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Discussion Forum 5

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Patient safety is a fundamental pillar of high-quality healthcare.

According to WHO World health organization. Around 1 in 10 patients experience harm in healthcare settings, with over 3 million deaths each year due to unsafe care. It also emphasized that more than 50% of this harm is preventable revealing that medications are responsible for about half of these preventable cases. WHO enumerated the most frequent adverse events that can lead to preventable patient harm which includes but not limited to medication errors, unsafe surgeries, healthcare-associated infections, diagnostic errors, patient falls, pressure injuries, misidentification of patients, unsafe blood transfusions, and venous thromboembolism.

The International patient safety goals help accredited organizations focus on and address the specific areas of concern within some of the most critical and problematic areas of patient safety. One of the five goals is to identify patients correctly, which is categorized as IPSG (International Patient Safety Goal) number one. This will be the focus of my discussion.

IPSG number 1 ensures that healthcare professionals accurately identify patients before administering care, procedures, or treatments, thereby minimizing the risk of errors and harm

The approved TWO patient-specific identifiers are:

- Complete name (Last Name, First Name and Middle Name)
- Date of birth

When performing proper identification of patient bedside nurse will start verifying the patient's identity directly by letting the patient state their name and birthday or if the patient is non communicative, letting the patient's family / companion state the patient's name and birthday, while simultaneously checking the name and birthday indicated on the patient's ID band.

One the newly implement intervention of St Lukes Medical Center which includes usage of medical electronic record (Allscript) that provides a comprehensive system for managing patient information, including medical history, treatment plans, medications, billing, insurance eligibility, and more. This EMR system includes usage of KBMA (Knowledge-based medication administration.)



Previously the process of medication administration involved the bedside nurse verifying the medication's name, dosage, frequency (time), and route, followed by a confirmation with the charge nurse for validation of correct dose and medication. An additional step has now been incorporated into the double-checking process. Each patient's ID band is equipped with a unique barcode, and the individualized medication ziplock also features a barcode specific to that patient. This system ensures that the correct medication and dosage are administered to the appropriate patient.

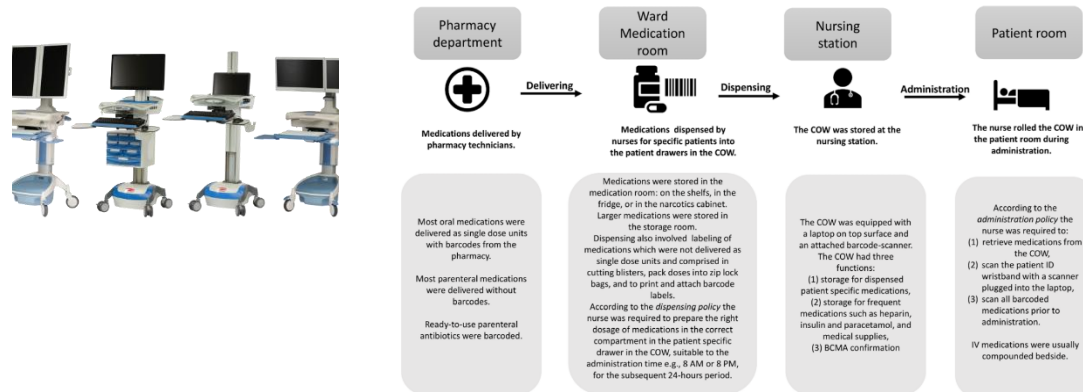
- **Describe a specific situation where you observed or implemented a strategy to enhance patient safety.**

As part of St. Luke's Medical Center's transition to a paperless system using Electronic Medical Records (EMR), including doctors' orders, the implementation of Knowledge-Based Medication Administration (KBMA) was introduced to prevent medication errors. This system ensures that the correct medication, dose, and route are administered to the right patient, with all details recorded in real-time on the electronic medical record.

- **What was the outcome?**

a specific and unique barcode is placed on the patient's ID band and medication ziplock, preventing nurses from administering medication to the wrong patient. The process also involves each nurse having an individual 'computer on wheels' (COW) when administering medication. After verifying the information in the system and consulting with the charge nurse, the bedside nurse proceeds to the patient's room. The nurse asks two patient identifiers: the full name and birthdate. The nurse then scans the barcode on

the patient's ID band, followed by scanning the medication ziplock. The KBMA system will confirm on the computer if the medication matches and is safe to administer. Once the medication and patient match, the nurse can administer the medication, then record it in the real-time system inside the patient's room, helping prevent medication errors. The outcome reveals that medication errors can be reduced if KBMA is properly used, thereby enhancing patient safety.



- **What evidence-based practices supported your actions?**

In the study entitled *Bar Code Medication Administration Technology: A Systematic Review of Impact on Patient Safety When Used with Computerized Prescriber Order Entry and Automated Dispensing Devices* by Kieran Shah, 2016. Stated that Medication errors that lead to adverse drug events remain a significant threat to patient safety, despite the widespread implementation of preventive programs and extensive training for hospital staff. The study also emphasized that despite its significant threat to patient safety, many medication errors can be prevented. And the adoption of health information technologies, such as barcode medication administration (BCMA) systems, is increasingly recognized as a viable solution. It discussed the process and advantage of using BCMA. barcode medication administration systems help prevent medication errors by electronically verifying the five key steps of medication administration: the right patient, right dose, right drug, right time, and right route. For instance, when a nurse scans the barcodes on the patients ID badge places on their wristband, after which scans the medication itself - the system checks the information against databases and provides immediate feedback—either a warning or an approval. Additionally, these systems automatically record the medication administration in an electronic medication record in real time. However, aside from cost, a key barrier to the widespread adoption of BCMA technology is the lack of conclusive evidence proving that it effectively reduces preventable medication errors, particularly in hospitals already using other safety systems like computerized prescriber order entry and automated dispensing devices. The method of the study conducted comprehensive research across the MEDLINE, PubMed, and Embase databases, covering the years 1992 to 2015, to identify English-language articles discussing medication errors related to the use of BCMA systems in conjunction with computerized prescriber order entry and automated dispensing devices in hospital wards. All relevant abstracts and titles were reviewed to determine which studies were eligible for inclusion

and all gathered data were used to critically evaluate the studies, assessing their strengths, weaknesses, potential biases, and overall quality and reliability, based on consensus using Newcastle–Ottawa Scale. A total of 430 citations were identified, of which 393 were excluded during the abstract review. The reasons for exclusion included not involving the specified complementary technologies (CPOE and ADD), not using BCMA at the patient's bedside, not reporting on the impact of BCMA on medication errors, or only providing preliminary results.

In conclusion BCMA can help improve compliance with patient identity checks before medication administration and with documenting medication administration on the MAR. While BCMA has been proven to reduce serious medication errors. However more long-term studies are needed to assess life-threatening errors. The study encourages early-adopting hospitals to publish their long-term data and share insights on overcoming human and technical challenges that prevent the complete elimination of medication errors and the consistent achievement of 100% barcode scanning compliance.

In the study entitled: *Effect of Bar-Code Technology on the Safety of Medication Administration* by Eric Poon, 2010. Emphasized that serious medication errors are common in hospitals, particularly during order transcription or medication administration, and to reduce these errors, bar-code verification technology has been integrated into electronic medication administration systems in order to ensure accuracy and improve patient safety. This study aims to evaluate the frequency of errors in order transcription and medication administration on units both prior to and following the introduction of the bar-code electronic medication administration record system. This includes errors that involved early or late administration of medications that is categorized as timing-related errors, while all other errors were designated as non-timing errors. The result reveals that the implementation of the bar-code electronic medication administration record system led to a relative reduction about 41.4 % in medication administration errors. Additionally, the rate of potential adverse drug events (excluding timing errors) decreased from 3.1% without the bar-code eMAR to 1.6% with its use, representing a 50.8% relative reduction. This concludes that implementing the bar-code electronic medication administration record system significantly reduced errors in order transcription and medication administration, as well as potential adverse drug events. Although it did not eliminate such errors, the study finding suggested that the bar-code eMAR is a crucial step toward enhancing medication safety.

In the study entitled *Effect of barcode technology with electronic medication administration record on medication accuracy rates* by Heather H. Seibert, 2014. Aims to evaluate the effect of integrating barcode-assisted medication administration with electronic medication administration record technology on the occurrence of medication administration errors. A pretest-posttest comparison was used to study the impact of BCMA-eMAR on medication administration accuracy at two community hospitals. The result reveals hospital 1- overall accuracy rate increased from 89%, When wrong-time errors were excluded, the accuracy improved from 92%. At hospital 2, the overall accuracy rate remained mostly unchanged, but when wrong-time errors

were excluded, the accuracy improved from 93%. Concluding that the implementation of BCMA-eMAR in two hospitals led to significant improvements in overall medication accuracy rates across most study units, without introducing new types of errors into the medication administration process. Additionally, when wrong-time errors were excluded from the analysis, accuracy rates showed further improvement.

In the study entitled *Impact of a Barcode Medication Administration System on Patient Safety* by Martha Macias, January 2018. This study aims to evaluate the effect of barcode medication administration on the occurrence of medication administration errors in an onco-hematology day hospital and to identify the types and features of these errors in that context. A pre-/post-intervention study was conducted to evaluate the effects of BCMA implementation, assessment of the incidence, classification, and severity of medication errors, along with patients' length of treatment stay were included. The results show that the implementation of a BCMA system led to a reduction in the frequency and severity of medication administration errors in the onco-hematology day hospital. Concluding that BCMA is a valuable tool for verifying the five rights of medication administration in the onco-hematology day hospital and may help nurses spend more time on direct patient care.

In contrast, another study entitled *Barcode medication administration technology use in hospital practice: a mixed-methods observational study of policy deviations* by Alma Mulac, 2021. The study highlights that poorly implemented barcode medication administration can disrupt workflow, increase workload, and result in medication errors. It also emphasized the importance of further exploration in order to understand the causes of BCMA policy deviations. The study aims to gain an insight and explore how nurses use barcode technology during medication dispensing and administration, document the number and types of BCMA policy deviations, and examine their causes. A prospective, mixed-methods study was conducted using the SEIPS (Systems Engineering Initiative for Patient Safety) model in analyzing the data.

44 nurses were observed administering 884 medications to 213 patients the result shows that BCMA policy deviations were linked to tasks, organization, technology, environment, and nurses. Task-related deviations were observed in 66% of patients during medication dispensing and 71% during administration. Organizational issues included the failure to scan 29% of medications and 20% of patients' wristbands. Technological problems, such as low laptop batteries and system freezing, as well as environmental factors like medication room location and patient drawer size, also contributed to the deviations. This also shows that the majority of deviations were due to policies that interfered with effective BCMA use and poor technology design. Hence the findings suggest that changes to the work system, especially in policies and technology, are needed to improve BCMA use by nurses during medication dispensing and administration. These changes should ultimately enhance patient safety, which is the main goal of BCMA implementation.

In summary, all the articles discussed show similar results, consistently indicating that the implementation of Barcode Medication Administration (BCMA) systems significantly reduces medication administration errors and improves patient safety across various healthcare settings. BCMA technology helps verify the five rights of medication administration -right patient, right dose, right drug, right time, and right route. Thereby preventing many types of errors. However despite these positive outcomes, the studies also highlight that BCMA does not eliminate all medication errors, particularly timing-related errors. There is a call for more long-term research to assess its impact on life-threatening errors and to gather additional data from early-adopting hospitals to refine BCMA technology. Furthermore, barriers to full adoption, such as human and technical challenges, cost, and the lack of conclusive evidence in some cases, are identified.

In conclusion, while BCMA systems have proven effective in improving medication administration accuracy and reducing errors, more research is needed to address the remaining challenges and enhance their impact on patient safety. Additionally, changes to the work system, particularly in policies and technology, are needed to improve BCMA use by nurses during medication dispensing and administration.

- **If faced with the same situation again, how would you further improve patient safety?**

In the case of a STAT order, the unit has an Omnicell cabinet to allow faster access to medications during life-threatening situations. Overriding the KBMA process is acceptable in such cases, as there may not be enough time to wait for the pharmacist to prepare and label the medication with a barcode. If I am placed in a situation where the use of KBMA must be overridden, I will ensure that I verify the medication name, dose, and route with the doctor, confirm the correct patient, and seek validation from the charge nurse for double-checking before administration, in order to prevent medication error and ensure patient safety.

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