NK8EOb – INNOVATION

BARCODE SCANNING TECHNOLOGY DECREASES PATIENT MEDICATION ERROR RATES

Using the required empirical outcomes (EO) presentation format, provide one example of an improved outcome in an ambulatory care setting associated with a clinical nurse(s) involvement in the adoption of technology.

Problem

Barcode medication administration (BCMA) scanning technology is known to improve patient safety by reducing medication errors (wrong drug, wrong dose, wrong patient, wrong route, wrong time) in healthcare facilities. However, nurses practicing in the EP Lab (606104) [EP Lab], Cardiac Services (606509) [Cardiac Services], and Cath Lab (606101) [Cath Lab] (ambulatory care settings) at NewYork-Presbyterian/Columbia University Irving Medical Center (NYP/Columbia) had not adopted BCMA which led a rise in medication administration errors in these ambulatory care settings.

Pre-Intervention

September 2022:

- The combined medication administration error rate for the EP Lab, Cardiac Services, and Cath Lab was 0.45 per 1,000 administered doses in September 2022.
- Rebekah Wiley, MSN, MBA, RN, CEN, Patient Care Director (nurse manager, at the time), EP Lab, Cardiac Services, and Cath Lab used direct observation to confirm lack of adoption of the available scanning devices. She conducted an electronic survey to gather EP Lab, Cardiac Services, and Cath Lab clinical nurse perceptions related to barriers associated with BCMA scanning technology. The responses revealed that most clinical nurses reported that the current mobile device BCMA scanning technology was not user-friendly and Wi-

Fi connectivity issues contributed to the nurses' perceptions of uselessness of the current technology.

Goal Statement

To decrease the combined medication error rate per 1,000 administered doses in the EP Lab, Cardiac Services, and Cath Lab

Participants

Name/Credentials	Discipline	Title	Department/Unit
Rebekah Wiley, MSN, MBA, RN, CEN	Nursing	Patient Care Director (nurse manager, at the time)	EP Lab, Cardiac Services, and Cath Lab
Siobhan Reilley, BSN, RN, CCRN	Nursing	Clinical Nurse	Cath Lab
Michelle Lindquist, BSN, RN, CCRN	Nursing	Clinical Nurse	Cath Lab
Jose Ramirez	Information Technology	Director, Information Technology	Information Technology

Intervention

October 2022:

- Due to Wi-Fi connectivity issues with the bar scanning technology, Ms. Wiley consulted with Information Technology and Epic (electronic medical record) teams to explore reliable scanning options for the ambulatory settings. She ordered 15 tethered barcode scanners. The decision to purchase the BCMA technology as a tethered device minimized and potentially mitigated the connectivity issues, remaining attached to workstations on wheels.

  Impact Statement: Providing clinical nurses with reliable technology aligned with the organization's mission, vision, and culture. Focusing on high reliability influenced quality and safety outcomes and reduced major quality failures, such as inoperability of technology. These actions addressed the nurses' concerns, reduced barriers, and shifted slow adopters to be the first to try the new technology. Full adoption of reliable technology directly impacted the medication error rate by having a technological safeguard for nurses when they administer medication.

November 2022:

- The BCMA technology devices were delivered to the unit and Jose Ramirez, Director, Information Technology (IT), and the IT team installed the barcode scanning technology.

  Impact Statement: Acquisition of the tethered barcode scanning technology made it possible for the clinical nurses to implement and fully adopt technology that could safeguard patients during medication administration.

December 2022:

- Ms. Wiley provided professional development on Epic BCMA scanning technology to all clinical nurses in the EP Lab, Cardiac Services, and Cath Lab setting. She accessed Epic training manuals and utilized the resources to ensure competency and compliance.

  Impact Statement: Educating clinical nurses with the training manuals impacted the outcome by improving nurses' knowledge, confidence, and skills to fully adopt the barcode scanner technology.

January 2023:

- Siobhan Reilley, BSN, RN, CCRN, and Michelle Lindquist, BSN, RN, CCRN, clinical nurses, Cath Lab selected BCMA adoption as a clinical ladder project, agreeing to serve as clinical nurse champions, in order to reduce medication errors. They provided additional real-time education and training to their peers in the EP Lab, Cardiac Services, and Cath Lab and tracked barcode scanning compliance reports.

  By the end of January 2023, 100 percent of clinical nurses from the EP Lab, Cardiac Services, and Cath Lab received education on the BCMA technology.

  Impact Statement: The efforts of the clinical nurse champions in providing education improved barcode scanning compliance, which improved patient safety during medication administration. Education of 100 percent of the clinical nurses with the training manuals impacted the outcome by improving each one of the nurse's knowledge and confidence of adopting the barcode scanner technology.

February 2023 – April 2023:

- Ms. Wiley ordered 10 additional scanners for the workstations on wheels so that each mobile computer station had tethered barcode scanners, which were installed by the end of April 2023 by the IT Department. By April 30, 2023, the EP Lab, Cardiac Services, and Cath Lab clinical nurses completely changed their

practice and fully integrated BCMA scanning technology with each patient medication administration.

Impact Statement: Ensuring that each computer/workstation on wheels in the EP Lab, Cardiac Services, and Cath Lab had the technology available to keep patients safe, Ms. Wiley created a nursing practice environment that empowered clinical nurses to confidently apply their knowledge, skills, behaviors to successfully adopt BCMA technology which reduced medication error rates.

- **Key references:**

Institute for Safe Medication Practices (2022). ISMP Guidelines for Safe Medication Use in Perioperative and Procedural Settings. *ISMP.* Retrieved from https://www.ismp.org/resources/guidelines-safe-medication-use-perioperative-and-procedural-settings

Naidu, M., & Alicia, Y. L. Y. (2019). Impact of Bar-Code Medication Administration and Electronic Medication Administration Record System in Clinical Practice for an Effective Medication Administration Process. *Health*, *11*(5), 511. https://doi.org/10.4236/health.2019.115044

Outcome