

2009 CAH Site Visit Summary

Site Visit Strengths

- Medical staff meetings
- 24/7 Pharmacist coverage
- Storage of concentrated electrolytes
- Use of pre-mixed IV infusions
- General Pharmacy organization
- Increased use of unit dose products
- Efficient use of ADC
- Elimination of medication carts
- Focus on clinical improvements
- Removal of heparin 10,000 unit/vials

Site Visit Strengths

- Medication security
- Use of pre-printed medication orders
- Labeling of LA/SA and high-alert meds
- Elimination of Pharmacy “department”
- Medication safety culture
- Focus on Joint Commission NPSG
- Storage and review of contrast
- Therapeutic monitoring of NTI meds

CAH Recommendations

- Continue to enhance medication variance reporting including prescribing errors.
- Engage all hospital staff in medication error reporting.
- Improve physician and hospital administration awareness of medication safety and the value of high volume medication variance reports.
- Implement comprehensive root cause analyses aimed at error prevention and avoiding individual blame.

CAH Recommendations

- Review the nurse double-check policy to ensure review of the original order prior to drug administration and appropriateness of drug selection / dosing and / or pump settings.
- Eliminate the need for nursing to access the pharmacy by optimizing the storage space in the automated dispensing cabinets.
- Review and reduce the list of override medications available to nursing in the automated dispensing cabinets.
- Implement a policy for first order nurse review along with a list of critical elements that need to be checked, especially for high-risk drugs.

CAH Recommendations

- Eliminate medication carts and the cart fill process by increasing utilization of ADC.
- Establish an interface between the ADC and the pharmacy information system to prevent nurse access to medications until pharmacist review has occurred.

CAH Recommendations

- Implement a system that allows pharmacy review of orders 24/7.
- Develop protocols for prescribing of high-risk medications, specifically insulin, heparin, sedatives, and narcotics, which reflect current best practices of glucose control, therapeutic anticoagulation, VTE prophylaxis and pain management.
- Consider greater involvement of Clinical Pharmacist to review prescribing practices, identify areas for improvement, and implement evidence-based guidelines.
- Increase Pharmacy involvement in the monitoring of narrow therapeutic index drugs.

CAH Recommendations

- Increase the availability of unit-dose medications, including blister packs for solid dosage forms as well as unit-dose containers / syringes for liquids.
- Review process for assuring that look-alike/sound-alike, and various doses of high-risk medications drugs are not stored together and labeled appropriately.
- Remove concentrated electrolyte (eg. potassium chloride, potassium phosphate) vials from the Pharmacy/Hospital.

CAH Recommendations

- Implement current IV compounding standards for Pharmacy, including compliance with USP 797 and formal policies and procedures for nurse compounding, especially high-risk medications like insulin.
- Consider upgrade of the Pharmacy information system to provide printed MARs.
- Remove shipping boxes in the Pharmacy.
- Label expired medication boxes in Pharmacy.

CAH Recommendations

- Remove Darvocet and Demerol from the Formulary.
- Substitute insulin pens for vials.
- Improve storage and labeling of neuromuscular blockers (NMB).
- Narrow therapeutic classes in the Formulary and implement a therapeutic substitution program.
- Evaluate the use of fentanyl (Duragesic) patches.

CAH Recommendations

- Consider process to validate allergy information that is reported by patients and to eliminate entries that do not pertain to clinically insignificant or non-immunologic reactions.
- Improve the medication reconciliation process.

CAH Recommendations

- Medication issues in the Operating Room
 - ◆ Do not pre-label syringes
 - ◆ Retain original vials until completion of procedure
 - ◆ Remove expired drugs
 - ◆ Place expiration date on opened multi-dose vials
 - ◆ Security – do not store keys on locked anesthesia carts
 - ◆ Act of temperature variances of medication refrigerator



CAH Recommendations

- Crash carts
 - ◆ Remove expired medications
 - ◆ Ensure consistent use of emergency drug references
 - ◆ Ensure EDR contains strengths for sodium bicarbonate
 - ◆ Utilize ready-to-use syringes instead of vials
 - ◆ Lock crash carts
 - ◆ Use consistent crash cart tray configurations

Weight (kg)	12.5 kg	15 kg	20 kg	25 kg	30 kg	40 kg	50 kg	Dose	Maximum Single Dose
Age	1-2 yr	2-3 yr	4-5 yr	6-7 yr	8-10 yr	11-12 yr	13-14 yr		
ET Tube Size	4.0-4.5	4.5	5.0	5.5	6.0-6.5	6.5	7.0-7.5		
Adrenaline Administer by rapid IV/IO bolus	Conc = 3 mg/mL		Dose						
	0.4 mL	0.5 mL	0.7 mL	0.8 mL	1 mL	1.3 mL	1.7 mL	0.03 mg/kg	4 mL
Atropine Dilute and administer IV/IO over 2-3 minutes	Conc = 0.01 mg/mL		Dose						
	1.25 mL	1.5 mL	2 mL	2.5 mL	3 mL	4 mL	5 mL	0.1 mg/kg	300 mg
Atropine* Administer IV/IO	Conc = 0.1 mg/mL		Dose						
	2.5 mL	3 mL	4 mL	5 mL	6 mL	8 mL	10 mL	0.02 mg/kg	1 mg
Calcium Chloride 10% Administer IV/IO very slowly (1 mL/min)	Conc = 100 mg/mL		Dose						
	2.5 mL	3 mL	4 mL	5 mL	6 mL	8 mL	10 mL	0.2 mg/kg	1000 mg
Dextrose 10% Dilute 1:1 with sterile water Administer IV/IO	Conc = 0.5 g/mL		Dose						
	12.5 mL	15 mL	20 mL	25 mL	30 mL	40 mL	50 mL	0.5 g/kg	80 g
Ephedrine 1:10,000 (Syndr) Administer IV/IO	Conc = 0.1 mg/mL		Dose						
	1.25 mL	1.5 mL	2 mL	2.5 mL	3 mL	4 mL	5 mL	0.01 mg/kg	1 mg
Ephedrine 1:1,000 (Vial) Administer per ETT only	Conc = 1 mg/mL		Dose						
	1.25 mL	1.5 mL	2 mL	2.5 mL	3 mL	4 mL	5 mL	0.1 mg/kg	10 mg (ETT)
Lidocaine Administer IV/IO	Conc = 20 mg/mL		Dose						
	0.6 mL	0.75 mL	1 mL	1.25 mL	1.5 mL	2 mL	2.5 mL	0.05 mg/kg	5 mL
Magnesium Sulfate Dilute and administer IV/IO over 20 minutes	Conc = 100 mg/mL		Dose						
	0.8 mL	1.0 mL	1.3 mL	1.6 mL	2.0 mL	2.5 mL	3.0 mL	0.05 mg/kg	4 mL
Morphine (oral reverse) Administer IV/IO/ETT	Conc = 0.4 mg/mL		Dose						
	1.25 mL	1.5 mL	2 mL	2.5 mL	3 mL	4 mL	5 mL	0.1 mg/kg	2 mg
Morphine (oral reverse) Administer IV/IO/ETT	Conc = 0.4 mg/mL		Dose						
	0.3 mL	0.4 mL	0.5 mL	0.6 mL	0.8 mL	1.0 mL	1.2 mL	0.01 mg/kg	0.2 mg
Sodium Bicarbonate 8.4% Dilute 1:1 with sterile water Administer IV/IO	Conc = 1 mg/mL		Dose						
	12.5 mL	15 mL	20 mL	25 mL	30 mL	40 mL	50 mL	1 mg/kg	50 mL
Vanopressor* Administer IV/IO	Conc = 50 mg/mL		Dose						
	0.5 mL	0.6 mL	0.8 mL	1 mL	1.2 mL	1.6 mL	2 mL	0.4 mg/kg	40 mg

*Morphine used vasoactively may be administered via ETT at 2-2.5 times IV/IO dose. Desflurane 2 Joules/kg. Sevoflurane 0.6 Joules/kg

Initial by Date: _____ Rechecked by Date: _____ Patient Name: _____ Patient Medication #: _____

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Weight (kg)		7.5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	40 kg	50 kg	Starting Dose
Ambesone IV Infusion Vial conc = 50 mg/mL		Add 100 mg (2 mL from 50 mg/mL vial) to 100 mL D5W								
	Starting Infusion rate (mL/hr)	6.3	7.5	10	12.5	15	20	25		0.5 mg/kg/hr
	1 mL/hr = (mcg/kg/hr)	0.58	0.77	0.95	0.94	0.95	0.925	0.92		
Dobutamine IV Infusion Vial conc = 12.5 mg/mL		Add 100 mg (8 mL from 12.5 mg/mL vial) to 100 mL D5W or NS								
	Starting Infusion rate (mL/hr)	7.5	9	12	15	18	24	30		10 mcg/kg/min
	1 mL/hr = (mcg/kg/min)	1.5	1.1	0.85	0.67	0.65	0.4	0.35		
Dopamine IV Infusion Premixed bag on cart		Premixed dopamine 500 mcg/mL bag on crash cart								
	Starting Infusion rate (mL/hr)	9.4	11.3	15	18.8	22.5	30	37.5		10 mcg/kg/min
	1 mL/hr = (mcg/kg/min)	1.1	0.99	0.67	0.69	0.44	0.39	0.27		
Epiapine IV Infusion Vial conc = 1 mg/mL		Add 0.8 mg (0.8 mL from 1 mg/mL vial) to 100 mL D5W or NS								
	Starting Infusion rate (mL/hr)	4.7	5.6	7.5	9.4	11.3	15	18.8		0.05 mcg/kg/min
	1 mL/hr = (mcg/kg/min)	0.01	0.009	0.007	0.005	0.004	0.003	0.003		
Microepinephrine IV Infusion Vial conc = 1 mg/mL		Add 0.8 mg (0.8 mL from 1 mg/mL vial) to 100 mL D5W or NS								
	Starting Infusion rate (mL/hr)	4.7	5.6	7.5	9.4	11.3	15	18.8		0.05 mcg/kg/min
	1 mL/hr = (mcg/kg/min)	0.01	0.009	0.007	0.005	0.004	0.003	0.003		
Vanopressin IV Infusion Vial conc = 20 units/mL "PANTOPRESSIN"		Add 40 units (2 mL from 20 units/mL vial) to 100 mL D5W or NS								
	Starting Infusion rate (mL/hr)	1.9	2.3	3	3.8	4.5	6	7.5		1 millunit/kg/min
	1 mL/hr = (millunit/kg/min)	0.5	0.4	0.3	0.27	0.22	0.17	0.13		

Use the following equation for drip situations:

$$\frac{\text{Dose ordered by prescriber}}{(\text{1 mL/hr} = \text{mg/min in above table})} \times \text{1 mL/hr} = \text{mL/hr to deliver ordered dose}$$

Example Problem:
 25 kg child, physician orders epinephrine 0.05 mcg/kg/min

$$\frac{0.05 \text{ mcg/kg/min}}{0.005 \text{ mcg/kg/min}} \times \text{1 mL/hr} = 6 \text{ mL/hr (use infusion rate to deliver 0.05 mcg/kg/min for a 25 kg child)}$$