



HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

# Implementation of an IV Workflow System to Reduce IV Preparation Errors Craig Senholzi, RPh, MBA; Jeremy Lawton, PharmD; Gary Bea, BS; Brian Swift, PharmD, MBA

#### 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.

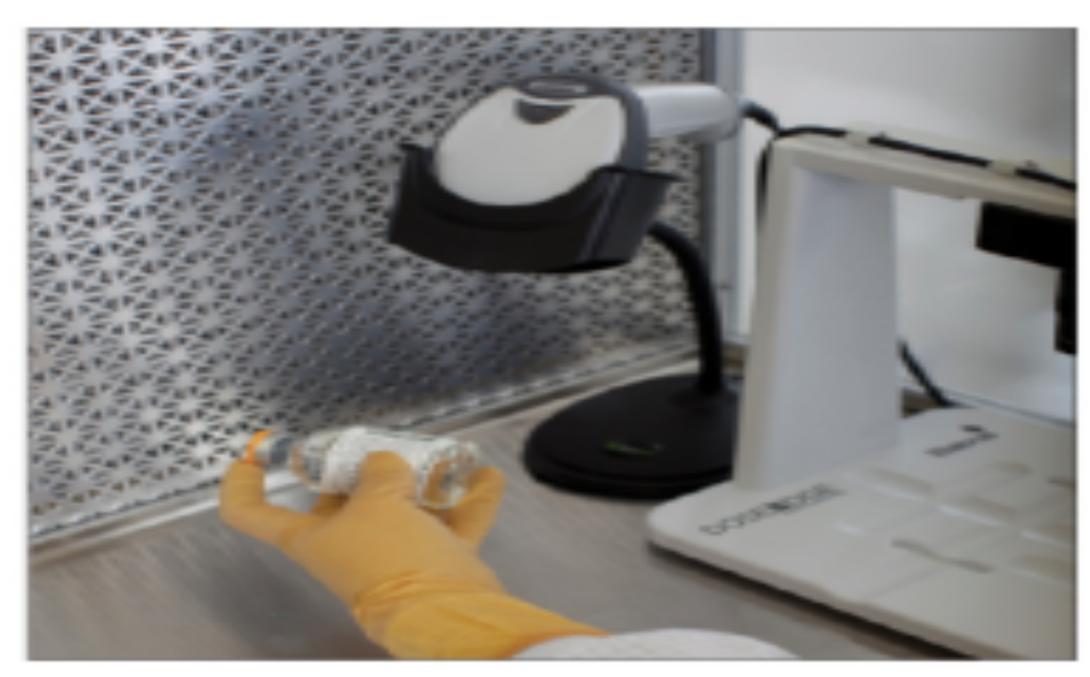
DOSE≧DGE' Tasks Urgent			0 Prep 0 STAT	167 Sort 166 STAT	0	Kits	0 Trac	king	
Queue		u •	View By	Individual 🔹	Preparation N	Vode: Default	preparation mode		
ALLV.	167								
		ADTMRT, FRANK	¢U	TJUH7NEG-722 6P	ampicilin-subac 0.9 % 50 mL IVF		<li>i) 1.5 g in sodium cl</li>	hioride	09/13/2017 11:45
STAT	166	ZZTEST, RWBJHNDISCHARGEONE		TJUH13P-1304 P	hemin in albumin 25% IVPB 125 mg			09/13/2017 14:45	
DC	0	0 MINT, JULEP		TJUHBWG-3121 A	celepime (MAXI) 50 mL IVPB	PIME) 1,000 n	ng in sodium chlorid	e 0.9 %	09/13/2017 15:30
	Ű			TJUH4WG-4124 P	meropenem (ME % 50 mL IVPB	SRREM) 1,000	) mg in sodium chlor	ide 0.9	09/13/2017 15:30
WAIT / HOLD	1	ADTMRT, FIVEE	GIB H	TJUHSEG-5258 P	piperacillin-tazot chloride 0.9 % 5		N) 3.375 g in sodiu	m	08/13/2017 15:45
Unknown Orders		ADTMRT, FRANKU MINT, JULEP		TJUH7NEG-722 6P	ampicilin-sulbac 0.9 % 50 mL IVF		<li>1.5 g in sodium cl</li>	hloride	09/13/2017 17:45
				TJUH4WG-4124 P	meropenem (ME % 50 mL IVPB	RREM) 1,000	) mg in sodium chlor	ide 0.9	08/13/2017 23:30
Resume Prep	0	ADTMRT, FRANK	¢U	TJUH7NEG-722 6P	ampicilin-sulbac 0.9 % 50 mL IVF		<li>1.5 g in sodium cl</li>	hloride	09/13/2017 23:45
	_	TEST, TELETRA	ск	TJUH3WG-3121 A	celepime (MAXI 50 mL IVPB	PIME) 1,000 n	ng in sodium chlorid	0.9%	09/14/2017 03:30
		ADTMRT, FIVEE	GIB H	TJUH5EG-5258 P	piperacillin-tazot chloride 0.9 % 5		N) 3.375 g in sodiu	m	09/14/2017 03:45
		ADTMRT, FRANK	¢U	TJUH7NEG-722 6P		tam (UNASY)	<li>i) 1.5 g in sodium cl</li>	hioride	08/14/2017 05:45
		MINT, JULEP		TJUH4WG-4124 P	meropenem (ME % 50 mL IVPB	SRREM) 1,000	) mg in sodium chlor	ide 0.9	09/14/2017 07:30
		ADTMRT, FRANKU		TJUH7NEG-722 6P	ampicillin-sulbactam (UNASYN) 1.5 g in sodium chloride 0.9 % 50 mL IVPB			hloride	09/14/2017 11:45

Thomas Jefferson University Hospital, Philadelphia, PA

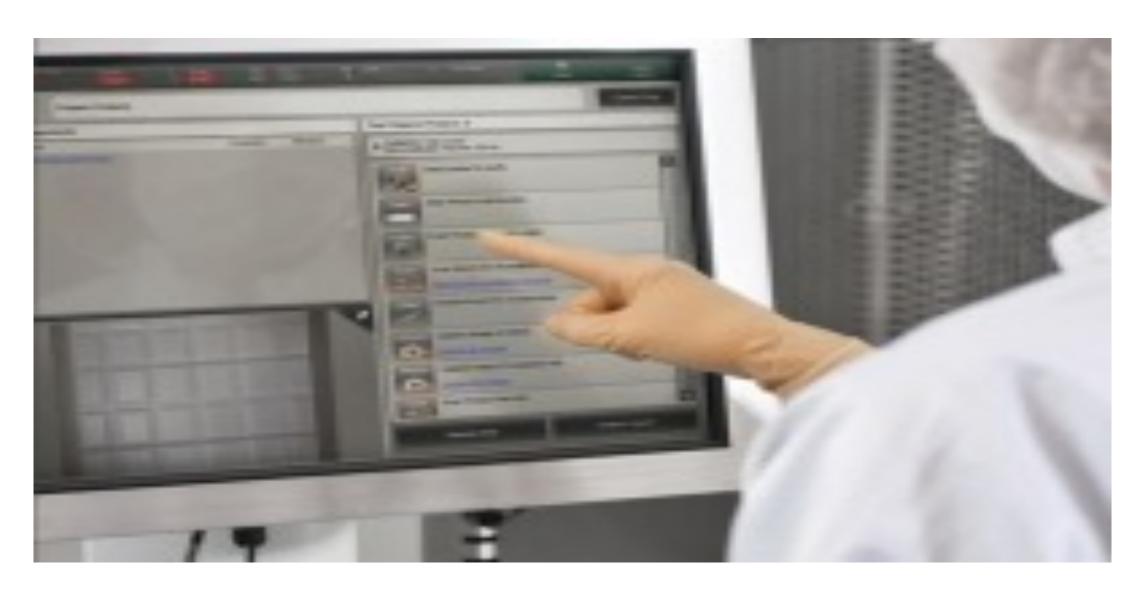


# Description of the IV Workflow System (cont.)

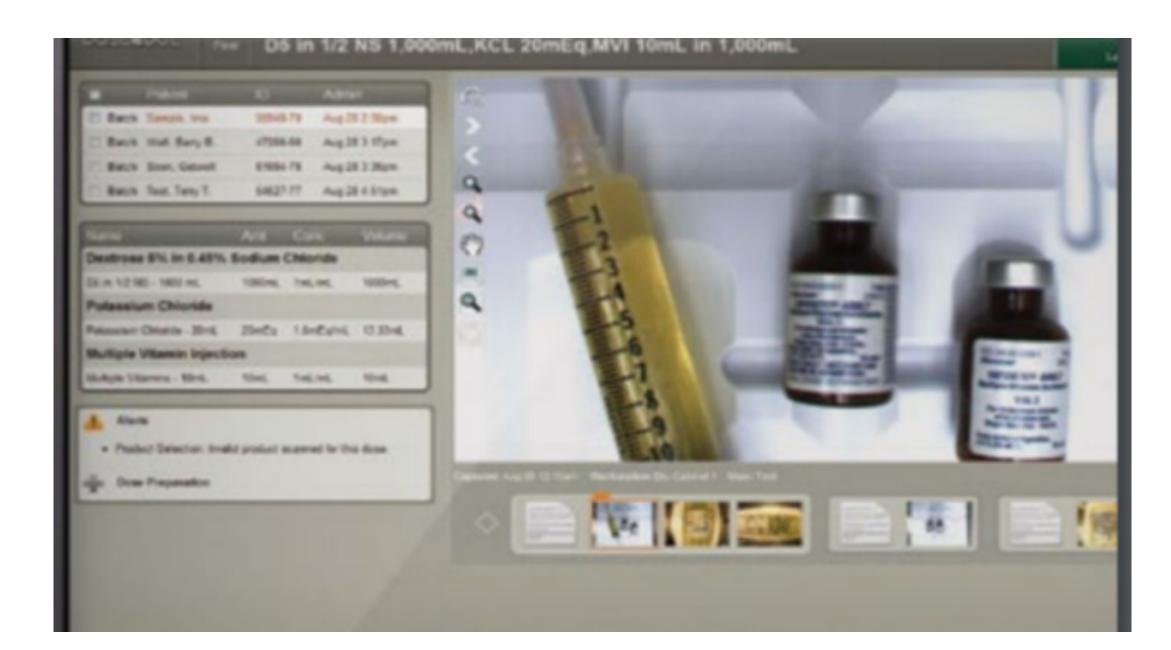
Utilizes barcode technology to ensure each ingredient is correct PRIOR to compounding.



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

One year period pr implementation of workflow system

Eight month period implementation c workflow system

- accountable for using the system as intended.
- savings.
- patients.

#### Reference

go wrong. [accessed 2017 June 5].



	Reported preparation errors/opportunities
rior to of IV m	26/445,783
l after of IV m	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

• 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

• 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

1. Vrabel R. My critical analysis of a deadly medication error – what can go wrong may

http://www.facebook.com/VrabelConsultingInc/posts/657383927779226.