Evaluating the Effectiveness of the Personalized Barcode Identification Card to verify High-risk, High-alert Medications

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INTRODUCTION

- About 1.5 million preventable adverse drug events (IOM,1999)

- By bar-coding patient identification bands and medication doses, facilities can reduce medication errors by 65% to 86% (Coyle & Heinen, 2005).

- The Veterans Health Administration developed and implemented a wireless, point-of-care technology called the Bar Code Medication Administration (BCMA), to administer and decrease medication errors.

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Background

- Joint commission's National Patient Safety Goals (2010).

The Joint Commission

- Hospital policy requirement

- The BCMA system did not include a process for a second verifier to witness, cosign, and verify the five rights of medication administration.

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High-Risk, High-Alert Medications

- HRHA medications:
    - Morphine Oral Concentrate
    - Heparin Unfractionated
    - Neuromuscular Blocking agents
    - Concentrated electrolytes
    - Chemotherapeutic agent
    - Dextrose Hypertonic 20% or more
    - Warfarin
    - Lovenox
    - Insulin intravenous
    - Insulin subcutaneous

High-risk/high-alert medications will be identified with a "High Alert" label.

Literature Review

- 28 articles reviewed

- 25 common medications
    - Top five medications
        - Insulin,
        - Morphine
        - Heparin
   - Potassium chloride
        - Warfarin

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Literature Review-Contd

- Second person manually check the HRHA medications.

- Fewer than half of 1,435 hospitals double checked the administration of high alert drugs (Grissinger & Globus, 2004).

- 8.6% of the Adverse drug Events (ADEs) are preventable
    - Accidental overdose,
    - Use of wrong drug,
    - Drug that was taken inadvertently (Sakowski, Newman & Dozier, 2008).

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Levels of Evidence

The review of the 28 articles found no facilities used the double-check/verification process using a pop box.


Level Of Evidence
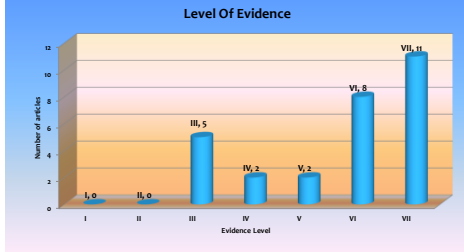
Level I-All relevant randomized controlled trials (RCTs)
Level II-At least one well-designed RCT)
Level III-Well-designed controlled trials without randomization
Level IV-Well-designed case-controlled or cohort studies
Level V-Descriptive or qualitative studies
Level VI-Single descriptive or qualitative study
Level VII-Authority opinion or expert committee reports   (Melnyk and Fineout-Overholt, 2005).
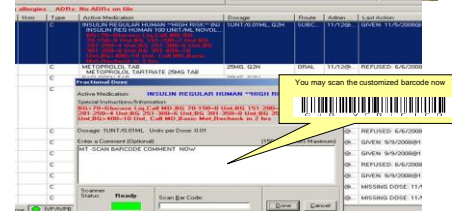
Intervention

Develop a Systematic process for a second person to manually verify the HRHA medications using the five rights of medication administration.

1. Implementation of the PBID card to verify the HRHA medications and
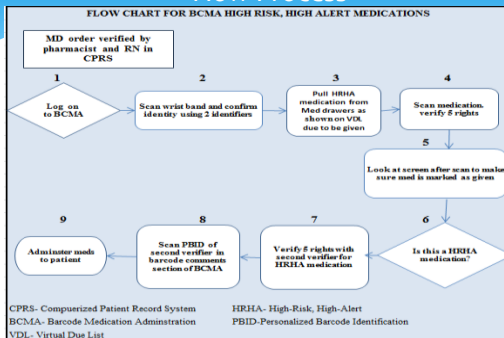2. Development of an evaluation tool to evaluate the effectiveness of the PBID card.

Personalized Bar Code Identification (PBID) card was developed and implemented.
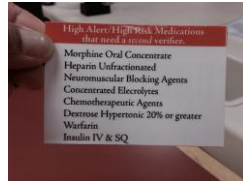
Implementation-Development of HRHA Verification Card and Process

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Implementation- Medication Administration Flow Process

CPRS- Compuerized Patient Record System   HRHA- High-Risk, High-Alert
BCMA- Barcode Medication Adminstration   PBID-Personalized Barcode Identification
VDL- Virtual Due List

Implementation

The PBID card developed and implemented to verify, document, and standardize the process of HRHA medications .
- Decrease medication errors
- Decrease adverse drug events
  Intensive Care Units ICUs
  1. Medical Intensive Care Unit
  2. Cardiac Intensive Care Unit
  3. Thoracic Intensive Care Unit
  4. Surgical Intensive Care Unit

Innovation-Decision Process

Change can be achieved

Adapted (Rogers, 2003).
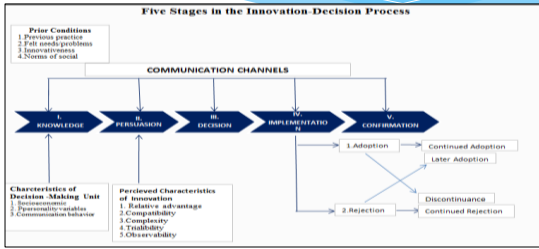
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Aim of the Project

To evaluate the effectiveness of the Personalized Bar Code Identification (PBID) Card to verify HRHA medications

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Project Questions

1. **Will the use of a PBID card to verify HRHA medications reduce medication errors?**
2. **Will the use of a PBID card to verify HRHA medications reduce adverse events.**

1. **How often do nurses follow the standardized process when administering HRHA medications?**

1. **How satisfied are nursing staff with a standardized process to verify HRHA?**
2. **Are there barriers to continuing adoption and ongoing use of the PBID?**

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Implementation-Evaluation of PBID Card Development

The HRHA Medication Verification Audit Tool

IRB approval

• IRB Approval Letter From Texas Christian University

• IRB Approval Letter From VA North Texas Health Care system

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Methods

The project used retrospective data analysis
  • **RNs**
  • **Four ICU units**
    • **MICU**
    • **CCU**
    • **SICU**
    • **TICU**
  • **Location**
    • **VA north Texas Health Care System**

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INCLUSION & EXCLUSION CRITERIA

Inclusion criteria:
- **Medical records of patients admitted to the four ICU units**
- **Receiving HRHA medications**
- **Administered by ICU registered nurses .**
- **HRHA medication administered and verified by second RN.**

Exclusion Criteria:
- **Medical records of patients not receiving HRHA medication in the ICUs**

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Data and Time Frame

Data and period:
- **Six medical records from each of the four intensive care units**
- **Audited weekly for four consecutive months (Nov 2010-Feb 2011).**
- **96 charts reviewed for top four HRHA medications monthly with the HRHA Medication Administration Audit Tool.**
- **Charts in each unit were randomly selected and audited for the following:**
    - **Administered HRHA medication**
    - **Primary RN, who administered**
    - **Secondary RN, who verified the medication**

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Project Results

How often do nurses follow the standardized process when administering HRHA medications?

- **The percentage of medications**
    - **Not verified,**
    - **PBID verified, and**
    - **Verified using a method other than the PBID**
- **Z-tests for two proportions calculated and compared**

- **Verification types were compared by month, unit, medication type, and month by unit.**

Analysis
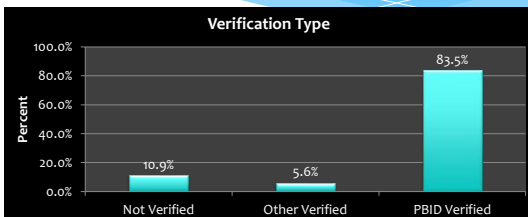- **1397 medications recorded**

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Data Analysis

Frequency and Percent's of Each Verification Type

	n	%	Δ Not Verified	Δ Other Verified
Not Verified	152	10.9		
Other Verified	78	5.6	5.03 **	
PBID Verified	1167	83.5	38.43 **	41.42 **

Note: ** $p < .05$

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Verification Type

Percentages of each of the three verification types

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Implications

Lessons Learned

- **Costs**

- **Benefits**
    - **Decrease medication errors and adverse events**
    - **Save time**
    - **No spelling mistakes or incomplete comments**
    - **Improved patient safety**
    - **Capture data, Increase audit trails and automation**
    - **Cost reduction by decreased time used in typing comments.**
    - **Increased compliance**
    - **Standardized process**
- **In-house project**

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Lessons learned

Challenges

- **IRB Process**

- **Data Collection:**
    1. Will the use of a PBID card to verify HRHA medications reduce medication errors?
    2. Will the use of a PBID card to verify HRHA medications reduce adverse events.

- **Bypassing the Card**

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Future Directions

- Hospital wide process
    - The adoption, implementation and successful standardization of the PBID process in the other areas of the hospital, determines the need to advance with the process.

- Development of an automatic pop box
    - that allows the second verifier to witness and sign is ideal. Until the ultimate solution to the second verification process is developed, it is essential to continue with the current process that works.

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Future Directions- Contd

- Reasons for bypassing
    - Verification process is to be focused in future studies.

- Innovative idea, no manpower or cost for implementation.

- Interventions to be shared
    - Information regarding the evaluation and impact

- Continuous monitor of nurse's performance
    - Components of the BCMA process to ensure success

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Future Directions
Nurse's Satisfaction Tool

VA North Texas Healthcare System
Personalized Barcode Identification (PBID) Card User Satisfaction Survey
Name: Unit: Date:
Please rate the following items and place a check mark on the rating scale.
4- Extremely well   3- Very well   2- Somewhat   1- Not at all

Items	4	3	2	1	Comments
1. How well does the PBID card meet the requirements to verify HRHA medications?					
1. How well the does the use of the PBID card save time from typing comments?					
1. How well has the use of the PBID card standardized the process of HRHA medication verification across the units?					
1. How well does the process of using the PBID card to verify HRHA medications decrease medication errors?					
1. How well does this process satisfy your HRHA medication verification process					
1. How well does the PBID card prevent you from bypassing the verification of the HRHA medication?					

Additional Questions:
• Is the PBID card easy to use? Please check: Yes   No
•Has your cards ever been lost or replaced since implementation? If 'yes' Please comment
_____

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Conclusions

- Simple medication safety program with a good adverse event reporting system will create a considerable and permanent decrease in patient injury as measured by ADEs (Cohen et al., 2005).

- Technology is not the only answer.
    - When an error with a second person check occurs, it could be due to a very serious structure breakdown, or because of a less than perfect working process, or both
    - Twenty-four hour Technical support
    - In-services
    - Variance reports

- Teaching health professionals and patients.

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Conclusion- Contd

- **PBID card implementation can improve medication safety, if there are inquiring clinicians who promotes safety and also are selective, systematic, and independent during the implementation of the process (Armitage, 2009).**

- **Communicating medication safety related to high risk medication needs to be consistent and standardized.**

- **Education tools, training, audits and staff competency are also essential.**

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Acknowledgements

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