

Standardize 4 Safety: Concentrating on Concentrations

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THAT PATIENT HAS BEEN ME!

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Standardize **Safety**



<https://www.ashp.org/Pharmacy-Practice/Standardize-4-Safety-Initiative>

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Association for the Advancement
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Pediatric Pharmacy
Advocacy Group



Learning Objectives

- Describe how standardization efforts are helping to improve medication management and operational efficiency
- Describe how standardization can be used as an error prevention tool in Anesthesia and across the continuum of care
- Introduce the *Standardize 4 Safety* campaign and its guiding principles
- Discuss results from S4S IV Version 1.01, edit mode of Peds 1.01
- Discuss challenges and questions that have been raised
- Propose how to support campaign initiatives

Why Standardize?



- **PATIENT SAFETY!!!**
- **Transitions of care**
- **Manufacturing**
 - Helps streamline production lines
 - Allows for premixes to be manufactured
 - Longer stability and shelf-lives
 - 503B quality – held to cGMP standards vs. 503A USP <797> requirements
- **Ordering**
 - Fewer choices uncomplicates the sometimes complicated
 - Order-sets can guide to appropriate concentration

Standardize for Operational Efficiencies and Administration Safety

- **Inventory, preparation, dispensing**
 - Less variability to order and stock pharmacy shelves; allows pharmacy to purchase premix solutions when possible
 - Eases burden and potential risks of in-house compounding and the necessity to do calculations on the fly by technicians and pharmacists
 - Can make products more readily available, especially in urgent situations
 - Gives flexibility for syringes, small volume products, large volume products
 - Less compounding for the pharmacy and clinicians – always a good thing!!
- **Administration**
 - Allows for more ready-to-use packaging so no or minimal manipulation at the bedside
 - Decreases use of “wild-cards” and non-standards in drug libraries that typically don’t have safeguards
 - Less programming and touching of pumps (each touch point is a risk)

Back to the Beginning

- **Henry Ford first developed standard work for car production lines in early 1900s**
 - First time standardization used to ensure quality work
- **LEAN concepts carried into the 1950s with the Toyota way**
- **LEAN enters into healthcare in late 1990s**
- **Smart infusion devices enter into the market place late 1990s but robust adoption started 2000, however some hospitals still do not use this technology**
- **High reliability**



ASHP IV Summit 2008

- **The effort to standardize IV concentrations started in 2008 when a multi-stakeholder IV summit was held in Maryland to address preventing patient harm and death from IV medication errors. Three main barriers were identified at the summit:**
 1. Lack of standardization and good process design for IV medications
 2. Lack of shared accountability for safety among members of different healthcare disciplines
 3. High-volume, high-demand environments in which safety may be sacrificed for other priorities

Proceedings of a summit on preventing patient harm and death from i.v. medication errors. July 14-15, 2008, Rockville, Maryland. Am J Health-Syst Pharm. 2008;65:2367-79.

Statement of the Problem

- **Currently, no national consensus for standard concentrations of IV medications (continuous, intermittent, etc.)**
- **Patients are transferred between patient care areas, settings and locations**
 - Within each hospital (e.g., from the OR to the ICU) or to other practice settings (e.g., home infusion and long-term care)
 - Within the same city, or same state
 - Out of state
- **Each time a patient needs an IV medication, there is potential for error if a concentration different from the previous patient care area is used**
- **Often, vulnerable patient populations are involved**
 - Critically ill
 - Pediatric, neonate
 - Geriatric
- **Weight categories**
- **Dosing units (how you talk matters!!)**
- **Special administration – intrathecal, intraneural, etc**

Status of S4S

- Half-way through the project

Done	In process (2017-2018)	Not started (2018)
Phase One, V 1.01 ≥50kg continuous	Phase Two, V 1.02 ≥50kg continuous	Intermittent IV meds
Phase One, V 1.01 compounded oral liquids	Phase Two, V 1.02 compounded oral liquids	
	Phase One, <50kg IV continuous	
	Phase One, standard doses oral liquids	
	PCAs, epidural	

Methods: Guiding Principles for IV

Safety first – use commercial or outsourced products when possible

Try to limit to one concentration when possible

Patient needs/clinical

**Consider concentration relative to fluid status
Use more concentrated whenever possible**

Operational dispensing aspects and steps including waste

Disclaimers

- **Dosing units were derived from:**
 - PI information
 - Commonly used drug-reference guides and clinical practice guidelines
 - Of special note, the expert panel is recommending that weight-based dosing be used for vasopressors (i.e., per kg, per minute), which may differ from institution-specific guidelines
- **These concentrations are guidelines only and are not mandatory**
 - It is the vision of the project that organizations will voluntarily adopt these concentrations and join a national movement to use standardization across the care continuum as an error-prevention strategy for patient safety

Results for IV Version 1.01

≥ 50 kg Continuous Infusions

Version 1.01 Drug List

Alteplase
Amiodarone
Argatroban
Bumetanide
Cisatracurium
Dexmedetomidine
Diltiazem
Dobutamine
Dopamine
Epinephrine
Esmolol
Fentanyl
Furosemide
Heparin
Hydromorphone
Insulin

Isoproterenol
Labetolol
Lidocaine
Lorazepam
Morphine
Midazolam
Milrinone
Nicardipine
Nitroglycerin
Nitroprusside
Norepinephrine
Phenylephrine
Propofol
Rocuronium
Vasopressin
Vecuronium

<https://www.ashp.org/-/media/assets/pharmacy-practice/s4s/docs/s4s-iv-adult-continuous-infusion-guiding-principles.ashx?la=en&hash=2A6F7EBC4296C05E93F46765EE6B19B6ACF70DC8>



Challenges and Questions Along the Way

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Medication Administration Considerations

- **Size of the patient**
- **Type of access**
 - Central
 - Peripheral
 - Open medication line
 - Number of lumens
- **Route**
- **Single lines vs. multiple lines**
- **Attachments like stopcocks, connectors, etc.**
- **IVP vs. continuous vs. intermittent**
- **Dosing units**
- **ICU units that anesthesia covers**
- **Paralytics**
 - Cisatracurium 2 mg/mL
 - Rocuronium 10 mg/mL
 - Vecuronium 1 mg/mL
- **Panel chose straight drug**
 - Use undiluted in the ORs
 - Wanted ICUs to be consistent
- **Use weight-based dosing for pressors**
- **Use flat-dose adult dosing for 50 kg or >**
 - Conversation needed for propofol, fentanyl

Dosing Units: How You Talk and Train Matters

- **Vasopressors**

- Panel recommends weight-based dosing
- Many endogenous
- Highly water-soluble, small molecular weight, little protein binding
- Protocols that are affected
 - ACLS, PALS, sepsis, etc.

- **Paralytics**

- Mcg/kg or mg/kg
- Flat dosing

- **Sedatives**

- Lorazepam/Midazolam: flat-based dosing
- Dexmedetomidine: weight-based dosing
- Propofol: boluses, infusions—have heard both ways used in practice

IV Challenges

- **Differences between the OR and other areas**
 - Paralytics
 - Chose to use straight drug vs. pharmacy compounded infusions
- **Stability data**
 - Some have used just because “we’ve always done it this way”
- **Drug shortages**
- **Other concentrations are needed**
 - Dexmedetomidine, Esmolol, Nicardipine, Hydromorphone
 - Role of pharmaceutical industry
- **Package size mismatches**
 - Example Esmolol
 - Amiodarone

What You Can Do



- **START TALKING!!!!**
- **Be a champion, cheerleader, sponsor**
- **Don't just get buy-in, take ownership**
- **Remember to take an inter-professional approach**
- **Start talking to the informatics team now**
- **Everyone can make a difference**
- **Resources: IPI, Bainbridge Health, ASHP, eBroselow, new potential tools in the pipeline**

What Does the Future Hold?

Flush and dilution practices



Overfill

VTBI

Volume to be Infused

Questions?

Standardize **4** Safety



<http://www.ashp.org/menu/PracticePolicy/Standardize-4-Safety.aspx>

<http://www.ashp.org/menu/AboutUs/ForPress/PressReleases/PressRelease.aspx?id=948>