



## Jefferson Community Health Center

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## “Our Journey with Medication Barcoding”

Critical Access Hospital

**Overview:**

Since 2004, Jefferson Community Health Center (JCHC) has taken its focus on quality of medication administration to the forefront. JCHC implemented Intellidot Barcoding in January 2008, after 4 years of researching the subject of barcoding and medication administration safety. Literature shows that adverse drug events cause one out of five injuries or deaths to hospital patients in the United States. With these alarming statistics, it was a quality improvement project that JCHC was proactive in implementing.

***Leadership/Planning/Human Resources***

The Pharmacy and Nursing Director were the driving forces in getting barcoding at Jefferson Community Health Center. They reviewed different literature and were convinced that this quality improvement effort was a practice that would benefit the JCHC's consumers. According to the IOM, the use of barcode technology at the patient's bedside has shown impressive gains in reducing medication administration errors, which may account for as many as 7,000 deaths per year in U.S. hospitals. The bottom line: what better place to protect than at the bedside, the point of administration.

The Director of Pharmacy also looked at the current medication administration process. A patient was admitted to the hospital, the nurse wrote out all of the meds on a written medication record, copies of admit and medication orders were sent to pharmacy. The written medex was not checked or verified by the pharmacy staff until the next morning or noon hour chart exchange. It was in the nurse's hands to make sure all medications were listed on the medex, as well as administration times. During daytime hours when pharmacy staff was in

house, mediations were reviewed for appropriateness and a review of allergies was quickly done. After pharmacy hours, the medex stayed as is, until it was reviewed the next morning.

The philosophy at that time was that we had a great manual system. There were very few issues. The manual system worked well, we knew our roles, and only occasionally was there a documentation problem. Errors were made, but there weren't many reported. About 15-30 total medication errors were reported every quarter between 2004 and 2007.

Barcoding was then taken to the nursing staff to discuss. There were a vast number of concerns brought to the table. Staff was leery; especially because of the nursing computer charting system that was not meeting staff's expectations. The consensus was that they would comply with the change if they had to, but it wasn't an endorsement. At that time, in 2006, the Directors of Pharmacy and Nursing took barcoding to administration. The literature showed barcoding was the most definitive patient safety process, and JCHC felt that this was a mandatory step at improving the quality of patient care. Intellidot was chosen to provide us with this service for 3 reasons. Foremost were the ratings it received by users and for customer service. Quality of product and reasonable cost were also selling points. Nursing staff had concerns with having barcode technology attached to a computer; their recommendation was for a portable handheld device, which Intellidot provided.

With the process change came a complete role reversal. No longer would the acute care staff be in charge of transcribing the written medex and ensuring its completeness on admission. Pharmacy now had to assume this role. Admission and medication orders would go to pharmacy to be put into the pharmacy system and populate the Intellidot medication administration worksheet. The pharmacist would then verify the completeness and

appropriateness and it would then be available for the primary nurse to do a second verification of the medications and orders.

This process was important for many reasons. Medications are put into the computer system with pharmacy's knowledge of proper medication and doses, allergies are checked, a pharmacist verifies medications, and the primary nurse is a double or triple check. The system allows pharmacy to check the status of medication records at any time, and notify staff if there is a discrepancy or omission. Barcoding also allows nursing to decrease the opportunity for error from transcription on the medex, as well as rewriting the medex when patients changed status. Barcoding also provides us with the most valuable benefit, assuring that the "five rights" are confirmed – right patient, right medication, right dose, right time, and right route of administration.

### ***Patient and/or Community Focus***

At the time that JCHC began researching the aspect of barcoding, the community lacked knowledge about what was good and bad about medication administration. Medication errors were not widely discussed. While barcoding technology has been used for quite some time in many hospital applications, it has only recently been used to address patient safety. JCHC's forethought was of being proactive in our journey to be the safest hospital. Our patients, medical staff, and employees did not see barcoding as a need, but continued research surrounding barcoding said differently. As previously stated, medication errors reported were fairly low. About 15 to 30 errors were reported every quarter between 2004 and 2007. These errors consisted of Category C errors-- errors that occurred and reached the patient, but did not cause harm. Very few near miss reports were filed, which indicated staff were afraid to report

or did not see the importance of reporting. The physicians' first discussion on barcoding was not positive. It was thought it would be a waste of money, and their concern was that nurses would have less time with the patient. With all of these concerns in mind, our goal didn't focus on the costs or time constraints, but that the safety it would provide our patients was priceless.

### **Methods:**

JCHC's transition to barcoding was difficult. If we were given the choice to do it all over again, we would do some things differently. The process for implementation was primarily based on Intellidot's recommendations. An initial visit was held about 2 months prior to the go-live date. Expectations of both entities were discussed, as well as how training would be provided. JCHC sought an early training period for nurses, but Intellidot suggested staff shouldn't train too early, because of the risk of forgetting skills. Training began the week before the go-live date. In the mean time, pharmacy was preparing by updating their system and doing a lot of foot work to interface the Intellidot and McKesson pharmacy systems. From the beginning, we had an advantage with the transition to barcoding because of a very detailed pharmacy technician that became the "go-to" girl. Her work behind the scenes started 6 months prior to go-live, and included setting up the drug database, formulating sig codes, making order entry rules, and scanning every medication in inventory to send to Intelliot. Her work continued for 6-8 months post implementation to remain as the "go-to" person for problem solving. On many occasions Intellidot said she had done things with our implementation that they have never done or thought of before. Two weeks prior to go-live, training was conducted for staff who would be considered the "super users," nurses with additional training to be proficient with the system. The week of training included all acute

care nursing, pharmacy staff, respiratory therapists, and surgical nurses. In addition, Intellidot staff were on site to assist several weeks after we went live.

On Jan. 28, 2008, we went live. On a daily basis for months after implementation, there were issues that needed to be fixed in the system. A daily log was initiated for staff to write out concerns, provide feedback, and ask questions. Pharmacy, Director of Patient Safety and the Assistant Director of Nursing were among the staff who trouble-shot these issues on a daily basis and would email out the solution or plan of action. Staff consistently had issues with the system. The pharmacy technician spent nearly every day for a year managing the system and helping to correct the issues we encountered. We quickly learned that we initially tried to do too much with the system. We wanted to scan everything, which included blood transfusions, incentive spirometry, oxygen, all tubing and supplies, as well as dressing changes. We had to back down; it had overwhelmed both the nursing and pharmacy staff. JCHC currently is doing things with the Intellidot system that no other facility does, including scanning non-medication items for the purpose of tracking and documentation.

Organizational buy-in in the first 6 months was slow to develop. The physicians heard the frustrations of nursing staff, and felt it wasn't meeting our expectations and goals. Frustrations mounted, not for the concept of the barcoding, but about the process change and amount of time it took. In the first 3 quarters of 2008, reported medication errors actually increased three-fold. But in comparison to the 2004-2006 data, the near misses increased to more than half of all errors reported. On average, beginning in the 1st quarter of 2008, 15 to 30 near misses were reported quarterly. Category C errors that reached the patient were at their highest during the quarter of implementation, but quickly began to decrease to

approximately the same average as in the 2004-2006 timeframe, which were approximately 10 to 20 per quarter.

JCHC hoped to achieve the following benefits through the use of barcode technology:

1. Improve patient safety through the reduction of medication administration errors, while minimally increasing nurse staffing time requirement.
2. Improve patient satisfaction, as well as nursing satisfaction with the medication administration process
3. Generate positive public response for our patient safety improvements

Within the Intellidot system, reports that can be generated to review and measure process outcomes. For example, "Near Miss Reports" are available to assess what medications may have been scanned but cancelled. This information shows us that a nurse may have gone into the wrong patient room or was in the process of administering a wrong medication to a patient. The "Quarantine Orders Report" shows us orders that were put into the system by pharmacy, but quarantined at some point because the order was incorrect or discontinued prior to pharmacy getting the order. Information is also available in these reports to see the percentage of time that medications are scanned via the barcode versus being manually charted. This information was shared with the nursing staff approximately 8 months into implementation. Our goal is for nurses to be scanning all medications at the bedside.

JCHC is about 19 months into using barcoding. Implementing the system presented challenges as the nursing staff and pharmacy staff adapted to the new work processes. The interventions applied were designed to improve the medication administration process and

decrease errors that reached the patient. In 2008, a total of 77 errors, including 73 near misses were reported. In 2009, as of July, a total of 32 errors and 73 near misses have been reported.

**Results:**

***Process Management/Organizational Performance Results***

A comparison of the medication administration error rates pre- and post- barcoding implementation show that JCHC is reporting twice as many medication errors. Approximately 40 to 70 errors per quarter are reported, 50% of them are Category A & B's, which are near misses. Reporting near misses reflects an organization that uses information to learn from its mistakes before they cause harm. Also, reporting near misses reveals the extent of safety mechanisms/system double checks in place to prevent errors from reaching the patient. These results indicate that JCHC's safety culture is improving as well. According to the 2009 AHRQ Hospital Survey on Patient Safety Culture, JCHC's acute care nurses' response to feedback and communication about error has increased 42% since 2007. This data represents a culture that has become more about what we can do to improve the system, versus who did it and why. Staff responded at 78% to the question "When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?" In 2007, the response was 54%. Despite the difficulties that JCHC has endured with the transition to barcoding, it has enabled staff to feel more empowered to report errors.

Medical staff has slowly begun to appreciate the system, with many of the good catches that the system has caught being presented to them in medical staff meetings. In the first year of implementation, six good catches were reported with many more viewable via Intellidot reports. In 2009, six good catches have been reported, three of which were high risk

medications; Lovenox, Coumadin, and Novolog insulin. In each of these circumstances, human error was the result of having the incorrect doses at the bedside. Catching errors at the bedside has emphasized the value of this system to both the nurses and patients.

An Intellidot survey was distributed to all acute care nurses in August to follow up with the process of the barcoding technology. Nurses were asked to list the top three things they liked about the Intellidot system. Ranking number one was safety. They commented that having the double-checking and warnings to alert them if there was a discrepancy has been a positive. Staff also enjoy the computer generated medication administration record, noting it is a time saver to not have to write out MARs on new admits, as well as when there is a change of status. Other top reasons for liking Intellidot barcoding include instant recording of medications given, patients like the system and concept of it, and also several staff feel the system is easier to use.

The process improvement method JCHC used was the PDSA (Plan, Do, Study, Act). With this complete change in medication administration, we had to focus on the process evolution. We put together focus groups that included the Director of Pharmacy, pharmacy technician, Director of Patient Safety, Director of Nursing, and several front-line nurses. In the initial stages of implementation, this group would often meet weekly to discuss major issues that were troubling the nurses. Day-to-day troubleshooting continued to occur, but the bigger problems would be taken to this focus group. About a year into the implementation, the nursing council (which consists of 6 frontline nurses) was the primary group that considered issues. The council could discuss why issues were occurring and whether a system change or education was needed.

Another result that has been beneficial for the pharmacy staff is capturing charges sooner rather than on dismissal. Pharmacy staff is able to see things on a day-to-day basis, as well as having the nurse available to answer questions or update their charting. This process takes a lot less time, especially in recognizing medications that did not get scanned.

As far as financial results, the Director of Pharmacy noted that he feels we are capturing more charges because they are now scanned. Prior to scanning, nurses took the sticker off of the bag or tubing and placed it on the patient's sticker sheet to account for supplies. Now, if there are discrepancies, pharmacy staff will write up action notices that detail the discrepancy and give it to the primary nurse involved. In 2007, approximately 300 action notices were given out to staff for follow up. In 2008, it had dropped to approximately 225. In 2009, there have only been 89 given out so far. This decrease indicates that computer entry errors are getting caught earlier either by staff when doing 12-hour chart checks, and/or the pharmacy staff detecting these errors and notifying staff.

**Lessons Learned:**

There were definitely many lessons learned in our journey with medication barcoding. From the beginning, it was discovered that one person should have been project coordinator. Instead, there was an Intellidot group formed, as well as the super users. This was difficult for many reasons; one in particular was too much information that was getting routed through too many people. Ideally, if there would have been one designated coordinator, that person would be responsible for all the issues, follow-up, process changes, and communication back to the staff.

Barcoding technology has certainly proven that barcoding is not a faster process. In response to the Intellidot survey, 65% of our staff feels they spend more time working with Intellidot compared to the paper medex. Increased time spent with the barcoding system means less time spent with their patients.

The most significant barrier that JCHC has identified and is currently in the process of removing is the lack of 24/7 pharmacy coverage. More than 75% of the nurses responded to the Intellidot survey that the biggest drawback to barcoding is not having order entry after pharmacy hours. Nurses said JCHC has two systems in place, one that functions well and is safe during pharmacy hours and the other system resorts to what we did in years past. JCHC has since researched vendors to provide us with coverage after pharmacy hours. In July 2009, the Director of Pharmacy made contact with Nebraska Heart Institute (NHI). At the current time, it has been approved by the Medical Staff to use NHI for pharmacy coverage. The pharmacy has recommended and the Medical Staff and administration has endorsed a vendor to provide 24 hour pharmacy coverage. The hospital board will consider this at its upcoming meeting. With the addition of 24/7 pharmacy coverage, we hope to make the barcoding technology complete.

At this time, JCHC feels barcoding is sustainable at our facility. A majority of staff in services directly involved with its use feel the program brings enough value to patient safety to justify the time, efforts, and expense necessary to continue to optimize its effectiveness.

Barcoding should be extremely portable. There are stand alone barcoding programs such as Intellidot, as well as programs built into nursing and pharmacy operating systems. It should be possible for any facility to go through a process of using PDSA (Plan, Do, Study, Act).