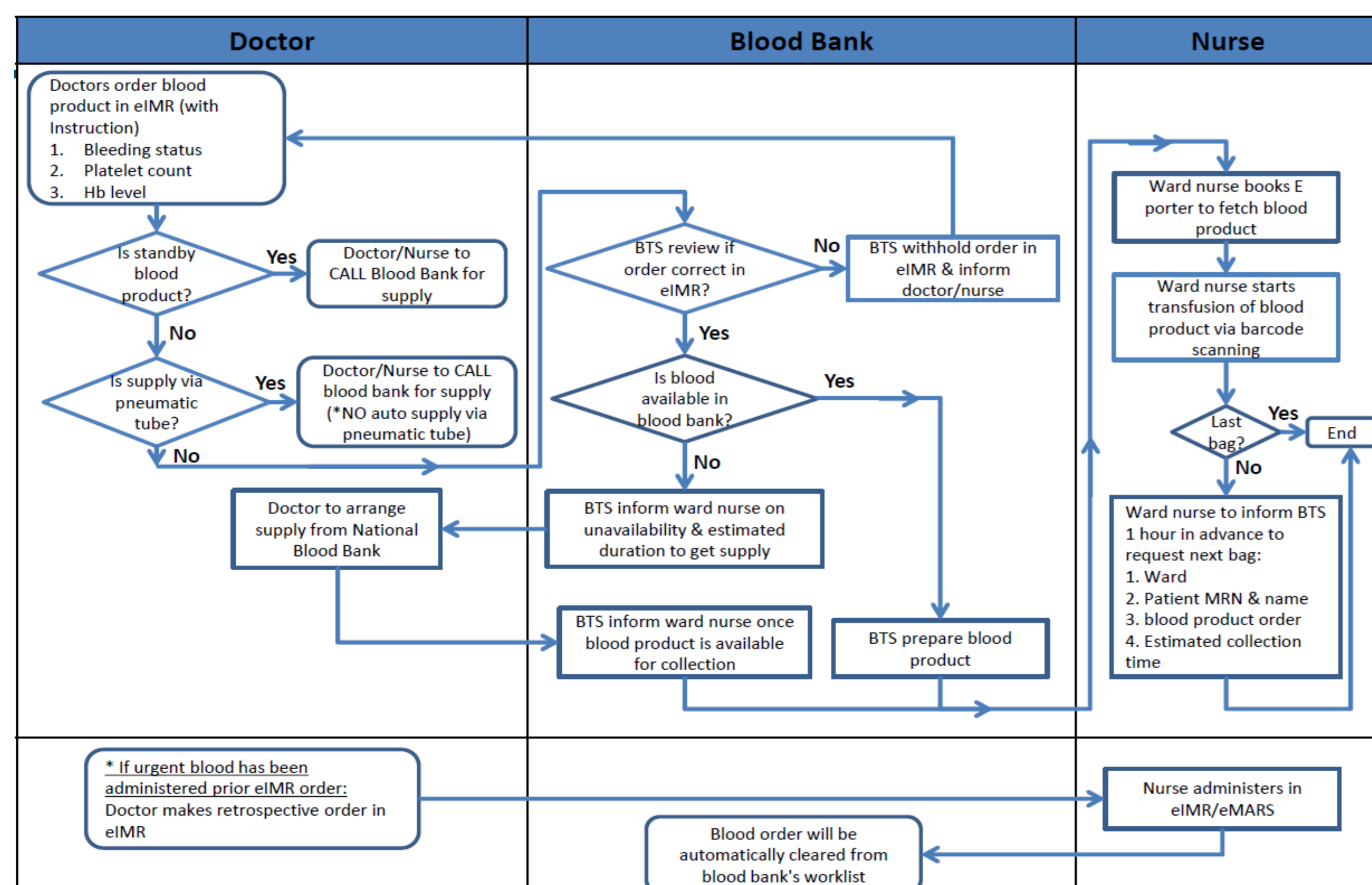
Project Rollout & Support

Project team conducted regularly check point meeting to address any issues raised from doctors, ward nurses and Blood Transfusion Service team. Patient-specific barcode label generation and verification are being monitored closed to ensure safety.

Aim

NUH team embarked on CLMMS enhancement to support the closed loop and barcode scanning technology for Blood product ordering; review and supply process, to improve the quality; efficiency as well as patient safety.

The objectives are:

- Improve blood product administration safety using patient-specific barcode verification technology.
- Timely review of blood product orders to reduce risk of prescribing & administration errors
- Reduce manual process related to operational cost

Results

Timely Intervention and Reduction of Variation of Orders
Live Dashboard within the system enables Blood Transfusion Service staff to review & intervene blood products orders timely; reduction of variation in prescribing practices serve to improve patient safety component significantly.

Identifiable Scanning Capability
Patient-specific blood product barcode is able to validate: • Patient MRN • Blood Product Item Code • Supply Batch ID • Product Code • ISBT No / Donor Unit No during blood product administration. Closed Loop Medication Management System (CLMMS) will alert nurses should any of information mismatch. This feature ensures correct blood products are being administered to correct patient.

Automated Work Process
Faxes and callings from wards to BTS are significantly eliminated. Nurses are able to arrange porter for blood products collection 30 mins or 1 hour for ICU wards or general wards respectively.

System Traceability
System provides 100% traceability for all blood product orders, review, intervene, supply and administration transactions. In the event of BTS needs to trace certain blood product batches, system could readily provide needed information.

Reusability of Capabilities Across Systems / Institutions
This Closed Loop patient-specific system enhancement could be extended to benefit other hospitals as they can leverage and re-use NUH's solution. More hospitals could achieve better blood transfusion related patient safety through reduction of blood product administration related adverse events.

Projected Cost Saving
An estimate of 4800 blood products administrations have benefited with the enhancement and estimated 450 phone calls were eliminated from Mid-December 2017 to Mid-February 2018.
The projected cost savings and cost avoidance for Closed Loop Barcoded patient-specific Blood Bank Enhancement **(Total Projected Cost Saving per year: $65,178)**:

1. Reduce paper print out from ward to BTS. (Cost Savings = $204)
2. Reduce time for nurse to check in eIMR, print from eIMR and fax to BTS. (Cost avoidance = $66,973)
3. Reduce phone calls by ward to check if BTS receive orders. Save time for both nurse and BTS staff. (Cost avoidance = $47,000)
4. Reduce futile trip by porters to BTS. (Cost avoidance = $11,000)
5. Time taken for BTS staff to print this and paste on the blood unit. (Cost Incurred = $59,999)

| Cost Saving $204 | Cost Avoidance $66,973 | Cost Avoidance $47,000 | Cost Avoidance $11,000 | Cost Incurred $59,999 |

Sustainability

Project team will conduct continuous review blood transfusion related adverse events, monitor and uphold high compliance of barcode verification.

Conclusion

Closed Loop Barcode Patient-Specific blood product order; supply and administration implementation has significantly improved cost efficiencies as well as importantly heightened the level of patient safety.