STUDYDADDY

Get Homework Help From Expert Tutor

Get Help

Sylvestor O. Foote
John R. Coleman

Medication Administration: The Implementation Process of Bar-Coding for Medication Administration to Enhance Medication Safety

EXECUTIVE SUMMARY

▶ Approximately 1.5 million Americans are injured each year because of medication errors. In hospitals alone medication errors cost the health system well over $3.5 billion per year.

▶ Nurses are at the frontline of medication administration accountability.

▶ A Bar Code Medication Administration application was implemented at a 300-bed community hospital.

▶ The creation of the process was spearheaded by a taskforce consisting of staff nurses, nursing and pharmacy administrators, and an IT representative.

▶ This group planned the implementation process, which included changes to medication policies and procedures, downtime procedures, workflow designs, planning for nursing training, and changes to medication delivery.

▶ The results from the pilot indicated that the bar-code technology reduced medication errors by 80%.

Sylvestor O. Foote

John R. Coleman

MEDICATION administration is a critical skill of the professional nurse, who must understand and follow various steps in the drug administration process to assure patient safety. This process consists of the "Six Rights" of medication dosing. If followed, this systematic process can effectively decrease the incidence of medication errors. The nurse needs to be sure that he/she is delivering the right *drug,* to the right *patient,* at the right *time,* at the right *dose,* per the right *route,* and for the right *reason.* After confirming each right, the nurse should ask, "Is there any reason not to give this patient this drug?" (McGovern, 1988). Upon giving the medication to the patient the nurse must assess the administration method of the medication be it via oral, IV infusion, or parental and ensure that there are no complications.

Traditionally, this process could take up to 30 minutes per patient. This depends on the number of medications the nurse is required to administer. To achieve all six rights the nurse must check the identification bracelet to ensure if it is indeed the correct patient. Double-checking each medication with the medication administration record (MAR) ensures that the particular medication is due to be given at this time and the amount to be given is correct. In addition, the nurse needs to assess a patient holistically by questioning if the medication about to be given is appropriate for the patient's diagnosis. Does the patient have any medication allergies? Would these medications have an adverse reaction with the other medications being given at this time and what laboratory results should be checked before administering these drugs? In today's world, time is an issue. A nurse can be assigned on average six patients with approximately 18 medications. Additionally the nurse must provide complete care, including all the necessary documentation legally required. The need for modern technology to provide assistance is in great demand.

Medication Errors

Medication errors strike at the heart of being a nurse: the value of "do no harm." Medication errors have serious direct and indirect results and are usually the consequence of a breakdown in a very complex system. This involves physician orders, transcription (data entries due to illegible communications), pharmacy calculations, IT systems compatibility, and dispensing of medications. The direct result can be a threat to patient safety. Indirectly, the trauma of an error experienced by the nurse affects confidence and nursing practice. Ten to 18% of all reported hospital injuries have been attributed to medication errors (Stetler, Morsi, & Burns, 2000). Five percent of all medication errors reported to the U.S. Food and Drug Administration in 2001 were fatal (Thomas, Holquist, & Phillips, 2001). A report from the Institute of Medicine (IOM, 2006) suggested that about 1.5 million Americans are injured each year because of medication errors. The IOM estimated that errors in hospitals alone cost the health system well over $3.5 billion per year. That does not include errors made at doctors' offices, pharmacies, long-term care facilities, and in patients' own homes. On average a hospital patient is subjected to at least one medication error per day (IOM, 2006). A single patient can receive up

SYLVESTOR O. FOOTE, MHA, BSN, RN, is Patient Care Director, New York Presbyterian Hospital, New York, NY.

JOHN R. COLEMAN, PhD, is Associate Professor, Department of Management, Ancell School of Business, Western Connecticut State University, Danbury, CT.

to 18 doses of medication per day (Marinon, Reomjardt, Eocjenerger, & Steingard, 2000), and a nurse can administer as many as 50 medications per shift. This places the nurse at the frontline of medication administration accountability (Benner et al., 2002). Inpatient medication errors can attribute to increased length of stay by 4.6 days, with a resulting cost of $4,685 per patient (McGovern, 1988).

Medication Management Standards and National Patient Safety Goals

Medication management standards and the National Patient Safety Goals set by the Joint Commission are requiring hospitals to have a plan for implementing bar-code technology for matching patient identification to medications by January 2007. This bar-coding technology called Bar Code Medication Administration (BCMA) is a "point of care" (at the bedside) solution that automates various aspects of the medication administration process and increases patient safety by system validation of the "Six Rights" of medication administration. This is a nursing, pharmacy, and IT collaborative initiative to increase patient safety in both dispensing and administration.

Bar-Code Medication Administration

The BCMA application within Powerchart (the electronic program used by the nursing department for documentation) enables the nurse to validate and document the administration of medications/IVs, using a computer and a bar-code scanner attached to a medication cart. This is then linked by a wireless network to the electronic MAR. If the scanned medication does not match, the medication ordered for the patient in the system produces an alert. The goals of the BCMA are listed in Table 1.

Selecting a System

Cost factor and effectiveness were carefully evaluated with the outcomes of staff satisfaction, assistance to employee productivity, and budgetary restraints. Two main concepts — medication carts and proximity — were considered (see Table 2).

Implementation Process

The implementation process of BCMA at a small 300-bed community hospital utilizes a Cerner electronic documentation system for the nursing department. This system has a compatible option of three bar-coding systems. All three were tried to see which system would work best with the medication carts used for storage of each patient's medications and for carrying the wireless PC's containing the MAR. The creation of the process was spearheaded by a task-force consisting of staff nurses, nursing and pharmacy administrators, and an IT representative. This group planned the implementation process, which

Table 1.
Goals of the BCMA System

1. *Increase patient safety.* Reduction in medication administration errors, the positive identification of the patient with a bar-code scanner will adhere to the "Right Patient." The scanning of individual medications/IVs with a bar-code scanner will validate the "Right Medication, Right Dose, Right Route, and Right Time. Nurses will receive alerts and no charting will be allowed if these five rights are incorrect.

2. *Increase patient satisfaction.* Due to the patient's perception that technology for increased safety is included in her/his care.

3. *Increase efficiency.* Integrated system will further enhance the electronic MAR. Bar-code documentation will automatically populate the patient's MAR and charge appropriately for each dose given.

4. *Increase nursing satisfaction.* Other institutions using similar technology showed increase nurse satisfaction (up to 68%).

5. *Decrease patient care costs.* Medication errors account for significant patient morbidity and mortality, as well as legal, operational, and patient care costs.

included changes to medication policies and procedures, downtime procedures, workflow designs, planning for nursing training, and changes to medication delivery.

The roll out of the new process occurred on one unit as the prototype thus enabling a smooth transition for any correction during the evaluation process. The unit used was a busy medical-surgical unit, which has a maximum capacity census of 33 and an average daily census of 25. The duration of this pilot was for 4 weeks with an additional 2 weeks of training for all nurses on that medical-surgical unit.

Training

Step 1. All nurses were required to read information online and perform computerized virtual training on a program called HealthStream. Upon completion nurses had to achieve a test score of 80% or higher.

Step 2. Each nurse had to sign up for classroom computerized training by the IT department for a 1 hour class which was followed by 0.5 hours of practice using both the bar-code scanner and simulated patient medications.

Step 3. The IT instructors identified subject matter experts during training who had outstanding competency levels with the new technology. They were granted an additional hour of training mainly to answer common troubleshooting questions, which were anticipated for the roll out.

Table 2.
Medication Carts Solution and Proximity Solution:
Advantages and Disadvantages

Medication Carts Solution
The use of Rubbermaid carts with the attached wired system of both the computerized MAR and the bar-coding scanner system.
Advantages
1. Medication carts are on wheels, which can be pulled to patients' bedsides to administer medication. 2. The Rubbermaid cart has the ability to be raised or lowered to accommodate the user's height. 3. A medication cart can be easily converted to a desk/working station with a chair. This is an added feature for the nurse to conduct his/her documentation especially when the nursing station is crowded or noisy. 4. The cost per medication cart with the transfer technology cost is $7,100; however, since there are only four nurses scheduled at a time for a census of 20 patients, the unit will only require five carts. An extra medication cart will be available in the event of a malfunction as a backup. 5. The medication cart can hold up to six medication cassettes, has ample space for additional drawers for equipment storage, and can be locked for safety using an electronic code. 6. The total cost of the 35 medication carts solution, which is the required amount for the hospital, is $248,500.
Disadvantages
1. The medication cart has a rechargeable battery life of 8 hours but requires an electrical charging time of 2 hours. 2. Lack of space in patient rooms creates a challenge when bringing the cart into the rooms. 3. For those patients in isolation the cart must stay at the patient's room door while the bar-code scanner is placed in a plastic bag. This creates a challenge when scanning the medications.
Proximity Solution
This is the use of an actual cupboard in each patient's room that will hold a laptop computer and the bar-coding device along with shelves for the assigned patient's medications and a lock device.
Advantages
1. Located right at patient's bedside. 2. The cost for the proximity cupboard with technology is $3,800 per unit; however, with semi-private rooms housing two patients, two proximity cupboards are needed per room.
Disadvantages
1. Pharmacy would be required to increase staffing by an additional 4.0 FTEs to facilitate the required replenishing of medications in the cabinets based on the unit's admissions and discharges. 2. The security of the medications in the patients' rooms cannot be guaranteed due to lack of constant observation in the rooms. 3. Additional nursing time required in isolation rooms when using the system. 4. The cost to install the 200 proximity cupboards is $760,000.

Familiarity with Equipment

Several days prior to the pilot roll out, nurses were given the new medication carts to use, as they normally would use the older carts. This gave them an opportunity to get adjusted to maneuvering the carts. Medications were given as normal without the use of the bar-coding scanners.

Chocolates, packaged in packets containing the bar-code scanning, were given to staff frequently, creating awareness of medication packaging and bar-code appearance.

Each patient was given a new identification bracelet, which consisted of medical record number, date of birth, last and first name, and bar codes, which were featured twice on each bracelet in anticipation of any difficulty of scanning.

Day of Roll Out

For the first 4 days of roll out, IT trainers, pharmacists, and subject matter experts were scheduled to work all nursing shifts on the unit to address any question or malfunction. Technical support was available 24 hours a day, 7 days a week for replacement of any malfunctioning medication cart or bar-coding scanner.

Recording and Reporting

Logs were provided on the unit for recording all problematic experiences. The main recurring problems were:
1. Scanning IV bags.
2. Some medications stored in bulk on the unit were not assigned bar codes.
3. Some medications obtained from the medication cart (Omnicell) had no bar codes and some with the bar codes were not accepted by the system when scanned.
4. Scanning patient's identification bracelets especially when they were wet.
5. System would not allow the nurse to administer medications if she/he was behind schedule.
6. Inability to chart water and saline flushes.

By recording these incidents and submitting findings to the pharmacy department, these problems were corrected by assigning the appropriate bar-code scans to the medications missing them, and by creating labels for medications packaged without bar codes. The identification bracelets were easily corrected using a different material, which enabled the ink from the printer to be more durable to water and wear and tear. As for the bulk stock, pharmacy started to stock unit dose items with adaptable prepackage bar scanning codes rather than multi-dose medications.

Evaluation

The taskforce analyzed the decrease of medication variances, the satisfaction of the nursing staff, the

decrease of missing medications from pharmacy, the ratings of the patients regarding medication safety, and the percentage of correct usage of the system by nurses when administering the medications.

Outcomes

Nurses expressed satisfaction with the new technology. Many expressed comfort using the medication carts in quiet areas to focus on documentation and charting accuracy. The new system, according to the nurses, improved workflow and allowed them to be more alert and engaged with patient education as they educate patients about the different medications as they scan them.

The results from the pilot indicated that the bar-code technology reduced medication errors by 80%. This confirms that positive identification of patients and medications via bar-code scanning at the beside is being achieved.

With such a positive outcome of the pilot on this busy medical-surgical unit, it was decided to roll out the program to the other units two at a time with an interval of 3 weeks between each roll out. The format for training will remain the same to allow familiarization with the equipment. **$**

REFERENCES

Benner, P., Sheets, V., Uris, P., Malloch, K., Schwed, K., & Jamison, D. (2002). Individual, practice and systems causes of errors in nursing. *Journal of Nursing Administration, 32*(10), 509-523.

Institute of Medicine (IOM). (2006). *Medication errors injure 1.5 million people and cost billions of dollars annually.* Retrieved October 9, 2006, from http://www8.nationalacademies.org/onpionews/newsitem.aspex?RecordID=11623

Marinon, B.L., Reomjardt, K., Eocjenerger, E.J., & Steingard, R. (2000). Prevalence of errors in a pediatric hospital medication system: Implications for error proofing. *Outcomes Management for Nursing Practice, 4*(3), 129-135.

McGovern, K. (1988). Ten golden rules for administering drugs safely. *Nursing, 18*(8), 34-42.

Stetler, C.B., Morsi, D., & Burns, M. (2000). Physical and emotional patient safety: A different look at nursing-sensitive outcomes. *Outcomes Management for Nursing Practice, 4*(4), 159-165.

Thomas, M.R., Holquist, C., & Phillips, J. (2001). Med error reports to FDA show a mixed bag. *FDA Safety Page, 145*(19), 23.

STUDYDADDY

Get Homework Help From Expert Tutor

Get Help