Striving for Zero IV Pump Errors – A Unique Approach

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Issue

Over a period of 18 months, there were 120 events involving the programming of IV pumps. Eight of the events resulted in serious injury to the patient. The contract for replacing the IV pumps would not be done for two years. Action was needed to be taken to avoid further serious events involving programming of IV pumps. There are more than 21 steps involved in programming the IV pumps to administer medications. A multi-disciplinary committee was assembled to review and to problem solve utilizing a FMEA tool. The committee included representatives from nursing, patient safety, risk management, education, nursing quality, information services and pharmacy.

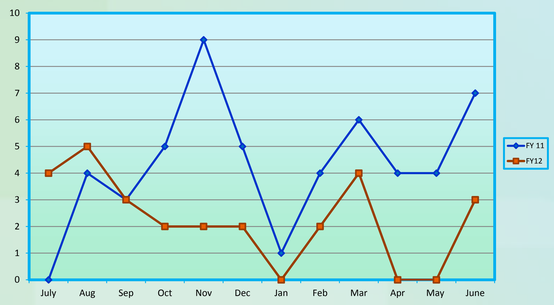
Purpose and Logic

- Initial review of the process included an A3 (lean) tool to determine the background, current conditions, analysis, and proposed countermeasures that were needed. The process was outlined step by step, and reviewed for severity, occurrence and detectability. The most critical risk areas were identified, reviewed and action steps were determined.
- Identified concerns:
  - Retained data in IV pumps: Data from previous IV administrations was retained. If pump was not programmed correctly, the pump settings would default to previous setting causing IV's/medications to infuse at incorrect rates.
  - IV calculations: Dosages were programmed incorrectly causing incorrect rate to infuse
  - Weights were entered as pounds or kilograms, causing programming to be incorrect when the two were interchanged
  - Library: Staff did not always utilize the library correctly for programming of pumps.
  - Line reconciliation: When hanging more than one IV, lines were sometimes crossed and rates on pumps were set for incorrect medication.

Results

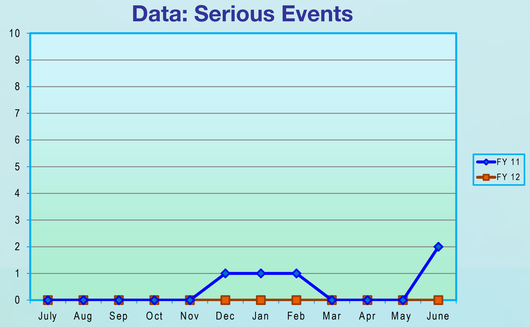
- Rollout of the action plan was initiated the beginning of December 2011, with education completed by the end of December 2011.
- In January 2012 we identified an increase in reported near-miss events.
  - The committee went to the units and interviewed staff to determine how well staff understood the education and were utilizing it to program the pumps.
  - Further education was provided to assure that staff were aware of the need to utilize the action steps for any IV's or medications being administered.
- Outcome to date: Zero serious events since the implementation of the new processes.

Data: Total Number of Programming Events



Includes Near Miss Incidents and Serious Events

Data: Serious Events



Serious Event = Unanticipated Injury Requiring Intervention

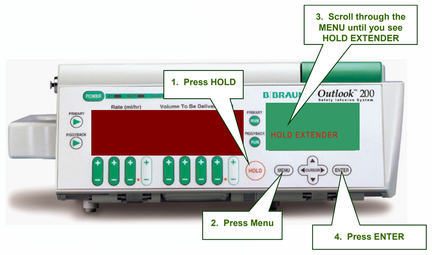
Conclusions

Through collaboration and a team effort, a multi-disciplinary team of professionals embraced the issues identified with programming of the IV pumps. Using a FMEA format and lean methodology an action plan was determined for each concern. When review of the data after implementation identified some confusion with staff perception of expectations, the group evaluated the education provided and revised it to assure that all staff understood the expectations. As a result ZERO serious events for our patients.

ACTIONS TAKEN

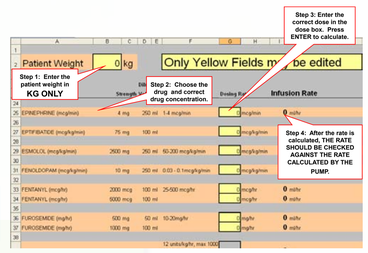
- Reprogram all IV pumps to remove retaining data from previous administrations.
  - Once the pump is shut off, the data is removed.
- Educated staff on how to use "Hold Extender"

How to Program the Hold Extender



How to Use the Drug Calculator

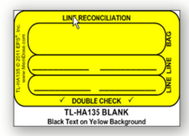
Created a calculator to be available within electronic documentation. Staff calculate the rate for IV administration. If it deviates from rate on the pumps, nurse must stop and contact a pharmacist or another nurse to review the calculations and determine the correct rate.



NOTE: When the drug has 2 concentrations, both are listed. Choose carefully!

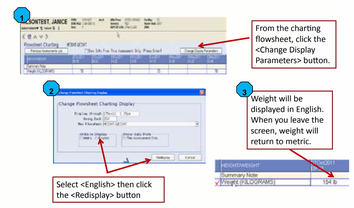
Yellow Line Tags

Yellow labels initiated for staff to use for line reconciliation. A yellow tag is placed at the drip chamber, on the left upper corner of the IV pump screen and then at the hub where the IV enters the patient. The name of the medication is to be written on the yellow label.



Providing Patient Weight in Pounds

All weights were converted to kilograms. This required revision of software programs so that only kilograms were submitted.



Liter Tag

An acronym was developed to be utilized by staff as a reminder of the steps to be taken when programming the pump. All education was based on the LITER acronym.

L = Library: utilize the pump library
I = Identity: identify the medication and dose in the library
T = Trace: trace the line for the medication from the drip chamber, to the pump, to the portal of entry for the patient. Labels at each point need to be checked for correct medication
E = Execute: after settings are programmed, push the run button
R = Rate: check that the rate on the pump is the rate that is to be infusing

Team Members

- Kristie Lowery
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