Nursing Informatics Collaboration: Improving Medication Safety in Heart Hospital through Infusion Management Solution

Background:

International and National Patient Safety Goals 2016, focuses on improvement of medication safety in hospitals. According to Centers for Disease Control and Prevention data, medication error is the third leading cause of patient deaths of 2016 in US hospitals. With aim of maximizing judicial use of technology in reducing preventable causes of medication error and ultimately improve health care quality, Infusion Management Solution was implemented in Heart Hospital.

Aim:

Primary aim of implementing infusion management solution was to create closed loop association of patient, infusion devices and medication orders in order to promote system-oriented process for safer medication administration practice.

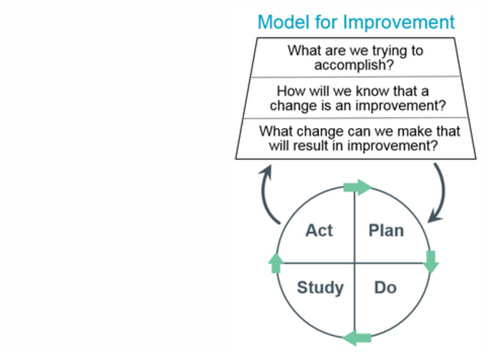
Assumptions: Infusion Management solution implementation in Heart Hospital by September 2016 will result in:

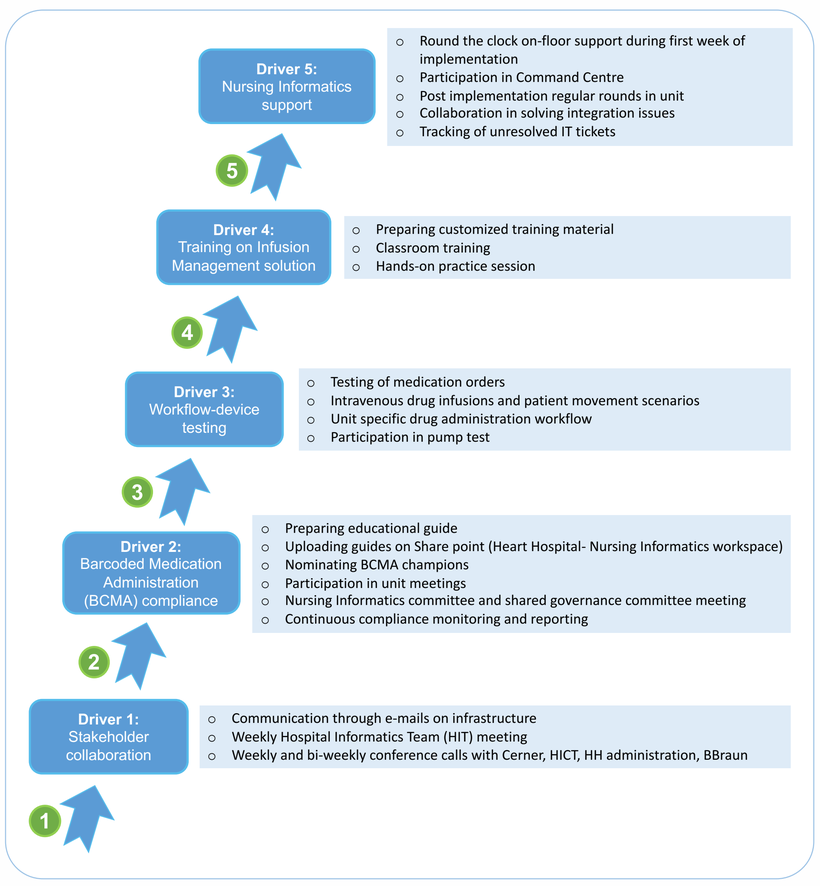
- Improved safety of medication administration, reflected by reduction in manual errors of pump programming and increase in compliance to fundamental rights of medication administration.
- 90% of patient wristbands, intravenous medications and infusion devices labels positively identified by Barcode electronic recognition method, in alignment to International Patient Safety goals for preventing errors related to wrong patient identification, wrong prescription and wrong device.
- Improved care of patients on intravenous medication therapy due to having clinicians view and monitor real time infusion documentation.
- 100% of infusion devices connected to network and associate with specific patient and IV medication to have complete interoperability of integration platform.

Intervention

Implementation of Infusion Management Solution in Heart Hospital was multi-disciplinary collaborative approach of Heart Hospital management, Nursing administration, Pharmacy, Health Information and Communication Technology (HICT) and Nursing Informatics Department. The integration platform went-live on 23 September, 2016 in Heart Hospital.

Nursing Informatics (NI) Department played a pivotal role in implementation, adopting IHI model of improvement





Outcome measurement:

1. Percentage of patients identified through electronic barcoded medication scanning
2. Number of medication related Occurrence, Variance and Accident (OVA) report
3. Percentage of Clinical Information System (CIS) alerts on near miss medication errors
4. Number of nursing staff receiving classroom trainings on Infusion Management
5. Post implementation end user perception survey

Results:

1. Positive patient identification increased from 78.3% in July 2016 to 96.3% in December 2016 (Fig. 2). Accordingly, 96.3% times when medications are administered, patients are electronically identified through barcode reader which eliminates errors risk related to wrong patient identification.

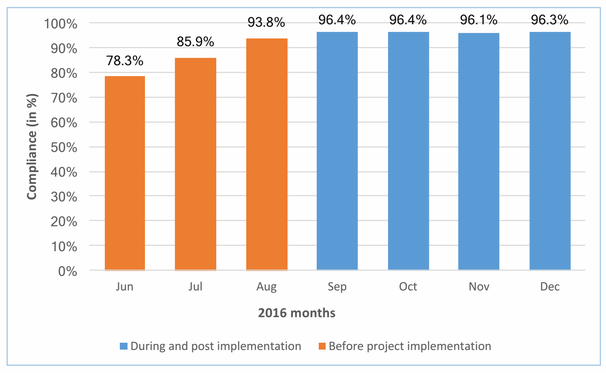


Fig 2.Electronic positive patient identification data (pre and post Infusion Management) (Data Source –Electronic reports generated through Discern Analytics)

2. Medication safety in the Heart Hospital improved as evident by medication related OVAs. Number of medication OVAs decreased from to 39.4% during September to December 2016 (3rd quarter) as compared to 60.6% during May to August (2nd quarter) of 2016 (Fig. 3)

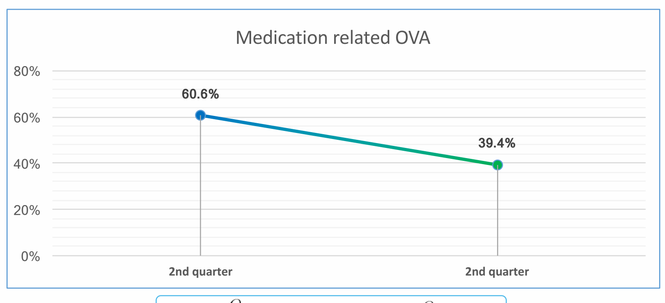


Fig 3.Medication OVA numbers of pre and post implementation of Infusion Management (Data Source: Project Analyst Heart Hospital)

3. Electronical system reports were generated on alerts indicating near miss medication error. This bridged data gap of unreported medication errors, and provided broad reflection on improved medication safety in Heart Hospital (Fig 4). The data indicates that 2261 alerts (1.48% of total alerts) related to patient mismatch, preventing drug errors related to wrong patient identification.

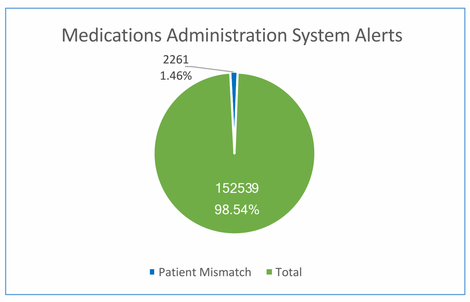


Fig 4.Electronically generated report on medication administration system alerts from 23 September-31 December 2016 (Data Source- Discern Analytics)

4. 364 nurses who comprise 90% of nurses from critical areas, inpatient units and emergency department received classroom trainings and hands-on practice 28 sessions by Nursing Informatics team.

5. High compliance of Barcoded Medication Administration and Closed-loop medication administration contributed in Heart Hospital attaining level 6 accreditation from Health Information and Management System Society (HIMSS) (Fig 5)

Middle East EMR Adoption Model℠

Stage	Cumulative Capabilities
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance) closed loop medication admin
Stage 5	Full R-PACS

Fig 5.EMRAM Model of HIMSS Accreditation (Source: HIMSS Analytics Database)

6. Post-implementation end-user perception survey was conducted to focus group nurses of in the Heart Hospital during January 2016 (three months post- implementation). The result indicated 100% nurses agreement on improved nursing workflow with Infusion Management Solution.(Fig. 6)

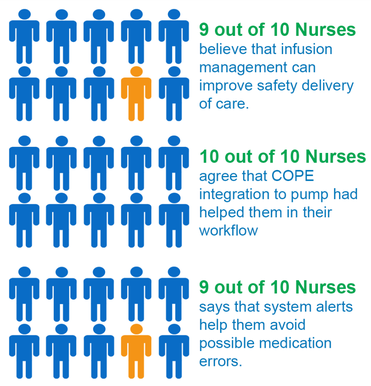


Fig 6.Results of post-implementation end-user perception survey conducted in Jan 2016

Summary of Improvement:

Closed-loop intravenous medication administration workflow is an integration of patient, Computerized Physician Order Entry (CPOE), drug, infusion device, and infusion documentation. Changes on pump are automatically electronically captured. (Fig 7). Structured closed-loop medication administration workflow bridged gap associated with:

- Manual verification of drug orders,
- Manual entry of infusion details in pump,
- Reliance on human memory related to time of rate change, bolus administration, drug hold orders etc.

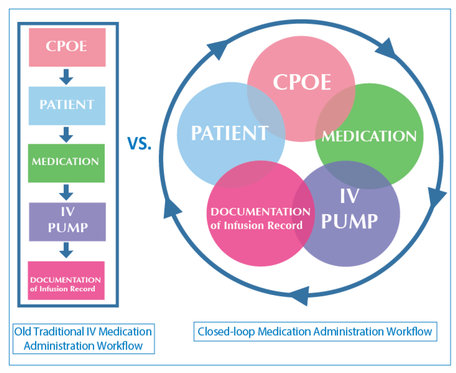


Fig 7.Comparison of traditional and closed loop medication administration

Improvement Team:

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- Dr. Sumaya Al Saadi-Executive Director of Pharmacy, Heart Hospital
- Dr. Alejandro John Tuli- Senior Consultant, Heart Hospital
- Ms. Darlene De Jesus- Project Analyst, Heart Hospital
- HICT application and device team

Conclusion:

Using IHI model of improvement, Nursing Informatics Department collaborated implementation of Infusion Management solution in Heart Hospital and helped nurses adapt the newer functionality of Clinical Information System. Structured process of solution implementation significantly contributed in improving medication safety in the Heart Hospital evident by measured outcomes.

In Collaboration with

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