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Contributing to a “culture of safety” by increasing usage of the drug library on smart infusion
pumps: A Quality Improvement Project

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Abstract

Background: Computerized infusion devices called smart infusion pumps or smart pumps are clinical tools capable of decreasing IV medication infusion calculation errors through the use of embedded drug libraries. These devices are now important tools contributing to a “culture of safety” defined by the Joint Commission. Reports from April 2015 indicated a 22% occurrence rate in which the devices were not correctly programmed before infusion.

AIM Statement: The global aim of this quality improvement project was to improve usage of the IV pump drug library by ensuring medication is correctly labeled before infusion. The specific aim was to increase the IV pump drug library usage from 78% to 90% by July 24, 2015.

Method: Kurt Lewin’s Change Theory was used as the theoretical framework to guide the project and usage of the IV pump drug library on a 30 bed surgical unit. A pre- intervention Likert style survey was conducted to identify barriers to library usage, determine level of confidence with the library, and understand nurses’ ability to find a medication in the library. Meetings with the Unit Practice Council (UPC) and educational huddles were conducted to discuss correct usage of the drug library. Based on pharmacy reports, the menu of drugs displayed in the pump was changed to reflect the top ten most frequently used medications. Post-intervention pharmacy reports were compared to baseline.

Results: Data from the pre-intervention survey and staff meetings indicated a knowledge deficit in correct usage of the IV pump drug library and perceptions of time constraints and inability to find medication as barriers to its usage. Data post “pump push” indicated the usage of the drug library was 84.2%.

Conclusions: Implementation of educational huddles and a “pump push” was anticipated to increase the percentage of IV pump drug library usage. Implications for the role of the Clinical Nurse Leader (CNL) are explored and discussed.

Key Words: Quality improvement, culture of safety, computerized infusion devices, smart infusion pumps, IV pump drug library.

Introduction

Medication errors that occur during the administration phase has become the most frequent type of mistake in hospitals and specifically, intravenous (IV) medication errors are the most detrimental causing considerable patient harm (Ohashi, Dykers, McIntosh, Buckley, Wien & Bates, 2013). Discovering solutions to prevent IV medication errors have become a critical priority since the Association for the Advancement of Medical Instrumentation (AAMI) and the Food and Drug Administration (FDA) Summit of 2010. Reports released during the summit revealed over 56,000 reported incidents related to IV infusions and as a result, there is a greater scrutiny of infusion safety by the FDA (Ohashi et al., 2013). Computerized infusion devices called smart infusion pumps or smart pumps are clinical tools with features for administration error prevention and data collection that can ultimately decrease the rate of IV medication errors in hospitals (Ohashi et al., 2013).

Compared to non-smart pumps, smart pumps require nurses to select a drug library that is appropriate to the care environment, select and verify the drug and drug concentration from the drug list, respond to alerts (hard and soft) from the pump when the drug selection is outside of the drug library limits (Carayon, Hundt & Wteerneck, 2010). Safety features of smart pumps rely on the correct medication and concentration selection from the drug library. Continual analysis and drug library adjustments of smart pumps can ultimately minimize nuisance alerts for nurses, decrease the need for nurses to create workarounds, and enhances safe medication administration (Catlin, Malloy, Arthur, Gaston, Young, Fernando, 2015). Continual evaluation of the IV pump set up and data reports are additional components to improving patient safety when IV medications are administered (Catlin et al., 2015).

At a local for-profit New England seacoast hospital, the proper usage of the IV pump drug library was well below the organization's goal of 90% since January 2015. Correct usage of the IV pump drug library consists of selecting the drug or fluid from the electronic drug library prior to starting the infusion. When IV medication or fluid is not selected from the drug library, correct dosage and administration time parameters are not provided to nurses. Smart infusion pumps have the capability of contributing to a culture of safety when used properly (Harding, 2012). Due to baseline reports being low, a quality improvement project focusing on increasing the drug library usage was a priority.

Evidence of the Local Problem

Smart infusion pumps are devices with built-in computers containing electronic libraries of selected drugs and fluids with preprogrammed volumes and concentrations along with corresponding administration rate limits (Harding, 2012). The improper usage of the machine ultimately increases the possibility of medication errors, leading to patient harm. Prior to the quality improvement project the medication was selected from the drug library 78% of the time prior to infusion. The remaining 22% represents data in which the IV medication or fluid was either selected after the infusion was started or was not selected throughout the entire infusion. (Refer to Figure 1).

Monthly reports of infusion summaries are available with the Hospira Plum A pump software. The pharmacy department is responsible for running these reports and disseminating the results to the units. The report includes the total number of infusions for the month and specific percentages of the three types of deliveries. With limits: medication is selected from the drug library before infusion begins; simple delivery: the drug library is not utilized and the nurse manually enters the infusion rate and volume to be infused; no drug selected: the library is used

however the mediation cannot be found and the nurse has selected the option ‘no drug selected’ on the screen. The percentage of each type of delivery are calculated by the occurrence of delivery (with limits, simple delivery, and no drug selected) divided by the total number of infusions monthly. (Refer to Figure 2). Daily and weekly reports are additionally available and the percentages are calculated in the same manner as the monthly reports.

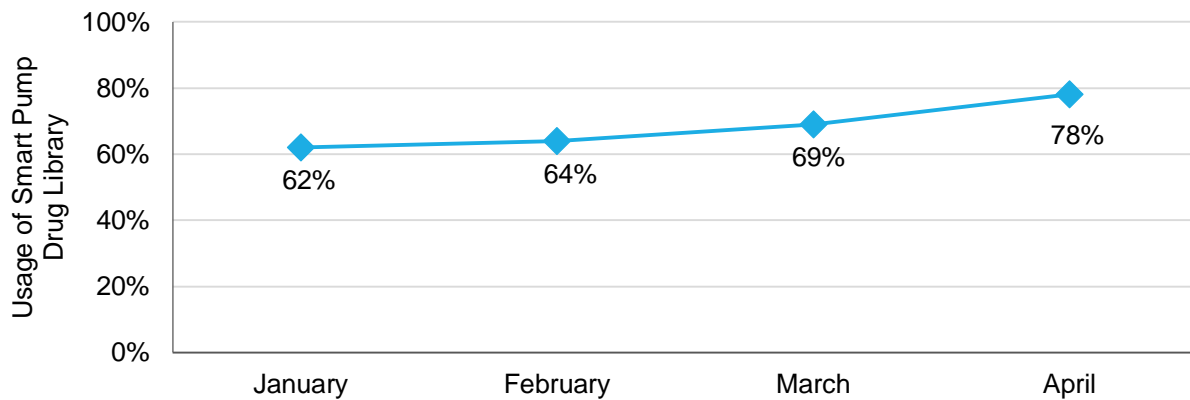


Figure 1. 2015 Monthly Pump Drug Library Usage

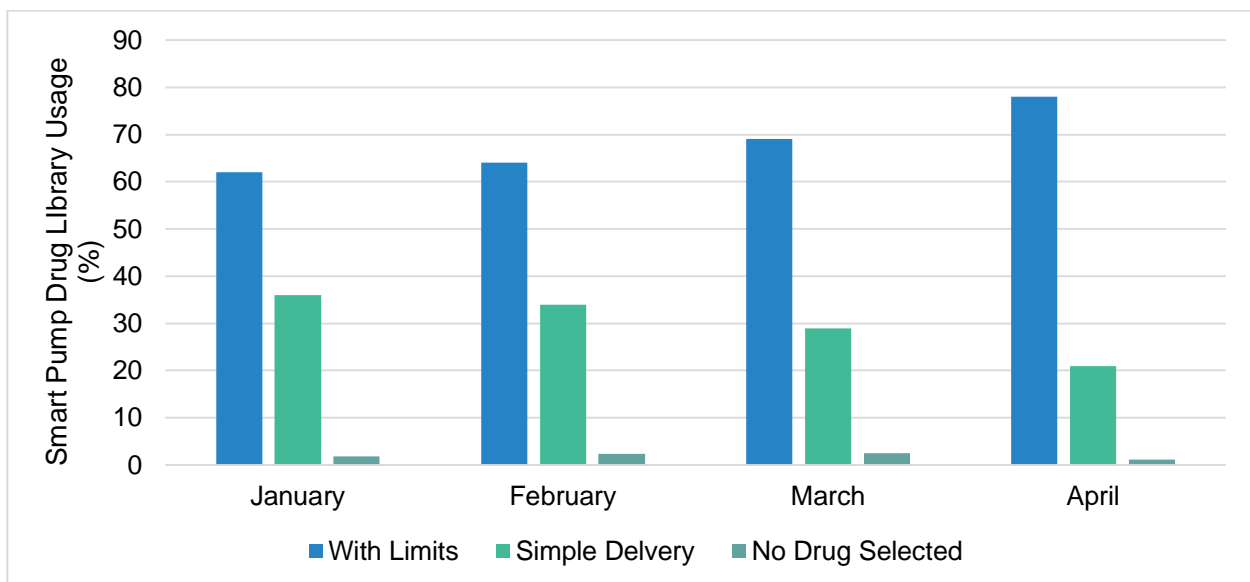


Figure 2. Monthly Drug Library Usage: With Limits, Simple Delivery, and No Drug Selected

Intended Improvement

The quality improvement project was aimed to improve usage of the IV pump drug library on a 30 bed surgical unit. The process for medication infusion begins with obtaining a physician order for the patient medication. The appropriate line on the smart infusion IV pump (primary or secondary) that the fluid and/or medication will be running through is selected on the machine. The drug list option (drug library) on the menu is selected by pushing the button on the device and scrolling on the screen with the up and down buttons to select the correct label of medication. The process ends with medication selection from the drug list, verifying the name of medication, the manual entering of infusion rate and volume to be infused (VTBI), and verification of the infusion duration. The name of the medication must be selected from the drug library before the start button is pushed on the machine. By working on the process we expect to increase the usage of the IV pump drug library to correctly label the medication being administered to the patient; increasing safeguards against medication errors. As previously mentioned, it was important to improve the drug library usage because the surgical unit had a percentage usage of 78% in the month of April; significantly below the organization's desired goal of 90%. The proposed goal was to increase the percentage of IV pump drug library usage from 78% to 90% by July 24, 2015.

Evidence Based Practice interventions

Patient safety is not guaranteed with solely the use of smart IV infusion pumps however when these devices are “well supported through proper programming, drug library development, limit setting... follow-up reviews, and staff education, they can be useful tools in creating what the Joint Commission has called a ‘culture of safety’ ” (Harding, 2012, p. 26-27). The Joint Commission defines culture of safety as establishing safety as an organizational priority;

transparency and accountability from staff; and promotion of safety through education and training (Barnsteiner, 2011). A culture of safety requires strong, committed leadership and engagement of all employees (Barnsteiner, 2011).

In 2009 Andrew D. Harding undertook a hospital wide quality improvement project spanning four months at a 140 bed independent community hospital in Massachusetts with a focus on increasing pump library usage percentage, thereby reducing risks associated with infusions and improving patient safety. The goal of the project was to increase the library usage from 37% to 90% from July – October 2009. Harding (2012) initiated interventions including: collecting feedback from and communicating feedback to direct care nurses through email, meetings, and one-on-one conversations; communicating with direct care nurses to discover why the library profiles were not being used; emailing nursing staff weekly with usage percentage for the drug library; running weekly usage and monthly limit override reports from the smart pump libraries; contacting the manufacturer for best practices; emailing nursing staff weekly with progress; and obtaining feedback from unit councils. Through the implementation of these interventions the IV pump drug library usage increased nearly double from 37-70.5%. It was planned the quality improvement project would utilize several of the interventions Harding (2012) implemented in his project.

Method

Ethical Considerations

The intended project was deemed quality improvement and did not pose ethical issues as there was no identifying patient information collected.

Theoretical Framework

Kurt Lewin's Change Theory (1951) was used as the theoretical framework to guide the project and usage of the IV pump drug library. Lewin identified three stages necessary for change: "unfreezing," "moving," and "refreezing". The first step, "unfreezing," begins with identifying the need for change and preliminary consideration and planning for the change (Dulaney & Stanley, 2005). Data is collected to identify problems or concerns with current strategies or protocols. Once the problems are identified and the need for change is determined, the proposed change is made to key players and groups that will be involved with the change process (Dulaney & Stanley, 2005). Encouragement of questions and group discussion are crucial during this stage in order for the change agent to identify concerns of key players and appropriately plan for the intervention.

The second stage, "moving," is when the actual change is initiated. Once data in the first stage has been compiled, a specific plan for the intended change is constructed. The change is implemented within the organization and adequate training and support is needed as it provides comfort to staff during the change process (Dulaney & Stanley, 2005). Providing sufficient resources to staff of the change promotes successful implementation of the change.

The third and final stage, "refreezing," is when the new strategies and behavior become fixed patterns within individual and group functioning (Dulaney & Stanley, 2005). Gathering and distributing the outcome data to key players is necessary. Providing outcome data promotes group discussion and allows an opportunity to identify emerging problems with the implementation. Re-education may be needed if it appears as though behaviors are returning to those of pre- intervention. Failure of change tends to occur in this final stage due to lack of attention and follow-up.

Setting

The quality improvement project was conducted at a for-profit organization with 209 beds in the seacoast of New Hampshire. Services provided by the hospital include 24 hour emergency care, oncology care, a neurosurgery program, heart and vascular care, orthopedics, maternal/child care, behavioral health services, and rehabilitation programs. The hospital's vision is to provide advanced care in a safe, healing environment with an ultimate goal of becoming a recognized healthcare leader in New England. The hospital considers individualized care, teamwork, staff, compassion, integrity, and improvement as essential values.

The intended quality improvement project was conducted on a 30 bed surgical unit comprising of patients who undergo surgeries including: total hip replacement, total knee replacement, bariatric surgery, spinal surgery, and emergent surgeries such as cholecystectomies and appendectomies. The hospital recently became a level 2 trauma center and as a result there has been an increase of trauma patients to the floor. The unit is staffed with twenty four registered nurses, licensed nursing assistants, a nurse practitioner, hospitalists, surgeons, physical therapists, and occupational therapists. In addition there is a unit supervisor, social worker, unit coordinator, dietary staff, and housekeeping staff members who are present throughout the day. Depending on patient census there is typically five to six nurses staffed during the day shift (0700-1900) and three to four nurses on the night shift (1900-0700).

When patients are prescribed IV medication or fluids, it the responsibility of nurses to verify the order from the physician and to initiate the infusion. IV medication administration includes verifying the amount of medication, concentration of the medication, and duration of infusion. The information is contained from the electronic medical record and it is the responsibility of the nurse to ensure the order corresponds with the bag of fluid or medication

that is to be infused. Correct method to administer IV medication is to utilize the IV pump and select the drug to be infused from the drug list on the pump, enter rate of infusion, volume to be infused (VTBI), and verify the duration.

Nature of Setting and Improvement Intervention

Introduction of smart infusion pumps to the surgical unit occurred approximately three years prior to the quality improvement project. Meetings with the development/education department and staff nurses revealed the implementation of the smart pumps consisted of education through printed documentations including pamphlets and packets. Further discussions revealed that until recently, new employees to the hospital were not trained on the usage of the smart pumps upon hire in orientation; employees were shown usage from co-workers within their first week on the floor. Currently, there is a segment of the orientation designated to proper usage of the IV pumps including drug library usage.

According to baseline data from the pump reports provided by the pharmacy department, the percentage of the drug library usage within limits on the surgical floor was consistently low since the initial implementation. Specifically in January of 2015 the drug library was used with limits 62% of the time by the staff nurses. Additionally, during 36% of the infusions the drug library was not utilized prior to the medication administration; the volume to be infused and duration was manually entered without selecting the medication from the library. At that time, the pharmacy department began to notify units and focus on the low drug library usage hospital wide.

In response, the staff of the surgical floor decided to incorporate the drug library usage into their shift reports. The unit currently uses I-Trace during bedside reporting to oncoming shifts. During I- Trace both nurses verify the IV tubing, the infusing drug, the IV bag content, the

pump that is associated with the tubing, and the correct rate of infusion. The addition made to the bedside report was to ensure the correct CCA library on the pump was selected and proper utilization of the drug library. The staff led intervention was a method to correct current errors with the library usage however it was not a prevention tool. The unit led intervention was an indication of the willingness for nurses to initiate an improvement process. Staff involvement was present throughout the quality improvement project and willingness to accept change was clear during the process.

Planning the Intervention

Improving the usage of the IV pump drug library began with identifying current barriers and creating baseline measures. Multifaceted strategies were implemented to further understand barriers to pump library utilization through a meeting with the Unit Practice Council (UPC) and an eight question survey provided to nurses. The first meeting with the UPC consisted of introducing the project to the members and discovering their perspectives of the IV pump drug library. Discussions were centered on elements the members believed prevented the usage of the pump and to recognize current strategies the unit implemented thus far addressing the low percentage usage. The meeting with the UPC revealed members were not aware of the elements calculated within the pump drug library usage (with limits, simple delivery, and no drug selected). In addition the UPC had requests to speak with the pharmacy department in regards to a certain medication (IV Tylenol) that was currently excluded from the library and suggestions of how to properly label when infusing. At the conclusion of the UPC meeting it was determined an educational element to the intervention was necessary as there was confusion to terms of the drug library usage including with limits, simple delivery, and no drug selected.

An eight question survey (Appendix A) was handed out the nurses on the floor personally as well as placement in mailboxes located in the break room. The survey consisted of five questions using a Likert scale and three open ended questions. The survey was created with the intention of identifying barriers to the library usage and determining the nurses' level of confidence with the library usage, how often nurses find a medication in the library, and medications needing frequent overrides. Twenty four surveys were handed out and ten were completed and returned (41.6% completion rate).

Results from the survey included a 60% "very comfortable" level with the pump system, 20% of respondents felt they always found a medication the drug library, and 80% believed the program settings were somewhat accurate. One open ended question on the survey asked: Any reasons you find yourself not using the IV pump drug library? Answers to the question included: Only if I forget (rarely), med isn't there, no time, I can't find the med, when using IV Tylenol. Answers to the survey indicated barriers to the drug library usage included the inability to find the medication and time constraints. Results from the survey contributed to the decision to reformat the drug library in a way for nurses to find a medication efficiently and quickly.

In addition to discovering current barriers to the IV pump drug library usage, initial meetings with the director of pharmacy and staff development department were completed. The purpose of the pharmacy meeting was to discover the specific components that calculate the percentage (with limits, simple delivery, and no drug selected). The meeting included reviewing drug usage reports throughout the year to verify baseline measures. Further discussions with the pharmacy department revealed the opportunity for the unit to reorganize the first page of the library to medications of their choice. "Pump pushes" are held by the pharmacy department periodically throughout the year allowing for ten medications to be listed by preference on the

first page of the library and remaining medications are listed alphabetically by brand name thereafter.

A meeting with the staff development/ education department was conducted to determine the education provided to staff regarding the proper usage of the IV pump drug library. The meeting focused on the education provided to staff when the IV pumps were introduced three years prior and the current education for newly hired staff. The staff member responsible for IV pump education provided a demonstration typically included within orientation to new hires involving the physical usages of the pump. In addition there was time spent on physically exploring the IV pump to gain insight into the current medications included in the unit's drug library and to determine the exact steps needed to correctly use the drug library. As a result, an educational intervention was created to reflect the method of selecting the correct critical care area (CCA) library, and tips to ensure the library is being utilized during infusion.

Once the surveys were collected and initial meetings with the pharmacy department were completed, a second meeting with the UPC was conducted. Results from the survey, discussions with staff, and meetings with the pharmacy department contributed to the decision of conducting a "pump push" to reflect the top ten most frequently used medications, creating easier and quicker access for nurses. The purpose of the UPC meeting was to introduce the purpose of the intervention and an overview of the "pump push" process.

Subsequent meetings with the pharmacy department and IT department centered on reviewing reports calculating the most infused medications within a three, six, and twelve month period. From those reports, the ten most commonly infused medications were identified and selected to be listed on the first page of the library. Education in addition to a "pump push" was

implemented to increase the unit's percentage of using the IV drug library within limits to the organization's 90% goal.

During the month leading to the planned "pump push" education regarding definitions and explanations of the drug library language including: with limits, simple delivery, and no drug selected was conducted. The education was completed through meetings with the UPC as well as email correspondences, handouts to the unit, and verbal conversations to the remaining staff. Education focusing on nurses' knowledge of properly changing the library upon the arrival of new patients was incorporated into the teaching.

Planning the Study of the Intervention

Success of the "pump push" was determined by reviewing infusion summaries and comparing the results to the baseline reports. Reports obtained from the Hospira software includes percentage of medications that were administered with limits, simple delivery, and no drug selected. Reports were collected daily and weekly to analyze the predicted increase of medication administration within limits of the drug library.

Results

Course of the Intervention

Results from the UPC meetings, survey, and staff discussion led to the intervention of a "pump push" including the reorganization of the drug library order on the Hospira Plum A pump. Additionally an education segment was incorporated into the intervention focusing on the elements used to calculate the drug library usage, and the correct method to select the CCA library on the pumps.

Education regarding those elements consisted of the following information distributed to nurses through education huddles and one to one conversations:

- How is the IV Pump Drug- Library % Usage Calculated?
 - With Limits: Drug/IV Fluid is selected from drug library BEFORE pump is started.
 - Simple Delivery: Drug library is NOT used—dosage & time to infuse is manually entered.
 - No Drug Selected: Library is used but medication is NOT selected
- With Limits: Correct way to use library
- Simple Delivery & No Drug Selected negatively affect drug library usage %

Reports obtained from the pharmacy department included: most commonly infused medications in a three, six, and twelve month period; infusion summary on a weekly and monthly basis to determine within limits, simple delivery, and no drug selected percentages. To prepare for the “pump push” the current five page drug library was reviewed to determine its current order. The sequence of the first ten medications were compared to the most commonly infused reports. The current first ten listed medications included four of the most commonly used medications; including No drug selected as the first option. No drug selected was required to remain as the first choice per the pharmacy department; corporate would not allow this listing to be changed.

At the conclusion of reviewing the baseline reports of most commonly infused medications within a twelve month period, the tentative order of the first ten medications in the library was constructed.

The reorganization of the first ten medications were as follows:

- No drug selected
- IV no additives ____ mL

- IV with additives ____mL
- Antibiotic syringe ____mL
- Antibiotic ____mL
- Zozyn extended
- IV bolus ____
- Magnesium sulfate
- Vancomycin ____gram /500 mL
- Vancomycin ____ gram/ 250 mL

Communication with the pharmacy department was crucial to the implementation of the “pump push.” The final request for the order change was submitted to the pharmacy department three days prior to the “pump push” for authorization. Approval was obtained from the unit director and pharmacy department same day. A one page reference was disseminated to the staff nurses three days prior to the “pump push” (Appendix B) including the top ten medications of the library and “tips and tricks” for usage. The reference provided information regarding the appropriate method to finding the surgical drug library on the pump, locating the drug by the brand name, the importance of selecting the medication before the infusions begins, and directions for properly labeling IV Tylenol.

On the day of the “pump push” directions of updating and loading the new dictionary onto the pumps were sent to nurses through the organizational email system. The drug library was reorganized by the pharmacy department in the morning and by midday the updated drug library was available to be implemented on the pumps. For the library to be correctly downloaded, it was necessary for all the pumps, including those in storage, to be plugged into the wall and for the nurses to physically accept the new parameters on the pump after restarting the

machine. To facilitate this process, assistance was provided to ensure all pumps were accounted for and that the staff was aware of the correct procedure. The total time for the machine to update the library was twenty minutes. By early afternoon the entire supply of pumps on the surgical unit had downloaded the new library and the first ten medications had been successfully changed. In addition to speaking with the day staff on the implementation day, a subsequent visit the floor was conducted for the night shift to ensure the nurses were aware of the implementation and to answer any questions. Visits to the floor occurred the two days after the implementation to speak with nurses and gain their perspective of the change.

Drug Library Results Post Intervention

Infusion summary reports post “pump push” did not reflect an increase of “with limit” usage of the drug library in the month of July 2015. Although an increase has not occurred in July, the drug library usage did increase from 78% in April to 83.3% in May and 84.1% in June. (Refer to Figure 3). Data obtained post “pump push” (July 6- July 24th) indicated an 84.2% drug library usage. The specific aim of reaching 90% was not met however there remains to be an upward trend since May 2015.

Unexpected Results

During the preliminary stage of the quality improvement project a meeting with the professional development/education department was conducted to determine current pump education provided to employees. As previously mentioned, until recently new employees were not provided teaching of how to use the Hospira Plum A pump machine. Further discussions revealed current teachings excluded information regarding the importance of ensuring the correct CCA library was selected on the pump prior to infusion. To address this concern, education regarding the pump and the drug library has since been altered to reflect the importance of CCA

library selection when the machine is turned on and when patients are transferred from one unit to another. Going forward, new hires will be shown how to correctly ensure the CCA is selected in the machine prior to infusion; individual CCAs are tailored to the units and if the incorrect library is selected, nurses may have difficulty locating the correct drug.

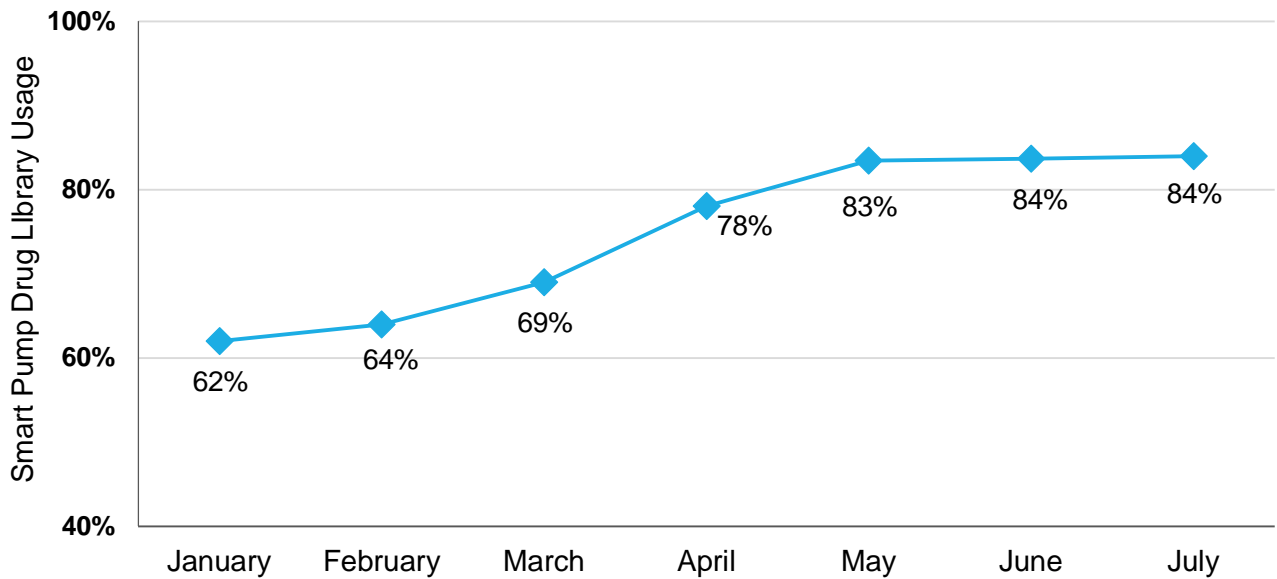


Figure 3. IV pump drug library usage pre intervention versus post intervention

Discussion

Summary

In April 2015 low usage of the IV pump drug library was identified as a problem on a 30 bed surgical unit; IV drug library usage was reported at 78% and hospital wide goal is 90%. In May 2015 initial meetings with the UPC, pharmacy department, and staff development department were conducted. In addition, one to one discussions with nurses, a pre- intervention survey, and obtainment of baseline measures were completed. Education huddles and discussion of pre- intervention survey results with the UPC and staff began in June 2015. Discussions with staff regarding a “pump push” was a priority during this time and to determine effective drug

library alterations, research of most commonly infused medications on the surgical unit was completed. The drug library usage increased from 78% in April to 84% in June. In July 2015 implementation of a “pump push” was accomplished along with the creations of a one page reference for nurses. During this timeframe there were continual discussions with staff regarding further alterations to the surgical pump library. Results from the “pump push” were dispersed to staff through weekly emails, postings in break room, and notifications at the nurse’s station. Significant improvement of the drug library usage was not seen in the month of July; the average usage of the drug library with limits was 84.2%.

Limitations

Limitations of the quality improvement project included a short time frame from May until July 2015. Additionally, the software data reports used for baseline data and measurements for the implementation success are exclusively available from the pharmacy and IT departments. As a result, it was difficult at times retrieving necessary reports and contributed to longer waiting periods of obtaining needed information.

Recommendations

Going forward it is recommended the surgical unit consistently participate in “pump pushes” on a quarterly basis. Staff involvement is a crucial element during the “pump pushes” because nurses are the primary users of the pumps and for the drug library to appropriately reflect the most commonly infused medications, feedback is needed. In addition to changing the order of the drug list, it is essential for continual drug library adjustments. Medications that are no longer predominately used on the unit should be removed and if there are certain medications nurses feel are excluded, it is possible to make alterations. Updated drug libraries contribute to enhanced medication administration and this requires nurse participation and feedback.

Clinical nurse leader (CNL) implications

An essential role of the CNL in this setting is to monitor the IV infusion summaries on a monthly and weekly basis to identify patterns. Reports containing the time of day in which there are higher percentages of medications not being labeled are available. A CNL would want to review these reports, identify patterns, and determine reasons for high occurrence rates. In addition a CNL would be instrumental with ensuring continual participation in “pump pushes” and further drug library alterations. Review of results should be shared with staff on a consistent basis to obtain their perspectives. In regards to IV pump drug library education, an important role for the CNL would to ensure new employees are aware of the correct pump drug library usage; reinforce information from orientation is needed.

Conclusion

Smart infusion pumps have the capability of contributing to what the Joint Commission defines as a “culture of safety.” Smart pumps alone do not guarantee patient safety however with continual data analysis of pump reports and drug library alterations, they are devices capable of enhanced medication safety. On a 30 bed surgical unit the low drug library usage was perceived to be a result of nurse’s inability to find a medication in the drug list and time constraints. As a result, a “pump push” was implemented to create a library that was efficient and tailored to the surgical unit. Education was needed to inform nurses of the drug library components and the correct procedure to select the surgical CCA library before infusion.

Although the specific aim of the quality improvement project was not achieved, there is an upward trend from 78% to 84% with drug library usage in May through July 2015. Nurses were not aware of the possibility of “pump pushes” and drug list alterations. Even though the usage did not reach 90% at the conclusion of the quality improvement project, it is expected

nurses will continue to participate in the pump pushes and provide feedback to how the drug library can be improved and altered. Continual analysis of the drug library, staff involvement, and consistent education will assist the surgical unit in reaching the hospital goal of 90%.

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Appendix A
Pre-Intervention Survey

How comfortable are you with using the Plum A+ IV Pump system?

- Very Comfortable
- Somewhat Comfortable
- Neither Comfortable nor Uncomfortable
- Somewhat Uncomfortable
- Very Uncomfortable

**Do you believe the implementation of the IV pump system to the unit was successful?
(Adequate education/ training/ notice was provided?)**

- Yes
- No

How often do you find a medication in the IV pump-drug library?

- Always
- Very Frequently
- Occasionally
- Rarely
- Very Rarely
- Never

How accurate do you find the preprogrammed settings of the IV pump-drug library?

- Very Accurate
- Somewhat accurate
- Neither accurate or inaccurate
- Somewhat inaccurate
- Very inaccurate

How often do you find yourself needing to acknowledge an override of an infusion because it is beyond a preset limit (dosage/time constraints)?

- Always
- Very Frequently
- Occasionally
- Rarely
- Very Rarely
- Never

Any medications in particular you find yourself overriding frequently?

Any reasons you find yourself not using the IV pump-drug library?

Additional Comments:

Appendix B
One page “pump push” reference

the IV Pump Drug Library

becoming **EASIER** to use

Top IV Drugs
→ 1st page of the library

<ol style="list-style-type: none"> 1. IV Fluid- no additives (31%) 2. IV Fluid- w/ additive (20%) 3. Antibiotic Syringe (13%) 4. Antibiotic (8%) 5. Zozyn Extended-100 mL (8%) 6. IV Bolus (6%) 	<ol style="list-style-type: none"> 7. Magnesium Sulfate (5%) 8. Vancomycin 2 Gram – 500mL (4%) 9. Vancomycin- 250 ml (2 %) 10. KCL 10mEQ IVPB- 10 meQ/ 100mL (1%)
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Month	Usage (%)
Jan	62
Feb	64
Mar	69
Apr	78
May	83
June	84

TIPS & TRICKS
→ how to use the library

<p><u>Finding Surgical</u></p> <ul style="list-style-type: none"> • Select OPTIONS/ VOL INF • Select CHANGE CCA • Arrow to select Surgical 	<p><u>Finding the Drug</u></p> <ul style="list-style-type: none"> • Alphabetical order by BRAND (after page 1) <ul style="list-style-type: none"> • Check Meditech for BRAND name • Select medication BEFORE infusion begins • For IV Tylenol → select IV BOLUS
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NOTE: AVOID using “No Drug Selected”!