Implementation of an IV Workflow System to Reduce IV Preparation Errors

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Background

- In our processes prior to completion of this project, our compounded IV products were checked by a pharmacist using the "pull back" method. The preparer would pull back the syringe AFTER completing the compounding to indicate the volume added.
- This process cannot assure that the actual volume added agrees with the amount indicated in the pulled back syringe. Moreover, when multiple ingredients may have been used in the compounding process, there is no assurance that the correct amounts of each drug have been used.
- Our organization had experienced within the past few years a harmful medication error in a pediatric patient that immediately caused us to eliminate the "pull back" method for checking IV products in the pediatric high risk population. However, our adult population did not have the same safety protection.
- Pharmacy literature recommends implementing an IV workflow system and recounts the pitfalls of the "pull back" method for checking the accuracy of IV preparation (1).

Goal

The goals of our IV workflow implementation project were to:

- Promote safety by reducing the number of preparation errors involving IV products that could subsequently lead to patient harm.
- Promote efficiency and standardization in our IV workflow process.
- Minimize waste of compounded IV products.
- Assist in our journey toward high reliability.

Description of the IV Workflow System

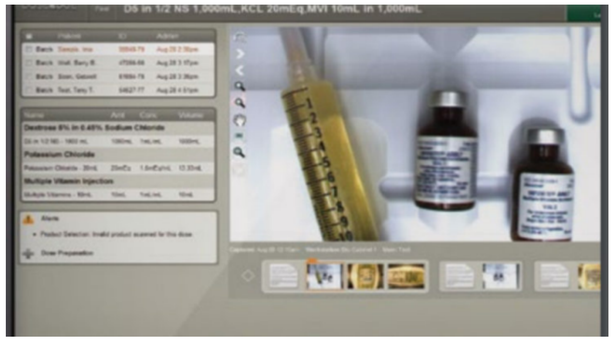
- IV workflow system interfaces with our electronic health record (EHR) and queues doses for just-in-time preparation based on actual administration times.
- Removes canceled and discontinued doses prior to preparation.

Description of the IV Workflow System (cont.)

- Utilizes barcode technology to ensure each ingredient is correct PRIOR to compounding.

- Provides standardization by instructing the technician through the preparation process, providing volumes, concentrations, and beyond-use dating.

- Images are produced by the technician of each compounding step, to be used by the pharmacist for final product verification.
- Electronic imaging allows for remote verification by the pharmacist from anywhere on the network.



- Provides the ability to scan doses at point of delivery.
- Workflow allows for the tracking of a dose from production to verification to dispensing to delivery.

Results of our Experience

Reported Preparation Errors

Time period	Reported preparation errors/opportunities
One year period prior to implementation of IV workflow system	26/445,783
Eight month period after implementation of IV workflow system	7/297,189 (significant reduction in reported error rate at p=0.019)

- The seven errors that have been reported post-implementation all involved situations where the workflow technology was bypassed.
- As a result, the Department defined the circumstances under which the system may be bypassed and reinforced that staff will be held accountable for using the system as intended.
- During the study period, 45% of doses queued in the system were canceled; these largely represent doses that are discontinued. In our previous workflow, many of these would have been prepared and wasted. Although not quantified, this waste avoidance represents significant cost savings.
- The ability to track doses through the delivery process has helped Pharmacy to respond to missing medication calls for compounded IV products, and reduce the amount of unnecessary rework required.
- Steady redesign and incremental improvement of the workflow system continue to be part of our high reliability journey to prevent harm to patients.

Reference

1. Vrabel R. My critical analysis of a deadly medication error – what can go wrong may go wrong. [accessed 2017 June 5]. http://www.facebook.com/VrabelConsultingInc/posts/657383927779226.