Ventura County Medical Center/Santa Paula Hospital
High Alert Medications
2015 -2016

Drug Class and Medication	Selection/ Procurement	Storage	Ordering Verifying and Transcribing	Preparing or Compounding	Administration	Monitoring
Antibiotics						
Aminoglycosides and Vancomycin	Purchased by pharmacy in vials intended to be further diluted to patient specific doses. Not currently available in pre-mixed products.	Stored within the pharmacy until time of dispensing. Not supplied in the ADCs. Vancomycin 1gm per 250mL "plug-ins" are available in SPH ADCs.	Prescribers to use the approved PowerPlan with monitoring and drug level instructions built into the order set. Pharmacists to verify orders and double check calculations and patient's renal function. Pharmacist to monitor the patient using approved monitoring form.	All doses are compounded by the pharmacy department in patient specific doses.	Nursing to ensure safe administration rates by using the programmable pumps and safety feature guardrails.	Monitoring of the patient's SCr or changes in the SCr, drug levels or troughs and infusion related reactions such as Redman Syndrome associated with Vancomycin at a rate greater than 1gm per hour.
Anticoagulants						
ORAL Anticoagulants **Warfarin**	Warfarin purchased in the following unit dosed strengths of 1mg, 2mg, 2.5mg, 5mg and 7.5mg.	Stocked in ADCs on most units.	Prescribers to use approved PowerPlan To ensure proper labs and monitoring is ordered	Oral agents are unit dosed and supplied in the ADCs	Warfarin is administered daily at 1400. A baseline INR must be obtained prior to initiation. INR monitoring will continue daily until goal levels are achieved and then INR levels can be obtained at least twice a week.	Monitor INR, signs and symptoms of bleeding. Use the protocol and Vit K to reverse the effects of Warfarin.
Novel (Target-Specific) ORAL Anticoagulants **Dabigatran** **Rivaroxaban**	Formulary Restricted	Not stocked in the pharmacy	Pharmacist to log a Clinical Intervention in the EMR and contact the physician	Patient may use own medications from home if approved and ordered by prescriber		Monitor for symptoms of bleeding, many of these agents have **NO** reversal agents

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Direct Thrombin Inhibitors (DTIs) **Argatroban**	Purchased by the pharmacy department with careful consideration to avoid LASA confusion whenever possible, in single dose vials.	Stored in the Department of Pharmacy only. Not to be stored in the automated dispensing cabinets.	Argatroban use requires the prescriber to use the powerplan or pre-printed order form for prescribing. CPOE requires the patients current weight and serum Coag panel (baseline PTT), and liver function tests be completed prior to processing or entering orders for DTIs	Argatroban is compounded by pharmacy in standard a concentration of 1mg/mL for adults (250mg/250mL)	Argatroban requires an independent double check and documentation on flow sheet with 2nd licensed HCP for initial settings, all subsequent rate changes, and/or stopping/starting drug. Use programmable pumps with guardrail safety feature	Monitor PTT, CBC, CMP, Coag and weight routinely. Dosage adjustments required in patients with hepatic impairment.
Low Molecular Weight Heparin **Enoxaparin (Lovenox®)** **Factor Xa Inhibitor** **Fondaparinux (Arixtra®)** *Restricted for use in HIT*	Purchased by Pharmacy Department with careful consideration to avoid LASA confusion whenever possible, in single dose pre-filled syringes.	Pre filled syringes are stored in the pharmacy and in the automated dispensing machines.	Use CPOE Powerplans or pre-printed order forms when ordering therapeutic doses of LMWH, and fondaparinux. Baseline SCr and PLT are required. Doses must be adjusted for renal insufficiency	Standard pre-filled syringes of 30, 40, 60, 80, 100, 120, 150 mg syringes available on the VCMC/SPH formulary. Standard pre-filled syringes of fondaparinux in 2.5, 5, 7.5 and 10 mg. Pharmacy compounds the exact dose in syringes for the pediatric and neonatal population.	Requires independent double check and documentation with 2nd licensed HCP	Monitor platelets, HGB, HCT and SCr routinely. Adjust dose for renal impairment. Monitor patient for bleeding. Lovenox is contraindicated in HIT. See protocol for additional parameters

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Heparin Infusions	Purchased by Pharmacy Department with careful consideration to avoid LASA confusion whenever possible, in single dose vials and pre-filled syringes. Multi dose vials of heparin are limited to use mainly in the pharmacy for compounding and are treated as single dose vials.	Stored away from products and look- alike vials that may be mistaken for heparin. Maximum concentration available is 5000 units/ml.	'Units' must be written out. The use of "U" for units is prohibited. Current patient's weight must be available in kg prior to initiating Heparin. CPOE requires the use of an approved powerplan or pre-printed order form (in the event of a downtime) for ordering Heparin drips.	Standard concentration of heparin infusion used in adults of 25,000 units/500 mL (50 units/mL). Only one concentration permitted for treatment and prophylaxis. A 1000 units/500mL solution is available for arterial lines in ER, ICU, OR.	Heparin Infusions require an independent double check and documentation with 2nd licensed HCP for initial settings and w/ rate changes, and/or stopping/starting drug. A Heparin flow sheet will be used to document all heparin titrations in the EMR. Heparin is infused with a Programmable pump with a guardrail safety feature.	Refer to Heparin Policy and protocol for daily labs, timing of PTT lab draws and rate related titrations. Monitor for bleeding, patient's CMP, CBC and Coags, watch for signs and symptoms of HIT or Heparin Induced Thrombocytopenia with decreased platelets.
Heparin Flushes for Pediatric Patients	Purchased and stored separately in the pharmacy to avoid LASA storage issues. Standard concentrations purchased are: 10 units/mL 3mL PFS 100 units/mL 5mL PFS	Preservative free heparin stored in NICU, PICU and PEDS only. Heparin vials, PFS and flushes are available in the ADC.	A standardized and approved Pediatric CVC Line care and flushing order is used when ordering flushes that require heparin. The 10 unit/3mL Heparin Flushes will be labeled as HIGH ALERT prior to dispensing.	Standard Heparin flushes are approved for pediatric use are available in premixed, prefilled syringes ready for use by the manufacturer.	All medications administered within the Neonatal and Pediatrics Units are by policy independently double checked by two HCP, prior to administration.	All lines flushed with heparin will be monitored for patency and signs of bleeding

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Antidiuretic Hormone						
Desmopressin (DDAVP) **SQ and IV infusion**	4 mcg/mL single dose vials	Stored in the pharmacy department under refrigeration.	Prescribers ordering and dosing for SQ or IV Desmopressin will only be accepted in "mcg" only. Pharmacist verifying SQ DDAVP orders will ensure all doses are dispensed and labeled dose in "--- mcg = ---mLs". Pediatric Population: Verify dose for age in mcgs, weight in kg and diagnosis	Pediatric Population: All DDAVP SQ orders will be drawn up and labeled by pharmacy using a 1mL syringe. Adult Population: All doses will be drawn up by nursing using an appropriate syringe.	IV infusions can be administered over 15 to 30 minutes. In both young and elderly patients, it may be a requirement to limit fluid intake to decrease the potential occurrence of water intoxication and hyponatremia.	Monitor BP and HR during infusions. Also monitor Na levels, and patient for possible fluid overload, monitor Intake and Output and notify Provider for decreased renal function. DDAVP is contraindicated for CrCl of <50 mL/min

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Antifungals						
Amphotericin B and Amphotericin B Liposomal (AmBisome®)	Two products purchased only, conventional Amphotericin B in a 50mg vial for reconstitution which is stored in the refrigerator and AmBisome® (Amphotericin B Liposomal) also in a 50mg vial for reconstitution. Storage for the liposomal product is at room temperature in the antibiotic section. These two drugs have a look-alike sound-alike warning stickers.	Amphotericin B is stored in the pharmacy department under refrigeration. AmBisome® is stored at room temperature. Storage within the pharmacy is separated to avoid LASA mix-ups.	These products are **NOT** bioequivalent, therefore, careful dosing and reassessment is need if switching between products to prevent accidental overdose. Dose adjustments are needed in renal impairment, consider an increase in frequency from daily to q36hrs. Amphotericin B conventional dose should not exceed 1.5mg/kg/day AmBisome®, Amphotericin B Liposomal dose is between 3 - 5mg/kg/day	Pharmacy compounded products are carefully verified for accuracy of dosing. Compounding of lipid complex, the vial is gently agitated until all yellow sediment is dissolved. A 5-micron filter is used with each vial injected.	Daily doses are infused over 2-6 hours. Rapid infusions may cause hypotension, hypokalemia, arrhythmia, and shock. Must be administered using a programmable pump with the guardrail safety feature. May require pre-meds to decrease infusion related reactions. **AmBisome®, Amphotericin B Liposomal infusions: Do NOT use an inline filter.**	Monitor for signs and symptoms of nephrotoxity. Monitor the patient's I&Os and SCr. Observe the patient for infusion related reactions which may include fever, chills, hypo or hypertension and tachycardia. Notify the prescriber of all side effects.

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Chemotherapy Agents						
Chemotherapy Agents	Procured by the Infusion Center Pharmacy Department. Segregate look-alike/sound-alike chemotherapy drugs.	Stored only in the Infusion Center Pharmacy Department Limited amounts of oral chemotherapy drugs and Methotrexate inj is stored in the Main inpatient pharmacy	Use approved pre-printed orders or Powerplans when ordering chemotherapy. Patient's current height, weight and BSA must be available prior to any orders. Do not use abbreviations.	Only trained personnel to prepare chemo drugs. Independent double check of maximum dosage using patient's BSA will be performed.	Requires independent double check and documentation of order, calculation of final product with 2 licensed HCP at the bedside and in the eMR. Use programmable pumps with guardrail safety feature. Consult Chemo Pharmacist if duration of infusion time needs to be adjusted.	Verify labs prior to treatment. Documented regimen cycles to be completed. Monitor patient for adverse drug reactions and report any ADRs noted
Chemotherapy Drugs PLATIUM (carboplatin and oxaliplatin)			Ordered on pre-printed order forms or Powerplans with hypersensitivity orders build into the order sets			Monitor for hypersensitivity reactions especially during Cycle 5 and beyond

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Electrolytes						
Calcium Gluconate **Calcium Chloride**	Calcium salts purchased by the Pharmacy Department with careful consideration to avoid LASA confusion whenever possible. Calcium Chloride is procured in prefilled syringes. Calcium Gluconate procured in the vial form.	Calcium Chloride is stored in adult and pediatric crash carts. Calcium Gluconate is available in the NICU crash carts, pharmacy, ICU, DOU, and in 3N. Calcium is also available in L&D in toxemia kits, dialysis box and other kits and transport boxes.	Specify the salt form of calcium. Order in milligram of Calcium Gluconate or Calcium Chloride. Do not order calcium in milligrams of elemental calcium. Do not order as "IM" or "SQ" routes of administration, always order as "IV."	Diluted by the pharmacy 1:1 with normal saline for all Calcium Gluconate orders in NICU for a concentration of 50 mg/mL.	See Adult IV guidelines for restricted use. Give by slow IV infusion using a programmable pump with guardrail safety feature.	Monitor for calcium – phosphate interactions in TPN solutions. Monitor any reports of burning sensation or tissue necrosis due to calcium administration. Monitor serum Calcium and Phosphate levels.
Hypertonic Sodium Chloride Solutions	Only the 3% Hypertonic Saline is available commercially.	Stored only in the pharmacy.	Orders must specify rate of infusion, duration of therapy and frequency of sodium monitoring.	Only 3% Hypertonic Saline is available commercially. 2% Hypertonic Saline is compounded by pharmacy	Requires independent double check and documentation with 2nd licensed HCP. Must be administered using a programmable pump. • 3% only via Central Line • 2% preferred Central Line, but can be administered peripherally	Serum Sodium levels monitored according to clinical indications – consult with prescriber or refer to the physician's order

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Magnesium Sulfate	Purchased in the 1 gm single dose vials, 5gm and 10 gm vials are stored within the pharmacy department **ONLY** for **PN** compounding purposes. Pre-mixed IV infusions of 4gms/100mL, 2gms/50mL, and 20gms/500mL are also purchased.	Pre-mixed diluted Magnesium IVPB is available in selected ADC of ED, ICU, DOU and OB.	Magnesium must NOT be abbreviated to avoid LASA mix-up with Morphine Sulfate. Orders will be standardized to order full grams of magnesium.	Standardized magnesium concentrations are premixed; 1gms/25mL, 2gms/50mL, 4gms/100mL, And 20gms/500mL	Infuse per Adult IV guidelines. Infusion of Magnesium is required to be on a programmable pump with guardrail safety feature.	Monitor serum magnesium levels, watch for hypotension, hypocalcemia, hypophosphatemia and hyperkalemia. Monitor for impaired cardiac function
Potassium Chloride	Procured by Pharmacy Department with careful consideration to avoid LASA confusion whenever possible. Undiluted solutions are locked in the department and are NOT stored outside the department.	Pre-mixed (diluted) KCl available on nursing floors. Concentrated K products located in the pharmacy department **ONLY.**	Do not order as bolus. Order only standardized K-rider doses and concentrations for both Central line administration as well as Peripheral line administration.	Only pre-mixed or standardized concentrations will be compounded and dispensed	Must be administered using a programmable pump with guardrail safety feature. Max Rates, Do not exceed: • 10 mEq/hr on Med/Surg • Pediatrics 0.5 mEq/kg/hr – with 10 mEq/hr max • 10 mEq/hr on ANY peripheral line • 20 mEq/hr on a Central Line AND with a Cardiac Monitor	Monitor serum potassium levels with a CMP. Contact MD for orders exceeding a rate over 10 mEq/hr of KCl on Med/Surg floors.

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Potassium Phosphate Injection	Procured by Pharmacy Department with careful consideration to avoid LASA confusion whenever possible. Undiluted solutions are locked in the department.	Concentrated KPhos solutions stored only in pharmacy and must be diluted before use	KPhos riders rate of administration is based on the phosphate component.	Only standardized concentrations will be compounded and dispensed	40 mEq = ˜30mmol Maximum rate of infusion for phosphate is 10mEq/hr or 7.5mmol/hr	IV Phosphate replacement indicated for phos levels less than 1.0 mg/dL, monitor serum phosphate and calcium levels with a CMP.
Hypoglycemic Agents						
Hypoglycemic Agents ORAL	Restricted in the inpatient setting	Stored within the pharmacy with LASA precautions	Pharmacists verifying the order will ensure restriction criteria are met prior to dispensing	Oral agents are available in unit dosed packaging	Nursing to ensure bar code administration	Monitor for signs and symptoms of hypoglycemia especially in the elderly or those with ESRD

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Hypoglycemic Agents INJECTABLE **Insulin SQ and Infusions**	Purchased by the pharmacy department. Segregated from other Look Alike-Sound-Alike insulin products during storage.	Stored in automated dispensing machines as a MDV Vial for initial doses but treated as a SDV. All MDV vials will be labeled with a 28 day expiration date and patient information when dispensed from the pharmacy for one specific patient use.	Do not use the abbreviation "U" when ordering insulin, units must be spelled out. If a telephone order is taken, read back the order. Do not place slash when ordering NPH and regular insulin. CPOE for insulin, both SQ and insulin infusions require the use of approved Powerplans or pre-printed orders (in the event of a downtime) that include clear orders for the treatment of hypoglycemia defined as a BG <70mg/dl.	Use only U-100 insulin. Do not draw insulin in TB syringes. Do not give NPH or any type of insulin suspension as an IV. All IV Insulin infusions of **REGULAR** insulin are compounded in a single standard concentration for adults (1 unit/mL).	Requires independent double check and documentation with 2nd licensed HCP on the dose being administered (IV and SQ) as well as initial infusion, dose adjustments, and bolus doses for IV route. Must use programmable pump for Insulin infusions. Glucommander software is mandatory for all Insulin infusions requiring nurse titrations in adult patients. **Replace all insulin drips daily at 1700, In the NICU, at 1600**	Monitor patients BG according to physician's order. Monitor use of Dextrose 50% and patients with Blood glucose levels < 70 mg/dl. Monitor inappropriate use of "U" instead of "units" in orders for insulin **Note:** For IV Insulin infusions monitor patient's BG per Insulin Infusion Software

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Neuromuscular Blocking Agents (NMBA)						
Neuromuscular Blocking Agents (NMBA)	Purchased by the Pharmacy Department with careful consideration to avoid LASA confusion whenever possible.	Stored in special locked intubation kits in the ICU, ED and L&D. NBA products may be stored out of the refrigerator such as in OR, with an expiration date of 14 days. Refrigerated, locked intubation kits are in ICU, DOU, 3N, 2W, OB, 4N and PICU.	Do not refer to neuromuscular blockers as "relaxants"	Use standardized drip concentrations only. See ICU Adult IV guidelines. Pharmacy to dispense vials within locked kits with warning sticker "Caution Neuromuscular Blocking Agent"	Stipulate neuromuscular blockers are to be discontinued when patient is extubated and removed from the ventilator. Use a programmable pump for NBA IV infusions.	Check reflexes. Motor/sensory responses.
Opioids						
Opioids (i.e., Morphine and Hydromorphone)	Purchased by the Pharmacy Department with careful consideration to avoid LASA confusion whenever possible.	Stored in secure locked storage areas and ADCs, with the LASA syringes separated	The abbreviation "MS" is not accepted for Morphine. Use lower recommended starting doses in opiate naïve patients. Pre-approved Powerplans or subphases are required for all PCA orders.	Monitor patient on PCA per policy. Standardize concentrations are purchased or prepared by the pharmacy.	Requires independent double check and documentation by 2 Licensed HCP for all PCA settings including initial dose, rate changes and syringe changes. Naloxone must be available in all ADCs and crash carts as a reversal agent.	Vital signs recorded. Monitor patient for signs and symptoms of over sedation.

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Continuous Opiate and Narcotic Infusions for Palliative Care	Purchased by the pharmacy department.	Prepared in the pharmacy on demand.	"MS" is not an accepted abbreviation for morphine. Pre-approved Powerplan is required for all Palliative Care orders	Use standard concentration of morphine and hydromorphone.	Titrate per MD's orders base on parameters	Monitoring and vital signs per MD orders. Watch for over sedation
Parenteral Nutrition Solutions						
Parenteral Nutrition (PN) Solutions	Base solution and ingredients purchased by the Pharmacy Department with careful consideration to avoid LASA confusion whenever possible.	Ingredients stored in pharmacy with concentrated electrolyte sections.	NICU TPN orders are computer generated, signed by the physician or NNP and faxed to the Pharmacy by 1100 daily. All other TPNs are ordered using pre-printed order forms and are delivered to pharmacy by 1100 for processing daily.	Pharmacist to perform a manual check of all additives prior to injection into final product. Including a visual inspection of the final product.	Nurse to Nurse verification with comparison of TPN label against original order. **Replace all TPN's daily at 1800; RN's to administer bags with Multi-Vitamins first.**	Monitor blood glucose for hypo or hyperglycemia. Monitor electrolytes and nutritional requirements daily.
Thrombolytics						
Thrombolytics **Alteplase*** **Reteplase** **Alteplase 2mg or (CathFlo®) is **NOT** High Alert*	Purchased by Pharmacy Department	Alteplase Stored in pharmacy and in the ED ADC Reteplase stored in the pharmacy and in the ED ADC at VCMC and SPH.	Requires a current patient weight in kg. Prescriber to dose in mg as a total dose, using the pre-approved Powerplan. Inclusion/Exclusion criteria to be reviewed prior to ordering.	The vials should **NOT** be shaken or agitated during preparation. Pharmacy to compound bolus syringe and remaining dose of Alteplase for ED and ICU at VCMC. SPH ED to prepare needed doses in emergent need.	Requires independent double check and documentation with 2nd licensed HCP for calculations, MAR documentation, plus visualization of drug and syringe if RN prepared in SPH ED. Alteplase must be administered using a programmable pump with guardrail safety feature.	Per clinical practice guidelines and Stroke Protocols.

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Titratable Drips						
Titratable Drips for Adults	Purchased and dispensed by the Pharmacy department in premixed solutions and in standardized concentrations whenever possible.	Stored in the pharmacy and in ADCs in ICU and DOU nursing units.	Standardized ordering via CPOE using approved PowerPlans. Pharmacist verification includes titration parameters and hold order information.	Drips not available in the premixed concentrations will be compounded by the Pharmacy Department. Drips to be labeled with colored drip identifiers to help reduce LASA mix-ups prior to dispensing.	All titratable drips require the use of the pump with the safety guardrail feature using the ICU or DOU profile	Monitoring parameters must be indicated on the order with Nurse driven titrations as outlined in the CPG for Titratable Drips.

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