



High Risk IV Infusion Medication Concentrations and Dosage Units Standardization

Intravenous infusion medications have the greatest potential for causing significant patient harm. IV medications are frequently associated with dosage errors during administration due to confusion created by the variety of available drug concentrations and dosage units. The Indianapolis Coalition for Patient Safety chartered a task force to standardize intravenous medication concentrations and dosage units across adult hospitals for safer and more consistent practices in administering high risk IV medications to patients. It was assumed that standardization would decrease the potential for medication errors within hospitals and on patient transfer between Coalition hospitals.

The approach was modeled after the work done by the San Diego Patient Safety Consortium. A survey was completed of the concentrations and dosage units for the most common and highest risk IV medications in use at all sites. A single concentration and dosage unit standard was developed for 25 high risk medications using manufacturers' recommendations, reference materials and a consensus driven approach. An implementation checklist was developed and used by hospitals as a guide in self-implementing the standards. All hospitals were assessed for adoption of the standards with nearly 100% compliance.

The attached materials are provided to assist others in implementing this standardized approach:

- Team List
- Drug List
- Implementation Checklist

For more information:

Theresa Knotts, BSN, RN, CPHQ
Team Facilitator
Indianapolis Coalition for Patient Safety
Purdue University PharmaTAP
tknotts@purdue.edu
317- 275-6084



Indianapolis Coalition for Patient Safety
Standard Adult IV Infusion Concentrations and Infusion Rate Units

DRUG	STANDARD FINAL CONCENTRATION <i>***For continuous infusion unless listed otherwise***</i>	STANDARD INFUSION RATE UNITS
AMIODARONE	IVPB Load: 1.5 mg/mL LVP Drip: 1.8 mg/mL	Mg/min
ARGATROBAN	1 Mg/mL	mCg/kg/min
BUMETANIDE	Undiluted 0.25 Mg/mL	Mg/hr
DEXMEDETOMIDINE	4 mCg/mL	mCg/kg/hr
DOBUTAMINE	4 Mg/mL	mCg/kg/min
DOPAMINE	3.2 Mg/mL	mCg/kg/min
EPTIFIBATIDE (Integrilin)	750 mCg/mL	mCg/kg/min
ESMOLOL (Brevibloc)	10 Mg/mL	mCg/kg/min
FENTANYL (Sublimaze)	10 mCg/mL std IV	mCg/hr
FUROSEMIDE	5 Mg/mL	Mg/hr
HEPARIN	100 Unit/mL	Unit/hr
ISOPERTERENOL	4 mCg/mL	mCg/min

DRUG	STANDARD FINAL CONCENTRATION ***For continuous infusion unless listed otherwise***	STANDARD INFUSION RATE UNITS
INSULIN	1 Unit/mL	Unit/hr
LABETALOL	2 Mg/mL	Mg/min
LIDOCAINE	4Mg/mL	Mg/min
MAGNESIUM SULFATE	OB: 0.04 gm/mL (std) CRRT: 0.04 gm/mL (std) IV drip: 0.02 gm/mL	gm/hr
MORPHINE IV (Does not include PCA)	1 Mg/mL	Mg/hr
MIDAZOLAM	1 Mg/mL	Mg/hr
MILRINONE	200 mCg/mL	mCg/kg/min
NESIRITIDE	6mCg/mL	mCg/kg/min
NITROGLYCERIN GLASS ONLY	200 mCg/ml (0.2 Mg/mL)	mCg/min
NITROPRUSSIDE	200 mCg/ml (0.2 Mg/mL)	mCg/kg/min
PROCAINAMIDE	4 Mg/mL	Mg/min
PROPOFOL	10 Mg/mL	mCg/kg/min
VECURONIUM	1 Mg/mL	mCg/kg/min



Indianapolis Coalition for Patient Safety
Standardization of High Risk IV Concentrations and Dosage Units

IMPLEMENTATION CHECKLIST

Ensure to address all items listed below:

PRESCRIBING:

- Formulary/Compendium
 - *Prescriber involvement/agreement
- CPOE and standard order sets
- Override criteria/restrictions for automated dispensing systems
- Manual Transcription

PREPARATION/DISPENSING

- Standard work processes in IV pharmacy
 - *Need to include manual and automated dispensing processes
 - *Need to include staff outside of pharmacy who may also prepare IV medications
- Standardize labeling of high risk IV solutions so the concentration stands out to the reader and overall font size enhances ability to read

ADMINISTRATION

- Dosing ranges and other dose-error-reduction-software (DERS) system changes
 - *Smart Pumps
 - *Bar coding medications

STORAGE/SUPPLY

- Availability of the concentration from the company supplying IV fluids to each hospital
- Removal of stock of IV concentrations no longer to be used and availability of high risk concentrations.
 - *Need to ensure removed from all storage locations (formal and informal)

OVERALL:

- Policies, Procedures, and Protocols
- IT systems, including point-of-care clinical charting, pharmacy dispensing systems, label printing system, medication ordering system, emergency department system, anesthesia system.
 - *Also includes pumps
 - *Need to consider ability to use concentration in each hospital's automated system
- Any references related to standard IV infusion guidelines need to be current and up to date (notebook, hardcopy, electronic, etc.)
- Orientation and preceptor documents to include all training materials and programs.
 - Encourage standardized approach for communicating updates and changes.
- Competency processes, initial and ongoing
- Case studies used in simulations, Advanced Cardiac Life Support, Pediatric Advanced Life Support training, and in-service education
- Evaluate safety culture and environment
- Coordination/inclusion EMS/Lifeline/Transporters
- Establish metrics/monitoring to evaluate implementation